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Oil, Economic Growth and Structural Change In the Libyan Economy: 1960-1990.

By

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Abstract

The subject of this study is the influence of an oil boom on the economic growth and structure of a open small economy with reference to Libya following the discovery of oil. The relevant theoretical literature is based upon the Dutch Disease theory.

After a survey of the literature upon this theory, the study investigates the economic growth and structural changes which occurred in the Libyan economy during the three decades to 1990. The analysis is conducted within a time-frame composed of three distinct periods: these are the pre-boom period, the boom period and the post-boom period.

Historical trends depicted within these periods show that the Libyan economy had undergone several fundamental structural changes and that the biggest of these took place during the oil price shock period between 1973-1982. The investigation examines Libya's experience of sectoral shifts and the performance of the agriculture and manufacturing sectors under booming conditions. It is shown that in both these sectors booming conditions brought about rapidly increased demand, relative price changes and change of technical conditions of production. These in turn led to rapid expansion in the manufacturing sectors share within the total tradables output combined with a decline in the share for agriculture. The study demonstrates that the fall in the share of agriculture was the result of fast industrialisation rather than the Dutch Disease effect.

In general the study reveals that speedy growth of oil export revenues was associated with high investment and economic activity in commodity producing sectors (manufacturing and agriculture) and that the period of slump in oil revenues had coincided with slower growth and lower investment in these sectors. The study's main finding is that the problems encountered in the Libyan economy were not those predicted by the Dutch Disease but that they were more directly connected with the efficiency of investment and government strategy toward the industrialisation process.

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CHAPTER I
INTRODUCTION

Introduction

The purpose of this study is to examine the influence of an oil boom on the economic growth and structural change of an open small economy with reference of Libya over the three decades to 1990.

The study is based theoretically on the Dutch Disease Theory. The phenomenon of the Dutch Disease has drawn the attention of a number of economists from both developed and developing countries. It is commonly described as de-industrialisation as a result of oil windfalls. It derives its name from the experience of the Dutch economy following the discovery of North Sea gas in the late 1960,s. This initial addition to national wealth, paradoxically, appeared to have led to high adjustment costs in the rest of the economy and to structural problems which had an adverse impact on medium and long term growth and the national welfare. Since then there has been a considerable amount of theoretical and empirical work done on the subject for advanced countries, including the UK and the Netherlands, as well as for developing countries.

However, the Dutch Disease does not merely refer to the problem of de-industrialisation, but also to the decline of the share of the tradable sectors (both manufacturing and agriculture) in GDP in response to exogenous windfalls, typically from oil exports. [1]/

According to the classical model, the main mechanism through which the Disease occurs is the real appreciation of the exchange rate (i.e., an increase in the price of non-tradables relative to that of tradables). The real appreciation is caused by the asymmetry between the tradable and non-tradable sectors in their response to an increase in demand. As the windfall income fuels domestic demand, the markets for tradables adjust by increasing imports, and the price of tradables remains constant and equal to its international level. On the other hand, with the assumption of full employment, the markets for non-tradables

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[1]/ For various case studies and policy discussion see, for example, Barker and Brailovsky (1981), Blackaby (1979), Gelb and Associated (1988)

can only adjust through increasing prices. The final result, as non-tradables become more profitable, is that resources shift to the production of them and, consequently, the relative size of the tradable sector in the economy declines. A second important mechanism of the Disease is that, due to the surge in demand and economic activity, the cost of factors of production (including labour) increase, leading to the eventual crowding-out of the tradable sectors.

There are three main reasons for such a set of changes to be described as a disease. First, if the windfalls are temporary, and if it is believed that tradables, particularly manufacturing, once left to decline will not be able to smoothly regain their competitiveness and expand again, it follows that when the windfalls decline, the economy will not be able to export enough tradables to finance the amount of imports sufficiently to maintain full employment and sustain growth. Furthermore, the continuous shifts of resources between the different sectors and the sequential expansion and contraction of these sectors in response to temporary booms and busts, can result in considerable reallocation and frictional costs. The volatility of relative prices will also create an environment of severe uncertainty that will necessitate high risk premia which will reduce investment to a sub-optimal level.[2]/ Secondly, by allowing the tradable sector to decline, the economy will become more vulnerable to external shocks because it will be at the mercy of factors affecting the international price of oil and the demand for it. Thirdly, manufacturing is believed by many economists to be subject to increasing returns and to produce various positive externalities, including the creation of linkages and the dispersion of technological progress, innovation and dynamism in the whole economy. Allowing de-industrialisation, it seems therefore, would deprive the economy of these positive externalities.

[2]/ Such volatility of demand and relative prices due to the spending effect of the Disease need not exist under two conditions. First, the consumption is determined by permanent rather than temporary income and it is known with certainty how much this permanent income is. Secondly, international financial markets are perfect, so that domestic agents can engage with the outside world in saving and borrowing in order to smooth short-term income fluctuations It is doubtful, however, that these conditions materialise in the real world specifically, in developing countries.

This thesis is the first study of its kind that comprehensively examines the topic in the context of Libya. It empirically investigates the magnitude and sources of the Dutch Disease and the mechanisms through which it would be transmitted into the rest of the economy. In other words, the study documents an era of rapid sectoral shifts in the economic history of Libya but it should be noted that this study is positive and not normative. However, it provides some of the positive analysis required for the full normative analysis of policies used by industrialising economies benefiting from favourable exogenous shocks.

The study also highlights the main limitation aspects of the Model in analysing the experiences of booms, especially when it is applied to industrialising economies. These limitations have centred around three issues. First, the short-to-medium term nature of the Model analysis does not accommodate important inter-temporal issues of adjustment. That is, in most economies that benefit from booms, the cost of adjustment to non-booming conditions has proven to be very high. This is especially true if the boom is temporary and the economy adjusts to the boom as recommended by the Dutch Disease advocating theoreticians. Second, the Dutch Disease Models behaviour of private agents only, while a significant proportion of the boom windfall accrues to the public sector. This constitutes an oversight given that government would play an important role in reallocating economic resources either directly through directing the investment policies and controlling the spending behaviour or indirectly through fiscal and monetary polices. Third, the Model has also been criticised for its assumption of full employment when the case is more usually that most developing economies are far more likely to have an excess supply of labour in the pre-boom period, which can neutralise the resource movement effect.

In addition to these considerations, the study attempts to extend the critique into other analytical areas, mainly, that of the dynamic analysis and the effect of changes in the structure of demand on sectoral output. The static nature of the Dutch Disease analysis does not take into account the impact of productivity growth on resources allocation and, consequently on the structure of production. Since productivity differentials between sectors are an essential cause of sectoral shifts on the supply side, ignoring them is therefore a serious oversight of the Dutch Disease Model. Equally importantly, changes in the demand patterns that might be induced by the booming conditions, would also directly change the structure of production. In developing economies particularly those experiencing booming conditions, demand patterns can change in three different ways. First, as per-capita income rises, the share of manufactured goods in total expenditure tends to grow at the expense of that of agricultural ones. Second, expenditure on investment goods will rise as economic activity increases. Third, if the boom is regional, as was the case of Libya and other Middle Eastern oil-exporting countries, demand for the country's exports may change.

It should be noted that the demand aspect of the critique becomes important only when dynamic aspects of growth and structural change are taken into consideration. Otherwise, such changes would produce the same results predicted by the Dutch Disease Model since the only important variable in such cases would be the new structure of price. Any change in demand for tradables can be met through imports, whose prices are lower under booming conditions than otherwise.

The elaboration of these points of criticism in the body of the thesis assists in establishing an alternative analytical approach to investigate the impact of booms on an economy. This alternative approach has three main stands. First, in challenging the Theory's assumptions of model macro-equilibrium with full employment, perfect factor markets, fixed national stock of both capital and labour and the immutability of technical conditions of production. Second, it uses the two mechanisms of the resource movement effect and the spending effect to examine the boom effect on changing relative prices. Third, taking into consideration the new structure of prices and demand, productivity analysis is conducted to show the impact of booming conditions on changing the technical conditions of production and thus on the profitability of the traded sectors.

In general, the thesis attempts to shed light on important structural features of the Libyan economy during the last three decades. These have important policy implications for economic performance and development. Looking at all the above issues in the context of Libya and bearing in mind the experiences of other developing countries, the thesis also attempts to contribute towards a better conceptual and practical understanding of the Dutch Disease Model and its application to developing countries.

In studying the above issues, the thesis compiles an economic data set for Libya, a large part of which is constructed from widely dispersed raw data. The data set embraces the period 1962-1990 and includes the structure of nominal and real GDP, domestic absorption, investment components both in macro and sectoral levels, external trade and the balance of payments. This task was carried out with care, and the sub-sectors were cross-checked in order to maintain strict accuracy. Also a field study for gathering data about the manufacturing sector has been carried out. The information obtained from this survey was carefully treated and cross-checked too.

Libya is a particularly good case for the study of these issues. It is a small-sized developing country which embarked on an import-substitution industrialisation programme before exporting an enormous oil-related boom in the early 1970's. After almost a decade, the boom turned into bust and the economy faced serious difficulties. The country is now implementing an unannounced structural adjustment programme. In the meantime capital inflows, mainly oil revenue, declined sharply after the early 1980's and created the risk that the decline may have intensified and complicated macroeconomics management further.

During the Seventies, and the early Eighties, as has been indicated, the Libyan economy enjoyed a stream of windfalls (oil exports) whose contribution amounted to 99% of GDP and 88% of merchandise exports in some years. In the same period certain non-liberalisation measures were introduced, including the enhancement of state monopoly on foreign trade and the increase of its intervention in various aspects of the economy. During that period, the Libyan economy was one of the fastest growing economies in the world, with an average real GDP growth of almost 13% per annum. However, it can be argued now that the boom was a wasted opportunity and that the windfalls revenue was not utilised in a way that would have promoted alternative sources of exports and created sustained growth. The impressive growth rate of that period concealed serious adverse developments, one of which was the decline in the share of tradables in GDP from 17.4% in the early 1970's to 11.5% in the early 1980's. The share of agriculture in non-oil GDP declined by almost 10% over the boom period and that of manufacturing stagnated over almost the whole boom period. By the end of the boom, the Libyan economy was still depending on oil exports to cover its imports despite the remarkable increase in non-oil exports.

Not surprisingly, when oil prices collapsed in the early 1980's, so did the growth rate. By the late 1980's per-capita GDP had declined and the external financial position became critical. The Government found great difficulty in financing the most basic imports. The situation was saved by liberalising the internal and external trade.

The rest of this thesis is organised as outlined:

Chapter 2: "The Dutch Disease Model: Theoretical and Empirical Background". This introduces the core model and the classical mechanisms through which it affects an economy as described in the literature. The chapter also introduces the criticism of the model and presents various extensions of it that may be of relevance to the case of Libya as well.

Chapter 3: "Literature Review and Synthesis". This chapter reviews some of the developed and developing countries experiences with booms that have been discussed in the literature. Two types of booms are considered: those arising from the discovery of a natural resource and those emanating from favourable change in the resource price. In the former case the resource movement dominates, and in the latter the spending effect does. A distinction is made between permanent and temporary booms on the basis that they required different levels of adjustment. The chapter also deals with the differences of the experiences of booms between developed economies and developing ones with regard to the boom's effects on the structure of production. In addition to that, emphasis is placed on how economic conditions prior to the boom may differ, including the level of per-capita income, the degree of industrialisation and the existence of constraints in capital markets. The role of government action is also discussed.

Chapter 4: "Review of the Libyan Economy, Structural Changes and Development Patterns." This chapter is mainly an illustrative account. It casts a light on the Libyan economy since Independence and examines the major changes which took place in it during the period of 1962-1990. The analysis is done within a time-frame composed of three distinct periods. An effort is made to incorporate demand-side factors into the analysis of sectoral shifts in order to redress the balance of the Dutch Disease supply-side analysis. Factor input and output growth are compared to test whether or not productivity change had contributed to the growth of the Libyan economy. The role of the Government in influencing sectoral shifts in favour of productive sectors is brought to the fore. Factors underlying the atypical structure of production in Libya with a disproportionately large share of services are also studied.

Chapter 5: "An Empirical Investigation of the Dutch Disease in Libya" attempts to quantify Libya's variety of the Disease. It constructs a 27-year Dutch Disease index for Libya using a counter factual analysis. The index is calculated for both manufacturing and agriculture to give a detailed picture of their reactions to the boom. Then the chapter turns to investigating the transmission mechanisms of the Disease. In the Libyan case, it analyses developments in the indices against both policy shifts and trends in the mechanisms of the Disease. It particularly examines the real exchange rate as well as other relevant aggregates including domestic absorption. This investigation attempts to establish what role if any, the classic mechanisms played in the Libyan case..

Chapters 6 and 7 examine the performance of both the agriculture and manufacturing sectors during the boom and the sequence of analysis adopted in each chapter is:-

Firstly, the growth of these sectors and their contribution to output and employment over the course of time are researched to reveal whether or not their performances during the boom period diverged from those calculated to have been expected from the observed precedents. Then patterns in output, import-substitution and exports are set up to presents the impact of domestic demand and trade on the structure of production. Factor input is compared with output growth to discover whether productivity growth had been large enough for the growth of both sectors and to assist their contributions to aggregate output. In agriculture, changes in the output prices of cereals, vegetables and fruit including factor cost, productivity growth and profitability are all analysed at the enterprise level. In the case of manufacturing industries the analysis is undertaken at three-digit level.

It should be asserted that although the general outline for the analysis is similar for both agriculture and manufacturing their treatment differs a lot because of the technology of production in each. For instance, whereas technological innovations, in the form of equipment or machinery, will be introduced likewise into agriculture as well as manufacturing, the greatest agents for technological change in agriculture production may be the agro-chemicals that are used.

The sectors are inherently dissimilar in other respects too. There is no parallel in manufacturing for the way in which investment in equipment-irrigation and new material inputs complement each other in agriculture. Neither is there a parallel for the increased total factor input of increased land utilisation and double-cropping brought about by irrigation. On the other hand, the effect of factor input on output growth is substantially changed by the dynamic economies of scale that are ubiquitous in manufacturing but not in agriculture.

Finally, it is necessary to mention the difficulties arising from the differential effects of a rise in per-capita income on demand for goods in both sectors. As the rise in per-capita income fuelled by the boom escalates, the amount of money spent on manufacturing goods escalates also and in so doing naturally reduces the share of that spent on agricultural products. Consequently, resources will be drawn from agriculture into manufacturing.

A rise in manufacturing output is attributed to the effects of successful industrialisation but a decline is pronounced as being the result of the Dutch Disease effect. But a decline in agriculture can be diagnosed as the outcome of either successful industrialisation or the Dutch Disease. So it can be seen from this that the attribution of cause in agricultural performance in times of boom is an enigmatic and ambivalent endeavour.

CHAPTER II
THEORETICAL AND EMPIRICAL APPROACH TO THE DUTCH DISEASE THEORY

II-1 Introduction

It has been argued that a resource discovery for export does not guarantee economic development. More often it is the case that a temporary rapid increase in exports gives rise to an adverse effect and therefore adjustment problems throughout the rest of the economy. This problem is referred to in the economic literature as "the Dutch Disease." This term derives from the difficulties experienced by the Dutch economy as a result of the natural gas discoveries of the 1960's. The export boom caused a real appreciation of the Gilder (above the level at which it would otherwise have been), reducing the competitiveness of the Dutch industry relative to the rest of the world.

The Dutch Disease Theory is a comparative static approach exploring the short to medium term structural effects of a boom emanating from either a new resource discovery or an increase in the price of an exportable commodity. In simple terms the model concerns the impact of the boom on the functional distribution of income, profitability and the size of the manufacturing sector of the economy.

The theory focuses on the interrelationship between factors mobility, output and output prices and predicts that, in an economy in full employment equilibrium, a permanent increase in the inflow of external funds will lead to a change in relative prices in favour of the non-traded goods sector but against the traded goods sector, which in turn will lead to a contraction of employment and output in the traded sector. This phenomenon is referred to in the Dutch Disease literature as "De-industrialisation" (M. Karshenas and Associates, 1994, P.152).

The key issue in this process is the real exchange rate - which is the relative price of non-traded goods to traded goods P_N/P_T, or the real effective exchange rate - which is an index of domestic prices for both tradable and non-tradable goods relative to the prices of main trading partners in terms of market exchange rate P_d/eP^*(Dornbusch and Associates, 1988, PP. 11-26).

The Dutch Disease Model can be regarded as a special case of the older named general booming sector model. This older model concerns the impact which a boom in one sector of the economy has on the other sectors and on the economy as a whole.

One of the earliest analyses done in this area was on the impact that the nineteenth-century gold discoveries in Australia had upon the Australian economy (Cairnes, 1859). Recent literature also refers to cases as old as that of sixteenth-century Spain and the effect of American inflows upon Spanish industry (Forsyth, and Nicholas, 1983).

The theoretical origins of the Dutch Disease Model can be found in Salter's Dependent Economy Model (Salter, 1959) where he discusses the relationship between external and internal balances. Salter examines the impact of a boom on both the tradable and non-tradable sectors of the economy.[3]/ He shows that this impact occurs through changes in domestic expenditure, affecting the real exchange rate. The varieties of the Model also influenced by these factors are Jones's Specific Model (1971) and Samuleson's (1971). Therefore, when discussing the consequences of the boom, these varieties of the Model assume that some factors are specific to certain sectors and others are intersectorally mobile. In fact, the differences which emerge from different varieties of the Model are mainly due to their different assumptions about factors mobility. The extensive theoretical literature that followed has been surveyed by Gregory (1976), Snape (1977) and developed further by Corden and Neary (1982) and Corden (in 1983 and 1984).

The rest of this chapter is arranged as follows: Section II illustrates the Core Model of the Dutch Disease and demonstrates how the disease occurs. Section III presents some extensions of the Model. Section IV explains why the phenomenon is considered a disease. Section V concludes by highlighting

[3]/ For the purpose of convenience we will refer to the tradable sector an non-tradable sector as tradables and non tradables. Tradables include sectors that produce all potentially international tradable goods mainly agriculture and manufacturing. Non-tradables include sectors that produce goods which are not commonly traded internationally mainly construction and services. It is true that international trade in services is increasing but their tradability is still generally Limited.

some policy implications and options. The discussion is presented in a way that reflects the classical literature as it stands and finally, Section VI gives criticism of the Model, re-examines some of the issues and offers an alternative understanding of the phenomenon and the optimal policy response.

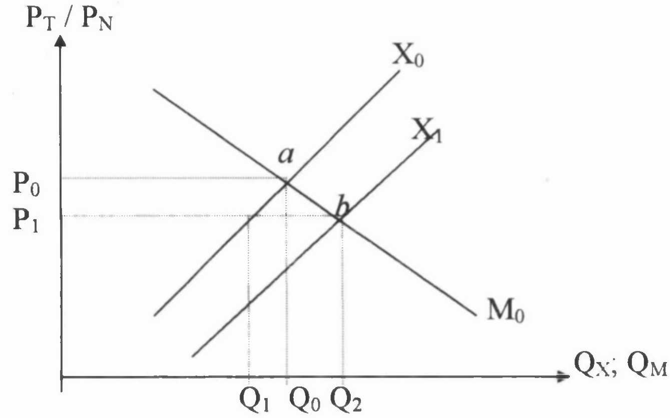
II-2 The Core Model of The Dutch Disease Theory.

As already mentioned, the Dutch Disease Theory emerged in the booming sector literature which drew its originality from other economic disciplines. Disciplines such as international trade theory, macro-economic analysis and resources and exhaustion. The cornerstone and main prominent features of this Theory, known in the literature as the Partial Equilibrium Model, have been put forward by Gregory (1976) and Snape (1977) when they studied Australia's latest mineral discoveries of 1968-1974 (Corden, 1981 Section 5).

This Model describes demand and supply in the traded sector under the assumptions of given international terms of trade and perfect substitution between import and importables goods as shown in Figure II-1. The vertical axis there denotes the relative price between traded and non-traded goods and the horizontal axis shows the quantity of traded goods and non-traded goods. and X_0 and M_0 indicate the supply of exports and demand for imports prior to the boom respectively.

Before the boom equilibrium is at point *a*. Where P_0 refers to the equilibrium of the traded and non-traded goods price and Q_0 refers to the equilibrium of the traded and non-traded quantities (ibid. 1981, Section 5).

Figure II-1
The Effects of A Boom on Exports & Imports



Following the boom the export curve X_0 will shift to X_1 leading to the new equilibrium point *b*. At this point price P_1 is lower than before the boom.

Ignoring the effects of domestic inflation and exchange rate revaluation, this lower price will lead to an increase in the quantity supplied of non-tradable goods; a decrease in the quantity supplied of pre-existing exports from Q_0 to Q_1 and an increase in the quantity demanded of imports from Q_0 to Q_2.

The general conclusion of the Model is that, with mineral discoveries, the price of non-tradables will increase relative to that of tradable goods and that non-mineral tradables production will contract. Consequently, both import-competing industries and pre-existing exporting industries will diminish in size (Snape: 155).

This Model was developed further by Snape in 1977 when he noticed that the export and import curves in the Model were not shifted as aggregate variables. He also realised that the impact of the new discovery outlay on the pre-existing importables and exportables industries was not considered (ibid. 155). In view of these effects he designed a General Equilibrium Model and this, in turn, was developed further by Corden and Neary (1982) and Corden (1983; 1984). This Model is known in the Dutch Disease literature as the

General Equilibrium Effects of the Boom and is the Core Model of the Dutch Disease Theory

II-2-1 The Framework and Basic Assumptions of the Model

In the Dutch Disease Model, the economy presented is a small open economy in which total production and consumption can be divided into three main sectors, the booming sector (B), the tradable sector T [4]/ and the non-tradable sector N. [5]/ The price of tradables P_T is exogenously determined in the international market and not affected by domestic policies. So it is assumed to be constant and equal to the international price[6]/. On the other hand, the price of non-tradables P_N is determined domestically, and varies so as to clear the market. In the basic case of the Model, the source of the boom is assumed to be equivalent to once-and-for all Hicks-neutral progress in production technology[7]/. It is also assumed that all the production of the booming sector is exported. The three sectors use specific factor (capital) as well as an intersectorally mobile factor (labour). The real wage (w) is assumed to be flexible and real prices (and wage) are measured in terms of P_T. The additional assumptions underlying the Model are that there are no distortions in the commodity or factor markets to rule out the possibility of immiserising growth for the economy as a whole, that both traded and non-traded goods are normal goods and used for final consumption, that national output and expenditure are always equal so that trade is always balanced overall and finally, that the oil sector uses no domestic mobile resources. In such circumstances, therefore, an increase in oil revenue resulting from an increase in the oil price is taken to be equivalent to a capital transfer.

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[4]/ Note that, although B also produces tradable goods, the tradable sector (T), as defined here, includes all tradables a part from these produced in the booming sector.

[5]/ In some of the literature, the booming sector is called the mining sector, the tradable sector is called booming sector, and the non-tradable sector is called the lagging sector. we find the denomination used above less confusing and less limited to the specific case when the windfalls occurs in the mining sector.

[6]/ This true only when assuming that the size of (T) is not large enough to influence its international price.

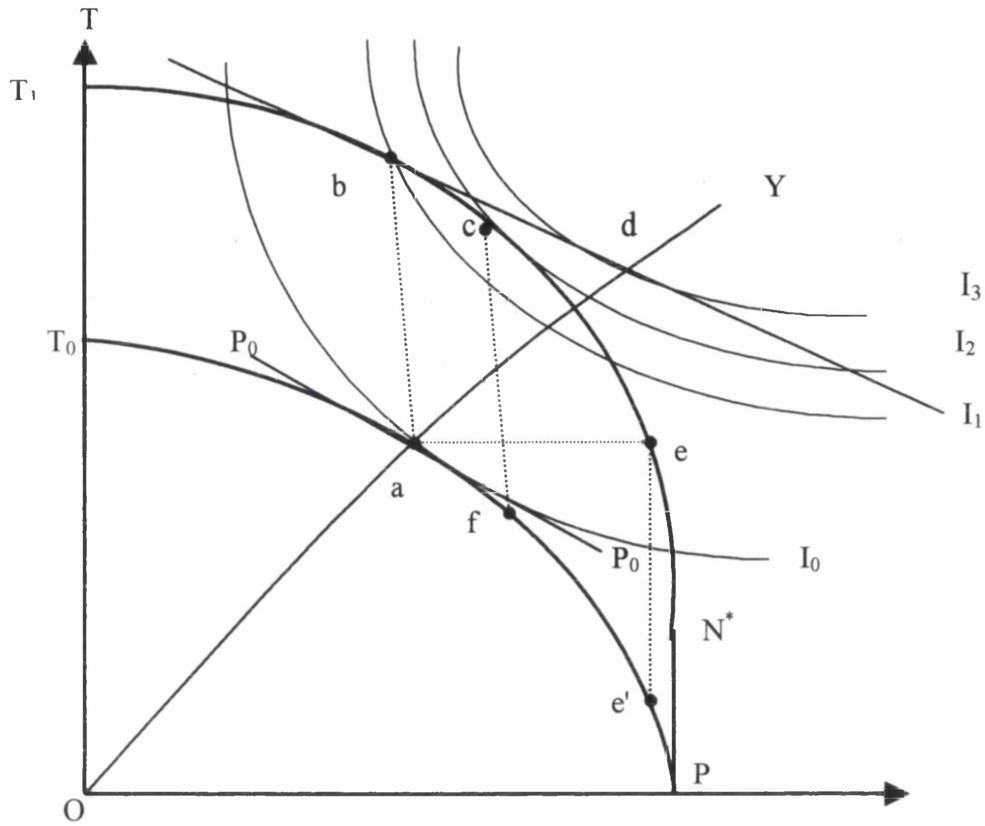
[7]/ This analysis is perfectly applicable to a price increase.

According to the Dutch Disease Theory, when a boom occurs, it can lead to the expansion of the booming sector (B) and the non-tradable sector (N) and the contraction of the tradable sector (T), through two effects: The first of these is the resource movement effect (or the shift effect) which draws factors of production out of used activities and into the booming sector and secondly, the spending effect, which draws factors of production out of activities producing traded goods (substituted by imports) and into non-traded sectors. [8]/. This process can be illustrated as in Figure II-2 which describes the commodity market by measuring the non-traded goods output along the horizontal axis and traded goods output (including both manufacturing and the booming sector output) along the vertical axis. In this figure, TN is the economy pre-boom production frontier curve (represented the aggregate supply side depending on domestic technology and factor endowments) (Neary, and Associates, 1985, pp. 15, 16)

Before the boom and in the absence of any intervention in market mechanisms or commodity distortion, equilibrium in the commodity market is determined by the intersection of the production possibilities curve (TN) with the highest attainable social indifference curve $I_{0,}$ (representing the aggregate demand side), at point *a*. This initial real exchange rate is equal to the slop of the relative price line $P_0P_{0.}$

[8]/ See Corden and Neary (1982), Corden (1984), Van Wijnbergen (1984), and Gelb and Associates (1988).

Figure II-2
Response to the Windfalls



II-2-2 The Spending Effect

A boom in B leads to a shift of the initial production possibilities curve outwards to T_1N. The equilibrium point moves to point *b* which lies to the left of point *a*. at this point the domestic output of both N and T remains the same but total availability of T is increased from OT to OT_1.since relative prices will remain unchanged, desired consumption must lie at point *d*, where the price line extending from the origin intersects the income-consumption line extending from the origin via point *a*. There is an excess demand for non-traded goods N, and this excess demand will lead to a driving up of their relative price until a new equilibrium is attained such as at point *c*. Thus the relative price of traded goods to non-traded goods P_T/P_N must fall to restore the equilibrium of the N market (therefore reduce demand for N goods and increase spending on traded goods to reduce the surplus). This fall in the relative price of traded goods is referred to as a real appreciation. In addition, at the new equilibrium point the output of N has risen whereas the output of T has declined and thus domestic welfare has increased, so there is de-industrialisation. So the spending effect of the boom gives rise to both de-industrialisation and to real appreciation.

The adjustment however will be expressed through increase in the P_N goods if the exchange rate is fixed and through a combination of nominal exchange rate appreciation and an increase in the P_N provided the exchange rate is flexible. Furthermore, since equilibrium in the market is brought about by the adjustment of the price of non-traded relative to traded goods. The output of the non-traded goods will depend solely on the real exchange rate. The demand in terms of non-traded goods depends on the level of income y and this is determined exogenously by the assumption of full employment. The equilibrium conditions of this Model in terms of the market clearing conditions can then be expressed by the following formula:

$$X_N(q) = C_N(q, y). \qquad (1).$$

Where X_N and C_N indicate domestic production and consumption of the non-traded goods respectively and q and y are the prices of non-traded goods relative to traded goods and the level of income in terms of traded goods respectively (ibid: 1986, P. 17).

II-2-3 The Resource Movement Effect (the Shift Effect)

The appreciation of the real exchange rate will tend to draw resources out of the non-oil traded sector into the non-traded sector and will also move demand away from the non-traded goods sector towards the non-oil sector (assuming perfect substitution). Equilibrium is attained at point d where total demand for traded and non-traded goods equal supplies. The final result is that there is a movement along the production possibilities curve from d to c and the production of traded goods will fall with the production of non-traded goods rising as factors shift. This squeeze on the non-oil traded goods sector is known as de-industrialisation.

Furthermore, if the booming sector B employs domestic factors the boom will entail an increase in the marginal product of the production factors employed in the booming sector B. This increase in the marginal product of production factors leads to an excess demand for these factors in that sector. Consequently, B draws factors of production out of both the non-traded goods N and non-oil traded T sectors and there are then two subsequent effects. Firstly the movement of the production factors out of the non-oil traded goods sector into B without involving the N market which lowers the output in that sector. (This is referred to as direct de-industrialisation). Secondly the movement of the mobile production factors out of N to B will lead to an increase excess demand created by the spending effect and thus add to upward pressure on the price of non-traded goods P_N. This will draw more labour out of the non-oil traded goods sector. In addition, labour will move from the booming sector as prices rise in that sector and this will offset the resource movement out of the N goods sector and into the booming sector. However it is presumed that this offset is small, so there will still be a net increase in oil production.

Under the assumption that each sector employs a single specific factor as well as drawing on the intersector mobility of the labour, the output of each sector will depend on the real wage (w) in addition to q and y indicated by equation (1). Hence equation (1) has to be modified to include the wage rate (w) as shown in equation (2).

$$X_N (q / w) = C_N (q / y) \qquad (2).$$

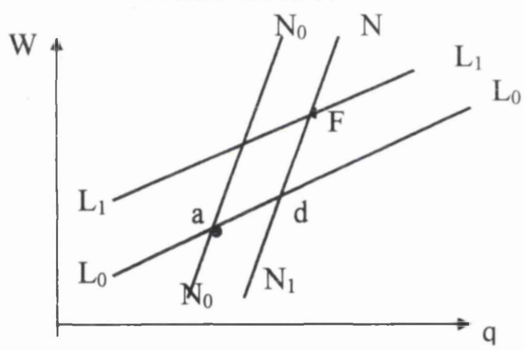
Solving this equation can be done by using the Labour Market Equilibrium Equation denoted by equation(3).

$$L = L_N\,(q / w) + L_T\,(w) + L_B\,(w, b) \qquad (3)$$

Where L is the total available supply of labour (assumed to be fixed) L_i is the labour function for sector i and b is the demand for labour that was created by the boom effect.

The determination of equilibrium in this model can be done by plotting these equations in (w, q) dimensions as two curves whereas N_0 depicting equation (2) and L_0 representing equation (3) as illustrated in Figure II-3.

Figure II-3
Spending and Resource movement
Effects of A Boom



It is obvious from equation (2) that either an increase in (q) or a decrease in (w) produces an excess supply of N goods and the curve N_0 must be upward-sloping. Since an equi-proportionate increase in (q) or (w) leads to unchanged supply of N goods, while a decreased demand for N goods will lead to an excess supply, the slope of the curve N_0 must be more than one. Similarly, according to Equation (3) either an increase in (w) or a decrease in (q) will lead to a rise in unemployment and hence the curve L_0 must also be upward-sloping.

Furthermore, since an equi-proportionate increase in (q) and (w) has no effect on changing the N goods demand for labour but reduces it in both T and B, so leading to unemployment. The slope of the curve L_0 is then less than one. The pre-boom equilibrium point is at point *a* where the curve N_0 (which represented the equilibrium in the non-traded goods market) intersects the curve L_0 (which represented the equilibrium in the labour market).

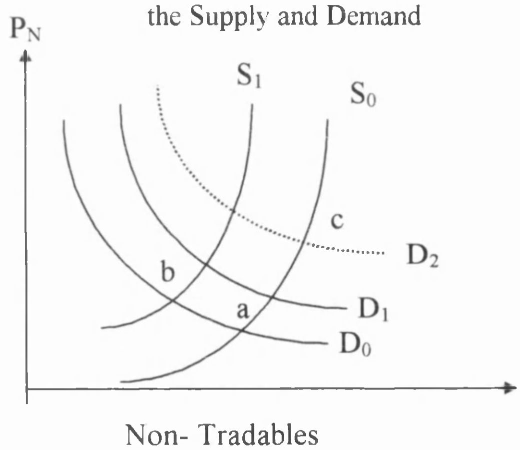
Following the boom the spending effect shifts the N_0 curve rightwards to N_1 and thus the initial equilibrium point moves to a new equilibrium point. The position of this new equilibrium point depends on the resource movement effect. If there was no resource movement effect the new equilibrium intersection point will take place at point *d*. While under a resource movement effect L_0 curve will shift upward to L_1. Thus the equilibrium will be at point *f*. This demonstrates the resource movement effect reinforcing the spending effect in terms of higher (q) and (w) and shows both the spending and resource movement effects leading to real appreciation and de-industrialisation (ibid. 1986 PP.17, 18).

II-2-4 The Final Outcome of the Boom.

The output of the non-traded goods sector might be higher or lower than before the boom because the resource movement effect results in lowering both the output and employment of non-traded goods whilst the spending effect tends to raise them. However, there is a definite decline in the output of the non-traded goods sector by both effects. But it should be noted that the final results are dependent upon which effect will dominate. In other words the final results are dependent on the assumptions made regarding the resource movement between sectors and the relative strengths of the spending effect versus the resource movement effect.

The resource movement effect produces rises both in direct and indirect de-industrialisation. in the case of direct de-industrialisation, it is shown by the fall of N output due to the movement of resources out of T and into B with out involving the market for N. In the instance of indirect de-industrialisation it is caused by the real appreciation that results both from the reduced output of N goods at the initial real exchange rate due to the resource movement effect and from the increased demand for N goods due to the spending effect. Furthermore, since N employment is unambiguous, the spending effect and the resource movement effect both lead to the withdrawal of resources out of T and hence the crowding out of output. Thus the output of T unambiguously falls. This can be illustrated by Figure II-4 in which the price of N relative to that of T is measured along the vertical axis and the non-traded goods on the horizontal axis. S_0 and D_0 indicate the supply and demand curves for N, respectively.

Figure II-4.
The Effect of the Boom on
the Supply and Demand



Given the assumption that the initial exchange rate is fixed the spending effect will lead to drawing the mobile resources out of T and into N as well as shifting demand away from N towards B and T and thus the demand curve will move from D_0 to D_1 and the price of N relative to that in the traded sector will rise.

The resource movement effect on the other hand leads to shifts in the supply curve into S_1 and thus induces an additional excess demand and so real appreciation will take place. Thus the resource movement effect creates an additional movement of labour from T to N which in turn brings about indirect de-industrialisation.

II-2-5 The Effect of the Boom on Income Distribution

II-2-5-1. The Effect of the Boom on Real Wages.

As already mentioned under the resource movement effect, when labour moves out of N into B the output of N tends to decline. Thus the wage measured in terms of N will rise and lead to an increase in the real wage which takes account of changes in the prices of all goods consumed by wage-earners.

Similarly, under the spending effect the output of N will increase as a response to labour movement from T to N and therefore the wage, measured in terms of N, will fall. Since the wage, in terms of T, tends to rise due to the spending effect through a real appreciation, the real wage may rise or fall. Thus when the two effects are combined the final outcome is uncertain. That is a fall in the real wage will depend on the labour mobility and the share of the N sector in wage-earners consumption (ibid, 1986,PP. 19-22).

II-2-5-2 The Effect of the Boom on the Profitability of Sectors

Factor mobility has a negative impact on its return when prices in the sector in which it is employed fall. Profitability in T tends to fall under both the resource movement effect and the spending effect. On the other hand profitability in N would fall under the resource movement effect while tending to rise under the spending effect. The combined effect of resource movement and the spending effect on profitability in N is ambiguous. In other words the final outcome depends on which effect dominates. In the booming sector profitability tends to rise because of the resource movement effect and fall because of the spending effect. Thus the return to the fixed factor in T suffers in terms of P_N and P_T while that in N gains most. In addition any change in P_N has a disproportionately large effect in increasing capital in N (Corden 1984, PP. 364.365).

Moreover, in the medium-to-long run, resource allocation depends on relative profitability. The return to the specific factor therefore depends on the factor intensities in terms of value shares. That is with a relatively smaller share of labour in the value of T output, real wage in terms of T rises and profitability in the traded sector tends to fall but by less than it reduces in both non-traded sectors and the booming sector. In other words if the traded sector is capital-intensive relative to the non-traded sector and if the resource movement effect is dominated the boom raises profitability in the traded sector relative to that in the non-traded sector. While if the traded sector is more capital-intensive than the booming sector and the spending effect is dominated profitability in the traded sector tends to fall but by less than that within the booming sector. Whether this brings about the de-industrialisation or not will depend on which effect dominates. That is if this reflects in terms of falls in output and employment in the traded sector there must be de-industrialisation.

However, in the real world, the boom, the resource movement effect and the spending effect and their consequences on the balance of trade do not occur instantly. Mechanisms take time to operate and expectations play an important role too. Dynamic analysis considers three time periods. In the first period, expectations about the boom are found, consequently, expenditure rises and a balance of trade deficit occurs. The boom occurring in the second period turns the trade deficit into surplus. In the third period, the boom effects build up, restore the trade balance. If expectations are not accurate, which often is the case, the spending effect may exceed what it would be otherwise. That why it is sometimes important to distinguish between the impact of false expectations and the impact of the boom.

The above mentioned mechanisms are usually accompanied by political mechanisms which exacerbate the disease. This is often the case where a significant part of the windfalls accrues directly to the governments.

Incremental expenditure is then more likely to be geared to expanding the welfare state, as in Northern Europe, or toward buying legitimacy by providing subsidised services and goods, or even building "white elephant" projects as in many developing countries. In addition to contributing to the spending effect such politically oriented expenditure is usually difficult to scale down when the boom ends.

II-3 The Extensions of the Model.

As mentioned earlier, the various extensions of the core Dutch Disease Model differ mainly in their assumptions regarding intersectoral and international factors mobility. These extensions show that, in certain circumstances, the Model predicts that the boom will result in industrialisation rather than de-industrialisation. However, these circumstances are never expected to materialise in the case of most oil booms and this can be seen from the overview of six important extensions below. Therefore, in the context of the neo-classical analysis that characterises the Model, it is de-industrialisation that is likely to occur as a consequence of such booms.

II-3-1 The Paradox Model (*more than one factor mobile*)

This model is concerned with the effect of the boom over the medium-to-long run under the following assumptions:

There are three sectors B, T and N. The booming sector B have its own specific factor and labour is mobile between all sectors. Capital is mobile between T and N. the two sectors behave as a Heckscher-Ohlin economy which faces a variable supply of labour equal to the total labour supply in the economy less labour employed in the B sector. As well as one of them being capital intensive and the other labour intensive.

Under these assumptions following the boom the output and employment in both T and N will depend on the sector relative intensities. Where the resource movement effect has some contradictory results. That is at a constant real exchange rate the resource movement effect will cause the output of the capital-intensive sector expand, this is because of under the resource movement effect labour moves out of both T and N into B. while if T is relatively more capital intensive sector than N there will be a tendency to pro-industrialisation. This result will be opposed by the spending effect through the mechanism of real appreciation and the movement of both capital and labour out of T into N. However, in contrast output of T could expand (Corden, 1984: 363).

II-3-2 Decomposition of the Lagging Sector

When the lagging sector is decomposed into several industries. Under the assumptions that each industry employs capital and labour and the two factors are mobile between its sub-industries. The boom entails a movement of labour out of T as a whole. With the stock capital for the sectors as a whole fixed and amount of labour reduced, the labour intensive industry will contract, while the capital-intensive industry will expand.

II-3-3. Intersectoral Capital Mobility.

In this model, another immobility assumption is relaxed. Let us assume that capital is intersectorally mobile between the non-tradable sector N and the tradable sector (T). [9]/

It was shown above that the resource movement effect leads to an out flow of labour from T and N into B. This means that the structure of resources available to N and T will become more capital intensive.[10]/ If we assume that T is more capital intensive than N, which is usually the case, then T is likely to benefit from this situation at the expense of N. If this is not offset by the

[9]/ Excluding B from the assumption of intersectoral capital mobility is not unrealistic, especially in the case of oil, where capital is highly specialised and most important is foreign.

[10]/ It is obvious this is not applicable to only oil booms where the amount of labour required is negligible. However, it can still be of some relevance if we assume that oil booms increase available capital relative to labour as the economy becomes relatively wealthier.

spending effect, the final result is likely to be industrialisation rather than de-industrialisation. [11]/

Let us assume that, on the contrary to the above case, the non-tradable sector (N) is more capital intensive than the tradable sector (T). In this case the output of N will expand at the expense of T. If this is not offset by any other mechanism, P_N/P_T is likely to decline, i.e. real appreciation will happen. This will counteract the initial hypothesis of real appreciation resulting from the spending effect and the final impact on the real exchange rate and, subsequently on T will be ambiguous, with the possibility of industrialisation. However, this paradoxical result is most unlikely, especially in the case of oil where the amount of labour withdrawn from T and N is negligible and, more importantly, where the spending effect is overwhelming.

II-3-4 International Capital Mobility

We now turn to the case where capital is intersectorally immobile (sector-specific) but internationally mobile.

When the boom takes place rents are likely to rise in B and T and fall in T as explained in the Core Model. Now, since capital is internationally mobile, it is likely that it will outflow from T and inflow to N. This will boost adjustment through the quantities produced in each sector and will reduce the amount of change required in relative prices (P_N/P_T). The extent of this happening will depend on the degree of the international mobility of capital. If this mobility is perfect with elastic supply, then de-industrialisation can occur in response to minor changes in the real exchange rate (P_N/P_T). [12]/

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[11]/ It is worth nothing that within the manufacturing sector itself some specific industries may expand, and other may contracting, according to this specific capital intensity. Thus, it can happen that even if de-industrialisation occurs in general, specific industries may still expand.

[12]/ Snce labour remain sectorally mobile as in the Core Model This outcome supports the argument for some restrictions on the capital movement to neutralise the disease where in the cases of free international capital movements, a smaller rise in the relative price of non-tradables (P_N /P_T) results in a greater structural change (de-industrialisation), drawing more domestic labour from the tradables than in the cases where there are restrictions on international capital mobility

II-3-5 International labour Mobility (Immigration).

In response to the boom, demand for labour rises leading to an increase in the real wage in terms of tradables (w). But since the price of non-tradables (P_N) also raises the "true" real wage (w^*) may rise or fall depending on both the extent of the rise in PN and the share of the non-tradables in labourers consumption bundle. [13]/

If w^* increases this is expected to lead to foreign labour immigrating into the country. Immigration will raise both domestic demand for and the supply of N and T. Thus, its influence on the relative price of non-tradables (P_N/P_T) may vary from one case to another.

Immigration is expected to continue until w^* is restored to its initial (lower) level. But what is more relevant is determining the final size of T w not w^* .So that the important question here is whether the restoration of w^* will lead to the restoration of w. This is not feasible as long as some of the boom and the immigrants, income is spent on N. Pressure on factors other than labour producing N will lead to the rise of (P_N), while P_T will be fixed at its international level. Even if we assume that capital is internationally mobile, this is not possible to lead. So, in this variety of the Model, the boom will not lead to industrialisation unless N is subjected to increasing returns.

II-3-6 The Domestic Absorption Effect.

This variety of the Model concerns the case where the boom is specifically due to a rise in the international (and, thus, the domestic) price of the booming sector products (P_B) and some of the product is used domestically. [14]/

Let us first assume that the product of (B) is used only for final consumption. A rise in the price of B (P_B) will lead to an increased rent in B (R_B). Here we are faced with both an income effect and a substitution effect. We first consider the income effect.

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[13]/ As noted earlier, in the Core Model, the real wage, like all other prices, is measured in terms of price of tradables only and is not influenced by changes in the price of non-tradables.

[14]/ This variety of the model is sometimes called the domestic utilisation effect.

The rise in P_B is equivalent to B taxing the rest of the economy for consuming its product. There will be a positive spending effect from the part of R_B and negative spending effect from the rest of the economy. The magnitude of each will depend on the marginal propensity of each sector to consume N. If the propensity varies between different sectors, the outcome is ambiguous. Both real appreciation and real devaluation are feasible.

As regards the substitution effect, there is no ambiguity, P_B rises and consumers shift some of their initial consumption of B to T and N. This boosts real appreciation through the spending effect and a shift effect occurs in the usual fashion, due to the rise in marginal productivity of factors producing B.

If the product of B is used as an intermediate good, similar analysis and ambiguity applies as in the above case of the final product. The adverse impact on T is, however, expected to be greater because the resource movement effect will be larger. The marginal productivity of the mobile factor in B will rise as usual. What is new here is that it will also decline in T and N due to the decrease of rent in them R_T and R_N.[15]/ This situation is exacerbated if T happens to be more intensive than N in its use of the product of B. This is likely to be the case where the boom is oil related.

As regards to the substitution effect, it will be stronger when the product of B is used as intermediate input. Products of N and T will be used as substitutes for the more expensive product of B. This will lead to further real appreciation because of the increasing pressure on available factors of production.

II-4 The 'Enclave' Nature of the Oil Sector.

For oil booms the resource movement effect is not significant due to the special factor market characteristics of the oil sector. Because of the weak forward and backward linkages of the oil sector, "one should perhaps emphasise that the oil industry is much like a small enclave in terms of the

[15]/ R_T and R_N will decrease due to the raise of the price of B which assumed to be used as input in both N and T.

almost negligible direct reliance on domestic labour and capital in OPEC", (Mckinnon, 1976, p. 162). As Neary (1983) puts it, the models analysing an oil boom "do not allow any participation by the booming sector in the domestic factor market" and the 'Dutch Disease' models, which analyse the case of the oil boom traditionally abstract from the resource movement effects[16]/. This is justified for at least two reasons. First, the oil industry is highly foreign capital-intensive and the domestic labour used by the oil sector constitutes a negligible part of the labour force. In addition, the skill of labour employed in the oil sector is, at least in the short run, highly sector specific. Moreover, the labour employed in the oil sector is consists mostly of foreigners, at least for the small oil-exporting countries such as Libya. Second, the oil sector in such countries is almost wholly owned by governments therefore, the increased oil revenues usually accrue to the government as monopoly rent and not to the factors of production. Also, the governments do not monetise the oil revenue right away. As a result, the real return of factors of production in the oil sector is initially unaffected by the boom.

Considering the spending effect alone leads us to conclude that in a competitive equilibrium the oil boom unambiguously undermines the non-oil tradable goods sector and expands the non-tradable goods sector.

II-5 Monetary Aspects of the Dutch Disease Theory.

The preceding discussion of the Dutch Disease Theory has been focused on those predictions which are relevant to the allocation of the real resources. In this section we turn to consider the monetary aspects of the Dutch Disease Model. This model assumes that the economy is small relative to the world markets for N goods and small in assets markets. It assumes that both the wages and prices in terms of N are flexible, but price in terms of T is fixed. It also assumes that capital is internationally mobile and that there is no political

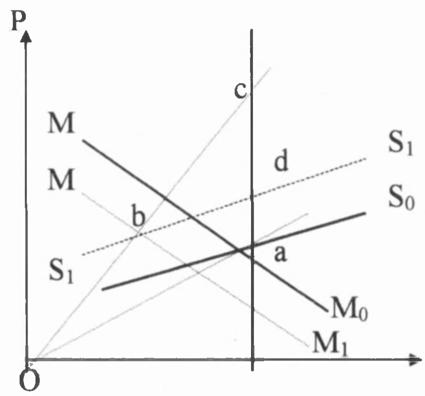
[16] .The oil sector in developing countries is treated as an enclave in the sense that it requires negligible domestic resources. Therefore, an increase in oil prices or production represents an increased transfer from abroad. e g. McHinnon (1976); Forsyth and Kay (1980), Buiter and Purvis (1980); Bruno and Satchs (1982); Wijnbergen 1984b); Benjamin, Devarajan and Weine (1984b); Benjamin, Devarajan and Weiner (1986) etc.

risk and transaction cost (foreign and domestic money are perfect substitutes) and that the domestic money constitutes the domestic assets. Under these assumptions the money market equilibrium can be illustrated by using Figure II-5 in which the nominal price in terms of N is measured along vertical axis and the nominal exchange rate (the domestic-currency price of a unit of foreign exchange) along the horizontal axis E_1 is the price in terms of T goods the curve M_0M_0 denotes the money market equilibrium condition obtained by substituting the domestic money supply into the following conventional money demand equation:

$$M\text{-}P = \alpha Y\text{-}\delta R \qquad (4)$$

Where R is referring to domestic interest rate, M is the log of nominal money demand P and Y indicates the price level and the real level of income respectively. While the curve S_0S_0 indicates the equilibrium condition of non-traded goods

Figure II-5
Effect of the Boom under Fixed
and Floating Exchange Rate Regimes



Before the boom and under the assumption that the exchange rate (g) is flexible and the domestic money market is in equilibrium status, an increase in P_N will lead to a fall in the exchange rate. If the money supply is held constant the level of the domestic interest rate will equal the world interest rate. That is the economy will lie along the curve M_0M_0. However if the exchange rate is fixed the economy will lie at a point above M_0M_0, where at this point the actual holdings of real money balances below desired holdings (disequilibrium status). In order to expand domestic money supply the disequilibrium can be equalised by building up foreign reserves. That is to say every point above the curve M_0M_0.indicates the surplus in the balance of trade and the opposite is also true: every point below this curve corresponds to a deficit in the balance of trade. In addition to this, the rise in P_N will induce an excess supply of non-tradable goods while an increase in the exchange rate will induce an excess demand for them. This is amounts to saying that with a fixed nominal money supply an equally proportional increase in both $P_{N,}$ and the exchange rate g will lead to an excess supply of N by reducing the value of real balances and therefore will decrease the spending. In other words, the non-trade market equilibrium curve S_0S_0 is upward sloping and less steep than a ray from the origin. The pre-boom equilibrium point is therefore at point *a,* where the curves M_0M_0 intersect the curve S_0S_0.

As presented already, at initial prices both the resource movement effect and the spending effect will lead to an excess demand for the N goods sector. Consequently, curve S_0S_0 will shift upwards to S_1S_1. This will raise the real income demand. Under the assumption that this change is not combined with an increase in money supply the domestic price level must fall to re-equilibrate the money market. This is known as the liquidity effect. This fall in the price level will lead to a shift of the curve M_0M_0 inwards to M_1M_1. The analysis can now be conducted in two stages. First the nominal exchange rate g is allowed to move freely and second the nominal exchange rate is held constant. Under the first assumption the new equilibrium point will be at point *b*. At this point the real exchange rate will fall. This fall in the real exchange rate will be equal to the slope of the line *ob* relative to the slope of line *oa*. Additionally the fall in the real exchange rate will be associated with a fall in the nominal exchange rate. Thus the domestic prices of traded goods will decline. However prices in terms of non-traded goods may rise or fall. On the other hand, under the second assumption and with a constant nominal money supply the two curves will move to M_1M_1 and S_1S_1 as stated above, but if price in terms of N is free to adjust the economy will move in the short-run to the point *d*. At this point the change in the relative price of N will be less than that which would be required for long-run equilibrium given that the spending effect is lower due to the balance of trade surplus and the desired money balance is greater than the actual economy at this point will be in disequilibrium. Thus the trade balance surplus is directed to build up the foreign reserves. Consequently, the domestic money supply will gradually increase. This will force both M_1M_1 and S_1S_1 to move upwards until the new equilibrium is attained at point *c*. At this point the surplus will be eliminated and the economy reaches its long-run equilibrium. This amounts to saying that the fixed exchange rate will delay the effect of the boom and raise the inflation. In other words, in the short-run and in order to eliminate the inflationary consequences, the Central Bank will impose the exchange rate protection policy through reducing the money supply and increasing reserves. This policy will lead to de-industrialisation.(Neary, 1985,. PP. 357 to 373).

II-6 The Dynamic Analysis of the Dutch Disease

In the absence of any market distortions such as short run inflexibility, sluggishness in economic variables or externalities, the boom raises national welfare. Therefore, as regarded in some of the literature the Dutch Disease is not looked upon as a problem unless it occurs with the presence of some kinds of economic distortions or externalities. Several Dutch Disease models were developed to trace either the effects of short run macro-dynamics given sluggish adjustment of economic variables, or adverse welfare effects associated with the presence of a market distortion or externality. The former will be discussed in this section while the latter will be discussed in the next section.

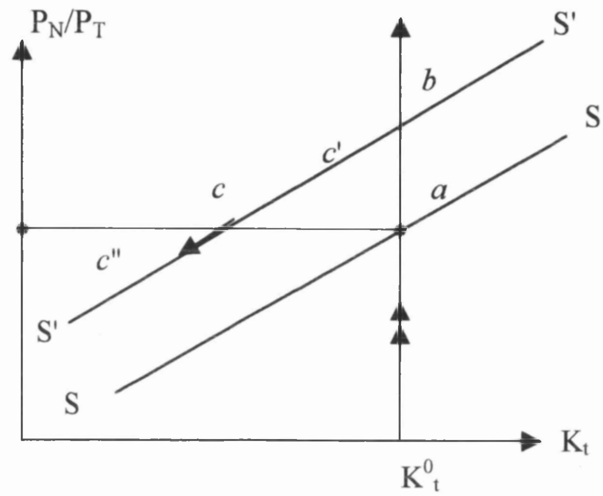
Neary and Purvis (1981) examine the short run adjustment of an economy faced with a resource boom towards the long-run equilibrium. They assume an open economy with three sectors, the booming sector (B), the non-booming traded sector (T) and the non-traded sector N. The booming sector employs capital and a factor-specific in its production process, where the traded sector uses both capital and labour. The stock of capital used in both sectors is assumed to be gradually augmented or depleted with the passage of time. Therefore, the booming sector is assumed to use no mobile factors in the short-run which implies that the resource movement effects of a resource boom are precluded. This assumption is consistent with the enclave nature of the oil sector. The non-traded sector in this model uses labour but was extended by Neary (1985) to allow for a factor specific to the non-traded sector with the same model. The latter extension does not change the conclusion of the model. All wages and prices are kept perfectly flexible in this model, as opposed to Dornbusch's overshooting model (Dornbusch, 1978), but the model assumes sluggish adjustment in the reallocation of capital between the two traded sectors (B and T).

Let the economy initially operate in long-run equilibrium. The effects of the boom in the booming sector could be illustrated by a figure which was used by Neary (1985) but with some modification (See Figure II-6). The horizontal axis represents the stock of capital allocated to the T sector. Therefore, in the short-run the economy is constrained by the initial allocation of capital to that sector, K^0_t. The vertical axis denotes the real exchange rate P_N/P_T, which is simply the relative price of N to the price of T. The curve SS is the locus of all combinations of P_N/P_T and K_t which are consistent with equilibrium in the market for N goods before the boom takes place. The curve is upward sloping, because a rise in K_t, with no change in P_N/P_T., indicates that labour is moving out of the N, which generates excess demand for N goods. To eliminate the excess demand, the real exchange rate must rise, which discourages the demand and stimulates the supply of N goods. The initial equilibrium is satisfied at point *a*.

Since there is only a spending effect in the short-run, the boom will cause the locus SS to shift upward to S'S'. The boom leads to a higher income and demand for N goods which raises their relative prices. While the wage in terms of N falls and induces higher demand for labour in that sector, the wage in terms of T increases thus discouraging the demand for labour in the booming sector. Hence labour moves from the latter towards the former. With K_t fixed in the short-run, this implies that the short-run equilibrium is satisfied at Pint *b* with a higher real exchange rate and lower non-resource traded employment and output. The short-run effect of the boom on the return to capital is positive in the booming sector but it is negative in the traded sector. Therefore, there is a clear incentive for capital to flow from the latter to the former. The short-run effect of the boom on the non-booming sector will be reinforced by the adjustment of the reallocation of capital in the long-run. The reallocation of capital out of T is more likely (given complementarity between capital and labour) to be accompanied by labour movement out of that sector and into N and this in turn works to mitigate the initial real exchange rate appreciation.

Moreover, since capital is now allocated more efficiently between the sectors, real income rises, which in turn induces an expansion in the N by squeezing labour out of B.

Figure II-6
Dutch Disease in Dynamic Framework



II-7. Why The Phenomenon is A Disease.

It was shown in the Core Model that real appreciation and de-industrialisation were necessary to achieve optimality in the case of a boom, so why should the phenomenon be considered a disease? There are two sets of reasons for this. The first is related to adjustment costs, and the second concerns various favourable characteristics that are usually associated with industry.

With regard to adjustment costs, if the boom is temporary then the initial de-industrialisation will have to be reversed when the boom ends. This reversal is usually difficult, costly and takes time to achieve. Shares in international markets are not easy to establish, and neither is international competitiveness because "learning by exporting" takes time to produce its desired effect. Furthermore, when a country stops exporting for a while, its institutional setting and industrial and organisational skills become out of date and lose their relevance for the international market which is increasingly developing and is characterised by fast changes. When the windfall ends, the country will therefore be unable, for a considerable time, to produce enough exports to sustain full employment and growth.

In addition, the volatility of the real exchange rate and relative prices in the economy entail high risk premia and lead to sub-optimal levels of investment. There will also be enormous frictional and adjustment costs as factors keep on shifting between the different sectors in response to the volatile real exchange rate [17]. Other adjustment costs arise from fiscal instability and the intertemporal volatility of consumption which implies serious welfare losses.

The second set of reasons for considering the phenomenon to be a disease has regard to the favourable characteristics of industry and these can be summarised as follows:-

II-7-1 Increasing Returns

Industry is regarded to be subject to increasing returns (Kaldor, 1961). The more an industry expands, the more efficient and productive it becomes. This is due to various reasons including, for example, the almost unlimited scope for specialisation and the division of labour in industry. Another factor contributing to the increasing returns in industry is the "learning by doing hypothesis" (Romer, 1986; 1987). The more you do in industry the more you learn and the more profitable it becomes. [18]/

II-7-2 Positive Externalities.

Furthermore, industry is also believed to produce externalities in terms of spreading technical programmes, innovation and dynamism in the whole economy. It also creates backward and forward linkages more than other sectors.

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[17]/ These include, inter alia, frictional unemployment, the unemployment of sector-specific factors of production and training and relocation costs

[18]/ For these reasons Kaldor argued that Verdoon's Law applies more to industry than to any other sector of the economy. Verdoon's Law states that the faster the growth of industrial production, the faster the growth in productivity. The references on Verdoon's Law are Verdoon (1949), Kaldor (1966), and McCombie (1987)

Another feature that may be considered a positive externality of industry is that it reduces structural imbalances. In developing countries as per-capita income increases so does the income elasticity of demand for, usually, imported manufacturing. This results in a widening balance of trade deficit and increasing unemployment. What exacerbates these problems is the inability of the primary sector to expand or absorb new entrants to the labour force. The capacity of this sector to expand is limited by its wealth or poverty of natural resources endowments and it is usually overburdened with disguised unemployment.

II-7-3 Terms of Trade

It is well established that the income elasticity of demand for primary goods is low while that for manufactured goods is high. This contributes to the declining trends in terms of the trade of non-industrial countries. The "deteriorating terms of trade" argument also holds at the empirical level despite the various methodological difficulties.

Countries which do not industrialise therefore are likely to remain poor and their balance of payments problems are bound to worsen. These factors beg industrialisation and justify the "Dutch Disease" connotation of windfall-induced de-industrialisation.

II-8 Policy Implications and Options

The above sections instructed that, according to the Dutch Disease Model, de-industrialisation is likely to occur in response to a boom. The possibilities of industrialisation in the context of the neo-classical analysis of the Dutch Disease Model, were shown to be limited to specific circumstances and to be negligible in the case of oil-related booms.

According to the orthodox version of neo-classical economics, excessive appreciation, and therefore the Disease itself, would not occur if market forces were left to operate freely. This is because the neo-classical theory assumes that perfect foresight and rational expectations prevail. In this context, financial markets will ensure that the currency does not appreciate beyond the level determined by long-run fundamentals, including the level of permanent income. It is also clear, however, that these assumptions are unrealistic. Mainstream neo-classical economics firmly asserts that indeed the Disease can be expected to occur as a result of windfalls and proclaims that it will be automatically reversed through real devaluation as the boom fades away. However, this mainstream philosophy still calls for action to avoid high adjustment costs, despite its acknowledgement of the positive externalities of industry for, inter alia, "learning by doing" reasons (e.g., Van Wijnbergan, 1984) and the main thrust of the Dutch Disease Model remains neo-classical. This is reflected in its general equilibrium framework of analysis with all its underlying assumptions including that of full employment and has implications for the explanations and policy recommendations that the Model offers.

To conclude the above overview, the main policy options that a country experiencing an oil boom faces are highlighted below.

The very first question that arises is how much of the oil resource to extract now and how much to leave for future extraction? This question is in the domain of the economics of exhaustible resources. The basic rule here is to compare the current price of oil to the expected future price, discounted by a social discount factor that more than likely reflects both the social rate of return on investment and the rate of time preference. This is called the Hotelling Rule (Hotelling, 1931). We leave this issue here as it is not the primary concern of this thesis. [19]

The second question that arises is this: once a certain amount of the oil windfalls are received, how can these windfalls be utilised in a way that is optimal and which neutralises the Disease? There are two broad alternative

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[19]/ For more details about this approach see Dasgupta and Heal 1979). Furthermore, it is important to note that this model suffers from similar shortcomings to those associated with the neo-classical approach of the Dutch Disease

strategies: the first is spending-financial stabilisation, and the second is absorbing the boom domestically by investing in tradables, especially industry.

The spending or financial stabilisation is the first best option from a neo-classical point of view. According to the permanent income hypothesis, most of the temporary boom income should be saved in order to intertemporarily maximise utility from consumption. The country should, therefore, be involved in saving abroad during a boom and dissaving during a bust. This will have the additional benefit of avoiding any temporary rise in domestic expenditure which would lead to real appreciation. Real appreciation will therefore not occur and the Dutch Disease will be avoided. According to the neo-classical approach the market mechanism will ensure that the structural composition of production is optimal and will warrant the simultaneous achievement of both internal and external equilibria, as explained earlier. If the exchange rate regime was determined administratively and a temporary boom occurs, then economic policy should aim at preventing real appreciation. If the government does not act and the Dutch Disease occurs, the government should devalue the national currency and this, along with the adoption of a liberal economic policy, would automatically lead to the reversal of the Disease and the restoration of optimality.

The strategy of total dependence on financial stabilisation abstracts not only from the positive externalities of industry but also from the fact that international capital markets are imperfect and tend to behave pro-cyclically rather than counter- cyclically. This pro-cyclical behaviour makes borrowing during the down-sliding cycle very difficult (and expensive) and renders the interest rate very low on savings abroad during the boom. Furthermore, this strategy of over-dependency on financial stabilisation can be self-defeating because the apparent strengthening of the final position of the country can lead to upward speculations on its currency, resulting in real appreciation, which is exactly what the strategy is initially designed to prevent.

Another important point is that it is questionable whether the price mechanism, and the real exchange rate in particular, can alone in reality play a decisive role in resources allocation. The appropriateness of the concern about keeping the real wage low to maintain competitiveness is also questionable. Not only can this wage policy be politically problematic and socially undesirable but it can also be argued that it distracts from the arguably more important dynamic determinants of promoting productivity and growth (Evans, 1986).

The alternative strategy to neutralise the Disease is to domestically invest most of the boom's revenues in tradables, particularly industry. This strategy would have two advantages: benefiting from the positive externalities of industry and creating a balance of trade deficit in the short term to ensure that the national currency will not appreciate. It can be argued that such a strategy, were it successful, would take the economy to new frontiers and would increase the capacity to export manufactured goods after the boom ends and allow higher rates of employment and sustained growth and development. Clearly, this approach is not limited by the inadequacies of the general equilibrium framework of analysis but is rather dynamic, and definitely more realistic, especially in the case of developing countries. It is, however, important to note here two reservations. The first is that this strategy is difficult to manage in a way that maintains that efficiency considerations are not totally ignored, and the second is that a degree of financial stabilisation would still be desirable to maintain financial prudence and to minimise the various adjustment costs arising from revenue volatility.

It can be argued that adopting either of these above strategies to extreme could prove disastrous. In all, the right balance will depend on the characteristics of the particular case in hand.

In conclusion, it can be argued that it is not inevitable that windfall booms should give rise to the Dutch Disease and that the final impact of the boom depends upon the initial circumstances and characteristics of the economy as well as the implementation of a successful policy to neutralise the Disease, thus allowing the economy to benefit from the newly available source of the boom without suffering from serious structural distortions.

II-9 Critique of the Dutch Disease Theory

Although the Dutch Disease Theory has provided valuable insights into the influence of exogenous shocks upon a small open economy, it has come under a barrage of criticism, some of which is theoretical in nature, and some is based on hard fact. The criticism given here originates from facts. It is not theoretical. This argument has been strengthened by the Dutch Disease Model's weak explanation of the facts observed to be the case in a number of countries experiences with booms, especially in the instances of those less developed oil-exporting countries such as Libya.

The discussion here is general, but in later chapters it will be more detailed when the Model's applicability to a number of countries is considered, and when dealing with specific economic sectors such as, for example, agriculture and manufacturing in Libya.

The critique is presented in three parts: the Model's assumptions, the nature of its analysis and thirdly its neglect of some important factors which, where considered from some points of view, do present the main limitation of the Dutch Disease Theory.

The first point in this context relates to the *Ceteris Paribus* Assumption. Just as in so many classical and neo-classical approaches, the Dutch Disease Model is based upon the Ceteris Paribus Assumption, whereby all things remain unchanged throughout the period under investigation. However, since some things may change, the Model's predictions may not truly encapsulate reality and also, because all countries experience sectoral changes for reasons irrelevant to the Model, it is difficult to determine the Dutch Disease effect at all, or its extent. Therefore, proving the counterfactual to the Dutch Disease

Theory is a condition rendered absolutely necessary for the correct testing of the Theory's assumptions.

The second point concerns the Model's weak explanatory capability because it does not show the range of change in sectoral contributions, and even following Gregory's 1976 Partial Equilibrium Model does little to improve this basic inadequacy. In this regard it is important to distinguish between the booms emanating from a new resource discovery and those induced by a favourable price change. The most prominent distinction between the two classes of booms is in the movement of resources. Resource movement certainly does take place in the cases where booms emanate from a new resource discovery, but it may not necessarily occur where booms are generated simply by favourable price changes within the economy. In cases where there is indication of resources shift, the General Equilibrium Analysis does not add much to the Partial Equilibrium Analysis, apart from showing the effect of changes in income and cost on the factors market of both traded and non-traded goods. Hence it is safe to say that what the General Equilibrium Model sets out to do is to explain sectoral shifts. This it clearly does do but only by showing that the traded goods sector declines, which is exactly what the Partial Equilibrium Model has already shown. It can also be said that resource movement obscures the effect of boom on output and employment within the non-traded goods sector. This is not a condemnation of the General Equilibrium Model, but it does clearly show that in those cases where there are resource transfers, there is nothing to be gained by moving from Partial to General Equilibrium Analysis[20]/.

Now we turn to the subject of full employment. Full employment is intrinsic to the Dutch Disease Model. It is founded upon Macro-Equilibrium Analysis with full employment. In other words, with no unemployment before,

[20] In fact, when only the spending effect is operative, Corden (1981) employs Partial Equilibrium Analysis for the traded and non-traded markets, with General Equilibrium assumed in the background.

during or after the boom[21]/ Therefore this assumption naturally prevents the Dutch Disease Model from being applied to a large number of booming economies. If the boom takes place in a low per-capita income economy, and some of its resources are idle and the economy is in the downswing of its business cycle when the boom starts then, inevitably, the increased demand created by the boom will lead to the expansion of the traded sector in both absolute and relative terms. This is never the case in economic circumstances other than boom conditions because it is usually the traded sectors (particularly manufacturing) that suffer most from contracted shares in aggregate output whilst services always enjoy a larger share in this.[22]/ But as demand rises and unemployment is reduced, incremental demand will have a far larger effect on the manufacturing sector than on the agriculture or services sectors. So with a faster rate of growth, the share of investment in GDP is greater, and this also implies a relative increase in the demand for manufactured goods.

In addition to that, the existence of an excessive supply of labour at the start of the boom means that resource movement need not take place at all because the booming sector can draw on unemployed labour, rather than on the labour employed in the traded and non-traded sectors. Thus the spending effect itself may be neutralised. Consequently, the non-traded goods sector can expand without an increase in the price of non-traded goods P_N because absorption of excess capacity means that output can expand without increasing costs. That is to say that the marginal physical product of labour in the non-traded goods sector will rise if wages rise in line with productivity, but not

[21] A post-boom unemployment case is discussed by Corden (1984) & Neary and Wijnbergen (1986) using disequilibrium analysis- where unemployment is caused downward rigidity of wages. In this case, labour is specific to the traded and non-traded sectors. in traded where the resource movement and the spending effect reduce returns to the specific factor in that sector, rigid wages can only lead to increasing unemployment, furthermore, if workers in the traded sector seek real wage increase to maintain their wages relative to those of the workers specific to the booming sector where market forces will have raised the real wage, unemployment in the traded sector intensifies. The reverse tacks place in the non-traded sector via the spending effect, which increases the price of the non-traded goods sector and, therefore, return to the specific factor.

[22] Once resources are fully utilised, the path of industrialisation would differ in industrial from industrialising economies. In mature industrial economies a further increase in *per capita* income increases the share of services, and contracts that of the manufacturing in aggregate output. This is due to both the Dutch Disease effect and to the same factors that cause de-industrialisation in these economies, namely higher productivity growth in manufacturing compared with that in services. In industrialising economies, a further increase in *per capita* income leads to a continuation of industrialisation, provided the Dutch disease effect is overcome.

more. P_N need not rise at all. Similarly, in the lagging sector the marginal physical product of capital rises because production is taking place at a higher level. Consequently, return to the specific factor does not decline even though P_T is fixed. So, resources do not withdraw out of the traded goods sector and transfer to the non-traded goods sector and both direct and indirect de-industrialisation are thus avoided.

Furthermore, since most of the developing economies are more likely to be quantity-constrained in world capital markets and in their own national markets (if saving is not approaching and there is credit rationing), then under these circumstances the boom will assist in relieving these constraints. This will be achieved either through increasing the country's creditworthiness or by making capital more abundant. In this case capital, coupled with the surplus labour available, will act as a motivation to accelerate the industrialisation process.

Another point that can be made against the Dutch Disease Model concerns the neo-classical models in general and relates to the assumption of no government intervention. According to this assumption only agents that optimise rationally in a competitive environment are allowed to shape the market [23]/.However, in most cases of resource booms, a significant proportion of resource rents are accrued to the governments. From a neo-classical point of view, the availability of these rents lowers the price of public revenue, which in turn increases the optimal proportion of publicly provided commodities in national income (See Neary and Wijnbergen, 1986:328). In principle, even if governments supplanted markets, this should not affect the conclusions of the Model, provided that government actions reflect the market's mechanisms. However, governments do not act in this way, either because it is impossible for them to do so, or because they have a political agenda to follow. Once removed from market image, government actions can affect the Model's outcome in unpredictable ways too. They may emphasise sectoral changes, or

[23] For more detail about the effect of the fiscal policies on functional income distribution and resource allocation see Corden (1981)

they may dampen them. That is to say that, without the inclusion of government in the Model, the outcome of the boom cannot be accurately determined.

Government action which relates to the Dutch Disease hypothesis includes spending and investment behaviour (the spending effect) and trade policies (which may impinge on tradability). Related sets of actions are macro-economic policies that are either induced by, or coincide with, the boom. These policies would either exaggerate the Dutch Disease effect (e.g. monetary contraction leading to currency appreciation), or counterbalance it (e.g. a devaluation leading to currency depreciation). Essentially, the effect of such government policies should be modelled separately to test the Dutch Disease Theory properly. In other words a counter-factual to the effect of the macro-economic policies on output and employment should be established before the Dutch Disease effect is assessed and in practical terms this would be quite difficult to do.

Referring to the static nature of the Model analysis, one could say that this is its most limiting aspect, since the dynamics of productivity growth and productivity differentials between the sectors are the supply-side factors that determine economic growth and sectoral shifts over time.[24]/. Under booming conditions the factors underlying productivity growth do themselves undergo significant changes. In developing economies booming conditions can induce rapid productivity growth for three main reasons. Firstly, the boom removes economic constraints such as the foreign exchange and investment saving gaps by making capital more abundant. Production can then take place with better quality investment and production inputs. The same result prevails because relative price movement makes imported capital and material cheaper relative to pre-boom conditions. Secondly, these conditions are consistent with technological advance, which is more likely to take place with new investment than otherwise. Thirdly, the existence of idle capacity in the pre-boom period,

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[24] The factors that determined growth and sectoral shares (on the demand side) are the increase in per-capita income and the differential income elasticities of demand for sectoral output.

which is rapidly absorbed as the boom expands demand, means that production can rise without additional inputs. More generally, the rapid expansion of demand generates rapid productivity growth through dynamic economies of scale that arise from learning-by-experience, integrated technology and new investors, etc. These changes are likely to promote industrialisation because of the higher productivity levels and growth rates in manufacturing.

Finally, if the boom takes place in the initial stages of industrialisation, the boom's effect on changing the structure of demand, as per-capita income rises, is an important factor in inducing further supply-side changes.[25]/ Thus, as income rises, more income is spent on manufactured goods than on the products of agriculture. This result is also created by the effect that the expansion of demand has on these supply changes and agricultural output and employment must be expected to decline relatively as per-capita income rises. It is therefore inaccurate to consider the agriculture and manufacturing sector in one category of analysis under booming conditions in these economies. Because even though the two sectors are certainly influenced in the same way by relative price changes, they are influenced in an opposite way by the income and demand effects. Hence Corden's (1984: 362-3) thesis that the Theory can be applied equally to agriculture and manufacturing is only correct within the Dutch Disease formulation, where there is neither growth nor change in productivity over time. Once the Model's assumptions are relaxed and dynamic analysis is adopted, the two sectors behave in totally different ways.

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[25] Specifically higher income and elasticity of demand for manufacturing than agriculture (Engle's Law)

CHAPTER III
REVIEW OF THE LITERATURE ON THE BOOMING SECTOR

III.1 Introduction.

As has already been mentioned, the Dutch Disease Model is a comparative static model applied to analyse the effect of favourable exogenous shocks upon an economy arising from either a new resource discovery or from an increase in the price of an exportable commodity has on the other sectors of the economy.

The Theory categorically states that provided the economy is an open economy with full employment equilibrium and given technology, the resulting relative price changes will decidedly favour the non-traded goods sector and lead to the reduction of employment and output in the traded goods sector. But the Model does not seem to be applicable to less developed oil-exporting countries experiences with booms and in those cases the very opposite end result appears to be true. So, is there an essential difference between the economies of developed countries and those of less developed ones ?.

Just how far are the predictions of the Dutch Disease Theory supported by reality ? Well, it is the intention of this chapter to look into these questions.

As related earlier, the Australian gold discoveries of (1851) and their impact on Australia's agriculture sector and its connected industries is the earliest example of boom referred to in the literature on the subject. This example raises the question of whether immigration can ward off de-industrialisation or encourage pro-industrialisation.

Following the discoveries, Australia understandably exploited her new-found resource by diverting a significant amount of capital and labour out of the traditional agricultural sector and into gold production. This in turn attracted a huge immigration of labour into the industry and contracted Australia's industrial sector.

According to Cairnes (1885), an increase of between 200% and 400% was needed in the prices of agricultural products simply to recoup this loss in labour. Sheep farming was severely affected and was regenerated only by the increased demand for meat resulting from the immigration. The price of meat actually increased by 400% and facilitated a recovery in the agricultural sector.

This example spotlights the effect that immigration has on the factors market of non-traded goods. The Dutch Disease argument claims that immigration should compensate for the effect of resource movement but not for the spending effect (including the spending created by the immigration itself). From a theoretical point of view, de-industrialisation can be avoided if immigration is sufficient to reinstate wages in the traded goods sector to their pre-boom level. But this does not seem to have happened in Australia's case, since wages in the traded goods sector witnessed a significant increase. However, since migrant workers also spent on non-traded goods this also meant the continued production of wool. De-industrialisation seems to have been relieved by immigration, but was not reversed by it, nor was it bypassed.

III.2 The Boom Experiences of Developed Economies.

As noted before, Australia's two new mineral resource discoveries during the 1970s have aroused much theoretical debate between Gregory's theory of 1976 and Snape's of 1977. This debate constituted the cornerstone of the Dutch Disease Model.

Although the two resultant booms increased the share of the minerals in GDP only marginally, this small increase involved long term adjustment difficulties. Sustainable revenues over a long time combined with fixed exchange rates led to the substantial appreciation of Australia's exchange rate. This appreciation was more pronounced in the second boom, compared with the first. This was because the expectations were too optimistic regarding the size of the second boom to lead to rapid increase in prices and wages. Since 1982 there was a depreciation consistent with the view that earlier price forecasts had certainly been optimistic (Forsyth, 1986, 256).

Excluding oil, most of the other minerals of Australia were exported and the booms altered her trading position. As mining grew after the first discoveries wool exports declined and the decline might have been more than justified by the boom conditions. The Government reduced tariffs by 25% (Gregory, 1976, Forsyth, 1986).

The main feature of these booms was the considerable resource movement which occurred involving immigration and the withdrawal of capital and labour from their usual places and into mining. The outcome for the traded goods sector was that output and employment contracted whereas the outcome for the non-traded goods sector was ambiguous because it depended on the magnitude of change in relative prices and movement of labour (Forsyth, 1986).

The third case in this study is the British experience from their North Sea oil and gas discoveries. This experience illustrates the enclave type of booms, in which little or no resource transfer occurs while the resource rents are very large. The spending effect therefore dominates, and leads to the expansion of output and employment in the non-traded goods sector. However, since the boom started at a time when such economies were experiencing de-industrialisation, it is crucially important to distinguish between the causes induced by the boom and those which are not connected to the boom but may have led to the de-industrialisation phenomenon. De-industrialisation in developed economies is caused, on the demand side, by the greater than unity income elasticity of demand for services and, on the supply side, by the higher growth rates in labour productivity in manufacturing compared with services. As per-capita income rises, demand for services rises at higher rates than that of aggregate demand. However, with productivity in services lagging behind that of manufacturing, labour will be drawn from manufacturing into services and not from agriculture, whose small share in aggregate output in small developed countries cannot be reduced any further. The two effects combined lead to an increased share of labour in services and a reduced share in manufacturing. Additionally, prices in services will rise and in manufacturing they will fall because of the productivity differential between the two sectors, thus increasing services and reducing manufacturing's share in aggregate output. The Dutch Disease effect in such cases is brought about by the relative price movement induced by the boom, which makes tradables less profitable to produce than non-tradables.

In the British North Sea oil case, the movement in prices was mainly caused by spending the additional income gained from the boom on both the traded and non-traded sectors, and by the rise in the prices of non-traded goods relative to those of traded, whose prices are determined in the world markets. This clarifies how de-industrialisation may have two entirely different causes. However, the margin between the two effects is more illusory than real, since the sudden rise of income can be expected to reinforce the tendencies underlying de-industrialisation.

Theoretically the Dutch Disease Theory does not deal with these complexities. It either ignores the effect of growth on general equilibrium or ignores productivity growth altogether. Practical analysis is thus left without an adequate framework on which to base an accurate assessment of the boom effect on sectoral outputs.

Forsyth and Kay (1980) stirred debate concerning the method that was used to analyse the economic implications of the North Sea oil revenues. Basing their analysis on a neo-classical model, they showed that a balance of external trade must be maintained if the use of domestic resources is to rise in line with national income. This implies that a movement from deficit to surplus in the primary account must be reflected in a movement from surplus to deficit in other accounts, which consists largely of manufacturing. Moreover, since manufactures make up a much larger ratio of the traded sector than that of the economy as a whole, the crowding out effect of the boom will be disproportionately concentrated on manufacturing. In other words, there is no mechanism for deriving benefit from North Sea oil which does not sooner or later require structural changes which then reduce the production of manufactures. Forsyth and Kay further went on to say that the benefit to the

UK citizens(a rise in their income) comes indirectly through changes in terms of trade. Such a rise in income then permits a further rise in the utilisation of total domestic resource. This additional income is best invested and the most ideal type of investment is one that uses tradables to produce non-tradables (i.e., imported machinery for use in services). Investment in manufacturing, or indeed in any type of protection to manufacturing, is counterproductive. Structural unemployment is likely to increase if reductions in wages in manufacturing are resisted.

The discussion originated mainly from the suggestion of a reduced role for manufacturing in the future development of the UK. Criticisms did not, however, challenge the logic of the argument in any essential way (Forsyth and Kay, 1980-81). Because Forsyth and Kay's exposition created a hypothetical case based on comparative static analysis and was basically micro-economic, while the UK's coexistent problems were of a macro-economic nature, the article did not answer many normative questions, such as what fiscal, monetary, and wage policies the government should follow. Since a large share of the rent accrued to the government, the failure to address government spending rendered the analysis unduly partial.

The British boom experience highlights the need for micro-economic rather than macro-economic analysis, as the boom came at a time when economic performance was poor and there was a need for further disaggregation of the non-booming traded sector. The oversimplified presentation of the economy in two sectors, (traded and non-traded) hides much of what actually happened during the British boom (Forsyth, 1986).

The complexity of the British case stems from the presence of other real changes which took place during the boom, the effects of which cannot be distinguished from the boom effect. These effects were not large enough to be indisputably noticeable in the data (Forsyth, 1986). Their existence, however, is evidenced by a larger decline in manufacturing than is justified simply by the increase in oil and gas production. Manufacturing fell from 30% of GDP in

1974 to 23% in the early Eighties, while oil and gas production rose by only 5% in the same period (Barker, 1981). The uncertainty regarding how large any particular change from the boom should be casts a cloud over the Dutch Disease analysis especially since more expectations of changes would themselves have had real effect on the economy. We have evidence of this in the case of Norway just as much as in the British economy. After 1976 the UK currency appreciated even before actual oil production had started and whilst the balance of payments was still in deficit (Forsyth and Kay, 1980). Whereas between 1974 and 1976, when people were unsure how significant the North Sea oil find was going to be, the foreign exchange rate was low and it was this that led to the revival of industrial production up to 1979 (Forsyth, 1986).

The British boom brings out other important points overlooked by the Dutch Disease Model because of the Theory's level of aggregation and its assumptions of perfect market and small country. Within manufacturing performances differed widely. Whilst some manufacturing industries expanded there were others that declined at a faster than average rate for the sector as a whole (See Forsyth, 1986: Table 8.15 p. 267).

According to Forsyth, (1986) some markets may have had a lagged response to the boom which manifested in the overshooting of the exchange rate. The rapid appreciation of the pound and its subsequent rapid decline revealed that some overshooting did in fact take place. This is a plausible explanation for the larger than merited de-industrialisation in Britain.

Forsyth (ibid.) also mentions the possibility that the small country assumption was not justified for all manufacturing industries. As the currency appreciated, some industries might have been able to secure higher than market prices for their exports, and lower prices for imports. In such cases appreciation would have been aggravated, and adjustment would have been forced on a smaller number of industries.

The Dutch experience reveals how governments can largely supplant market factors and still bring about the same structural changes predicted by the Dutch Disease Model. The most prominent feature of the Dutch boom was the government sector. Although the government sector in the Netherlands was large and already dominated, it expanded further with the discovery of energy in the late 1950s. About 80% of gas rents accrued to the Government, making up 14% of its total income in 1981. However, public expenditure wildly outstripped the growth in revenue. Government expenditure had already reached a high level prior to the boom (Ellman, 1981). But by 1981, the share of central and local government expenditures in the national income had grown to become more than 800% larger than that of gas. Wages also increased rapidly during the boom and soon labour productivity could not keep up with it. Added to that employers social security contributions increased, swelling the increased labour costs. Wages in Holland had become much higher than those in Germany-its most important trading partner. The wage differential between the two countries exerted pressure on production costs and squeezed profits. As a result, rapid structural changes took place in the economy and chief among these was the de-industrialisation phenomenon. Labour-intensive manufactures such as ship-building, vehicles, metal manufacturing and mechanical engineering experienced low profits or even loss because of growing aggressive world competition and the textiles, clothing and shoe industries almost disappeared during the late Seventies. Consequently, the capital-intensive, labour-extensive sectors of the economy replaced those industries. Meanwhile the services sector continued to grow but was not able to absorb all the labour that manufacturing industry had discarded. Unemployment had not existed in Holland prior to the boom but in the early Eighties it stood at 6% (Ellman, 1981: 157).

However, as a case for the Dutch Disease, again the Dutch experience seems to be far from ideal because the boom was actually superimposed on long-drawn out structural changes in the economy. De-industrialisation did not start with the energy boom. It started much earlier in the mid-Sixties, as indicated by the decline in the share of manufacturing, the balance of payments deficit and the rapidly increasing share of the services sector. These trends in Holland have also been observed in other progressed economies. So too have other symptoms: increasing participation of the public sector in GDP, the internationalisation of leading industrial enterprises, modification of the sectoral structure within manufacturing industry, a decrease in the rhythm of growth of industrial productivity in the mid-1960s, and the falling profit rate since the end of the 1960s. All these factors appeared before gas exports became relevant to the Dutch economy (Fajnzylber, 1981). An observation which should remind us of the need to distinguish between the temporary effects of the boom, the Dutch Disease effect and the more profound de-industrialisation problems in Europe.

In managing energy it is generally accepted that Holland is the example to be avoided, and Norway the one to be followed (Kaldor, 1981 and also Barker and Brailovsky 1981).

Norway's oil reserves are larger than Holland's. Relative to its economy Norway's oil represents a third of exports and an equal output share in GDP as that of manufactures, and this major position is expected to prevail well into the twenty-first century. Thus long-term adjustment issues are involved. In the mid-Seventies, there were expectations of high levels of revenue. Anti-recessionary measures were adopted, and domestic demand and employment were kept high. Foreign borrowing was increased rapidly, and financial incentives in different forms were given to some of the struggling industries when traditional exports stagnated. In 1978 there were fears that Norwegian industry's competitiveness might decline because of the uncertainty of future oil prices and accordingly, the prevailing policy of demand expansion was reversed, domestic demand was reined in and a comprehensive prices and incomes freeze was instituted (Bjerkholt 1981).

From a neo-classical point of view, this non-adjustment stance entailed resources waste, especially since energy resources are sustainable over long periods of time. However, the Norwegian example is celebrated because it shows how, at an efficiency cost, the transitional cost of adjustment to post-boom conditions is reduced.

III-3 The Boom Experiences of Developing Economies

The experiences of booms in developing economies raise a number of important theoretical issues, some of which have already been discussed in connection with the experiences of developed economies. It is, first of all, clear that government action plays a crucial role in determining the impact effect of boom on resource allocation. Secondly, what is revealed is the importance of finally adjusting the traded and non-traded dichotomy on the basis of careful examination of trade policies and institutional aspects which affect tradability - e.g. low absorptive capacity or high cost of transportation.

One certain thing that causes industrialisation in developing economies is the differential income elasticity of demand for manufacturing and agriculture (greater than unity in the case of manufacturing and less than unity in the case of agriculture). There are supply-side factors underlying industrialisation too. The most important of these is the above-average rate of growth in labour productivity in manufacturing. As per-capita income increases, the stimulus given to manufacturing output is disproportionately larger than that for agriculture. Agricultural output declines and is compensated by a rise in the share of manufacturing. Thus, the industrialisation process in developing economies, which continues during their booms, works in the opposite direction to the Dutch Disease effect. This is quite contrary to the experiences of developed economies where the two processes work in the same direction. But it is just as difficult to distinguish between the two effects in the case of developing economies as it is in developed ones, unless the industrialisation effect overcomes the Dutch Disease effect, as is the case for most developing economies.

There are other aspects in which the experiences of developing economies differ widely from those of developed ones and these are connected with the initial conditions on which the boom is superimposed. These conditions include a low level of per-capita income, a small market, an excess supply of labour and constrained borrowing ability. The boom changed those conditions in these countries either directly, by making capital more available and creating a rapid expansion of demand that absorbed excess capacity, or indirectly through relative price changes, which made imported inputs relatively cheaper. The outcome of such changes is the acceleration of industrialisation, or reversed Dutch Disease.

Now we come to a very interesting case- that of Indonesia. Its government's actions actually reversed the boom's effect on agriculture rather than added to it. The share of oil in Indonesia's national income is very significant (rising from 5% in 1970 to no less than 25% in 1980). The share of oil in total exports however, features less prominently because of the phenomenal success of other major commodities. The boom revenues completely monetised, and as a consequence there was currency appreciation, which led the government to devalue twice in 1978 and again in 1983 (Warr 1986).

Despite appreciation, agricultural output in Indonesia grew by nearly 4% p.a. between 1970 and 1982. During this period rice production increased by two-thirds, maize production increased by 50% and cassava by 25%. Furthermore, the period 1977-82 brought about an agricultural export boom due to favourable world prices. Over the Seventies, rubber production increased by a fifth, palm oil exports tripled, crop exports rose by nearly half, and coffee exports were up to over 40% (Scherr, 1989).

There seems to be four main reasons explaining Indonesia's singularly distinguished performance. First there was the very fortuitous coincidence of the Green Revolution. Then there was the equally fortuitous and effective setting-up of rural institutions just before the start of the boom (Gelb 1986 : 337). Thirdly, foreign exchange availability from the oil shock enabled the purchase of fertilisers which were necessary for growing the new varieties of rice that were planned and lastly the commitment of the Indonesian Government to pursue the development of rice products. The Government extended subsidies for the purchase of fertilisers to promote Green Revolution technologies. They provided technical extension programmes, small scale infrastructure improvements and smallholder irrigation rehabilitation in Java (Scherr, 1989).

In general, one might say that government spending priorities heavily favoured rural areas. Government spending on agriculture rose from 16% prior to the boom to 22% in 1979-80. Prices and trade policies were also used to stabilise agriculture. Prices generally followed international markets, but a guaranteed base price was maintained. The risks of unfavourable world prices and uncertainty were borne by the Government, although there were no large net public subsidies. Imports were targeted to cover only domestic production shortfalls. Many traditional export taxes were abolished or lowered in 1976 and 1978 (Scherr, 1989).

According to Gelb (1986), Indonesia's agricultural change was closer to the resource rent and technological change, than it was to the Dutch Disease. Manufacturing performed much better than agriculture in Indonesia during the boom, supported mainly by an effective rate of protection as high as 66% compared with 11% for agriculture (Scherr, 1989)

Despite the celebrated performance of agriculture in Indonesia its share in aggregate output had declined at faster rates during the boom period than would have been expected had previous trends continued (Warr 1986). Thus, even in Indonesia, the boom period seems to have been one of rapid industrialisation, since growth in manufacturing's share in aggregate output was also higher than previous trends. The average change in manufacturing's share over 1972-1981 was 0.8% p.a. while the norm change predicted in this share on the basis of the Chenery-Syrquin methodology should have been only 0.34% p.a.

Now consider Nigeria. It attracted a lot of attention because of its poor performance during and after its boom. As a percentage of GDP, oil production in Nigeria increased from 8% in 1970 to 22% in 1983, and its share in total exports rose from 57% to 70%. With 80% of the population living in rural areas, agriculture's performance seems more relevant for Dutch Disease analysis than manufacturing does, even though manufacturing increased its share at an average 0.48% p.a. against an expected norm of only 0.11% p.a. and agriculture declined at 1.9% p.a. against an expected norm of 0.67% (Gelb, 1988). It must also be said that government policies increased the boom's effect on agriculture.

Nigeria started the boom with an already over-valued currency, but with an inflation rate ranging between 20-35% p.a. during the boom, the Nira suffered from extreme over-valuation (Scherr, 1989). Between 1973 and 1981 the effective real exchange rate appreciated by 110%, and by a further 13% in 1984 (Struthers, 1990). The increased opportunities for employment and self-employment in services and distributive branches in urban areas created a pull on labour from agriculture, pushing up rural wages three-fold during the period 1970-1982 (Scherr, 1989). Consequently, CPI-deflated food prices rose by 46% over 1968-1977 (Struthers, 1990). The result was that food production, which constituteed 90% of total agricultural production, increased at the modest rate of nearly 3% during the two booms, which was less than population growth, while the formerly dynamic agricultural export sector declined at an average rate of 30% p.a. Cocoa production declined by 43% p.a., rubber by 29% p.a. and cotton by 65% p.a. Groundnut exports declined just to meet domestic demand. Only the protected palm kernel and palm oil sectors rose by 23% and 30% respectively. Over the same period the share of agriculture in national output declined by no less than 55%, and its share of total employment declined by 21% (Scherr, 1989).

Although the decline in agriculture in Nigeria had begun prior to the boom, there are reasons to believe that during the boom the decline actually intensified. Simply during the year between 1976 and 1977 it fell by almost 23%.

Gelb (1986) has argued that, if agriculture is broken down into food agriculture and export agriculture, then it can be said that the former was non-traded as it was effectively protected from international markets by deficient port facilities. If this was so the Nigerian case comes much closer to the model of the Dutch Disease Theory. However, this does somewhat over-simplify the Nigerian case. The decline in export agriculture in Nigeria was not only the result of resource transfers out of agriculture, and of increased spending on services, but also of numerous other factors. During its boom Nigeria was adopting a strategy of import-substitution, and thus imposed taxes on exports and barriers on imports. The adverse terms of trade for agriculture benefited food producers for the domestic market, and harmed exporters. Government investment policies were disposed against rural development (Struthers, 1990). Throughout the decade, government spending on agriculture amounted to between 3% and5% of its total expenditure and rose to between 9% and10% during 1980-1982. The largest proportion of government expenditure during the boom period went on transport, education, construction, vehicle-assembly and a major steel complex (Pinto, 1987). Furthermore, investment in agriculture was dominated by large-scale capital intensive projects. Scherr (1989) argues that most of these projects were inefficiently managed and drew resources out of small agricultural activities. Only 17% of agricultural expenditure was placed on small farm activities.

Trade pricing and marketing policies, on the other hand, were irregular and seem to have further confused farmers who were already overwhelmed by price fluctuations (Scherr 1989). For instance, between 1978 and 1982, import duties on maize, rice, wheat and sorghum were increased to between 50% and 100%, but trade was already controlled by quantitative restrictions through import licensing. Export taxes were maintained until 1976, but were replaced by subsidies in 1982. Support prices were granted for many major crops, and although in some cases they were twice as high as international prices, they did not compensate for the indirect tax of currency over-valuation, except in the case of palm kernel and palm oil (Scherr 1989). Also agricultural tariff rates were lower than those for manufacturing.

In contrast, manufacturing output grew at an average rate of 13.4% p.a. over 1970-82. This may be explained by tariff protection and the availability of imported input, cheapened by high currency overvaluation. New capital-intensive industries, such as iron and steel, and petroleum refining, were created during the boom. However, after 1982, manufacturing declined sharply because imported raw and intermediate materials were no longer available (Struthers, 1990). Thus the growth of the whole of Nigerian manufacturing during the boom hinged on relaxing the foreign exchange constraints and on relative price movement. Whilst the effect of adverse relative prices on the trade position of agriculture in Nigeria is easy to interpret, the same is not true of the output of its traded sectors. Disregarding, for the moment, the confusing signals government action sent to agriculture, the latter's performance was not as surprising as the above suggests it ought to be given what happened in manufacturing. Manufacturing's remarkable 13.4% p.a. growth rate compared with non-oil GDP growth at 5.3% p.a. over 1972-81 (See Gelb, 1986: p.,79) by necessity meant a large increase of manufacturing's share in aggregate output which was compensated by a decline in that of agriculture. Seen in this light, a 2.3% p.a. growth in food agriculture, which as has been said, makes up 90% of the Nigerian agricultural sector, seems quite reasonable.

The crucial point is that Nigeria's experience during its oil boom is better interpreted as an acceleration of industrialisation, which is to have been expected, given the rapid rise in per-capita income and agriculture's initial 49% share of gross output. Thus, paradoxically, agriculture's poor performance during the boom is in part the reverse of the Dutch Disease Model and not totally a symptom of it.

Despite the recognition by many Dutch Disease economists, that a rise in manufacturing's share is normally accompanied by a decline in that of agriculture, the speeding decline in agriculture's share is still looked upon purely as a symptom of the Dutch Disease rather than merely an accompaniment of accelerating industrialisation. This confusion in the literature upon the Dutch Disease seems to have been encouraged by Corden's (1984) assertion that the Dutch Disease Model applies equally to agriculture and manufacturing, since both produce tradables. The term de-industrialisation can therefore be misleading. It has to be reaffirmed that a rise in the manufacturing share of an economy's national output would be coupled by a decline in its agricultural sector if the circumstances concurred with the assumption of Corden's static model - in other words - with no growth, no productivity change and no structural change over time apart from those induced by the change in relative prices. But this is not true in real world economies where these changes do take place over time, and they do so more strongly during the boom than otherwise, because of the rapid rise in income. Thus, while it is to be expected that the two sectors would behave similarly in response to changes in the structure of prices, their behaviour should be fully expected to differ in responding to the income-demand effect, because of differential productivity growth in the two sectors and because of differential income elasticity of demand, which would instigate different supply responses.

Now let us introduce the Iranian case. However, only performances during Iran's first oil boom are considered here, since its second oil boom coincided with political instability.

Because oil revenues accrued in totality to the Government, the Iranian story is distinguished because it reveals clearly the importance of incorporating micro-analysis, the study of socio-economic institutions and an awareness of practical reaction to government policies.

Although Iran had been very dependent on oil prior to its boom, its dependence had vastly increased following the oil price shock of 1973-1974.

The ratio of oil to total exports had increased from 75% prior to the boom to 84% during it. Oil revenues were used for consumption. Consequently, during the boom period both the government and private consumption had increased at average rates of 12% p.a. and 10% p.a. respectively. For the same period investment (in terms of GFCF) had increased at an average rate of 10% p.a.. However the share of consumption in total oil revenues was larger than that of investment and was equally divided between military and subsidies. Investment was directed towards construction and services. Investment in agriculture (including the credit to agriculture) constituted about 5% of GDP during the boom (Majd, 1991). In the meantime the share of agriculture in non-oil GDP declined from its pre-boom levels by more than 6% (Jazayeri, 1988: 54). This performance, however, is open to conflicting interpretations. On the one hand Gelb (1988: 88) estimates that agriculture's share in total output over the period of 1972-1981 had declined by 0.42% p.a. more than it should have done had the norm been followed. On the other hand Majd (1991) contends that agriculture performed rather well during this period since its value added rose at an average of 2.5% p.a.

The most prominent feature of Iran's agricultural performance was that small farming enterprises performed more profitably than large ones. The reason for this was the phenomenon of family labour and dual employment. It was common for people to work part of their time in agriculture and part in rug-making or construction to supplement their incomes. So, despite the fact that transportation costs and wages rose twice as fast as the increase in sugar prices, the total production costs of small farms rose slower than those of larger producers. Thus, the cost of yield per hectare was lower for small farms than all others. This fact indicates the importance of micro-analysis to understand the mechanisms by which a boom's effects are transmitted to agriculture.

Considering now the manufacturing sector. This sector is less ambiguous than agriculture. Its general performance was in line with the Dutch Disease Model (Jazayeri, 1988). Prices of manufactures lagged behind those of construction, while- in real terms- labour costs increased at an average of nearly 13% p.a. Manufacturing had been the largest growing sector in the Iranian economy during the ten years previous to the oil boom. but had dropped to 5.9% p.a. over 1973-1979 and lost its position to services. Manufacturing's share in total output declined by 6.7% during the first oil boom and therefore Iran experienced de-industrialisation.

Performance varied between different industries within manufacturing, just as it did in the agriculture sector. The labour - intensive textile industry faced stiff competition from cheap imports and started declining from 1976. But Jazayeri suggests that growth took place in the manufacturing industries with low value-added and a high percentage of imported inputs. Therefore, the capital-intensive footwear industry was able to thrive, as also the transport equipment and metal products industries. Other non-traded industries grew well too-such as non-metal mining products. Thus, even at the micro-level, Jazayeri is able to explain the performance of traded goods production while staying strictly within the Dutch Disease analysis by using the factor intensity argument and the de-composition of the traded sector.

Finally, we include the case of Libya. Comment here, however, is brief because extensive facts are provided in the chapters which follow in this analysis.

The period of 1970-1982 in Libya, covering its two booms, saw very considerable public investment in the traded sectors. Investment in agriculture reached an amazing 19.7% of the total investment. In manufacturing it consisted of 15.8% of the total. A significant proportion of government investment also went into infrastructure: mainly transport and communication, electricity and construction. This type of investment directly enhanced production and distribution efficiency in the two traded sectors since it increased the handling capacity of exporters and the imports of raw and intermediate inputs. During these years GDP grew at 9.2% p.a. Growth in agriculture was running at 10% p.a. and manufacturing-one of the fastest growing sectors-was increasing at no less than 12.5% p.a. The ratio of oil revenues to the GDP and exports between 1973 and 1982 averaged at 57.5% p.a. and 90% p.a. respectively (Based on 1970 constant price). The performance of Libya throughout its boom periods was outstandingly remarkable.

Gelb (1986) selected seven booming developing countries- Venezuela, Ecuador, Trinidad and Tobago, Algeria, Indonesia, Nigeria and Iran-to examine how closely, if at all, their experiences fitted the Dutch Disease Model. The study revealed that there were deviations from the Model both in sectoral shifts and exchange rate movements, and the correlation between these two variables was not always good. The study also suggested that government role was the single most important determinant of performance both during and after the boom.

The estimated average size of the revenues in these economies was about a quarter of non-oil GDP and about four-fifths of it accrued to the governments whose reactions, therefore, primarily determined the ultimate effects of price increase. All the countries examined showed a striking readiness to use about half their revenue to finance domestic capital formation. This share was reduced by greater consumption in the late 1970s, while the fraction invested abroad remained stable at a quarter throughout.

Government strategies varied widely from country to country. At one extreme the public sector had accounted for 90% of domestic investment. At the other extreme the role of the public sector had been very limited. Nevertheless, all these oil exporters witnessed remarkable growth in the size of the public sector after 1973 and, in most instances, the public sector participated directly in industrial output. Investment was intended to increase growth and attenuate currency appreciation and, therefore, the sectoral shifts of the non-oil output. However, this depended on the efficacy and distribution of capital formation and the factor intensity of various sectors. A recurring effect in the countries investigated by Gelb was that the oil price shock itself rendered some of the initial capital stock obsolete. Within these economies the impact of investment on growth had been disappointing. Most infrastructure investments were subject to long gestation lags. Often public investment was in large-scale projects, which were enormously costly and produced disappointing operating performances. Findings on the performance of agriculture show that public and private investment in that sector brought about significant technological advances. Investment in public agriculture development projects, which started in 1962 and private investment in on-farm machinery, improved agricultural input and modernised production techniques. These technology-embodying investments changed technical conditions of production, and were taking place at much higher levels of productivity and, therefore profitability. Once oil revenues had fallen, governments faced serious problems in attempting to curb the momentum of public investment, some of which implied large future recurrent obligations and growing subsidies.

The rapid increase of oil revenues allowed the existing industries to expand very fast without increasing their production cost, through utilising more of their existing capacities and enhancing the opportunity to establish new industries.

On average, the non-oil economies in these countries were 4% smaller during 1979-81 than they would have been had they maintained their 1967-72 growth trajectories. Average non-oil growth after 1972 was only 0.9% more rapid than that of oil-importing developing countries. Moreover, most of this growth was demand-led rather than supply-generated, in the sense that non-oil growth responded to increased absorption after 1974 but was lowered after 1978, despite the expectation that large investment undertaken in the period 1975-78 would begin to contribute to output (Gelb, 1986).

The most salient feature of these experiences with booms is the influencing effect they had upon the initial conditions on which the boom is superimposed. These initial conditions can be classified into three: i) the level of per-capita income and the degree of industrialisation prior to the boom, ii) the economic constraints prevailing just prior to the boom and iii) the particular phase of the business cycle within which the economy was operating just before the boom.

In general, economies can be divided into two groupings on the basis of the extent of industrialisation at the start of the boom: those whose share of manufacturing in aggregate output was on an upward trend and those whose share was on a downward trend. The forces that underlie industrialisation or de-industrialisation, are related to the level of per-capita income, differential income elasticities of demand for sectoral output and differential productivity growth between sectors. These forces do not stop operating during the boom, rather, they operate more powerfully because the boom is equivalent to a demand shock if revenue is partially or wholly monetised. But since these forces work in the same direction as the Dutch Disease effect in developed economies, and in an opposite direction in developing economies, we would expect them to augment the Dutch Disease in the former and to counter it in the latter cases.

As has been said the second initial condition that influences the sectoral outcome is the presence of economic constraints, such as a balance of payments deficit, or being quantity-constrained in the capital markets. These constraints may hold back industrialisation, so their removal can only accelerate it. Furthermore, the availability of capital and imported inputs is consistent with both technological advance and rapid productivity growth and both of these speed the industrialisation process.

Thirdly, sectoral shifts are also influenced by the economy's position in the business cycle at the start of the boom, as already noted. The Dutch Disease Model assumes the economy to be in macro-equilibrium with no unemployment at any time. On the other hand if, prior to the boom, idle capacity exists in the economy, whether it is a developed or developing economy, the boom is likely to induce industrialisation. This is because, under conditions of repressed demand, the share of services is disproportionately large and that of manufacturing disproportionately small.

On the question of employment, the experiences of developed and developing economies differ considerably.

It is likely that developed economies start the boom with fully employed resources, but the boom creates unemployment because of wage increases and downward rigidities in wages, and through the replacement of labour-intensive sectors (manufacturing) with capital-intensive, labour-extensive sectors (energy). In such cases a more useful model would be one in which the full employment assumption is relaxed. Additional employment is created by, among other things, oil revenues, government spending, and the wage rate (Seers, 1962).

Alternatively, developing economies are likely to start the boom from a position of unemployment. This unemployment will be reduced or eliminated by the boom as the foreign exchange and savings gaps are relieved. The reversal of the boom would reverse the picture, leading again to an excess supply of labour. In this case the more useful model is likely to be one in which the full employment assumption hinges on the removal of economic constraints such as the two-gap model (Salizu, 1990).

It is important to note that, as far as employment is concerned, the outcomes for developed and developing economies will differ because the idle capacity starting point of developing economies will ensure that productivity gains associated with the boom will be very significant, thereby leading to an expansion of manufacturing where productivity growth can reasonably be expected to be fastest.

III-4 Synthesis

If we synthesise all these factors, namely, the growth in per-capita income and its effect on changing demand structure, the presence or absence of economic constraints and thirdly, the state of the economy in regard to its position in the business cycle, we produce two plausible themes. One of these themes is representative of the majority of developed economies experiences, and the other represents those of the majority of developing economies. The two themes are as follows:

In a pre-boom developing economy, per-capita income is low, demand is constrained by a balance of payments deficit and lack of investable funds, and there is, therefore, an excess supply of labour. If, in addition, the economy is very small there may be idle capacity because of the efficient size of plant constraint. Furthermore, much production technology will not be state of the art technology because of the foreign exchange constraint, and because investment in human resources is also constrained by the generally low level of economic activity. As per-capita income rises in the course of development, the relative importance of food expenditure undergoes a continuous decline and that of manufacturing a continuous rise. However, the above-mentioned economic constraints will hold back industrialisation. The boom changes these conditions. Per capita-income rises rapidly, inducing a fast expansion of demand. Foreign exchange becomes relatively abundant and imported inputs are purchased more cheaply than before the boom. Industrialisation can proceed at a quick pace since, as idle capacity is reduced, output expands while unit costs fall and productivity is advancing. There may also be rapid technological change induced by imported capital and material. The effect of relative price changes on output (the Dutch Disease effect) would counterbalance these forces, but it is unlikely to reverse them.

In developed economies, per capita-income is high and demand is buoyant enough to absorb any excess capacity into the economy. Technology is state of the art, and production takes place at the frontier. The economy experiences de-industrialisation. The rise in per-capita income induced by the boom can only accelerate these patterns. In addition to this the Dutch Disease effect also reduces the share of manufacturing in aggregate output through change in the structure of prices and continued de-industrialisation is the most plausible outcome. This assertion is consistent with the experiences of the developed booming economies reviewed above.

We end this chapter by stating that the Libyan experience brings to light the dynamic approach of booms neglected in the Dutch Disease literature. Practical findings on Libya lend support to Karshenas' argument (1990) that boom conditions are conducive to rapid technological advancement. Libya's experience also shows that investment in non-traded sectors e.g., transport and communication, electricity and water and construction can be complementary to that in the traded sector and, therefore, increases return to factor employed in the production of tradables.

CHAPTER IV
A REVIEW OF THE LIBYAN ECONOMY: HISTORICAL BACKGROUND, STRUCTURAL CHANGES AND DEVELOPMENT PATTERNS

IV-1 Introduction

The structure of the Libyan economy provides a challenge to development economists because it does not fit in easily to any of the traditional broad classifications of either developed or under-developed economies. The lighting speed of change within Libya has contributed to the blurring of this distinction, and Libya's economy combines extreme features of both these broad classifications.

So, on the one hand, the economy is characterised by rising capital surplus. With no country in the world has development proceeded with such rapidity as in Libya with the exceptions of Saudi Arabia and Kuwait. The rate of economic growth since the early 1960s has been high and relatively stable, averaging 10.5% p.a. (in real terms) over the period of 1962-1990. The country has one of the highest per-capita incomes, and one of the highest savings rates. These facts in themselves are indicators of a developed economy.

On the other hand, there are striking features of under-development. These include Libya's inadequate indigenous supply of technical manpower, its total reliance on the import of both capital and consumer goods, and the over-dependence of the economy on a single product-namely oil. The country is also characterised by a narrow market which is due to the numerical size of the population, the pattern of consumption brought about by affluence and the inadequacy of domestic products both in terms of quantity and quality.

The purpose of this chapter is to explore further those characteristics which are relevant particularly to the Libyan economy and to analyse the trends in its economic growth and structural changes which took place during the period of 1962 1990.

The analysis compares economic developments during the oil price shock period of 1973-1982 with those in the first oil exporting period of 1962-1970 and the post-boom period of 1983-1990. The first section provides the geographical and historical background of the Libyan economy and discusses the basic characteristics of it prior to the discovery of oil in commercial quantities in 1962. The second section deals with the structural changes which took place in the economy during the period of 1962-1990, and the third section directs attention to productivity growth and technical changes during this major period.

However, it is important to emphasise that this analysis is fundamentally an illustrative account only to enable more intensive sectoral examination to be presented in later chapters.

IV-2 Physical Features: (Geographical and Historical)

Libya (officially the Socialist People's Libyan Arab Jamahiryea) is located in the northern part of Africa, on its northern side Libya is bounded by the Mediterranean Sea. It has Tunisia and Algeria on its western border and Egypt and Sudan to the east. Its southern border meets Chad and the Niger Republic. The Libyan coast on the Mediterranean Sea extends for about 2,000 kilometres. This long coastline affects the climate of the northern part of the country, whilst the rest of the country is affected by the great Sahara Desert of Central Africa.

The territorial size of Libya is about 1,740,000 square kilometres and is considered to be the fourth largest country in Africa, but about 42% of the land is desert. Only 10% of the remaining 58% of area is populated and the rest is a dry barren uninhabited region (Farley, 1971, p.25).

The population of Libya in 1911 was approximately 750,000. In 1942 it was about 500,000. This loss was due to death in war and to Allied and Axis campaigns. According to the 1973 census, Libya had a population of slightly more than two million. However, by 1993 it was estimated to have risen to more than four million (National Authority for Information and Documentation 1994, p.16).

Owing to its strategic location in both North Africa and the Middle East, Libya was subject to wave after wave of military invasions, which were to continue until 1942. The Phoenicians, Numedians, Ptolemies, the Byzantine Empire, Vandals, Romans, and Greeks all had at one time or another, settled on the coast of Libya (Habib, 1979). As a result, numerous cities were built along the coast. Present-day ruins tell the stories of civilisations which had flourished previously around the Mediterranean Sea. The majority of the population came to the country in several waves of migrants from the Arabian peninsula in the seventh, ninth, and eleventh centuries A.D,. Arabs came to Libya carrying with them their Arabic language and their way of life as well as the Islamic religion. They dominated the country and integrated into Libyan society. Thus Libya became an Arabic Islamic state. In 1551, Libya become a part of the Ottoman Empire, remaining so until 1911 (First, 1975; Wright, 1969).

The Italians were the last of the invaders. Italy started its occupation of Libya in October 1911, and was only displaced after the Allies won the Second World War, but Libya came under the British and French military administrations in 1942.

Libya became an independent state through the United Nation's Resolution of 24 December 1951. The new nation became a monarchy ruled by King Idris whose political leadership derived from his role as a leader of the religious order established by his family under the name of the Senssi Order. On the eve of Independence, the King started negotiating with both the British and the American military authorities. In 1953-1954, Libya was tied by military treaties to both Britain and the United States in exchange for less than \$10 million annually. In 1958 oil was first discovered in Libya, and by 1962 oil exports started in commercial quantities. Since then profound changes took place in the Libyan economy.

In September 1969, a group of young revolutionary officers overthrew the monarchy, became political leaders and announced a republican form of government. Subsequently, fundamental changes occurred in the Libyan economy as the result of a combination of external and internal factors. The socialist tendencies of the revolutionaries, the vagaries of the oil market, the instability of the administrative institutions, the ambitions of the leadership and the confrontation with Western countries have all left their marks on the Libyan economy.

IV-3 The Libyan Economy Before Oil (*A case of Backwardness and Stagnation)*

As the term is commonly defined, Libya, on the eve of Independence in 1952, possessed most of the salient features of an under-developed economy. These included a very low per-capita income, a chronic deficit in government budget and balance of payments, a high rate of illiteracy, a high degree of resource immobility, an unequal distribution of income and wealth, a stagnant agricultural sector, and low productivity of labour. Broadly speaking it is sufficient to say that nearly any indicator of economic development that one chooses could illustrate that Libya at the time of independence was one of the poorest and most backward nations in the world.

In 1952, officials of the British administration estimated the per-capita income in Tripolitania at $30 to $40 per annum. This income was subject to fluctuation; it tended to fall in drought years and rise in good crop years. In 1952, no reliable tax records existed for Cyrenaica or the Fezzan, but officials estimated per capita income at $35 for these territories (Lindberg, 1952, p.32)

Given this low per-capita income, one would expect the levels of nutrition and health to be severely low. In 1952 Libya's birth rate was 5.3% p.a. The natural rate of population was kept down to 1.1% by a death rate of 4.2% which reflected an extremely low health standard (Higgins, 1953,p. 4)

The amount of monetised activity in the Libyan economy also pointed to the low level of development. The rural sector comprised more than 90% of the active population. Wages were paid in kind, in money or a mixture of the two.

Payment in kind was extensive, especially for indentured labour and for seasonal activities. The JEBBAD (drawers of water) was one example of indentured labour also, the harvesting of cereals, weaving of wool and stock-tending involved payments in kind fixed by tradition. Money wage payments were mainly confined to the cities or the Italian agricultural schemes (ibid, p. 86).

The Libyan balance of payments ran heavy deficits from 1952 to 1960. The value of Libya's imports of goods and services was about 50% of its own GNP. The World Bank Report noted that this was an extraordinarily high proportion matched by few other countries of the world. Less than 20% of the foreign exchange proceeds necessary to pay for these imports was obtained from the sale of Libyan merchandise exports, while the remainder came from invisible exports, mainly from the military expenditure of foreign governments and foreign aid. This unearned income was enough to cover the imports, and Libya was able to make additions of $25.2 million to its foreign exchange reserves.[1]/

Furthermore, the available data suggested that, at the time of Independence, Libya did not have the stock of human capital to launch the economy on to the path of self-sustained growth. Not only was the stock of human capital deficient, but there was a lack of educational institutions to augment the supply of manpower resources. Some of the human resource problems were inherited from the past, but many of them were related to social and cultural factors which inhibited the proper utilisation of existing resources and production of new resources. In 1936, it was estimated that 95% of the population was illiterate. Between 1939 and 1940, merely 9,646 students attended public schools and only 282 of these were enrolled in secondary schools (Lindberg, ibid., p.7).

[1] During the 1950's over 50% of the country imports were consumer goods. In 1954, imports of food, clothing, footwear, textiles and clearing materials reached more than 57% of the total imports, while the remainder 43% were petroleum, rubber tires, machinery and household appliances.

By 1950-1951 the educational situation had improved somewhat. According to the official census figures of 1954, 81% of the total population was illiterate. Between 1954 and 1964, there had been a significant increase in the number of students attending schools, but the census figures of 1964 reported that over 73% of the Libyan citizens were still illiterate. Functional illiteracy was probably higher than the above proportion. In 1964, only 5.2% of the population had completed primary school or more education.

In addition to that, before the discovery of oil in commercial quantities in 1962, Libya was deficient in capital. Except for a very few wealthy families, the accumulated capital stock of the Libyan population consisted mainly of livestock, hand tools and some primitive housing. Even this simple capital stock suffered depletion during the Second World War (Higgins, ibid., p. 6). The severe shortage of capital precluded any development of Libyan-owned industry. Handicrafts were the only other field of economic activity outside of agriculture which was controlled by Libyans. In the early 1950's, it was estimated that only 3% of the entire income of Tripoli city was earned by hand-weavers. A United Nations report on Libya stated that the introduction of simple spinning wheels would result in the unemployment of hundreds of poor workers who were dependent on hand-spinning for basic income (ibid. p. 61)

Furthermore, according to a closer study, even before the discovery of oil the Libyan economy exhibited characteristics of dualism. A modern sector developed during the Italian occupation. Before this took place, no real industrial sector existed in Libya. The industries that were established by the Italians were based on agriculture or on the breeding and utilisation of sea products. Under ideal conditions, the presence of the Italian modern sector could have been a positive influence for Libya's development by providing a demonstration effect for Libyan entrepreneurs. In practice, the Italian presence created a dual economy. The dualism was technological, regional and social. The Italian modern sector consisted of relatively large-scale and capital-intensive agriculture and manufacturing activities, together with the various services associated with these activities. The traditional sector consisted of small-scale, labour-intensive, technologically backward and low productivity agriculture. This technological dualism produced a regional dualism. The modern sector was confined to Tripoli and, to a lesser extent, Benghazi. In the rural areas, the World Bank reported that: "Most Libyans still lead a very simple life. Their diet is plain, their wants are limited, they have very limited knowledge of the twentieth-century technology and tribal conditions are strong" (IBRD, 1958, p.18).

Technological and regional dualism tended to interact to produce a vicious circle of under-development. This produced a non-integrated economy which relegated a large proportion of the population to live in rural poverty.

The Libyan agricultural sector faced severe problems. As mentioned so much of the country is desert. Only around 2% of the land is arable. Nevertheless, at the time of Independence, over 73% of the Libyan active population was engaged in agriculture and animal husbandry and these activities encountered extraordinary difficulties, the main one of which was the unpredictable and inadequate rainfall, then there were the primitive methods of production and the lack of credit facilities. Added to that a tribal land tenure system and extended family structure had reduced individual incentives to either expand arable land or improve yields on existing acres in agricultural use.

At the macro-economic levels the available sources suggested that the pre-oil period witnessed a fourfold increase in gross domestic product (Fearly, 1972). This increase was due exclusively to the rents paid by the United States and Great Britain for the use of the military base, and to technical assistance granted by the United Nations and Western countries.

According to the 1958 Census, the agricultural sector contributed an estimated 26% of the gross domestic product and the industrial sector share was 11%. However, by 1958 the value added by the industrial sector had reached about L£ 15,695,000 of which 61% was from manufacturing. (See Tables IV-1 &. IV-2). In addition and according to the 1962 Census, by 1960 more than 60% of the total active population was still engaged in agriculture and animal husbandry activities, and between 35% and 40% in services, manufacturing and construction. The per-capita income in agriculture at that time was only L£ 19 per year, while in non-agricultural activities it amounted to about L£ 35 per year

In short, when Libya became independent in late 1951, it was one of the most backward and poorest countries in the world. After almost three thousand years of foreign domination and due to a general acceptance of a rigid social system, the country was very ill-equipped to solve the many problems of economic growth and sustained development. Until the discovery of oil, in the late 1950s and early 1960s, Libya had been economically stagnant. In 1953, Benjamin Higgine observed that if Libya can be brought to a state of sustained growth, there is hope for every country of the world. The Report pinpointed that the problems the country encountered then were a lack of livestock, the absence of educated and technical people, low purchasing power, limited foreign trade, a chronic state of deficit in budget and balance of payments, and a low rate of saving.

Table IV-1

Industrial Origin of GDP in Libya 1958 (L£.Million, at 1958 constant factor cost)

	Value million	Share (%)
Agriculture, Forestry & Fishing	13.6	26.1
Petroleum, Mining & Quarrying	3.6	6.9
Manufacturing & Repairing	6	11.5
Construction	1.8	3.4
Electricity, Gas & Water	0.8	1.5
Transport, Storage & Communication	2.9	5.6
Wholesale & Retail Trade	7.3	14
Banking, Insurance, Dwelling & Social Services	9.5	18.2
Public Administrative Services	6.7	12.8
Total	52.2	100

Source: BIRD, The Economic development of Libya, 1960, P. 294 (in Arabic)

Table IV-2
Value Added & Number of Employees in Manufacturing Industries in Libya 1958

	Value Added (L£..000)	(%) of Total	Number of Employees	(%) of Total
Crude Oil & Natural Gas	3449	36.1	3254	19.5
Mining & Quarrying	120	1.3	400	2.4
Food, Soft Drink, & Tobacco	2932	30.7	4272	25.7
Textiles, Clothing & Footwear	654	6.8	2255	13.5
Woodworks & Furniture	283	3.0	899	5.4
Paper, Printing & Publishing	232	2.4	374	2.2
Leather & Rubber (exc.: footwear)	79	0.8	190	1.1
Chemical Coal & Non-Metallic Products	178	1.9	526	3.2
Basic Metals	1150	12.0	4137	24.8
Other	480	5.0	344	2.1
Total Manufacturing Value Added	9557	60.9	16651	62.7
Mining & Quarrying Value Added	3569	22.7	3654	13.7
Construction Value Added	1808	11.5	5244	19.8
Electricity Value added	761	4.9	1008	3.8
Total Industrial Activities Value Added	15695	100	26557	100

Source: Kingdom of Libya, Ministry of National Economy, Statistical Abstract 1964.

IV-4 The New Era of Capital Surplus and Economic Development.

The exporting of the first shipment of Libyan crude oil in September 1961, marked the beginning of a new era in the economic history of Libya. The era of capital-surplus and rapid growth. Until the discovery of oil in the late 1950s and early 1960s, there was no economic sector in Libya with adequate production and visible resources that could have been expected to raise the standard of living markedly and alter the serious economic and foreign trade imbalances. But by 1962, this picture had changed dramatically and since then profound structural changes have taken place in the Libyan economy. The country had managed to achieve a vertical take-off from being a small regional trading post to becoming an affluent metropolitan state of international prominence, with high rates of per-capita income, savings, and a high and relatively stable growth rate, as well as a well-developed infrastructure and social welfare system. In what follows, we shall examine closely the oil sector and these changes in detail.

IV-4-1 Development of Oil Production, Price, Exports and Revenues.

Oil production dates back to 1958 when the Libyan Government first granted a concession to foreign oil companies for the exploration, production and marketing of oil. However, the first shipment of oil from the country did not take place until nearly 5 years after this first concession was granted. Oil exports started in 1962 and the level of production in that year was 182,3,000 barrels a day. This figure rose to 3,318,000 barrels a day in 1970, then declined to 1,790,000 and 1,387,000 by 1980 and 1990 respectively.

The decline in production during the 1970s was the direct outcome of government restrictions on the production of oil companies, which aimed to prevent over-production and to force the companies to agree to higher taxes and new contractual arrangements. The decline in the later years, particularly after 1982, was due to the decline in OPEC quotas and also to the later confrontation with Western countries.

Accordingly, the first few years of oil production 1962-1969 witnessed a high rate of increase in oil exports in both quantitative and monetary terms, registered at about 50% and 47%p.a. respectively. Subsequently, the annual rates of increase in oil exports, in quantitative terms, fluctuated with a downward bias but the value of oil exports continued to rise. The most remarkable increase had taken place during the first oil boom period of 1973-1974 when it increased at 62% p.a.

As to the oil prices, the available data reveals that Libya's oil price during the first oil exporting period of 1962-1969 was almost fixed at a low level, and increased at 33% p.a. over the oil price shock period of 1973-1982, The big jump in the oil price had taken place during 1973-1974 (increasing at 87% p.a.) and during 1980-82 (increasing at 6.4% p.a.), while the oil price growth rate was negative over the post-oil price shock period of 1983-1990. Accordingly, oil revenues increased substantially during the boom period. Between 1973-1974 oil revenue had increased at 62% p.a., but since 1982 oil revenues had fluctuated with a downward trend. Table IV-3 below depicts the trends in oil production, export, price, and revenue in Libya over the period of 1962-1990.

Table IV-3

Growth of Oil Production, Exports, Price and Revenues, in Libya 1962-1990

	1962-1969	1970-1972	1973-1974	1975-1979	1980-1982	1983-1990
Crude Oil Production (000,b/d)**	48.4	-9.7	-16.5	7.3	-17.5	3.6
Volume of Exports (000,b/d)***	49.9	-9.5	-11.1	6.4	-19.8	2.5
Value of Oil Exports (LD.,000)	46.6	12.2	62.2	10.5	4.1	-6.5
Official Selling Price (US/b)	0.0	18.1	87.0	27.7	6.4	-4.6
Monetary Revenues (US$ Million)	72.6	10.7	62.2	20.0	-1.0	-4.0

Source: Calculated from: OPEC, yearly statistical Bulletin, and Petroleum Press Service, Middle East Economic Digest, Arab Oil and Gas Directory 1994, National Authority for Information & Documentation, The Results of the Annual Survey of the Petroleum Industry, yearly analytical and statistical series, various issues and Central Bank of Libya, yearly statistical series, various issues

Notes: ** Crude Oil Exports by Destination

*** Average Marsa El-Briga Selling Price

IV-4 -2 The Structure of the Libyan Economy 1962-1990.

As already mentioned, the year 1962 signalled a turning point in the history of Libya, clearly representing the dividing line between the oil and the pre-oil eras, because it was in this year that the first shipment of oil was made from the country. Since then Libya's economy has undergone and is undergoing major structural changes. Change has taken place in all fields: economic, political and social. For analytical purposes it may be convenient to divide the period during which the economy experienced changes into sub-periods. Starting in 1962 one can systematically recognise three sub-periods:

1 **1962-1969,** from the discovery of oil in commercial quantities to the Revolution in 1969. This period was one of rapid economic growth in Libyan history.

2 **1970-1982**, a period of sustained accumulation following the massive injection of oil windfall gained from the two oil booms of 1973-1974 and 1980-1982.

3 1983-1990, a period of economic slowdown following the sharp decline in oil prices, the appearance of economic bottlenecks and the political confrontation with Western countries.

1962-1969 This period was the first oil exporting period. The structure of the Libyan economy and its nature during this period can be described as dualistic because there existed a large agricultural sector and an active, modern industrial sector. But 1962-1969 was the first oil exporting period and oil was Libya's main natural resource. So the Libyan economy was an oil dual economy. In such an economy the oil sector and export origin are regarded as one sector, with the rest of the national economy aggregated together and regarded as the other sector.

Libya's economic growth rate during this period was one of the highest growth rates in the world. The gross national product (GNP) had increased at an average growth rate of nearly 20% p.a. For the same period per-capita GNP (in real terms) increased at an average rate of nearly 16% p.a., with gross domestic product (GDP) increasing at an average rate of 22.6% p.a. Furthermore, gross fixed investment had increased at an average rate of 15.6% p.a. with the share in non-oil GDP reaching 63%

At the sectoral level, the most remarkable increase was in mining and quarrying (including crude oil) 46.7% p.a.. Construction was growing at a remarkable 19.9% p.a., transport and communication 16.6% p.a., services gathering 13.4% p.a. and trade at 12.7% p.a. However, with the exception of the mining and construction sectors, the share of all the other economic sectors in aggregate output had decreased. But the decrease in agriculture and manufacturing was relatively more than that in the services sector. Many factors accounted for this. One was the internal migration of agricultural workers leaving the rural areas to seek higher earnings in the construction, transport and communication and social services sectors which were centred in the urban areas. Then there was the limited absorptive capacity of the economy, the lack of infrastructure and the small size of the population.

1970-1982. During this period the new government directed its efforts to the oil sector. It insisted on the correction of the Libyan oil price which was undervalued compared to similar crude oil exported from other countries. Due to this effort and the contribution of other factors (such as the devaluation of the US dollar, the October 1973 War and its aftermath, and the 1979 Iranian Revolution) oil prices had increased sharply. The correction of the posted oil price system combined with new government social and economic tendencies and the relative improvement in the economic infrastructure, gave rise to more investment in construction, transport, and light industries and the establishment of plants to convert a part of the domestic petroleum production. Consequently, the period of 1970-1982 witnessed a rapid growth of real investment. The gross fixed investment had increased at an average annual rate of 14.5% p.a., with an average annual share in the non-oil GDP accounted for as 58%. For the same period GNP had increased at an average rate of 14.6% p.a., and gross domestic product GDP and per-capita GNP had increased at an average rate of 12.6% p.a., and 10.4% p.a. respectively.

At the sectoral level the most remarkable increase had been in the manufacturing sector which grew at an average rate of 18.6% p.a. This was followed by transport and communication at 18% p.a.; construction at 15% p.a.; trade 17% p.a.; mining 14.3% p.a., services at 14% p.a. and agriculture at 4.6% p.a., However, the share of the productive sectors - agriculture and manufacturing - in total GDP compared with that for services, construction, trade and transport and communication was relatively very low.

1983-1990 During this period major transformation in Libya's state and society had taken place and several features of the economic bottlenecks had become clearly visible: There was a shortage of technical and skilled labour for the advanced public sector and the lack of, and instability of, administrative institutions and instability in the oil market combined with the political crisis. Consequently, the period witnessed a sharp decrease in economic growth rates. Gross fixed investment growth rate during this period was negative, and also both GNP and GDP growth rates had been negative. However, at the sectoral level there was a significant increase in the productive sectors value added. The value added by the agriculture sector (in real terms) increased at an average rate of 11.8% p.a. followed by manufacturing at 7% p.a., services 2.7% p.a., Furthermore, in 1990, the sector share occupied by agriculture was 7.1% and that of manufacturing was 7.2%. Both these sectors had more than doubled within eight years.

For the entire period under investigation, 1962-1990, GDP had increased at an average rate of 11.8% p.a. Most of this growth was accounted for by the oil sector and no less than 50.8% of the country's GDP was generated within that sector. In contrast the agricultural sector, which contributed around 22.6% of GDP in 1962, had decreased its contribution to 7% by 1990. However, up until 1986, the agricultural sector's contribution to GDP was not more than 5%, while manufacturing and all other sectors had more than trebled within the three decades. For the same period real gross fixed investment increased at an average rate of 9.1% with the share in non-oil GDP reaching 54.9% (See Tables IV-4, IV-5 & IV-6 and Figure IV-1).

Table IV-4

Annual Growth Rates of the Libyan Economy by Sectors, In Real Terms 1962-1990

	1962 1969	1970 1982	1983 1990	1962 1990
Gross Domestic Product (GDP)	22.6	13.2	-2.5	11.8
Agriculture Forestry & Fishing	4.1	4.6	11.8	6.70
Mining & Quarrying (Incl. crude oil)	46.7	14.3	-7.8	17.8
Manufacturing	8.4	18.6	7	13.0
Construction	19.9	15.3	-1.8	12.0
Transport & Communication	16.6	18.1	-0.4	13.1
Wholesale & Retail Trade	12.7	17	-2.1	10.9
Services Gathering	13.4	14.0	2.7	11.1

Source: Calculated from, Central Bank of Libya, yearly statistical series, & Monthly Bulletin, various issues., and National Authorities for Information and Documentation, yearly statistical series, various issues

Table IV-5

Libya's Economic Growth 1962-1990 (% Change)

	Average Annual Growth Rates During			
	1962 1969	1970 1982	1983 1990	1962 1990
Gross Domestic Product (GDP)	22.6	12.6	-2.5	11.6
Gross National Product (GNP)	20	14.6	-2.1	11.9
Gross Fixed Investment (GFI)	15.6	14.5	-7.1	9.1
Per-Capita GNP	16.2	10.4	-5.9	7.9
Export of Goods and Services	31.7	12.4	-0.4	14.7
Import of Goods and Services	10.3	18.4	-7.1	9.5
Private Consumption	6.7	14.1	-3.3	7.5
Consumption Per-Capita	3.3	9.9	-7.1	7.9
Government Consumption	21.6	16.8	-2.6	13.2
Population	3.2	4.2	4.0	3.9

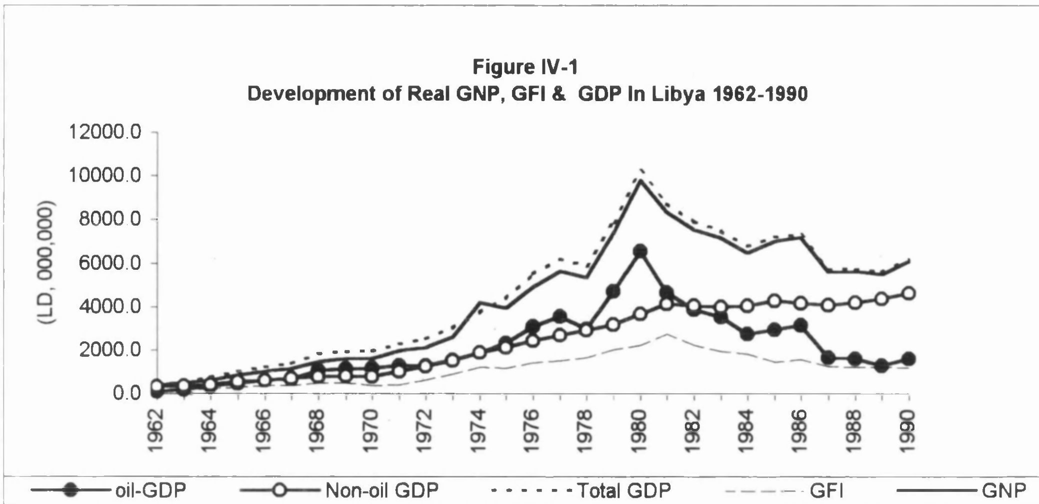
Source: As for Table III-4

Table IV-6

Sectoral Shares in Real GDP (Selective years, 1962-1990

	GDP	Agriculture Forestry & Fishing	Mining Quarrying (Incl. oil)	Manufacturing	Construction	Transport & Communication	Wholesale and Retail Trade	Other Services
1962	100.0	22.5	18.6	4.0	13.8	4.0	7.2	29.9
1964	100.0	11.4	45.7	2.4	12.4	3.3	4.9	19.9
1966	100.0	9.4	50.5	1.9	13.1	3.1	4.4	17.7
1968	100.0	6.3	57.0	1.6	13.0	3.9	3.8	15.4
1970	100.0	5.2	60.2	1.6	9.4	2.9	3.7	17.1
1972	100.0	5.2	51.1	1.6	12.6	5.0	5.2	19.3
1974	100.0	4.0	77.3	1.7	15.2	4.9	5.8	17.7
1976	100.0	3.3	56.6	1.8	11.9	4.0	5.4	17.0
1978	100.0	3.1	51.3	2.6	12.5	4.5	5.9	20.2
1980	100.0	1.6	64.7	2.1	9.1	3.3	4.7	14.5
1982	100.0	1.9	49.6	3.3	12.5	4.7	6.5	21.4
1984	100.0	3.0	40.9	4.8	10.7	5.4	7.5	27.8
1986	100.0	3.4	43.6	4.8	10.9	4.9	5.8	26.6
1988	100.0	5.2	28.1	6.9	13.1	5.9	6.4	34.4
1990	100.0	7.1	26.0	7.2	13.2	5.9	6.7	33.8

Source: As for Table III-4



Source: Appendix AV-1

IV-5 Factor Inputs, Productivity Growth and Technical Progress

The preceding discussion suggests that the periods with the highest growth rates are the first oil period of 1962-1969 and the oil price shock period of 1970-1982, but growth rates during the oil price shock period of 1970-1982 were relatively sluggish. While growth rates during the post- boom period were either negative or considerably lower. The negative and lower growth rates during that period reflect an era of political instability and poor adjustment to the reversal of the boom conditions. The rapid growth rates during the periods of 1962-1969 and 1970-1982, were mainly attributable to the rapid growth in factor input, while technical changes seems insignificant. In the following few sections factor inputs will be examined in great detail.

IV-5-1 Investment and the Accumulation Process

IV-5-1-1 The Expansion of the Banking System

Before the 1969 Revolution most of the Libyan financial institutions were subsidiaries of foreign institutions, mainly foreign banks. Following the Libyanisation of the Libyan banking system in December 1970 the financial institutions in Libya consisted of two types of institutions: i) Commercial banks and ii) Specialised credit institutions. The specialised credit institutions comprise the Libyan Arab Foreign Bank (LAFB), the Agriculture Bank, (ADB), the Savings and Real Estate Bank (SREB), and the Development Bank (NDB). In addition to that there are two non-bank financial institutions. These are the Pension and Social Security Institution (PSSI) and the Libyan Insurance Company (LIC).

The Central Bank (Bank of Libya) provides direct credit to the government institutions and liquidity credit to commercial banks. The Bank of Libya is also equipped with the usual monetary instruments. It is the sole issuer of currency, it re-discounts bills for banks, administers gold and foreign exchange reserves, regulates all financial institutions, sets up the level and structure of interest rates and controls the quantity and quality of bank credit.

The rapid growth rates over the period 1962-1982 involved a rapid expansion in bank credits to the private sector. Table IV-7 shows that bank credit to the private sector had increased (in real terms) at an average rate of 15.6% p.a. and 21.5% p.a. respectively over the two oil boom periods. In the meantime the share of currency in total money supply (M_1) had declined from 50% in 1965 to 27.5% in 1982. However, the rapid increase of bank credits to the private sector and the declining share of currency in total money supply did not merely reflect the fast expansion of the banking system and its use in the economy, but also attributed to the growth of the net public sector debt and an increase of net foreign assets as well as to the government polices to control money supply.

With regard to the use of bank credits, the available data reveals that during the first oil exporting period most of the bank credits were used to finance trade, construction and government building. While during the period of 1970-1982 most bank credits were used to finance agriculture manufacturing and construction. This was signified by the expansion of commercial banking credits to the productive sectors and the establishment of the Agriculture, Development, Savings and Real Estate Banks.

Table IV-8 shows the value of commercial bank assets, deposits, and credit during the selective years 1965-1990 and their growth before and after they are deflated by the general cost of living index (at 1975 constant price). It reveals that the value of commercial bank total assets and deposits had increased (in real terms) during the first oil exporting period of 1965-1969 at an average rate of 10% and 1.0% p.a. respectively, and bank credit at 15% p.a.,. Whereas, during the oil price shock period of 1970-1982, bank assets had grown at an average rate of 51% p.a., bank deposits at 43% p.a. and bank credit at 23% p.a. While, during the post boom period of 1983-1990, the growth rates were negative.

The fastest rate of increase of commercial credit during the whole period was in manufacturing whose share in total commercial credit increased from 2.4% in 1965 to 21.8% in 1982, while it decreased to 10.3% in 1990. Over the same periods the share of agriculture in total commercial credit had increased from 2.5% in 1965 to 9.2% in 1982. The share of agriculture declined to 4.6% in 1990. The increase of the agricultural and manufacturing sector shares in total commercial credit over the two boom periods, reflected the Central Bank's monetary policy which was to expand lending for the productive sectors and increase the credit availability for both sectors at low interest rates.

IV-5-1-2 The Accumulation Process

Throughout the period under investigation interest rates were fixed by law which permitted commercial banks to charge 7% on investment loans. The real rate of return on savings as well as the cost of borrowing was negative throughout the whole period.

Furthermore, with a constant increase in the oil revenues and negative impact of interest rates, gross fixed capital formation (GCFF) had increased significantly during the two oil boom periods. It increased at an average annual rate of 22.9% during the 1962-1969 period, and at an average rate of 19% p.a. during the period of 1970-1982. During the post boom period of 1983-1990 the growth rate was negative. The share of GFCF in total GDP was 30.5% during the period of 1962-1969, while for the subsequent periods of 1970-1982 and 1983-1988 it averaged at about 25% and 20.7% respectively (See Table IV-9).

Table 7

Changes in Money Supply and Factors Effecting It 1962-1990 (LD 000,000)

									Annual Growth		
									1962	1970	1983-
	1965	1970	1973	1975	1980	1982	1988	1990	1969	1982	1990
Net Claims on the Public Sector	-17.9	-282	-194.1	256.4	705.0	1120.9	1327	4669.7	-23.0	47.0	38.0
Net Claims on the Private Sector	35.2	95.9	277.6	645.3	1141.5	1585.8	2361	2560.1	23.5	28.5	7.1
Net Foreign Assets	89.2	573.7	654.6	772.2	4504.2	2312.9	1228	1564.9	34.0	26.0	-0.7
Money Supply	66.8	241.1	514.0	867.6	2891.0	3232.3	3012	4452.2	28.3	24.6	5.4
Deflated Figures 1975 Constant Price											
Net Claims on the Public Sector	-24.0	-277.0	-172.0	256.0	382.0	479.0	376.0	1201.0	-28.0	29.0	30.0
Net Claims on the Private Sector	47.7	94.4	246.1	645.3	618.0	677.1	668.1	658.3	15.6	21.5	0.5
Net Foreign Assets	120.9	564.7	580.3	772.2	2439.0	987.6	347.6	402.4	25	17.8	-6.9
Money Supply	90.5	237.3	455.7	867.6	1565.0	1380	852.2	1145	19.8	17	-1.0
Currency (%) of Money Supply	50.3	46.6	39.4	39.9	56.9	27.5	29.90	32.80			

Source: Central Bank of Libya, yearly statistical series and Monthly Bulletin, various issues.

Table 8

Growth of Commercial Banking (End of Year 000 LD)

									Annual Growth Rate		
	1965	1970	1973	1978	1980	1983	1988	1990	62/69	70/82	83/90
Total Assets	106.0	261.0	1,399.2	3,413.3	1,334.8	6,764.8	7,138.0	7,160	17.1	60.5	1.2
Total Deposit	18.6	33.7	168.8	940.7	1,944.5	1,356.6	2,542.6	1,154	6.8	50.6	3.9
Total Credit	35.2	96.2	240.9	926.0	132.1	2,208.1	2,316.6	2,533	22.0	29.8	2.1
Value & Growth at 1975 Prices											
Total Assets	143.6	257	1,240.4	2,469.8	722.70	2,649.8	2,018.8	1,841	10.4	51.4	-5.4
Total Deposit	25.2	33.2	112.8	680.7	1,052.8	523.8	719.5	296.8	1.0	42.5	-3.2
Total Credit	47.7	94.7	213.6	670	71.5	852.6	655.5	651.4	15.1	22.6	-4.0

Source: Central Bank of Libya, yearly statistical series, and monthly Bulletin various issues 1968 - 1994.

Table IV-9

Average Annual Growth of Gross Fixed Capital Formation, 1962-1988

	1962-1969	1970-1982	1983-1988
Average Annual Increase in Real GFCF	22.9	19.0	-7.0
GFCF as a Percentage of GDP	30.5	25.2	20.7

Source: Libyan Arab Republic, Ministry of Planning, Economic & Social Indicators, 1984. p. 20 – 28, and National Authority for Information & Documentation, yearly statistical series 1990-1994, p. 57-58

IV-5-1-3 Public Sector Investment

Public sector investment in Libya comprised of mainly two types of investment: External investment (which is mainly a monetary investment), conducted by the Libyan Arab Foreign Bank (LAFB) and the Libyan Foreign Investment Company (LFIC), and internal investment, which comprises the development investment and part of the ordinary expenditure.

Starting in 1962, when oil was first discovered in commercial quantities, the government of Libya adopted serious development programmes within the framework of Development Plans. Table IV-10 shows the distribution of the actual development expenditure among the various economic sectors during the period of 1962-1990. It reveals that during the period of 1962-1969 the total actual development expenditure amounted to about LD. 562 million. More than 56% of this expenditure was spent upon economic infrastructure (transport and communication, electricity, gas and water, housing and construction) and 26.2% went to services, 11.8% to agriculture and 5.1% to manufacturing. The share of commodity producing sectors (traded sectors) in the total actual expenditure amounted to 16.9% while the remaining 83.1% was spent on the non-commodity producing sectors (non-traded sectors).

During the period of 1970-1982 there was an apparent shift in the sectoral distribution of investment expenditure laying great emphasis on the manufacturing and agriculture sectors. The actual development expenditure over this period reached about LD. 16417 million. The highest priority was given to agriculture-which received 19.5% of total actual expenditure. This was followed by manufacturing 15.8%, transport and communication 14.3%, construction 11.4%, and electricity 10%, while the remaining 29% was divided among other social services. The share of the traded sectors in the total actual expenditure reached around 39.4%, compared to 16.9% for the previous period, while the share of the non-traded sectors was 60.6%, compared to 83.1% for the preceding period. For the post-boom period of 1983-1990 the share of the traded sectors declined slightly to 28.5%. This decline was mainly due to the decline of the oil price and to political instability which interrupted the development programmes. Development expenditure during this period was directed into completing unfinished projects.

A similar conclusion can be obtained from Table IV-11 which gives sectoral share in the gross fixed capital formation GFCF for the time frame set stated above. During the period of 1962-1969 the share of the traded sectors in GFCF was 54.4%, of which 47% was in mining, oil and natural gas and the remaining 7.4% was in agriculture and manufacturing combined. In the non-traded sectors the share was 45.6%, of which 32.4% was in infrastructure (transport, electricity, gas and water, building and construction). For the 1970-1982 period, the share of the traded sectors in GFCF was 30.9% of which 14% was in manufacturing and 13% in agriculture. This represented a four-fold increase since the previous period. In the meantime the share of the non-traded sectors was 69% of which 20.2% was in services, 19.6% in transport, 16.3% in construction, and 13% in electricity and water. For the post-boom period of 1983-1988 the share of both traded and non-traded sectors decreased slightly to 39% and 61% respectively. The most remarkable decline in this period had been in construction and services, which decreased from 16.3% and 20.2%, to 12.2% and 17.5% respectively. For the same periods the share of the manufacturing and agriculture sectors had increased to 17% and 13% respectively.

The preceding discussion so far has shown that during the 1962-1969 period, planning strategy was directed to the reconstruction of the defective and poor economy through intensifying investment into developing the country's infrastructure and services. This embraced education, health, transport and communication, construction and electricity. Then during the second and third periods from 1970 right through to 1986 the Government's strategy was aimed at reducing the dependence upon oil as the main source of income. It concentrated on diversifying the economic base and reinforcing self-sufficiency through industrialisation and increasing agricultural production.

III-5-1-4 Private Sector Investment

Regarding private sector investment the available data indicates that throughout the period under study private investment was insignificant. Private investment was concentrated in trade and construction during the 1963-1969 period and in productive sectors, mainly agriculture and manufacturing as well as construction, during the period of 1960-1982. The share of public sector investment in the total investment throughout the period under investigation was more than 85% (Development Bank, 1988, 25-31). This large share of state investment gave the Government great influence in directing investment into the different sectors. Government ability to influence investment behaviour arose from its status as a major investor, which emanated from its position as the main recipient for the oil revenues. Since government investment in the productive sectors was stimulated further after the Development Plan of 1973-1975, the investment during the two oil boom periods was relatively more balanced than would have been envisaged by the Dutch Disease Model.

Table 10

Distribution of Investment by Economic Sectors 1962-1990 (LD, 000,000)

	1963-1969		1970-1982		1983-1990		1963-1990	
	Value	(%)	Value	(%)	Value	(%)	Value	(%)
Commodity Producing Sectors	95.1	16.9	6467.1	39.4	3510.1	28.5	10072	34.4
Agriculture, Forestry & Fishing	66.5	11.8	3242.0	19.7	1360.8	11.1	4669.3	15.9
Mining & Quarrying (Incl., Oil & Gas)	–	–	629.2	3.8	325.0	2.6	954.3	3.3
Manufacturing	26.6	5.1	2595.9	15.8	1824	14.8	4448.8	15.2
Non-Commodity Producing Sectors	466.9	83.1	9950.2	60.6	8802.0	71.5	19219	65.6
Electricity & Energy	58.3	10.4	1655.0	10.0	1031.1	8.4	2744.4	9.4
Transport & Communication	95.4	17.0	2346.0	14.3	1774.9	14.4	4216.3	14.4
Municipals & Public Utilities	64.3	8.2	1602.0	9.8	1494.8	12.1	3143.1	10.7
Education, Training & Sport	48.1	8.6	1177.5	7.2	644.9	5.2	1870.5	6.4
Public Health	16.9	3.0	527.2	3.2	389.9	3.2	933.7	3.2
Information and Culture	6.6	1.2	178.2	1.1	91.7	0.7	276.5	0.9
Labour & Social Affairs	20.3	3.5	153.0	0.9	139.6	1.1	312.9	1.1
Housing & Construction	165.8	29.5	1869.5	11.4	3224	26.2	5059.3	17.3
Tourism, Economy & Planning	9.5	1.7	411.3	2.5	211.1	1.7	631.9	2.2
Other Services	–	–	30.5	0.2	–	–	30.7	0.1
Total Investment	562	100	16417	100	12312	100	29292	100

Source: Ministry of Planning Economic and Social Indicators, (ibid.), National Authority for Information & Documentation, and Central Bank of Libya, yearly statistical series and monthly Bulletin, various issues 1967-1995.

Table IV-11

Sectoral Shares in Gross Fixed Capital Formation 1962-1988 (% of Total)

	1962-1969	1970-1982	1983-1988
Commodity Producing Goods Sectors	54.4	30.9	39.0
Agriculture, Forestry & Fishing	3.7	12.7	13.1
Mining (incl., oil & Natural gas)	47.2	4.1	9.0
Manufacturing	3.5	14.1	16.9
Non-Commodity Producing Goods Sectors	45.6	69.1	61.0
Electricity, Gas & Water	7.9	13.0	12.7
Construction & Dwellings	12.5	16.3	12.2
Transport & Communication	12.0	19.6	18.6
Services Gathering	13.2	20.2	17.5
Grand Total	100	100	100

Source: Kingdom of Libya, Ministry of Planning, Five-year Economic and Social Development Plan, 1963-1968, Economic & Social Indicators, (ibid.), p. 20- 23, and National Authority for Information and Documentation, yearly statistical series various issues

IV-5-2 Labour Force

IV-5-2-1.The Nature of the Labour Market

Libya shares several labour market characteristics with other capital-rich states in the Arab region. These include: i) the high population growth rate, ii) the high level of under 20 years-old age group, iii) the high level of enrolment in educational institutions iv) her national labour force (divided between nationals and non-nationals) is relatively small v) the national participation rate is low as few females work in modern sector activities, and vi) the high share of immigrant labour. We will now briefly examine the relative contribution each of these features made to the development of the labour force in Libya

The population of Libya preceding the discovery and exportation of oil in 1962 was relatively small, estimated at about 1,088,800 in 1954 and about 1,451,000 in 1962 with most of the inhabitants being indigenous Libyans and only about 3% non-Libyan. However, over almost three decades (from the early-Sixties through to the late-Eighties) the country had experienced a phenomenal population explosion. The main factors responsible for this were: i) the high natural growth rate of Libyans and ii) the influx of immigration

By far the main cause of the population explosion was the high natural growth rate of Libyans. The available data on population indicates that, during the period under investigation, Libya's population growth rate had been at an average rate of nearly 4% per annum- one of the highest in the world. One contributory factor for the Libyan population explosion was the decline in the mortality rate among infants and adults due to the public provision of medical health and services on an extensive scale. The second and perhaps the most important factor was the influx of immigration into the country following the discovery of oil in commercial quantities in 1962. In the first place the vast oil revenues accruing solely to the state made it possible for the latter to embark on large-scale development projects providing basic infrastructure such as electricity, water supply, street and road-building and other public building and construction works. The Libyan labour force was not adequate for the fulfilment of the national needs because it lacked the necessary skills and technical knowledge. It is also doubtful if it was adequate in terms of size. Consequently, the government had to attract foreign skilled labour, offering them generous remuneration. Other immigrants had been attracted into Libya by the prospect of a building and construction boom: thousands of semi-skilled labourers, Arab and non-Arabs, fell into this category.

Table IV-12 shows the population explosion experienced by Libya. The estimate of total population for 1962 is fixed at 1,451,000. Over the period of 1970-1982 the number of Libyans and non-Libyans had both been growing at an average annual rate of 4% and 21% p.a. respectively. While, during the period 1983-1990 the rate of increase of the non-Libyan population was negative and that for the Libyan population continued to increase at the same rate of 4.1% p.a.

Regarding the ratio of the under 20 year-old age group in the Libyan total population, examination of the population age structure (See Table IV-13), revealed that the share of under 20s in the Libyan total population between 1973-1990 was about 60 per cent but in 1964 only 49% of the population was in this age group. This is very high compared with more advanced nations such as France (32.2%), United States (46%), Jordan (53.3%) and Lebanon (51%) (Zagallai, 1973). A large proportion of this age group, combined with the compulsory education policy, resulted in a high level of enrolment in educational institutions.

Table IV-14 shows the number of enrolled students, their growth rates and their shares in the total population from 1970 to 1990, and the total number of students below 15 years old and over, as a percentage of total students. It reveals that the total number of students, as a proportion of total Libyan population, had increased from 19% in 1970 to 32% in 1990. The share of the students below 15 years old in the total number of students was 95% in 1970 and decreased to 83% by 1990, while the share for students 15 years old and over was relatively low. This implies that the higher rate of enrolment was in the primary and secondary levels, and this naturally delayed their ability to join the labour market.

The available data shows that the number of females getting employment was growing at about the same rate as males. The figures show a growth rate of around 4% p.a. for both sexes during the periods 1954-1964 and 1973-1984. (National Authority for Information and Documentation, 1994, p., 16). But even though the female participation in total population had been growing substantially and the education gap between males and females had sharply declined, the female participation in both total labour force and domestically employed population was very low. This relatively low female participation is attributed to the social system and the nature of the work, its capacity, and its location. So most Libyan females had been engaged in teaching, health services, administrative and other clerical work. These kinds of work either attained the full employment point (as in the education sector) or were located outside the big cities. All the government institutions and financial companies had been moved outside the main cities. In addition to that, the official figures on employment do not include those who were working in the agricultural sector as unpaid family workers. Those working privately in weaving and textiles or as private teachers or nurses. The available statistics show that the female share in the total labour had increased from 6.4% in 1972 to 11% in 1985, while the share of males had declined from 94% in 1972 to 89% in 1985 (See Table IV-15).

Table IV-12

Libyan Population by Libyan and Non-Libyan 1962-1990

	Number (000)							Annual Growth Rates		
								1962	1970	1983
	1964	1970	1973	1978	1980	1984	1990	1969	1982	1990
Total Population	1560	2006	2348.8	3014	3245.8	3643	4380.0	3.3	5.5	2.0
Libyan	1511	1922	2146.0	2598	2804.6	3231	4177.2	3.2	4.1	4.1
Non-Libyan	49	84.0	202.8	416.5	441.2	411.5	202.8	8.7	21.1	-13.0
Libyan as (%) of total	96.9	95.8	91.4	86.2	86.4	88.7	95.4			
Non-Libyan as (%) of total	3.1	4.2	8.6	13.8	13.6	11.3	4.6			

Source: Ministry of Planning, Economic and Social Indicators, 1984, and National Authority for Information and Documentation yearly statistical series, various issues.

Table 13

Libyan Population by Sex and Age Groups 1973-1990 (Percentage of Total)

	1973			1984			1988			1990		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-9	18.9	18.6	37.5	17.8	17.2	34.9	18.5	18.1	36.6	18.7	18.1	36.7
10.-19	12.8	12.4	25.2	13.4	13.0	26.4	12.2	11.8	24.0	12.1	11.9	23.9
20-29	6.8	6.5	13.3	7.3	6.9	14.3	7.7	7.3	15.0	7.9	7.5	15.4
30-64	10.5	10.3	20.8	10.7	10.1	20.8	11.4	10.7	22.1	11.2	10.5	21.7
65 & over	1.7	1.5	3.2	1.8	1.8	3.6	1.1	1.2	2.3	1.1	1.2	2.3
Total share	50.7	49.3	100	51.0	49.0	100.0	50.9	49.1	100.0	50.9	49.1	100.0

Source: Calculated from, National Authority for Information and Documentation yearly statistical series, various issues, and Census and Statistical Department, statistical abstract, 1973 to1982.

Table 14

Evolution of Educational Enrolment in Libya 1970-1990

	Academic Years							Annual Average	
	1969 1970	1972 1973	1975 1977	1979 1980	1982 1983	1985 1986	1989 1990	1970 1980	1981 1990
Total number of Students	366.5	540.4	736.3	958.9	1092	1245.5	1375.7	10.2	3.7
Total Student as (%) of Total Population	19.1	25.2	30.6	34.2	34.6	37.0	33.2	30.6	35
Students below 15 years old (% of total)	94.7	93.8	92.3	90.0	87.1	85.1	83.2	9.6	2.9
Student over 15 years (% of total)	5.3	6.2	7.7	10.0	12.9	14.9	16.8	17.5	9.4

Source: Calculated from, Economic and Social Indicators, Ibid., pp. 54-59, and National Authority for Information and Documentation, yearly statistical series, various issues

Note: All figures did not include, military institutions students and scholarships students.

Table IV-15

Distribution of Domestic and Total Labour Force by Sex in Libya 1972-1985

	1972	1975	1978	1980	1983	1985	Average 1972/85
Males as a percentage of Total labour Force	93.6	94.8	94.5	92.2	92.9	88.9	92.8
Females as a percentage of Total labour Force	6.4	5.2	5.5	7.8	7.1	11.1	7.2
Total Labour Force	100	100	100	100	100	100	100
Males as a percentage of Domestic Labour Force	92.4	92.2	91.8	88.9	87.5	85.8	89.8
Females as Percentage of Domestic labour Force	7.6	7.8	8.2	11.1	12.5	14.2	10.2
Total Domestic Employment	100	100	100	100	100	100	100

Source: Calculated from: National Authority for Information and Documentation yearly statistical series, various issues. and Ministry of Planning, Economic and Social Indicators 1970-1983 (Tripoli, February 1984, pp. 5 to 10)

As noted earlier, the first few years of the oil era witnessed the beginnings of the influx of immigration which then continued at an increasing rate into the next few decades. Consequently, the presence of a high proportion of imported labour in the total labour force soon became very apparent. Between 1970 and 1982 the share of foreign labour in the total employed population had quadrupled. This corresponded to 6.1% in the preceding period of 1962-1969 and 22.4% during the post-boom period of 1983-1990.

IV-5-2-2 Labour Supply.

The total number of the economically active population in Libya (defined as those in the 15-65 age group in 1990 was 1,018,600. This number had nearly trebled itself since 1962. There had been an average growth rate of more than 4% p.a. to reach this level. In 1962, the labour force amounted to 24.5% of the total population, and in 1990 it was the same. But there had been an increase in the inactive population over these three decades who were either over 65 years old or who could not work because they were students or in military service. There had also been a rise in female participation in total population but a relatively low female content in the labour force

Tables IV-16 & IV-17 and Figures IV-2 and IV-3 show the size of the employed population from 1962 to 1990 in terms of Libyan and non-Libyan and its growth and distribution among the major economic sectors. They reveal that during the period 1962-1969 the total labour force had increased from 356,000 in 1962 to 414,600 in 1969, at an average growth rate of 1.9% p.a. in less than 93.9% of the labour force in 1962 was Libyan and by 1969 the Libyan content within the total labour force had been growing at an average rate of 1.2% p.a. However, during the same period the content of non-Libyans within the total labour force had been increasing at 10 times this rate.

During the period of 1970-1982, the total labour force continued to grow at an average rate of 7.8% p.a. But by the end of the period in 1982 the proportion of Libyan labour force in the total labour force had dropped to 54.3%. The total number of the labour force remained virtually unchanged throughout the rest of the decade to 1990. The growth rate had been only 0.5% p.a. However, the share of Libyans employed in the workforce compared with foreign labour had grown by 1990 to 86.3%. The main reason for this was the 1985 self-sufficiency policy. Labour growth had also been affected by the latest confrontation crisis with Western countries, by the ending of the development programmes and the rebuilding of the private sector.

Taking the entire period under investigation 1962-1990 the domestic employed population occupied an average annual share in the total labour force amounting to 81.8%.

As to how labour force within the various economic activities was distributed, observation reveals that before the discovery of oil the agricultural sector in Libya was the most important labour absorbing sector. Although this situation changed slightly following the discovery of oil in commercial quantities in 1962, it seems that the agricultural sector was still the most important labour absorbing sector, particularly when taking into consideration those engaged in agricultural activities as a second occupation and those who partook in these activities as unpaid family work. However, the official figures on employment indicate that the agricultural sector share of total employed population had declined substantially since 1962. It decreased from 40.9% in 1962 to 30.2% in 1969 and to 18.6% in 1990. Several factors were responsible for this. There was the substantial increase in the number of agricultural workers seeking higher earnings in the construction and service sectors centred in the urban areas. Then there were such things as the undeveloped agricultural products market, the lack of water resources, the imbalances of the development expenditure (particularly during the period of 1962-1969), and the domination of the public sector.

Following the discovery of oil in commercial quantities, the construction and electricity sectors were the leading sectors in absorbing labour. Their combined share in overall employment had increased from 10.6% in 1962 to 18.2% in 1990. During the first oil exporting period of 1962-1969, construction and electricity employment had increased at an average rate of 10.8% p.a.,. This rate more than doubled during the boom period of 1970-1982, and settled at an average growth rate of 21.8% p.a. during the post-boom period of 1983-1990. This meant an average sustained growth rate during the whole period of 1962-1990 of 19.8% p.a. This high increase was mainly attributable to the huge investment programmes in infrastructure.

The transport and communication sector was the second important labour absorbing sector. Its share in overall employment had increased from approximately 6.3% over the period of 1962-1969 to 8.3% and 8.2% during 1970-1982 and 1983-1990 respectively with a remarkable increase in 1971 reaching 9.1%.

Moreover, for the entire period under study (1962-1990), the transport and communication sector share in overall employment reached about 8%. Once again, the reasons for absorbing labour at this relatively higher rate in both the construction and electricity and the transport and communication sectors can be explained by the vast investment in infrastructure. Then of course, employment in the manufacturing sector had increased at an average rate of 5.7% p.a. during 1962-1990, with a remarkable growth rate during the boom period of 1970-1982 reaching 10.9% p.a. The share of manufacturing in overall employment had decreased though from 6.7% in 1962 to 4.7% in 1970, but rose to 7.1% in 1980 with a further increase to 9.8% by 1990.

As has already been mentioned, the relatively low share of manufacturing employment in the total labour force reflects the position of high level shortage in domestic manpower as well as revealing the relatively capital-intensive features of the manufacturing sector.

In contrast, during the period of 1962-1969 services sector employment had increased at an average rate of 5.7% p.a. with an annual share in total labour force averaging at about 35.7%, whilst, during the period 1970-1982 it grew at the rate of 6.5% p.a. with an average share in overall employment reaching 40.2%. But during the period of 1983-1990 it grew at only 1.6% p.a. with an almost unchanged average share in overall employment. For the whole period of 1962-1990 service sector employment grew at an average rate of only 5% p.a. with an average annual participation rate in overall employed population amounting to about 40%.

The oil sector-the booming sector-was the less important labour absorbing sector. Its share in overall employment decreased from 3.6% in 1962 to 1.7% in 1990.

In conclusion, the share of the commodity producing sectors in the total labour force had decreased from 51.7% in 1962 to 28.9% in 1980 and then increased slightly to 30.8% by 1990. Whereas the share of the non-commodity producing sectors in the total employed population had increased from 48.3% in 1962 to 71% in 1980, but declined back slightly to 69% in 1990. The relatively higher share of the non-commodity producing sectors has three main causes: the first was that the initial development programmes called for a high proportion of the labour force to be occupied in infrastructure activities (electricity, transport and construction) which to some extent seemed to be productive sectors. The second cause was that, as in most SPE-LDCs, the manufacturing sector (and partly the agriculture sector) in Libya are primarily capital-intensive sectors, and thirdly the official figures on employment in the agriculture sector are not reliable, since they include only registered employees.

Table 16

Trends in Growth of Libyan Labour Force 1962-1990

							Annual Growth Rate			
							1962	1970	1983	1962
	1968	1970	1975	1980	1988	1990	1969	1982	1990	1990
Population (000)	1803.0	2006.0	2683.1	3245.8	4220.0	4380.0	3.3	5.5	2.0	4.1
Total Labour Force	400.5	433.5	677.1	813.0	927.6	1019.0	1.9	7.8	-0.5	4.0
Participation Rate (%)	22.2	21.6	25.2	25.0	22.0	23.3	23	27.4	28.8	27.5
Domestic Labour	369.3	383.5	454.1	533.0	824.6	879.4	1.2	3.6	5.2	3.5
Foreign Labour	31.2	50.0	223.0	280.0	103.0	139.2	12.3	22.6	-10.7	10.9
Share of Domestic Labour (%)	92.2	88.5	67.1	65.6	88.9	86.3	-0.7	-3.8	6.4	-0.1
Share of Foreign Labour (%)	7.8	11.5	32.9	34.4	11.1	13.7	10.1	13.5	-11.5	5.9

Source: Calculated from Ministry of Planning, Economic and Social Indicators,1962-1983 (ibid.), National Authority for Information and Documentation, yearly statistical series, various issues, and Ministry of Planning and Finance, Distribution of Total Labour Force by Kind of Economic Activities 1970-1994, unpublished statistical series 1996.

Table IV-17

Sectoral Distribution of Total Employment in Libya 1962-1990

	Workers in thousands				Share in Total (%)				Annual Growth			
									1962	1970	1983	1962
	1962	1970	1980	1990	1962	1970	1980	1990	1969	1982	1990	1990
Commodity Producing Sectors	184.1	160.4	234.6	313.7	51.7	37.0	28.9	30.8	-1.9	4.1	2.3	1.0
Agriculture, Forestry & Fishing	145.7	126.0	153.4	188.9	40.9	29.1	18.9	18.5	-1.9	2.3	1.5	1.0
Instruction of Oil & Natural Gas	12.9	10.0	13.7	16.9	3.6	2.3	1.7	1.7	-3.1	2.7	2.7	3.1
Mining and Quarrying	1.7	4.0	9.5	8.5	0.5	0.9	1.2	0.8	10.9	8.2	-1.3	6.5
Manufacturing	23.8	20.4	58.0	99.4	6.7	4.7	7.1	9.7	-2.5	10.9	4.9	5.7
Non-Commodity Producing Sectors	171.9	273.1	578.4	705.3	48.3	63.0	71.1	69.2	5.2	9.5	-1.3	5.5
Electricity, Gas & Water	5.3	8.4	19.7	28.5	1.5	1.9	2.4	2.8	5.5	8.5	3.2	6.4
Construction	32.4	49	173.0	157.1	9.1	11.3	21.3	15.4	3.0	18.0	-11.6	5.9
Transport and Communication	22.4	34.9	71.7	82.3	6.3	8.1	8.8	8.1	5.2	7.8	-0.5	9.4
Services Gathering	112	180.8	314.0	437.4	31.5	41.7	38.6	42.9	5.7	6.5	3.8	5.7
Total Labour Force	356.0	433.5	813.0	1019.0	100	100	100	100	1.9	7.8	-0.5	4.0

Source : As for Table III-16.

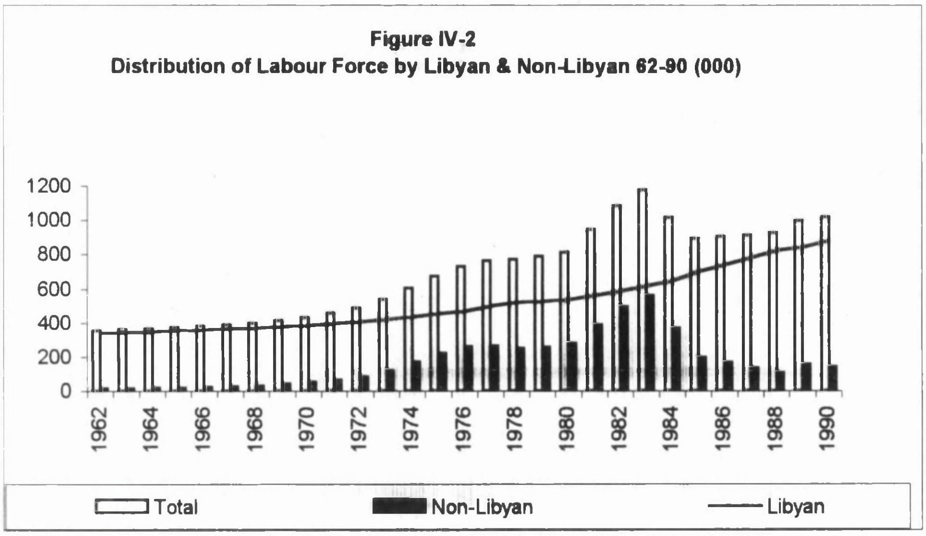


Figure IV-2
Distribution of Labour Force by Libyan & Non-Libyan 62-90 (000)
1200
1000
800
600
400
200
0
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
Total
Non-Libyan
Libyan

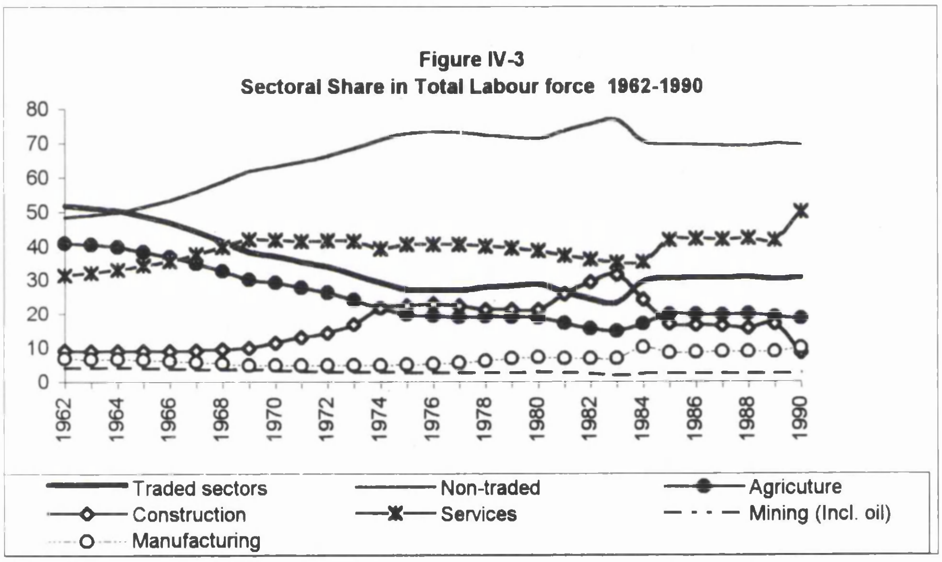


Figure IV-3
Sectoral Share in Total Labour force 1962-1990
80
70
60
50
40
30
20
10
0
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
Traded sectors
Non-traded
Agricuture
Construction
Services
Mining (Incl. oil)
Manufacturing

IV-5-3 Productivity Growth and Technical Progress

The preceding exposition shows that the size of the economically active population in Libya had grown at an average rate of 4%p.a. over almost three decades. This sustained level of growth was due to a high ratio of imported labour and a high population growth rate. For almost the same period gross capital formation had grown at an average rate of nearly 23% p.a. The most remarkable increase in both the labour supply and gross capital formation occurred during the oil price shock periods of 1973-1974 and 1980-1982.[2]/ However, growth rates in this latter sense do not necessarily imply equivalent increase in output per unit of labour nor output per capita. In what follows partial and total productivity growth will be discussed in detail.

Productivity is usually measured as a ratio of output to inputs. So there are as many indices of productivity as there are factors of production. However, the most commonly used are the partial productivity indices of labour and capital and the total or multifactors productivity index. The former indices are simply the average products of labour or capital, while the latter, often referred to as residual or the index of technical progress, is defined as output per unit of capital and labour combined.

However, the two measures are not entirely adequate either because of they do not take into consideration changes relating to other factors (the partial productivity indices) or because of data and measurement difficulties (the multifactors productivity index).

The experiences of the oil-exporting less developed countries revealed that during the boom periods resources (especially capital) are absorbed with rapid speed and this rapidity always coincided with serious institutional bottlenecks and administrative problems. In the case of Libya this was either because of the failure of the government, which undertook more than 80% of total investment to choose the right technology and required skills, or because

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[2]/ Capital stock is estimated using a 1:1 ratio of capital stock to GDP in the base year 1970 , deflating GFCF AND adding and subtracting forward and backward

of the sluggish change in the socio-economic structure as a whole. Under these circumstances the two measures will be used to measure productivity gains in Libya but the results should be treated with caution.

Table IV-18 shows labour productivity (real value added per worker) during the period of 1962-1990. It indicates that labour productivity had steadily grown at an average rate of 20.5% p.a. during the first oil exporting period of 1962-1969, and at an average rate of 5.3 %p.a. over the oil price shock period of 1970-1982, while it was negative during the post-boom period of 1983-1990.

The estimation of capital productivity however, during this whole period, is more problematic. This is not merely because of the difficulty of defining and measuring capital, but also because of the dependence upon measurements of different factors which are complex. One such factor being government policies involve the mixing of capital and labour (i.e., the capital-labour ratio) in the production process. A high proportion of government investment during the period under study was placed in large capital intensive projects. The measure used is the incremental capital output ratio (ICOR)[3]/. The results shown in Table IV-19 indicates that capital absorption seems to have been efficient during the boom period of 1973-1982, with an ICOR value of -0.1 It is especially the period of rapid capital intensification of 1975-1982, that has a low ICOR. What this is effectively saying is that if the ICOR measure is to be given any significance then Libya seemed to be efficient in utilising of capital.

For total factor productivity growth (TFPG) estimations a homogenous production function with constant returns to scale is used. Factor shares are used as weights upon the assumption that factor elasticities are represented by factor shares. The results given in Table IV-20 reveal that TFP growth was

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[3] / The concept of (ICOR) is based on the Harrod-Domar Model of growth that accounts only for capital as input Symbolically. $\Delta Y = p\Delta K$ Where Y is GDP, K is capital stock (net of depreciation, and $p = \Delta Y / \Delta K$ or the inverse of ICOR. Then $\Delta Y / Y = P(\Delta K / K)$ or ICOR = $(\Delta Y / Y) / (\Delta Y / Y)$. thus ICOR is a quotient the num erator of which is the ratio of investment to GDP. And the denominator was legged by one year from the numerator's period.

negative over the period of the pre-boom period of 1969-1972. This negative value can be explained by the production disruption induced by political changes which were linked with the revolution. During the boom period output growth was mainly putdown to factors inputs while TFP was negative over the post-boom period of 1983-1990. The negative value for this period can be explained by both the production disruption, and the moderate growth rates of factor inputs. Generally speaking, productivity gains in Libya seem to be insignificant during the boom period despite Libya's access to imported technology. The failure of productivity to grow can be explained partly by the economy's limited absorptive capacity and partly by the failure to get the right technology. These TFP growth results, however, are not in line with the calculated ICOR, whose low value over 1973-1982 is indicative of efficient utilisation of capital.

Table IV-18

Growth of Labour Productivity (Value added per worker at 1980 prices)

Value Added Per Worker										Annual Average Growth Rate			
										1962	1970	1983	1962
1962	1965	1970	1973	1975	1978	1980	1985	1988	1990	1969	1982	1990	1990
1.1	2.7	4.4	5.7	6.7	7.6	12.6	8.1	6.2	6.1	20.5	5.3	-1.4	7.9

Source: Calculated from National Authority for Information and Documentation yearly statistical series.
and Central Bank of Libya, yearly statistical series and Monthly Bulletin, various issues.

Table IV-19

Incremental Capital Output Ratio (ICOR)

								Annual Average				
								1962	1973	1973	1983	1962
1968	1970	1974	1976	1978	1980	1986	1990	1972	1978	1982	1990	1990
0.8	0.1	0.2	0.2	-0.8	0.4	0.7	0.1	0.7	-0.1	-0.1	1.2	0.6

Source: Calculated from National Authority for Information and Documentation yearly statistical series, 1994-96
and Central Bank of Libya, yearly statistical series and Monthly Bulletin, various issues.

Table IV-20
Factor Input and Output Growth for the Libyan Economy 1969-1990

	Output	Labour	Capital	Residual
1969-1972	10.5	19.3	5.3	-14.2
1973-1982	15.9	13.6	10.9	-8.1
1983-1990	-1.0	-1.8	5.3	-4.5
1973-1990	8.8	9.0	7.9	-8.1

Source : Calculated from National Authority for Information and Documentation, yearly statistical series , various issues and Central Bank of Libya, yearly statistical series and Monthly Bulletin various issues.

IV-6 Sectoral Shifts

As in most developed and developing countries services sectors in Libya had been the largest sectors in the economy. This is not only because of their relatively easy expansion capabilities, but also because the conditions imposed by the development process had necessitated the further expansion of these sectors.

Table IV-21 and Figure IV-4 show the sectoral distribution of aggregate output and employment during the period of 1962-1990. It indicates that the services sectors share in aggregate output amounted to 59.8% in 1962, dropped to nearly 32.5% in 1970 but by the following first oil price shock of 1973-1974 it had grown again but only to 42.8%.In the meantime, employment in the services sectors rose steadily from 48.3% in 1962 to 63% in 1970 and 72.8% in 1975. According to international standards these shares are very high.

Although the manufacturing and agricultural sectors had received absolutely huge financial allocations during the Seventies, their contribution in aggregate output had declined from 5.8% in 1962 to 1.8% in 1975. So many reasons were responsible for this position. Certainly the scarcity of water and arable land, the shortage of raw materials and the lack of skilled and technical labour did not help. But then there was also the absence of administrative institutions, the limited absorptive capacity of the economy, the smallness of the domestic market supremely the government policy. The Government had nationalised the private sector and gave little priority to industry in the early period. The high priority placed on industry was introduced later in the transformation plan which was launched in 1976.

For almost the same reasons, the share of the agricultural sector in both output and employment had declined sharply during the same period. Its share in aggregate output had declined from 9.6% in 1962 to 2.3% in 1975, and employment which was 40.9% in 1962, had also declined to 19.7% in 1975. However, it must be mentioned that the fluctuation in the relative shares of the various economic sectors which automatically reduced the share taken by the commodity producing sectors in the overall gross output did not necessarily indicate a reduction in absolute output of the latter.

Table IV-21
Contribution to GDP and Employment by Major Economic Sectors 1962-1990

									Percentage Shares			
Sectoral Shares in GDP									1962	1973	1980	1983
(at 1970 constant price)	1962	1970	1973	1975	1980	1983	1987	1990	1972	1975	1982	1990
Agriculture	9.6	2.6	2.8	2.3	1.6	3.6	5.2	5.5	4.3	2.2	2.1	4.5
Manufacturing	5.8	1.7	2	1.8	2.1	3.6	6.5	7.8	2.6	1.8	2.7	5.9
Services Gathering	59.8	32.5	42.8	42.1	31.6	45.9	58.4	59	40	39.5	38.8	54.2
Mining (incl., Crude Oil)	24.8	63.2	52.4	53.8	60.3	47.2	29.9	27.7	53.1	56.5	56.3	35.4
Sectoral Shares in Employment												
Agriculture	40.9	29.1	24	19.7	18.9	14.7	19.7	18.6	34	21.8	17.2	18.6
Manufacturing	6.7	4.7	4.8	4.9	7.1	6.8	8.7	9.8	5.4	4.8	6.9	8.7
Services Gathering	48.3	63	68.4	72.8	71.1	76.4	69.3	69.1	57	70.7	73.2	70.4
Mining (incl. Crude Oil)	4.1	3.2	2.8	2.6	2.9	2.1	2.3	2.5	3.6	2.7	2.7	2.3

Source: Calculated from Economic and Social Indicators (1983-84) and Central Bank of Libya, yearly statistical series and Monthly Bulletin, various issues, and National Authority for Information & Documentation (ibid.)

IV-6-1 The Dutch Disease Counterfactual

In this section the counterfactual to the Dutch Disease is established. The necessity and difficulty of this task are related to the continuous shifts in the structure of production because of the de-industrialisation in developed economies, and industrialisation in developing economies. The task is particularly difficult for Libya mainly because Libya has a demonstrably atypical structure for a developing country, with a very large services sector and a small agricultural sector. Its structure, therefore, cannot be compared with other developing economies at similar stages of development, and some ingenuity is required in determining the "what would have been" scenario.

Bearing this in mind, the counterfactual will be established in two stages. First, the historical trends of sectoral growth and the share in non-oil output for the period preceding the boom years, i.e. 1962-1972 are established (An exponential growth rate is assumed). Second, these historical patterns are projected into the boom and post-boom periods in this way establishing the counterfactual. The result is then compared with the actual pattern of sectoral development to see what this says about the economy's response to the boom conditions insofar as the relative price changes had impact on the supply response in the different sectors. Because the Theory makes a distinction between traded and non-traded sectors, the analysis will be organised along these lines which is, admittedly, arbitrary.

Figure IV-5 shows the results. For the traded goods sector, agriculture's share during the boom period was lower than expected (shown by the trend line) and the manufacturing share was significantly higher than expected. Results for the non-traded goods sectors are equally mixed, with construction performing better than anticipated and other non-traded worse. Not too much significance should be attached to the actual magnitude of deviation between the sectors but importance should be placed on their order of magnitude because of the qualifications made to establishing the counterfactual discussed above. All that needs to be noted really is that sectoral shifts do not entirely accord with the predictions of the Dutch Disease. In Libya the traded sectors are comprised of manufacturing, agriculture and non-oil mining and the Theory predicts a decline in the output and employment of these and an increase in the share of the non-traded goods sectors, which is largely made up of services.

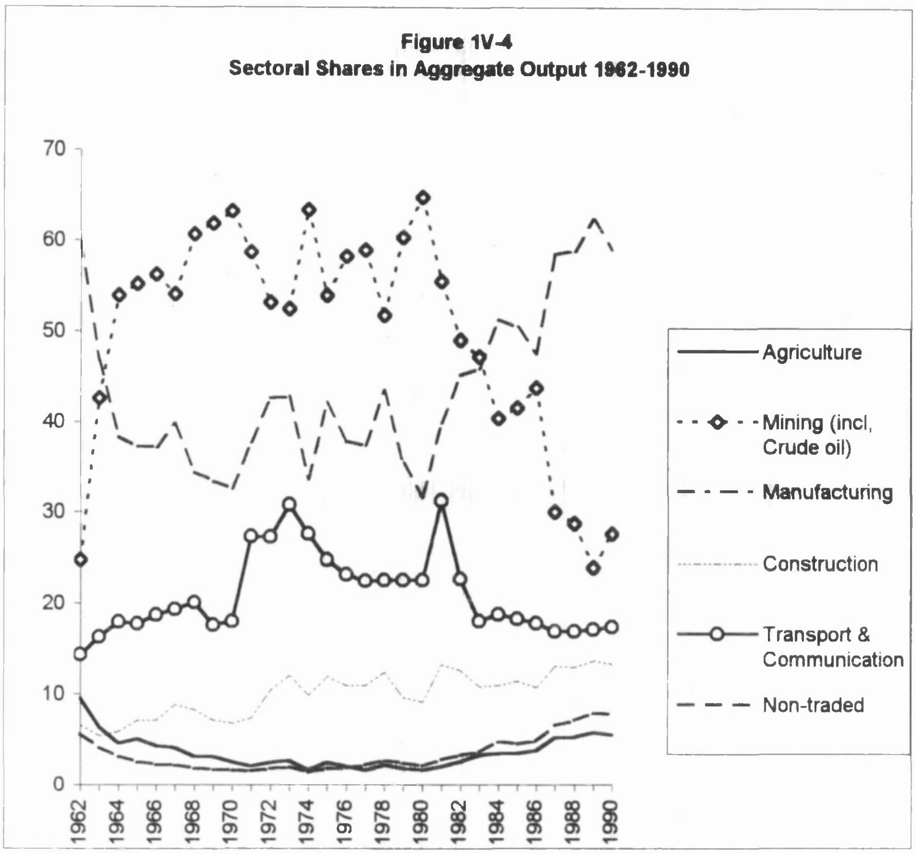

Figure 1V-4
Sectoral Shares in Aggregate Output 1962-1990
70
60
50
40
30
20
10
0
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
Agriculture
Mining (incl, Crude oil)
Manufacturing
Construction
Transport & Communication
Non-traded

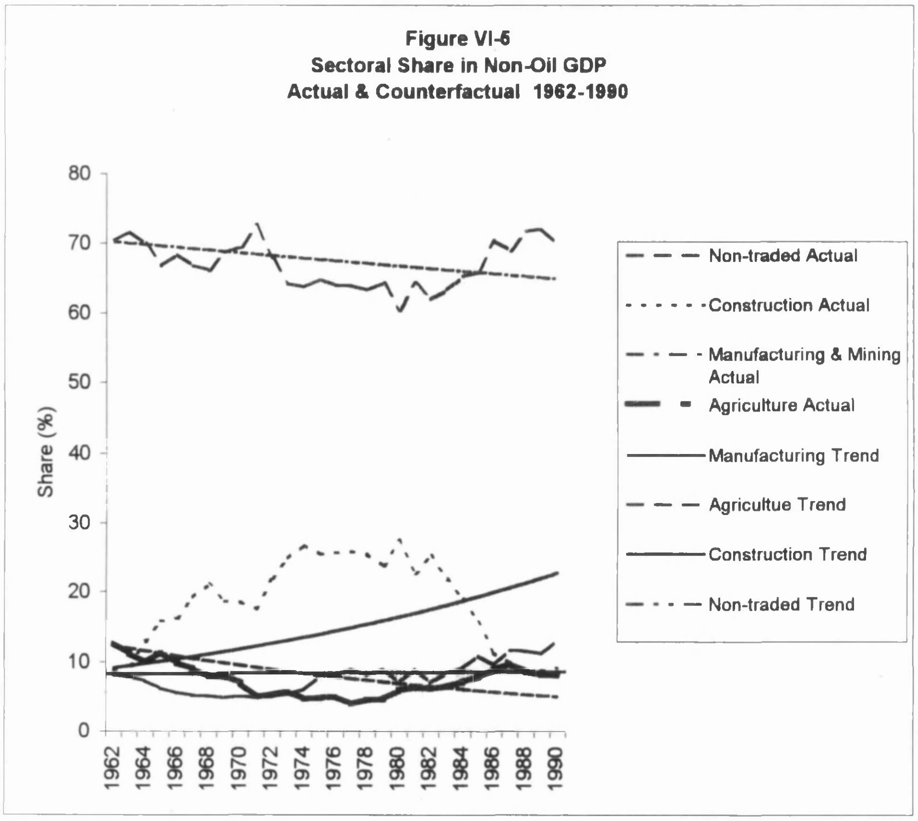

Figure VI-5
Sectoral Share in Non-Oil GDP
Actual & Counterfactual 1962-1990
Share (%)
80
70
60
50
40
30
20
10
0
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
Non-traded Actual
Construction Actual
Manufacturing & Mining Actual
Agriculture Actual
Manufacturing Trend
Agricultue Trend
Construction Trend
Non-traded Trend

CHAPTER V
AN EMPIRICAL INVESTIGATION INTO THE DUTCH DISEASE IN LIBYA

V-1 Introduction

Having surveyed the salient developments of the Libyan economy during the period 1962-1990, the discussion will now turn to the specific analysis of the changes that coincided with the oil prices shock period of 1973-1982. The hypothesis that the sudden inflow of foreign exchange funds may alter the structure of prices and, consequently, the structure of production and employment in favour of the non-tradable goods sectors and to the disfavour of the tradable ones will be examined. However, certain warning signals should be flashed at the outset.

First, the distinction between traded and non-traded sectors is not tenable without some generalisation. The sectors which are assumed to be tradables are manufacturing, mining and agriculture, and the non-tradables are electricity and water, banking and insurance, construction, trade and storage, transport and communication and social services-even though a closer look at the second category (non-tradables) reveals that, part of each is actually tradable. This applies to electricity and water and transport and communication. In other words, since there is great difficulty in assessing the tradable content and consequently its share of the respective sector's production and employment, the discussion will focus on whole sectors assuming them to be totally tradables or non-tradables. Secondly, with regard to the resource movement effect, the analysis will be in terms of labour shifts from tradables to non-tradables. This movement is considered as a proxy for the Dutch Disease, although it could encompass a far wider definition. The analysis will focus on the changes in the main labour market variables, but it must be borne in mind that such a method does not take certain other considerations to task. Foremost among these is the shift toward more capital-intensive techniques. Where, the increase in both labour imports and the shift in medium and small scale industries to capital-intensive techniques in the face of labour shortages and the pursuit of cheaper costs obscures the overall picture of domestic labour mobility. In agriculture, for instance, new techniques were introduced and the shortage in domestic agricultural labour supply was offset by unskilled foreign labour. Paradoxically however, the shift to more modern techniques created demand for skilled and technical labour in both agriculture and agriculture-supporting industries such as plastic and metallic irrigation pipes, green plastic houses, pumps, chemical fertilisers, irrigation pivots etc. There are also other socio-economic and socio-political considerations which complicate the analysis, such as the effect of production and price subsidies on both the prices and wage levels and price and wage control policy. So there are many dynamic forces which render the analysis more ambiguous.

In view of all these warning factors we shall start the analysis by examining the nature, magnitude, and volatility of the foreign exchange earnings (Section II). Section III paves the way for measuring the Disease by overviewing stylised facts regarding structural change and the general trends of those changes in Libya. Section IV constructs a 20-year Dutch Disease index for Libya libelling a counter-factual analysis. Finally Section V investigates the mechanisms through which the boom effects are transmitted into the economy.

V-2 The Windfalls

As already mentioned, the Libyan economy grew at an impressive annual rate between 1970 and 1983 averaging about 13% p.a. in real terms. This impressive growth was associated with three major developments: firstly, the increase of foreign earnings from petroleum exports, secondly, an alteration of the structure of production and employment and thirdly the implementation of a self-sufficient central planning development strategy. However, it can be argued that these windfalls were a costly opportunity because they were not utilised in a way that would have laid the foundations for sustainable growth or made the economy less vulnerable to external shocks. Indeed, the observed high growth does not reflect the whole picture but actually conceals an unfavourable adverse development, namely the emergence of an unfavourable structural change which resulted in an increase in the dependence upon revenues from oil that were volatile and had a large rental component. This situation can be argued to be that of a Dutch Disease. An implicit feature of this unfavourable change was a significant drop in the share of the tradable sectors in the economy. During that period, the share of agriculture and manufacturing in real GDP declined from 5.2% in 1970 to 1.9% in 1982 and the balance of non-oil trade deficit widened despite the increase in the overall trade balance surplus. For the same period oil revenue (in real terms) had more than trebled. In 1974 alone it increased by more than 70%. In 1979, with further oil price increase, the value of oil revenue grew at nearly 67%. But with the fall in oil prices since 1982 oil revenue had fluctuated with a downward trend.

Table V-1 indicates the absolute and relative value of oil exports (as ratios to the GDP, exports and imports). It reveals that the ratio of oil earnings to total GDP has always been significant in the Libyan economy but increased noticeably in 1973 when it constituted 67% of total GDP and, again, in 1978 when it peaked at 70.8%. Subsequently the ratio declined steadily afterward and in 1990 it constituted 22% of the total GDP. As a ratio to exports and imports oil earnings averaged 96% and 242% p.a. respectively over the period of 1973-1982, corresponding to 94% and 241% p.a., for the pre-boom period 1962-1972, and 72% and 142% p.a., for the post-boom period of 1983-1990.

Table V-2 shows the effect that these windfalls had on the balance of payments. The current account balance is dominated by merchandise, unrequited transfer and services balances, the former consist of oil and non-oil exports. Thus, with an increase in oil revenue the current account position and consequently the overall balance had improved further over the period 1965-1980, with the exception of 1973 and 1975. The deficit during these two years was mainly due to the increase in imports and invisible transactions. Over the period of 1981-1988, with the exception of 1985 and 1986, the current account balance and consequently the overall balance were both in deficit. Furthermore, Libya's stock of foreign assets was growing substantially during almost the entire period and especially during the boom periods. However, the expansion of foreign reserves in the economy from 240.3 billion in 1970 to 360.5 billion in 1980 was not associated with any significant investment abroad, so it is safe to say that the economy was not sterilised from the foreign exchange effect.

Table V-1
Growth of Oil Windfalls in Libya, 1962-1990

	1962	1968	1970	1973	1975	1978	1980	1983	1985	1987	1990
Value of Oil Exports in (LD.000)	45.0	564.9	741.1	1461.7	2525.3	3889.6	6486.4	3454.2	2577.6	1338.8	1739.5
As a Ratio to GDP (%)	28.9	52.7	57.5	67.0	68.0	70.8	63.4	42.4	32.0	19.8	22.7
As a Ratio to Total Exports (%)	91.8	99.9	99.9	97.1	99.4	98.6	99.9	95.5	70.7	56.4	46.5
As a Ratio to Total Imports (%)	61.3	245.4	374.3	270.7	240.8	285.2	323.3	193.5	207.7	104.8	115.2

Source: Calculated from: Central Bank of Libya, yearly statistical series, and Monthly Bulletin, various issues, and National Authority for Information and Documentation, Yearly statistical series 1989-94.

Table V-2

Summary of Libya's Balance of Payments, 1967-1993, (LD 000.000)

	Balance of Trade	Services Balance	Net Transfer Payments	Net of Current Account	Net Capital Account	Net Errors, & Omissions	Overall Balance
1966	211.7	-610.1	-13.4	-411.8	-10.7	4.9	-417.6
1967	248.2	-189.2	-43.2	15.8	4.3	-5.8	14.3
1968	435.2	-299.6	-45.4	90.2	-23.9	-12.3	54.0
1969	499.4	-324.3	-58.0	117.1	42.7	-23.3	136.5
1970	589.2	-302.9	-56.6	229.7	46.9	-36.3	240.3
1971	597.7	-269.8	-48.8	279.1	49.7	-19.1	309.7
1972	946.4	-367.6	-50.9	527.9	70.3	-7.8	590.4
1973	1132.5	-506.2	-59.9	566.4	107.3	-305.0	368.7
1974	1215.8	-670.6	-29.8	515.4	-122.4	-26.8	366.2
1975	1550.8	-588.3	-57.8	904.7	-307.5	-77.0	520.2
1976	2676.5	-767.0	-60.6	1848.9	-376.4	-46.5	1426.0
1977	1761.2	-777.7	-72.9	910.6	-438.8	-18.6	453.2
1978	1067.1	-731.0	-16.2	319.9	-325.1	-54.0	-59.2
1979	1472.3	-455.9	-61.6	954.8	-236.5	-76.7	641.6
1980	746.0	-331.8	-155.2	259.0	-535.6	-83.9	-360.5
1981	153.1	-418.2	-404.8	-669.9	-302.5	-77.2	-1049.6
1982	806.8	-762.3	-495.7	-451.2	-191.9	22.5	-620.6
1983	997.9	-821.2	-622.4	-445.7	-112.5	-47.8	-606.0
1984	561.0	-575.7	-357.0	-371.7	-85.2	-27.7	-484.6
1985	1361.6	-520.1	-227.0	614.5	93.6	-11.4	696.7
1986	434.7	-323.2	-153.3	-14.8	62.1	37.6	84.9
1987	107.6	-345.8	-119.0	-357.2	50.0	30.5	-276.7
1988	-31.1	-523.9	-152.6	-707.6	1.6	114.5	-591.5
1989	229.2	-410.3	-146.1	-327.2	436.6	-30.0	79.4
1990	1069.5	-320.0	-136.2	613.3	-284.9	-15.2	313.2
1991	721.6	-377.8	-154.2	189.6	-125.6	76.8	140.8
1992	808.1	-296.1	-95.5	416.5	276.0	-118.4	574.1
1993	-44.1	-194.9	-45.0	-284.0	239.5	-53.3	-97.8

Source: Central Bank of Libya, yearly statistical series, and Monthly Bulletin, various issues, United Nations International Financial Statistics, various issues, and National Authority for Information and Documentation, yearly statistical series, various issues.

V-3 Structural Transformation

V-3-1 Introduction

Structural change is an important aspect of economic development. Economic development is usually defined as a process of transformation and growth. It is believed that neither structural transformation nor growth are exclusive of each other but rather that they include each other. Furthermore, structural change has important implications for external equilibrium because products of the different sectors vary in tradability and it has implications in this connection for the substantiality of growth and employment levels.

V-3-2 Source and Patterns of Structural Transformation

Structural transformation is attributed to various factors.[1]/ These however, can be broadly divided into demand-side and supply-side features. On the demand-side income elasticities of demand for the products of different sectors vary according to Engel's Law. Consequently, as income increases, demand shifts from primary to secondary and eventually to tertiary products. A similar trend occurs in intermediate demand because modern technology is associated with high fabrication which leads to the expansion of manufacturing at the expense of the primary sectors. On the supply-side it has been observed that growth in total factor productivity is higher in manufacturing than in agriculture. This leads to the eventual rise of the share of manufacturing in GDP in relation to the agriculture. Another supply-side factor is that while there are limitations to the supply of new land, which restricts the growth of agriculture, the supply of capital is flexible and this results in a more elastic supply of factors for manufacturing relative to agriculture. Manufacturing is expected to benefit from this more than services because manufacturing is usually more labour intensive than the former. Because of this, when labour is expanding rapidly it usually "jumps" directly to services, bypassing manufacturing.

[1] /This section draws on Chenery (1975 and 1979); Chenery and Syrquin (1986); and Syequin (1989)

Furthermore, increasing specialisation leads to the transfer of production of many services to specialist firms where formerly may of these things had been produced in the commodity sectors and this leads to an "empirical" expansion of services. In addition to the above factors, policies advocated by governments as well as structural and institutional factors do have an important impact on patterns of structural change too. [2]/

Despite the variety of factors influencing structural change, a general stylised pattern has been observed, which relates structural change to the growth of per-capita income. This pattern is believed to hold with a significant degree of consistency and formed Chenery's stylised pattern of structural change. The main feature of this pattern is that, as per-capita income grows, the relative share of industry in GDP expands at the expense of the share of the primary sector. Then, after reaching a higher per-capita income, the share of services starts to expand at the expense of the share taken by the other sectors. This stylised pattern of structural change is widely accepted and was confirmed by the extensive empirical work done by many economists, led by Chenery and Syrquin.

V-4 Structural Change and the Dutch Disease in Libya.

As mentioned earlier the high growth of the Libyan economy during the boom period of 1973-1982 was associated with great structural change. Indeed, during the period 1973-1982, the share of agriculture in real GDP dropped from about 2.8% to 1.6% and the share of manufacturing stagnated at about 2%, with a moderate decline in the middle of the period. On the other hand, the shares of construction, electricity, and services, especially transport and communication and trade and finance, increased significantly. In short, there

[2]/ The trade and exchange rate regimes are to important policy spheres them directly influence the pattern of structural changes. Labour immigration also plays an important role. Ideology can have great impact. The bias of socialist against services is one example. Resource endowments and the size of the economy also have a significant impact. For more details about these issues, see Chenery (1975 and 1979); and Chenery and Syrqin (1986); and Syrqin (1989).

was an expansion in the share of the non-tradable sectors and a contraction in the share of tradables (excluding oil). Similar trends were observed in the structure of the non-booming economy, taken as GDP excluding oil.

The above trends however, are not in themselves sufficient to be indictors of the occurrence of Dutch Disease, but should first be compared with the standardised pattern of structural change as defined by Chenery and Syrquin.

In a recent study conducted by Syrquin (1989)[3]/ structural change was investigated in a hundred countries and regressions were run to estimate the changes in the shares of different sectors in GDP associated with changes in per-capita income.[4]/ The recent findings concerning countries in the upper-middle income group, to which Libya belongs[5]/ are reported in the Table (V-3) compound with an estimation of the Syrquin equation for Libya.[6]/

Table V-3
Estimated Change (percentage points) in Shares in Real GDP Corresponding to each 1% increase in Per-Capita Income in the Upper-Middle Income Countries 1957-1989

	The Group's Average	Libya
Agriculture	-0.11	-0.21
Manufacturing	0.06	0.03
Total Tradables	-0.05	-0.18

Source: Syrquin (1989), particularly for Column 1, and Column 2 are estimated figures obtained by running a regression to the Syrquin equation against Libyan data (See Footnote 6 for the methodology)

The comparison of these results with the group's averages did not show a strong indication of Dutch Disease in the case of Libya. Although the parameter for manufacturing was positive for Libya it was less than the group's

[3]/ This study by Syrquin is unique because it separates manufacturing from construction and electricity rather than taking industry as a whole like in early studies and also because it uses more updated data. We therefore start our analysis from the results of this study rather than from Chenery and Syrquin (1975) as Gelb (1985) did.
[4]/ These regressions were run using available data for each country within the period 1950-1983. The years used for each country varied between 11 and 34 years. Libya is not includes in this study but the study indicates that Libya and Saudi Arabia had shown the same patterns of oil-exporting countries (Algeria, Iran, Iraq) (See Syrquin, 1989 p. 38 and note 4 p. 51)
[5]/ The classification of the countries was in accordance with that given in the 1986 World Development Report.
[6] The estimated equation in Syrquin (1989) took the form $Y=\alpha + \beta \ln X$. Where, Y is the share of the sector in GDP, and X is per-capita income The general results of the study confirm the stylised patterns especially in agriculture (more than 90% of the countries) but less strongly in manufacturing (about 70% of the countries). In some countries (Algeria, Congo, Egypt, Iran and Iraq) and also Libya and Saudi Arabia inverse signs of the estimated parameters were observed and according to Syrquin this an indication of the Dutch Disease.

average. As to agriculture, the parameter for Libya was about 50% lower than that of the group's average. In general, the results show that each 1% increase in per-capita income was associated with a 0.18 percentage point decline in the share of tradables in GDP in Libya compared with a decline of a 0.05 percentage point for the upper-middle income countries as a group.

Indeed, there is a reservation due that structural change depends to a great extent on structural characteristics: resource endowment, the size of the economy and government policies. This, however, should not distract from the previously mentioned fact that a stylised pattern has been widely accepted as the general case and was found to be proven empirically. The above reservation, therefore, does not undermine the validity of the analysis below which aims to measure the deviation from the general case and investigate the reasons that could explain it.

V-4-1 Quantifying the Disease.

A formal methodology to construct an index for the Dutch Disease was developed by Gelb and associates (1988). In this methodology Gelb attempts to isolate structural changes due to the Dutch Disease from the stylised trends which are associated with growth in per-capita income. Following the tradition in the Dutch Disease literature, Gelb divides the economy into three sectors, the booming sector, the non-tradable sector, and the tradables. The latter includes both agriculture and manufacturing. After excluding the booming sector from the economy, Gelb calculated the deviation of the share of the tradable sector in the economy from its stylised share according to Chenery and Syrquin (1975) and uses this deviation as an index for the Dutch Disease[7]/. In

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[7]/ The reason for excluding the booming sector from the economy before constructing the index is that the dramatic growth of the sector will lead to the decline of the share of all other sectors in GDP, including that of tradables. By excluding the booming sector this problem is neutralised. Therefore, the equation Gelb uses to construct a Dutch Disease Index is: $DD = (AGR_N + MAN_N) - (AGR_F + MAN_F)$ where,
DD is the Dutch Disease Index. And AGR & MAN are the shares of agriculture and manufacturing in non-oil GDP respectively (all in real terms) and the subscripts (N and F) are the standardised and actual shares respectively.

this section an attempt will be made to quantify the Disease in Libya by constructing an index for it along the above lines for the period 1962-1990. The behaviour of the index along the years will be noted, compared with before, during and after the boom, and related to the relevant variables (such as the real wages, domestic absorption and the real exchange rate).

In the counter-factual scenario, however, we will construct separate indices for manufacturing and agriculture before adding them up to obtain the Gelb overall Dutch Disease index. This should be helpful in highlighting the sub-trends in the tradable sector. We will also calculate the so-called "incremental indices" which show the divergence of each year's sectoral growth rates from the stylised growth rates. These incremental indices are most helpful in examining the determinants of the Dutch Disease phenomenon.

First, by applying Gelb's methodology and calculating the stylised shares of manufacturing and agriculture in non-oil GDP we will proceed to construct the index. This is done by using the stylised growth rates of those sectors corresponding to a 1% growth of GDP, and then applying them to the observed GDP growth in the Libyan economy. The difference between the counter-factual and the factual shares of the tradable sectors in non-oil GDP are then the Dutch Disease index.

The results are reported in Table V-4. A positive index indicates the occurrence of the Disease, while a negative index means a healthier than average position (as far as the Dutch Disease is concerned). The index is represented as an aggregate of both manufacturing and agriculture as well as taking them separately in order to provide more information and to facilitate analysis.

V-4-1-1 The Manufacturing Index.

It is obvious from Table V-4 below that, until the early Seventies, the index for manufacturing was positive, indicating a lower share for the manufacturing sector in non-oil GDP than the upper-middle income countries average. The main reasons behind that were the insufficiency and shortages of skilled labour and the emphasis of the development policy on infrastructure. The index even showed a deteriorated trend reflecting a decrease in the degree of industrialisation.This situation changed entirely after the early Seventies. Starting from 1972, the index for manufacturing showed a continued steady improvement, reflecting a gradual increase in the degree of industrialisation and, by 1990, the index reached a remarkable -7.5.

V-4-1-2 The Agriculture Index

With regard to agriculture, the index showed a fluctuating trend from as early as 1963 up to the late Seventies. While the index deteriorated between 1976 and 1982. The deterioration during this period was mainly due to the self-sufficiency policy which prevented agriculture from the use of foreign workers and was also the result of the import-substitution industrialisation policies adopted then, which made agriculture the least favoured sector of all. It is important to mention that this deterioration in the relative size of agriculture occurred despite the intensive public investment in irrigation and land reclamation. However, this situation had changed favourably since 1983 and trends continued, although increasingly, thereafter.

The above trends in the Dutch Disease sub-indices for manufacturing and agriculture are reflected in the overall Dutch Disease index. The index was increasing slowly during the Sixties from -0.4 in 1963 to 0.3 by 1970. But it improved remarkably over the boom period of 1973-1982 and continued to improve during the subsequent period.

Table V-4
Dutch Disease Indices for Libya 1963-1990

	Agriculture	Manufacturing	General Index	Incremental Indices		
	DD1	DD2	DD*	DD1	DD2	DD*
1963	-0.40	0.00	-0.40	-0.40	0.00	-0.40
1964	2.10	0.20	2.30	2.50	0.2	2.70
1965	-1.20	1.00	-0.20	-3.30	0.80	-2.50
1966	0.20	0.70	0.90	1.40	-0.30	1.10
1967	0.30	0.90	1.20	0.10	0.20	0.30
1968	1.50	0.60	2.10	1.20	-0.30	0.90
1969	-0.10	0.50	0.40	-1.60	-0.10	-1.70
1970	0.30	0.00	0.30	0.40	-0.50	-0.10
1971	2.10	0.00	2.10	1.80	0.00	1.80
1972	0.60	-0.10	0.50	-1.50	-0.10	-1.60
1973	-1.20	-0.40	-1.60	-1.80	0.30	-2.10
1974	1.20	-0.40	0.80	2.40	0.00	2.40
1975	-0.50	-0.80	-1.30	-1.70	-0.40	-2.10
1976	0.30	-1.30	-1.00	0.80	-0.50	0.30
1977	0.60	-2.10	-1.50	0.30	-0.80	-0.50
1978	0.10	-2.60	-2.50	-0.50	-0.50	-1.00
1979	0.50	-3.50	-3.00	0.40	-0.90	-0.50
1980	0.80	-3.50	-2.70	0.30	0.00	0.30
1981	0.50	-3.50	-3.00	-0.30	0.00	-0.30
1982	0.80	-4.30	-3.50	0.30	-0.80	-0.50
1983	-1.10	-4.60	-5.70	-1.90	-0.30	-2.20
1984	-1.30	-5.60	-6.90	-0.20	-1.00	-1.20
1985	-2.30	-5.50	-7.80	-1.00	0.10	-0.90
1986	-2.90	-6.10	-9.00	-0.60	-0.60	-1.20
1987	-3.90	-6.40	-10.30	-1.00	-0.3	-1.30
1988	-4.60	-7.20	-11.80	-0.70	-0.8	-1.50
1989	-5.80	-7.40	-13.20	-1.20	-0.20	-1.40
1990	-7.50	-7.50	-15.00	-1.70	-0.10	-1.80

Source: Calculated from Tables of Appendix AIV-1 (see Text for methodology)

V-5 Transmission Mechanisms

By tradition the Dutch Disease Model presented in Chapter II suggests that the main transmission mechanisms of the Disease are the resource movement effect and the spending effect. This section attempts to examine how the boom transmitted into the rest of the economy in the case of Libya.

V-5-1 Income Effect

Although the first few years of the oil era witnessed the initial influx of immigration into Libya, the massive increase in foreign labour coming into the country coincided with the vastly growing oil wealth following a sudden increase in oil prices during the Seventies and early Eighties. Many reasons accounted for this. Chiefly the huge increase in oil revenues accruing solely to the State made it possible for the Government to embark on large-scale developmental projects providing basic infrastructure such as electricity, street and road building, public building construction, etc. The Libyan labour force was not adequate for the current needs of these public projects because it lacked the skills and technical knowledge that were necessary. It is certainly doubtful that it was adequate in terms of size. Consequently the Government had to attract foreign workers, offering them generous remuneration. Other immigration had been attracted to Libya by the prospect of a building and construction boom and thousands of semi-skilled labourers, Arabs and non-Arabs, fell into this category.

On the other hand the increase in oil prices was also associated with rural-urban migration. The inflow of rural population into big cities (especially into Tripoli and Benghazi) during the Seventies coincided with the rapid build-up of government civil and military services and the boom in the construction sector in these cities. This movement deprived the agriculture sector of manpower, and thus contributed partly to the foreign labour inflow into the country.

The available data on the foreign labour working in Libya suggested that, during the Seventies demand for labour had been overtaking its supply. Table V-5 demonstrates that while the demand for labour had increased from 163,000 workers in 1975 to a total of 1,062,000 workers in 1985, the supply of labour had increased from 109,000 workers in 1975 to 678,400 in 1985. This implies that the gap between the demand for and the supply of labour had increased from 54,000 workers in 1975 to 383,000 workers in 1985 (i.e., the gap had increased by more than 709%).

Table V-6 reveals that, between 1970-73, foreign labour inflow increased by nearly 31.9% p.a., and between 1976-79 the annual rate of growth of foreign labour averaged at about 30.2%, while it started to decline in the subsequent years, particularly from 1980. Hence it could be said that the most intense period of foreign labour influx coincided with the elevation of the boom period in Libya. The share of foreign workers in the Libyan labour force had increased from 22% in 1973 to 34.4%in 1980, but declined to 13.7%% in 1990.

Regarding the distribution of foreign labour among economic sectors, the available statistical figures reveal that the leading sector throughout the boom period of 1973-1982 was construction and this was followed by social services, agriculture, mining and manufacturing, extraction of oil and natural gas, transport and communication, wholesale and retail trade, electricity and water and finance insurance and banking services (see Table V-7). However, since the official figures on foreign employment did not include unregistered workers, the overall percentage in reality could have had a downward bias. This downward bias would naturally be expected to be high in both the agriculture and the manufacturing sectors, where the ratio of unregistered foreign labour in these two sectors was relatively high.

The concentration of foreign labour in construction and agriculture, both of which were labour-intensive, is an indication of the high ratio of semi-skilled workers within the foreign labour in Libya. Functional classifications for foreign labour working in Libya (Table V-8), show that the ratio of professional technical workers to total foreign labour working in Libya in 1971 was 10.2% declining to 6.3% in 1980. The ratio of administrative and managerial workers to total foreign labour was 20% in 1971 decreasing to 4.3% in 1980, while covering the same years the same ratio for semi-skilled workers declined from 62% in 1971 to 40%, in 1980.

Furthermore, it is important to note that, by the mid to late Eighties, it had become apparent that foreign labour had started to compete with the domestic unskilled and semi-skilled workers, which were becoming relatively abundant in the economy. So many of these were available following the dismissal of considerable numbers of them from the military services and because of the suspending of development programmes and the transformation from the public to the private sector. This raised the magnitude of unemployment in those sectors employing such skills and consequently unemployment in the economy as a whole. There were several reasons for the continuance of the immigration of foreign labour into the country despite the existence of unemployment. One reason lay in the difference between the working conditions accepted by the foreign workers and those of the domestic workers. Other reasons were the Government's open border policy, its weak labour legislation and virtually non-existent trade unions. Then there was the public employment policy which had formerly guaranteed employment to all Libyans willing to work, regardless of their qualifications or demand for their services. But this policy had been abandoned, so this was clearly another reason for the rise of unemployment.

Table V-5

Growth of Demand for and Supply of Labour 1975-1985

				Growth Rates (%)		
				1975-	1980	1975-
	1975	1980	1985	1980	1985	1985
Demand for Labour	163.0	303.6	1062	86.3	250.0	551.0
Supply of Labour	109.0	143.0	678.4	31.2	374.0	522.0
Shortage of Labour	54.0	160.6	383.0	197.4	138.0	609.0

Source: Ministry of Planning, the Three-Year Economic Development Plan, of 1973-75, the and Five- Year Economic and Social Transformation Plans of 1976-80 & 1981-85. and , Economic and Social indicators, ibid

Table V-6

Growth of Foreign and National Labour in Libya 1970-1990

	Number of Workers						Average annual Growth Rates				
							1970	1973	1975	1980	1985
	1970	1973	1975	1980	1985	1990	1973	1975	1980	1985	1990
1-Total Libyan Labour force	433.5	538.1	677.1	812.8	895.0	1019	6.8	11.5	5.0	2.8	0.2
2- National Workers	383.5	419.7	454.1	532.8	700.0	879	3.1	3.7	3.4	4.8	5.3
3-Foreign Workers	50.0	118.4	223.0	280.0	195.0	139.2	31.9	30.2	9.3	1.0	-11
4- Percentage of National Workers	88.5	78.0	67.1	65.6	78.2	86.3					
5-Percentage of Foreign Workers	11.5	22.0	32.9	34.4	21.8	13.7					

Source: As for Table 5

Table V-7

Sectoral Distribution of Foreign Labour in Libya 1970-1990

	Number of Workers (000)					Percentage of total (%)					Annual Growth Rates		
											1970	1973	1983
	1973	1978	1982	1985	1990	1973	1978	1982	1985	1990	1972	1982	1990
Agriculture, Forestry & Fishing	14.0	29.0	29.2	25.0	10.3	11.8	11.5	8.8	12.8	7.4	2.9	14.5	-3.4
Instruction of Oil & Natural Gas	3.0	2.0	2.7	2.0	2.5	2.5	0.8	0.8	1.1	1.7	1.3	4.1	13.1
Mining & Manufacturing	11.0	22	39.4	17	11.8	9.3	8.7	12	8.7	8.4	7.9	13.1	-4.3
Electricity Water	1.0	5.0	4.5	3.0	1.4	0.9	2.0	1.4	1.5	1.0	21.7	26.6	-10.6
Construction	58.0	122.0	170.5	107	89.8	49.2	48.4	51.7	54.9	64.6	19.9	20.1	-4.8
Wholesale & Retail Trade	4.0	5.0	1.5	1.0	0.5	3.4	2.0	0.5	0.5	0.4	18.1	1122	28.6
Transport & Communication	2.0	8.0	11.6	4.0	2.0	1.7	3.2	3.5	2.1	1.4	23.3	25.4	-14
Finance, Insurance & Banking	1.0	1.0	1.1	1.0	0.1	0.9	0.4	0.3	0.5	0.1	18.1	8.6	87
Administrative & Social Services	24.0	58.0	69.1	35.0	20.8	20.3	23.0	21.0	17.9	15.0	31.2	13.4	-9.1
Total	118.0	252.0	329.6	195.0	139.2	100.0	100.0	100.0	100.0	100.			

Source: As for Table 5

Table V-8

Foreign Skilled Labour in Libya Classified According to Occupations 1971-1980

	Number of Workers (000)					Percentage of Total (%)				
	1971	1973	1975	1977	1980	1971	1973	1975	1977	1980
Professional, Technical & Related Workers	6.5	12.0	16.1	19.2	17.5	10.2	10.7	7.2	7.2	6.3
Administrative & Managerial Workers	12.9	15.5	24.5	27.1	12.2	20.2	13.1	11.0	10.2	4.3
Clerical and Related Workers	3.0	4.2	6.2	5.2	0.5	4.7	3.5	2.8	2.0	0.2
Semi-Skilled Workers	39.6	50.4	95.3	120.3	112.1	61.8	42.7	42.7	45.2	40.0
Unclassified Workers	2.0	35.9	81.0	94.2	137.7	3.1	30.4	36.3	35.4	49.2
Total	64.0	118.0	223.0	266.0	280.0	100	100	100	100	100

Source : Socialist People Libyan Arab Jamahirya, Secretary of Planning, Libyan and Foreigners during 1970-1985, (In Arabic, Tripoli, 1987, Tables, PP. 68-69), IMF, Recent Economic Development in Libya, a report reported by Staff Mission 1972, Particularly for domestic skilled labour force in 1972., and Socialist People Libyan Arab Jamahirya, National Authority for Information & Documentation, yearly statistical series, ibid.

V-5-1-1 Wages

During the period between 1970 and 1990, wages in Libya had undergone a great deal of adjustment. Commercial companies in Libya paid wages consisting of a basic wage plus increments which were applicable to the workers and to the job. These increments could be any or all of the following allowances:

1 Family Allowance: This allowance provided an additional set sum to be added to the basic wage of the worker for each of his dependants and was usually payable monthly. It was usually only granted to male employees over 18 years old and excluded working wives.

2 Specialisation Allowance. This allowance was originally payable only to certain employees with particular rare skills, but it soon became part and parcel of the make-up of every salary and was calculated as a percentage which depended on the level of attainment reached and the rarity of the skill.

3 Housing Allowance. This was a fixed monthly amount of provision for each dependant as an alternative to housing, and like Family Allowance, it was given only to male employees and excluded working wives.

4 Hardship Allowance: This was a special allowance given to jobs in out-of-town or remote areas-such as those of oil-fields workers. The allowance varied according to the location of the assignment.

5 End of Work Compensation and Pensions. The Libyan Government had a pension plan for permanent employees. Those employed on a contractual basis were compensated at the end of their periods of work according to the terms of their contracts. If end of work compensation was not specified, labour law dictated the minimum amount to be granted. However, most private companies paid a moth's salary for every year worked.

There were other kinds of allowances too. Such as for overtime done, provision for a cut in working hours during certain times, travelling allowance and so on.

A survey of foreign employees wages undertaken by the Industrial Research Centre (IRC) and the Department of Economic of the University of El-Fath 1987, showed that in both the public and private sectors more than 70% of foreign workers enjoyed wage rates equal to or higher than those of Libyans. For example, The informal average wage for a farm worker in 1987 was about LD 8 per day, while the informal average wage in a contracting industry or a small business such as confectionery manufacture, car repairs etc., was about LD 10 per day. The attractive rates of pay were one of the main reasons for the intensification of immigration.

Regarding the wage levels, the survey of wage movement, conducted by the National Authority for Information and Documentation (NAFD) in 1990, revealed that the average medium wage in the public sector remained almost unchanged for both females and males over the period from 1975-1985 and it also showed that the wage differentials between professional and technical workers on the one hand and skilled and semi-skilled workers on the other were generally narrowing. But it revealed too that the differential between the skilled and semi-skilled group and the unskilled workers was wider. In contrast the wages of unskilled workers in the private sector improved relative to their colleagues in the public sector.

Furthermore, in distinguishing the wage levels in Libya with those in relevant and neighbouring countries, such as Kuwait, Saudi Arabia, Egypt, Tunisia and Algeria the wage levels in Libya during the boom were slightly lower than those of Kuwait and Saudi Arabia and much were higher than those of Egypt, Tunisia and Algeria.

Assessment of whether those wage levels were competitive or not requires the measurement of wage cost per unit of production. In other words, it requires taking into consideration labour productivity. Table V-9 gives the measurements of the unit cost of labour for Libya during the period of 1963-1985. It reveals that the rate at which labour productivity grew exceeded that of wage growth for most economic sectors particularly during the boom period with the exception of the agricultural sector. This growth led to a remarkable decline in their unit labour cost and consequently for the economy as a whole. In agriculture, however, the rapid rise in wages was associated with a significant decline in labour productivity and thus rising wage unit cost in this sector.

Additionally two main observations may be made with respect to these results. Firstly, since the proportion of foreign labour was highest in services, construction and agriculture and lowest in mining and manufacturing it seems that there was no apparent relationship between the increase of foreign labour and change in the unit wage cost within these sectors. Thus it is quite safe to say that immigration had not restored what is so called in Corden's Model the true real wage to its pre-boom level. Secondly, Libya's traded goods seemed to be competitive since there was a significant gain in labour productivity which reduced unit wage cost in most sectors during the boom.

Table V-9

Average Annual Growth Rates of Real Wages, Labour Productivity and Unit Wage Cost in Libya 1970-1990

	Real Wage per Worker				Labour Productivity				Unit Wage Cost 1/			
	1970 1972	1973 1982	1983 1990	1973 1990	1970 1972	1973 1982	1983 1990	1973 1990	1970 1972	1973 1982	1983 1990	1973 1990
Agriculture, Forestry & Fishing	-22.13	13.38	-2.67	6.25	9.62	-0.17	13.2	5.77	-31.75	13.55	-15.88	0.48
Mining & Quarry (Inc. Crude oil)	4.09	8.51	-5.53	2.36	2.54	11.18	-8.01	2.65	1.55	-2.67	2.48	-0.29
Manufacturing	11.95	6.19	0.02	0.35	5.48	7.34	3.81	5.77	6.47	-1.15	-3.79	-5.42
Electricity, Gas & Water	19.51	1.07	-1.46	-0.06	10.75	9.96	7.05	7.56	8.76	-8.89	-8.51	-7.62
Construction	6.69	-3.56	4.98	0.23	7.65	-1.4	11.23	4.22	-0.96	-2.16	-6.25	-3.99
Transport & Communication	6.93	-1.43	-5.89	-3.41	28.48	3.98	0.80	2.57	-21.55	-5.41	-6.69	-5.98
Wholesale & Retail Trade	12.43	8.95	1.14	5.48	17.22	10.98	-1.20	5.57	17.22	-2.03	2.34	-0.09
Finance, Business & Insurance	5.60	-4.05	-4.76	-4.37	46.65	4.96	-1.70	26.80	-41.05	-9.01	-3.06	-31.17
Services Gathering	3.16	1.52	-5.56	-1.63	6.51	5.29	0.81	7.42	-3.35	-3.77	-6.37	-9.05
Total	14.83	1.14	-5.32	-1.73	5.05	7.87	-1.43	2.62	9.78	-6.73	-3.89	-4.35

Source: Calculated from, Central Bank of Libya, yearly statistical series, and Monthly Bulletin various issues, and National Authority For Information and Documentation yearly statistical series various issues. For Labour and Wages Ministry of Planning, Economic and Social Indicators 1962-1983 (Tripoli- February 1984), and Structure of Employment in Libya 1971-1994, Unpublished Statistical Series March 1995.and National Accounts various issues 1962-1996

Note 1/=(Change in real wage per worker) - (Change in labour productivity).

V-5-2 The Spending Effect

V-5-2-1. Public Spending.

The Libyan Government is the channel through which the oil revenues are fed into the economy. Thus the pattern by which these revenues are distributed among the various sectors of the economy will have a crucial impact on its development and on the distribution of income. Officially, since 1973, oil revenues have been divided between the ordinary or current and development or capital budgets by a ratio of 30% to 70% respectively.

Ordinary or current budget covers the expenses on goods and services including salaries and wages paid to civil servants as well as transfer and subsidies to the householder sector, whereas development or capital budget covers the expenses relating to public expenditure on infrastructure and investment in manufacturing, agriculture, and social services.

As far as the Dutch Disease Model is concerned government spending during a boom will favour non-traded goods sectors and disfavour traded goods sectors. What follows is an attempt to examine this presentation against the Libyan experience.

Table V-10 illustrates the fact that total government spending over the period of 1963-1990, as a ratio of GDP, was very significant in Libya, with an average of 33% for 1963-90. There are distinct periods, however, when this ratio has actually been higher than this: 1973-1982, 36.2% and 1983-1990, 34%. The remarkably high ratio in the former period was largely due to an increase in capital expenditure. But, in the latter period it was mainly due to both an increase in current expenditure and a decline in GDP. Between 1973 and 1982 the total of actual government spending (at current prices) grew at an average rate of 21.3% p.a., which surpassed growth in GDP of 19.9% both at current prices. In real terms, this growth depicts 6.4% p.a., which outstripped growth in GDP of 5% p.a.

Turning now to the ratio of capital and current expenditures in total government spending, capital expenditure was relatively larger than current expenditure throughout the period under investigation, with the exception of the 1963-1968 period. The share of capital expenditure in total government spending became gradually higher during the oil price shock period of 1973-1982, and stood at 68.1% at that time. This demonstrates a considerable gain from its pre-boom level of 49.6% and post-boom position of 49.2% during 1983-1990. This reveals that the rate of growth in government capital expenditure had been faster than that of current expenditure (32.1% and 19.5% p.a., respectively over the period of 1973-1982). These trends changed in the post-boom period of 1983-1990. Capital expenditure growth rate during this period was negative while, current expenditure continued to grow at an average of 3.4% p.a.

Table V-11 shows the distribution of current expenditure during the period of 1970-1986. It reveals that the share of wages and salaries in GDP had increased from 5.5% (41.6% of current spending) in 1970 to 9.9% (62.2% of current spending) in 1986, whilst the shares of civil services and the other items in both GDP and current spending had declined. The remarkable increase in the share of wages in both GDP and total current spending (GCS) during the boom period of 1973-1982 was a direct outcome of extensive expansion in the civil and social services. Table V-12 shows that the leading sector absorbing current expenditure throughout the period under investigation was education and training followed by health and social security and law and order and protective services.

Table V-10

Trends In Government Expenditure 1963-1990 (In Current Prices)

	Annual Growth Rates					Percentage of Total					Percentage to GDP				
	1963 1968	1969 1972	1973 1982	1983 1990	1963 1990	1963 1968	1969 1972	1973 1982	1983 1990	1963 1990	1963 1968	1969 1972	1973 1982	1983 1990	1963 1990
Current Expenditure	19.7	20.6	19.5	3.4	15.1	62.8	50.4	31.9	50.8	46.6	17.9	14.1	11.6	17.0	14.9
Capital Expenditure	55.5	35.0	23.1	-6.9	23.2	37.2	49.6	68.1	49.2	53.4	11.0	14.7	24.6	17.0	18.1
Total Expenditure	30.1	26.8	21.3	-3.0	17.2	100	100	100	100	100	28.9	28.8	36.2	34.0	33.0
GDP	30.0	13.3	19.9	-1.2	15.1	100	100	100	100	100	100	100	100	100	100

Source: Central Bank of Libya, yearly statistical series, various issues, Ministry of Planning, Economic and Social Indicators, ibid and National Authority for Information & Documentation, ibid

Table V-11

Government Current Expenditure by Kind of Spending 1970-1986 (Ratios of GDP & total GCS)

	In Percentage of GDP				In Percentage of Total			
	1970	1974	1979	1986	1970	1974	1979	1986
Total Current Expenditure	13.7	11.5	8.7	15.9	100	100	100	100
Civil Service	4.0	2.5	1.9	3.1	29.3	21.6	22.1	19.5
Wages and Salaries	5.7	6.2	5.4	9.9	41.6	54.0	61.7	62.2
Other\ 1	4.0	2.8	1.4	2.9	29.2	24.4	16.2	18.3

Source: Calculated from Central Bank of Libya, Monthly Bulletin, various issues., and Audit Department, yearly statistical series, various issues.

Note: 1- includes, subsidies, transfers & spending on public ceremonies and celebrations. etc.

Table V-12
Distribution of General Government Expenditure by Sectors (Selective Years at Current Prices)

	Percentage of GDP				Percentage of Total GGE			
	1973	1975	1985	1990	1973	1975	1985	1990
Total General Expenditure	13.4	15.6	14.7	19.4	100	100	100	100
Law Order and Protective Services	1.3	1.2	0.1	0.5	9.2	7.9	0.9	2.4
Civil Services	0.1	0.1	0.3	0.4	0.4	0.4	1.8	2.1
Foreign Liaisons	0.1	0.2	0.3	0.4	1.0	1.5	1.9	2.0
Local Authorities	n.a.	n.a.	10.7	13.8	n.a.	n.a.	72.5	71.1
Education, Sport & Training	1.9	3.1	1.1	1.4	14.3	20	7.6	7.1
Health & Social Security	1.2	1.6	0.7	0.9	9.3	10.2	4.5	4.9
Housing & Public Utilities	0.2	0.1	0.03	0.1	1.8	0.8	0.3	0.4
Transport & Communication	0.5	0.4	0.2	0.1	3.6	2.7	1.2	0.7
Agriculture, Forestry & Sea Wealth	0.3	0.4	0.1	0.1	2.5	2.5	0.8	0.4
Mining, industry & Energy	0.1	0.1	0.1	0.1	0.3	0.5	0.8	0.5
Economic, Trade & Finance	0.4	0.3	0.1	0.9	2.7	1.8	0.9	4.7
Other	7.3	8.1	1.0	0.7	54.6	51.7	0.9	3.7

Source: As for Table 10

With regard to the distribution of development expenditure among economic sectors, the available data (See Table V-13) reveals that during the period of 1973-1986 there had been a significant shift in investment distribution towards commodity-producing sectors compared with that of the preceding period of 1970-1972. The share of the commodity-producing sectors in the total development expenditure had increased from 36.6% in the pre-boom period of 1970-1972 to 44% in the First Plan period of 1973-1975, and declined subsequently to 41% and 35.5% in the Second and Third Plan periods of 1976-1980 and 1981-1986 respectively. In contrast the share of the non-commodity producing sectors had decreased from 50.5% in the pre-boom period of 1970-1972 to 43.2% in the First Plan period of 1973-1975 and increased to 45.6% and to 48.5% over the subsequent Plan periods of 1976-1980 and 1981-1986 respectively. In the meantime, the share of public and social services increased only by 1% over the First and Second Plan periods of 1973-1975 and 1976-1980, but had increased by 4.7 % in the Third Plan period of 1981-1986. Investment in agriculture had increased by more than 20% of the actual total capital expenditure over almost all Plan periods. While, the share of the manufacturing sector in the actual total capital expenditure had increased from 11% in 1970-1972 to 19.4% in the Third Plan period of 1981-1986. Whereas the most remarkable change in non-traded sector investment was the decline in the share of construction and housing from 30.5% in the First Plan period of 1973-1975 to 22.4% in the Third Plan period of 1981-1986.

However, despite the relatively small change in the share of public and social services over almost all Plan periods, expenditure behaviour does not seem to differ from many other economies, where the increase in internal funds continually led to an expansion of spending on social services. This is particularly so when taking into consideration the volume of investment in each plan.

The Libyan story, was not only that the Government particularly wished to develop the commodity-producing sectors, but also to develop both the non-commodity producing sectors and social services too. As a result it increased spending on transport, construction and education as well as health and other social services.

Moreover, the available data on public investment revealed that a large proportion of public investment made during the period of 1973-1987 was earmarked for large-scale capital-intensive projects. But implementation of these projects was so severely obstructed by fundamental institutional economic bottlenecks that they substantially reduced the pristine social benefits that these projects originally had to offer. Rampant corruption and the shortage of technical and skilled labour were chiefly responsible for these problems, together with the lack of efficient organisation and management and inaccuracy in the statistical data on the economy.

Table V-13

Sectoral Distribution of Actual Capital Expenditure, 1970-1986, (Value in Million LD. Share, (%) in total).

	1970-1972		1973-1975		1976-1980		1981-1986	
	Value	Share	Value	Share	Value	Share	Value	Share
Commodity Producing Sector	289.6	36.6	968.5	44.0	3379.5	41.0	4167.9	35.5
Agriculture, Forestry & Fishing	135.9	17.2	560.8	25.5	1739.2	21.1	1624.0	13.8
Mining (incl., Oil & Natural Gas Instruction)	63.7	8.0	138.2	6.3	363.6	4.4	265.3	2.3
Manufacturing	90.0	11.4	269.5	12.2	1276.7	15.5	2278.6	19.4
Non-Commodity Producing Sector	399.1	50.5	951.7	43.2	3767.6	45.6	5688.3	48.3
Electricity, Energy & Water	80.3	10.2	212.2	9.6	1053.2	12.8	1075.8	9.1
Construction & Housing	241.0	30.5	513.3	23.3	1588.8	19.2	2639.0	22.4
Transport & Communication	77.8	9.8	226.2	10.3	1125.6	13.6	1973.5	16.8
Social & Public Services Sector	102.3	12.9	282.8	12.8	1112.1	13.4	1906.4	16.2
Education & Training	54.3	6.9	174.8	7.9	481.9	5.8	910.0	7.7
Health & Social Security	26.0	3.3	62.9	2.9	272.9	3.3	467.2	4.0
Other services	22.0	2.7	45.1	2.0	357.3	4.3	529.2	4.5
Total Investment	791.0	100	2203	100	8259.2	100	11762.6	100

Source: Libyan Arab Republic, Ministry of Planning, Economic & Social Indicators 1970-83, (Tripoli, February, 84, PP. 15 to 18), Socialist People Libyan Arab Jamahirya, National Authority for Information & Documentation yearly statistical series , various issues, and Central Bank of Libya, yearly statistical series and Monthly Bulletins, various issues.

V-5-3-1 Private Spending

The increase in oil price was also associated with an increase in private spending. A study conducted by the Department of Statistics of the Ministry of Planning on household spending in 1989, showed that, with the advent of the oil boom, the accumulated wealth of the household had increased substantially, and a large proportion of this wealth had been confined to improving the general standard of living. This was consumer spending rather than leading to any significant contribution in re-structuring of production potential. The chief findings of this study indicate that more than 80% of household income went into increased consumption, mainly food items, clothing and consumer durables, while the remaining 20% was directed to investing in housing (either renovation, repairs or construction) and in small business.

On the macro-level the available data (See Table V-14) indicates that the most important area of private sector venture during the boom was housing and this accounted for more than 40% of total private investment in all Plans. This was followed by transport and communication 18.3%, oil and natural gas extraction 15.6%, agriculture 7.7%, and manufacturing 5.5%.

Broadly speaking, it is safe to say that private spending seems to be much more balanced than would have been envisaged by the Dutch Disease Theory, since investment in productive activities was undertaken and this indicates that such activities were still relatively profitable under booming conditions, which is contrary to the Theory's predictions.

Table V-14

Sectoral Shares in Private Investment 1973-1985 (LD. Million at 1974 Constant Price)

	1973-1975		1976-1980		1981-1985		1973-1985	
	Value	(%) Share	Value	(%) Share	Value	(%) Share	Value	(%) Share
Agriculture, Forestry and Fishing	25.0	6.7	65.0	6.2	126.0	9.2	216.0	7.7
Oil and Natural Gas Extraction	150.0	40.4	155.0	14.6	132.0	9.7	437.0	15.6
Mining	3.0	0.8	10.0	0.9	15.0	1.1	28.0	1.0
Manufacturing	20.0	5.4	35.0	3.3	98.0	7.2	153.0	5.5
Construction	15.0	4	40.0	3.8	88.0	6.4	143.0	5.1
Wholesale and Retail Trade	7.0	1.9	15.0	1.4	15.0	1.1	37.0	1.3
Transport, Storage and Communication	25.0	6.7	280.0	26.4	206.0	15.1	511.0	18.3
Housing	115.0	30.9	430.0	40.5	620.0	45.4	1165.0	41.6
Social and Administrative Services	12.0	3.2	31.0	2.9	66.0	4.8	109.0	3.9
TOTAL	372.0	100.0	1061.0	100.0	1366.0	100	2799.0	100.0

Source: Ministry of Planning, The Three Year Economic and Social Development Plan of 1973-75, and the Five-Year Economic and Social Transformation Plans of 1976-1980, & of 1981-1985

V-6 Relative Prices, Real Exchange Rate and Terms of Trade

The Libyan economy represented an ideal pattern for an open economy facing a state of structural dis-equilibrium. This circumstance arose from the nature of its economic resources and the patterns of their use and also from its socio-political environment.

This dis-equilibrium was displayed directly by its inability to diversify its economic base and by its persistent dependence on the oil as the main source of income to finance investment and pay for its imports. The unbalanced position also reflected indirectly upon the structure of capital, the volume and role of foreign trade and consequently, on Libya's foreign exchange policy.

V-6-1 Development of the Libyan Foreign Exchange Policy

Libya has continuously maintained a conservative foreign exchange policy. While being a member of the Sterling Zone, it clung to the one-to-one relationship between the Libyan pound and sterling until 1967. After quitting the Zone and joining the dollar bandwagon Libya's foreign exchange policy was solemnly observed. Money supply was controlled and exogenously determined by changes in the stock of foreign reserves. As the economy became increasingly monetised, the factors affecting money supply increased in number and their relationship to the money supply became more complex.

In order to glean some sort of understanding about the development of this monetary system and Libya's management of foreign exchange, it is appropriate here to divide the period into main sub-periods during which the monetary system underwent several changes.

The first of these sub-periods encompasses the pre-Independence period: the period up to 1956.

This period is marked by the presence of the three currencies that were in common use at the time, each circulating in its territory within Libya and with its own monetary system.

During the Italian Occupation of Libya, the Italian Lira-the metropolitan Lira-circulated freely in all these territories.

After the conquest of Cyrenaica region the British introduced the Egyptian pound and, in what had formerly been known as Tripolitania, they brought in the military authority pound.

In the area previously known as the Fezzan, the French administration introduced the Algerian franc. Bartering was also prevalent and popular in remote areas of Libya.

Monetary matters were dealt with by a preparatory currency committee consisting of representatives of Libya, Britain, Italy and Egypt.

The second period comprises the post-independence period: the period spanning 1956 to 1995 and from the outset Libya was no longer a multi-currencied country. It now had only one currency- the Libyan pound (later the Libyan Dinnar).

This period in the history of Libya's monetary system lends itself to division into three more sub-periods:

1956-1967: During this time, as already mentioned, Libya belonged to the Sterling Zone and the Libyan pound was at par with the pound sterling, (i.e. L£.1.00 = £.1.00).

When Britain devalued the pound sterling by 14% in 1967, the sterling share in Libya's total foreign assets and gold reserves was small in comparison with dollars, gold and fund assets (Central Bank of Libya, 1975). However, Libya decided not to devalue its own currency, thereby raising its already overvalued level by almost 3 chillinges.

1967-1986: Following Britain's currency devaluation in 1967, the Libyan Dinnar was detached from the pound sterling and pegged instead to the US dollar and consequently, gold at a value of L£ 1.00 = US$ 2.88

However, after the breakdown of Breton Woods and due to the devaluation of the US dollar in 1971 and its further decline in 1973, the value of the Libyan dinnar had increased by 60 cents against the American dollar. In other words, LD1.00 = US$3. It remained stable through both oil price shocks essentially because of the glut of the foreign exchange which followed them and the rate stayed unchanged till 1986.

1986-1995 : Following serious concern about the de-stabilisation of the currency arising from the collapse of the oil price and the sharp fall in oil revenues, it was decided to take steps to insulate the Libyan dinnar from the effects of negative fluctuations in the value of the US dollar, the whims of the international financial markets and the resultant deficit in the balance of payments. Therefore it was pegged to the SDR.

The parity value was LD 1.00 = SDR 2.88 ± 7.5. However, this action automatically devalued the LD relative to the US dollar by 4.2%. Because of fluctuations in the value of the American dollar in the world markets, an adjustment of ± 10.65% was made in 1992 to Libya's registered official exchange rate. The exchange value of 1.00LD relative to the 1.00 unit of SDR then reached 0.3942.

The International Monetary Fund (IMF) Agreement permits a member country to adjust its official registered exchange rate more than once if it deems it necessary to do so and international fluctuations made it necessary to do this twice in 1993 .

An adjustment of ± 13.5% caused the exchange rate to increase to 0.3964 LD to 1.00 unit SDR and after adjustment toards the end of the year of ± 16% resulted in a value of 0.41428 LD.

By the end of 1993 the rate of exchange of the Libyan dinnar had decreased from LD1.00 = US$3.40 in 1986 to US$3.25 and by the close of 1994 its value relative to SDR had dropped from 0.2934 LD in 1986 to 0.35399 LD.

Commenting upon the pattern of these monetary events, it can be said that up to the middle of the 1980's Libya had kept to a fixed exchange rate strategy but after 1986, in practice, it was hardly pursued at all.

The substantial decline in oil prices and the use of Libya's foreign reserves to prop up its financial commitments and to pay for imports were certainly at the root of, if not totally responsible for, the rapidly increased demand for foreign currencies and, of course, the constant attrition of foreign reserves. The freezing of these same financial assets was another reason why the fixed exchange rate strategy was not followed.

The circumstances of this period spawned two other Libyan exchange rates running concurrently with the official exchange rate- the so-called commercial exchange rate where in 1994 1.00Ld = 1.00$ and the black market exchange rate which ranged between 3.50 LD and 3.25 LD to the US$.

V-6 2 Real Exchange Rate and Relative Prices

In the Dutch Disease literature the most commonly used measure of relative price change is the real effective exchange rate, which is the composite index of trade-weighted bilateral nominal exchange rates with major trading partners, adjusted by the ratio of inflation in the domestic economy to inflation in the respective trading partners' economies.

Table V-15 shows the trade and imports and export-weighted real effective exchange rate (REER) for Libya over the period of 1971-1990. It shows that most of the appreciation during the boom period took place between 1973-1978, as the import-weighted real effective exchange rate had appreciated by 14%, and the trade-weighted real effective exchange rate by 15%. Apart from minor fluctuations, the real effective exchange rate remained stable during the period from 1978 to the end of the boom in 1983. But it started depreciating slowly in the subsequent periods. The appreciation of Libya's import-weighted real effective exchange rate appears to have been moderate compared with those of some other countries. The chief reasons for this appear to be the heavy subsidies on important food items and the control of domestic prices. Domestic price control had started in 1977.

The REER had been developed in an international economic context but it may not be an accurate measure of relative price changes in the economy for the same reasons that make the law of one price not operable all the time. It must be stated that the REER miscalculates the true degree of inflation in the domestic economy because it includes both traded and non-traded goods in the measurement.

Other means can be used to measure the change in relative prices. Export and import prices are obvious examples of proxies for traded goods. The structure of exports and imports determines which is more appropriate. In the Libyan case the high import penetration (an average of more than 80% of GDP over the period of 1970-1982) meant that the imports covered a wider range of goods than did exports which were concentrated in crude oil. The implication of this concentration is that oil revenue was subjected to fluctuations which were irrelevant to the Dutch Disease Theory, making imports a better measure of traded goods' prices. The cost of living index is a far better measure to use for non-traded goods and is easy to construct. This measure is also suitable because it combines traded as well as non-traded goods.

In the case of Libya, the level of dis-aggregation of price data allowed for the construction of a non-traded goods price index composed of seven items: foodstuffs (48.2%),housing services (12.2%), education (11%), medical care (4.3%), clothing (8.9%) and other personal expenses (3.2%). The weights used are in accordance with the dis-aggregated GCL data available from the National Authority for Information and Documentation and the Central Bank of Libya.

Table V-16 shows indices of some aggregate price series. The indices are for both traded and non-traded goods. In Table V-17 these indices are converted to relative price form, by using the appropriate indices, and setting 1975 at 100 (see also Figure V-1). The indices for import and export prices have declined significantly relative to the consumer price index over the period of 1973-1982. The decline is more pronounced when the cost of living for non-traded goods (GCL_N) is used rather than the general cost of living (GCL). Prices of manufacturing and agriculture, in terms of non-traded goods, have also declined, as did the ratio of agriculture prices to GCL involving a diminishing farmers' real income. It is worth noting that the real effective exchange rate REER index gives lower rates of decline of traded to non-traded goods than other indices (because of its inclusion of both traded and non-traded goods in its measurement of domestic inflation.

Table V-15
Real Effective Exchange Rate for Libya , 1971-1990 (LD. per $us)

	Import Weighted	REER Index 1971=100	Export Weighted	REER Index 1971=100	Trade Weighted	REER Index 1971=100
1971	35.21	100	34.06	100	34.40	100
1972	34.75	99	33.93	100	34.15	99
1973	36.43	104	36.28	107	36.33	106
1974	37.68	107	37.23	109	37.36	109
1975	29.41	84	29.01	85	29.12	85
1976	22.32	63	22.13	65	22.19	65
1977	25.45	72	24.84	73	25.01	73
1978	30.14	86	29.46	87	29.63	86
1979	35.25	100	34.36	101	34.57	101
1980	39.98	114	38.70	114	38.99	113
1981	34.65	98	34.06	100	34.19	99
1982	31.67	90	31.30	92	31.38	91
1983	29.54	84	29.27	86	29.32	85
1984	25.70	73	25.93	76	25.86	75
1985	34.54	98	34.07	100	34.17	99
1986	35.85	102	35.82	105	35.79	104
1987	55.99	159	58.31	171	58.00	169
1988	57.80	164	59.25	174	58.93	171
1989	53.84	153	56.11	165	55.60	162
1990	64.20	182	66.39	195	65.96	192
Change between						
1971-75		-16%		-15%		-15%
1973-82		-14%		-15%		-15%
1983-90		98%		109%		107%
1971-90		82%		95%		92%

Source: Calculated from Tables AV-1 to AV-10 in Appendix AV-1

Table V-16

Aggregate Price Indices for Libya 1975-1990 (1975=100)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Export Prices (EP)	100	83	68	66	46	46	59	62	60	62	55	35	35	32	32	32
Import Prices (IP)	100	89	91	88	94	118	135	147	155	125	118	112	108	115	135	166
Manufacturing (MP)	100	110	120	125	160	166	193	208	212	215	222	225	235	242	276	318
Agricultural (AP)	100	125	132	140	186	192	220	239	256	285	278	266	261	287	325	366
General (GCL)	100	109	123	138	170	212	221	234	245	291	318	328	343	353	368	389
GCL for housing (GCLh)	100	115	138	186	227	268	298	321	341	216	225	228	228	233	238	246
Traded good Goods (PT)	100	118	133	156	192	225	236	267	291	253	268	277	282	281	284	294
Non-Traded Goods (PN)	100	113	128	136	187	195	228	254	284	332	368	378	397	414	419	454

Source: Calculated from Central Bank of Libya, yearly statistical series and Monthly Bulletin various issues 1967-1994, National Authority for Information and Documentation, yearly statistical series 1990-1995, and Ministry of Planning, National Accounts 1962-93

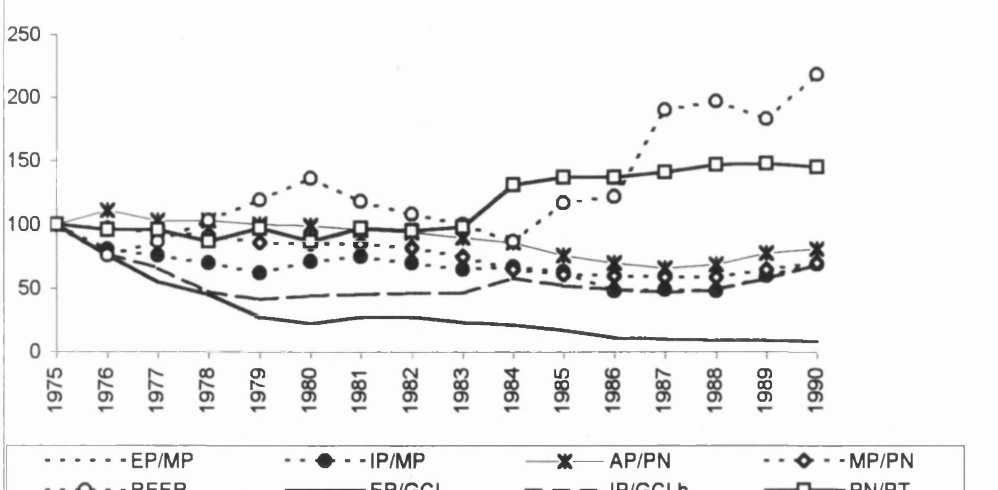
Table V-17

Selected Relative Price indices in Libya 1975-1990 (1975=100)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
EP/MP	100	76	57	52.0	31	28	31	30	28	29	24	16	15	13	12	11
IP/MP	100	81	76	70	62	71	75	70	65	67	63	48	49	48	60	69
AP/PN	100	111	103	103	100	99	96	94	90	86	76	70	66	69	78	81
REER	100	76	87	103	119	136	118	108	100	87	117	122	190	197	183	218
MP/PN	100	97	94	92	86	85	85	82	75	65	61	60	59	59	65	70
EP/GCL	100	76	55	45	27	22	27	27	23	21	17	11	10	9	9	8
IP/GCLh	100	77	66	47	41	44	45	46	46	58	52	49	47	49	58	68
PN/PT	100	96	96	87	97	87	97	95	98	131	137	137	141	147	148	145

Source: Calculated from Table VI-16

Figure V-1
Relative Price Indices for Libya 1975-1990



V-6-3 The Trade Regime

Until almost the late Eighties, the State maintained a monopoly over external trade. But since the early Nineties, the private sector has been allowed to participate in the trade activity. However, the import business remained more attractive than export. The situation, however, has been improving. Regulations and procedures are being simplified to encourage the growth of those non-traditional exports which are still lagging as is made clear by the deteriorating balance of non-oil trade position.

Libya has always had a complex system of tariffs and non-tariff barriers. Although such protection makes private investment more profitable in the short run, it is argued that in the long run it creates various welfare and efficiency losses. The impact of such policies however, depends largely on the level and the design of tariffs and other barriers. The system in Libya has been very complicated. Effective protection and, therefore, resource costs were found to vary between the private and public sectors and sometimes even between firms operating in the same sector.

Well designed protection, however, still has some considerable support in the literature. Hansen (1991) presented an empirical support for the argument of infant-industry protection, as he noted that the Egyptians protected new industries such as textiles, food processing and beverages and these became increasingly competitive industries. This argument was also supported by many others including the World Bank (1983). Shernana (1987, p. 22) goes as far as suggesting that, without protection, the entire period of 1970-1980 probably would have been characterised by the importation of final goods and the de-industrialisation of the manufacturing sector that already existed.

V-6-3-1 The Impact of Relative Price changes on Commodity Trade.

Right through the period of 1973-1990 foreign trade persistently took a large percentage of Libya's gross domestic product. But although this presented a general upward trend, the volume of Libya's export business was more restrained. During this period exports actually expanded by 264% and this was due to a sharp rise in the oil price in the Seventies. The circumstances provided enabled improvement in the balance of payments and the welcome relaxation of the earlier constraint on foreign exchange and facilitated real increase in national income. These two developments intensified overall activity within the economy and government strategy encouraged the productive sectors within both agriculture and manufacturing.

Table V-18 illustrates how the balance of the effect of commodity trade during 1973-82 was affected by the growth in overall economic activity. There was a severe deterioration in non-mineral fuels, lubricants and related materials directly due to the inability of these sectors to satisfy demand. But the mineral alternatives suffered a depression because of the solid growth in oil sector imports.

Trade in machinery and transport equipment however, was vigorous and significant. Intensified activity within the economy increased demand for foreign manufactures and stimulated more imports. The demand for these was encouraged still further because of bottlenecks arising out of this inability to meet demand (see Table V-19).

This big increase in imports therefore definitely did not mean that the boom put increased pressure on domestic production through relative price changes as asserted by the Dutch Disease Model. This observation clearly claims that the impact that a sudden change in foreign exchange windfalls may have on the structure of an economy depends on more than just relative price changes and the additional agents in the picture come within both the macro and micro categories of economic effects. For the moment we shall simply present the suggested hypothesis and leave it till the following chapters to enter into more detail.

At the macro-level the constraint on foreign exchange was relieved by changes in its availability and this had two important results. Firstly, imported raw, intermediate and capital inputs to production were made available and these were likely to incorporate better technologies than those in use before the boom. Secondly, the more abundant foreign exchange enabled the expansion of overall economic activity which naturally improved income and therefore employment.

If it had happened that the economy had been in a situation of idle capacity just prior to the boom, the expansion of economic activity would have allowed the increasing utilisation of capacity and the benefits from economies of scale where these existed, thereby increasing productivity and ultimately the competitiveness of exports.

At the micro-level, the increase in total national income, of course, increased demand for all products. The pattern of demand growth depends very much on the stage of development of the particular country. For countries in the primary stage of development (e.g. Libya in the early Seventies) the increase in demand for manufactured goods may be very considerable. Changes in the pattern of demand will therefore have great impact on the substructure of production and resources will naturally be directed into those areas where it needs to be to meet the fast escalating demand. The growth of production in any area will increase its productivity even further. Such increases would have been enhanced if the growth of domestic demand coincided with the growth in demand for exported goods.

Table V-18

Trends in Libya's Commodity Trade, 1968-90 (Net Exports as a % of GDP)

	Value as a (%) of GDP								Annual Average		
									1968	1973	1983
	1968	1970	1973	1978	1980	1982	1985	1990	1972	1982	1990
Food & Live Animals	-2.6	-3.1	-3.9	-3.7	-3.3	-3.6	-2.3	-3.9	-2.83	-3.60	-3.24
Beverages & Tobacco	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.17	-0.10	-0.58
Crude Materials & Inedible (exc.., Fuels)	-0.4	-0.3	-1.1	-0.5	-0.4	-0.4	-0.2	-0.2	-0.39	-0.58	-0.28
Mineral Fuels, Lubricants & Related Materials	61.6	64.8	54.2	53.0	63.2	51.2	44.4	46.0	60.68	57.19	39.50
Animal Fats and Vegetable Oils	-0.2	-0.2	-0.4	-0.3	-0.4	-0.3	-0.3	-0.4	-0.20	-0.31	-0.37
Chemical & Petrochemical Products	-1.1	-0.9	1.0	-0.6	-1.1	-0.2	-0.2	0.5	-0.99	-0.78	-0.18
Manufactured Goods Classified chiefly by Materials	-5.9	-3.3	-6.3	-5.4	-4.7	-6.9	-3.3	-4.3	-4.33	-5.90	-4.60
Machinery & Transport Equipment	-7.5	-4.6	-8.4	-10.3	-7.5	-9.4	-6.1	-6.8	-6.42	-8.63	-7.60
Miscellaneous Manufactured Articles	-2.9	-2.4	-3.0	-3.5	-2.1	-3.4	-1.9	-1.8	-2.71	-2.92	-2.77
Commodities not Classified According to Kind	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.1	-0.1	n.a.	n.a.	n.a.
Net Export (Total as % of GDP)	40.8	50.0	30.1	28.5	43.8	27.1	30.2	29.1	42.90	32.90	18.44
Trade Ratio. **	83.8	80.7	79.6	78.1	83.0	77.9	60.4	68.5	79.70	78.90	59.71

Source: Calculated from, Ministry of Planning, Economic and Social Indicators, & National Authority for Information and Documentation yearly statistical series, various issues.

Note: Trade Ratio is defined as "The ratio of the sum of exports + imports to GDP" (See Peter Lloyd (1968), p.24). This Ratio is supposed to indicate the extent of a particular country's dependence on foreign trade Symbolically:
TR. = (X + M) / Y*100, where X is exports, M is imports and Y is GDP

Table V-19

Composition of Imports 1968-1990 (Current Prices)

	Value as a (%) of Total									Annual Average		
										1968	1973	1983
	1968	1970	1973	1975	1978	1980	1982	1988	1990	1972	1982	1990
Food & Live Animals	12.0	19.9	10.8	15.4	15.1	16.9	14.2	13.3	20.6	15.8	15.5	16.0
Beverages & Tobacco	1.0	1.3	0.3	0.3	0.4	0.5	0.5	0.4	0.1	0.9	0.4	0.4
Crude Materials & Inedible (exc.., Fuels)	2.3	1.8	4.5	2.7	2.0	1.8	1.5	1.2	2.1	2.3	2.5	1.5
Mineral Fuels, Lubricants & Related Materials	3.0	3.2	2.0	2.0	0.8	0.7	1.5	0.3	0.3	3.0	1.3	0.6
Animal Fats and Vegetable Oils	0.8	0.4	1.8	1.4	1.1	1.3	1.3	1.9	1.9	1.1	1.3	1.8
Chemical and Petrochemical Products	5.2	5.8	3.9	3.7	3.1	5.4	3.9	7.9	6.8	5.4	4.0	7.0
Manufactured Goods Classified chiefly by Materials	27.3	21.4	25.4	29.2	21.8	24.2	25.1	17.9	23.8	23.3	25.3	22.4
Machinery & Transport Equipment	35.0	29.7	34.0	34.3	41.6	38.0	41.0	38.7	34.6	33.5	37.2	36.5
Miscellaneous Manufactured Articles	13.4	15.7	12.3	11.1	14.1	10.7	11.0	18.4	9.4	14.7	12.6	13.2
Commodities not Classified According to Kind	0.1	1.0	5.0	0.0	0.0	0.6	0.0	0.0	0.3	n.a.	n.a.	0.6
Total	100	100	100	100	100	100	100	100	100	100.	100.	100.

Source: As for Table V-18

To conclude, the increases in oil prices in 1973/1974 and 1979 created booming conditions in Libya as the country's foreign exchange earnings expanded very rapidly after each shock. The boom effects were transmitted to the rest of the economy via the spending and income effects, while government spending and the subsidy on commodity sectors mitigated these effects.

The general movement of prices in the economy, as measured by the change in terms of trade between traded and non-traded sectors, was as would have been expected by the Dutch Disease Model (which would have favoured the non-tradables and disfavoured of tradables), albeit more moderately than experienced by many other developing economies under similar conditions. However, commodity producing sectors (agriculture and manufacturing) managed to expand during the boom period in response to the rapid rise in demand induced by the rise in income.

PART II: THE DUTCH DISEASE AND THE SECTORAL SHIFTS: A DYNAMIC APPROACH

CHAPTER VI
AN INVESTIGATION INTO THE PERFORMANCE OF THE AGRICULTURAL SECTOR UNDER BOOMING CONDITIONS IN LIBYA

VI-1 Introduction

A period of exceptional boom was generated in Libya following the oil price increases of the Seventies and early Eighties as the previous chapter clearly showed. The Government revenues resulting from these increases were gigantic. The Libyan real exchange rate rose very considerably and the spending effect and the resources movement were both remarkable.

This chapter deals solely with agriculture and, of course, particularly with Libya's agricultural performance during this boom period.

Between 1973 and 1982, Libya's agricultural output grew by an average rate of 4.6% p.a. and employment in the industry grew at an average rate of 2.3% p.a. This is completely contradictory to the expectation of the Dutch Disease Model which presumes a contraction in the output and employment of the traded goods sector.

This growth in the agricultural sector of Libya during the boom is particularly interesting especially when it is remembered that there were a number of separate factors that constrained its supply response. There was first the country's narrow physical resource base. Then there were the historical developments which evolved a structure within agriculture which was unhelpful to the making of large profits in general farming activities. Then there were the institutional factors which did not help agriculture - such as research and extension services and organisational issues.

This chapter seeks to offer a reasonable answer as to why this divergence between the Model and the Libyan experience should occur. Section Two actually consists of a discussion upon whether or not the Dutch Disease Model can be usefully applied for the analysis of agricultural performance in developing economies. However, despite the possibility that there may be circumstances included by the Model to explain Libya's agricultural performance, the main thing to be deduced after examining this question is that indeed the answer lies somewhere else - specifically in the technological progress that was made by the agricultural sector during the boom. It was this that provided Libya with the basis for production with higher profit.

The rest of this chapter is divided into three further sections. Section Three deals with Libya's general agricultural performance. Section Four is concerned with a quantitative analysis of the agricultural sector's input and output growth, relative price changes, production cost and profitability. Section Five presents a conclusion.

VI-2 Applicability of the Dutch Disease Model for Developing Economies.

The controversy concerning the relevance or reliability of the Dutch Disease Model and whether or not it can usefully be applied to the analysis of developing economies has been a matter that has persisted for more than twenty years and there has been much written upon it.

As has been asserted, the Dutch Disease Theory is a static model developed from within the general equilibrium framework of an open industrial economy to analyse the intersectoral movements originating either from a new resource discovery or a great increase in the price of an exportable commodity. The focus of the Model is upon the manufacturing sector.

Although there might not be grounds for radical criticism or controversy when applying the Dutch Disease Model to examine the intersectoral changes in industrialised economies, certain inconsistencies do arise when the Model is used to analyse developing economies experiences with booms. Clearly these inconsistencies inherently affect the capability and scope of the Model's applicability and they constitute the basis for the ongoing debate upon it.

Before dallying further upon this matter it is important to mention that many of the advocate's of the Dutch Disease Theory, principally led by Corden (1984), have addressed these inconsistencies: particularly those concerned with the enclave nature of the booming sector and its constituent products and the make-up of the tradable sector.

It should be mentioned that the enclave nature of the booming sector simply means that the spending effect will predominate. Results from a number of close studies have shown that it is certainly not a phenomenon exclusive to developing economies and that it does not seriously divert the analysis.

Regarding the nature of booming sector products - it goes without saying that the tradable sector need not only produce exportable goods but can also produce importable goods provided that they are as equally saleable as imports and can be perfect substitutes for them. However, if exclusive tariffs and volume restrictions are placed on traded goods their prices will be determined domestically rather than internationally and therefore they effectively become non-tradables.

Turning finally to the constituents of the traded goods sector, it could be said that because the sector does not only include manufacturing goods but also agricultural goods, that these too should be considered.

The leading questions here would be to what extent would the behaviour of agricultural products mirror those of manufactures and do the historical and social factors have the same effect on each of their structures?

These matters have recently been debated widely in development literature so there is no need to dwell upon them here. All that need be said is that, for reasons allied with the methods of utilising factors of production, factors mobility and the differing influences of the socio-economic variables, there is a very different response to the profit squeeze in agricultural concerns than in manufacturing companies. This becomes more conspicuous if the analysis is conducted with the aid of the decomposition of the tradable sector model. This underlines the significance of using the dynamic analysis to examine the mechanisms through which the boom effects are relayed in agricultural economies. (Scherr, 1989). For example, much evidence from closer studies on the experiences of agricultural economies with booms has revealed that the production of peasant farms had expanded during the boom whilst that of commercial ones contracted (Majd, 1991) and this was just as the Dutch Disease Model had predicted.

It can also be added that Corden (1984) dealt with a number of similar cases. He observed that variations could occur in the performance of some non-booming industries within the tradable sector and that some could actually expand while the sector as a whole was contracting. He explained this by means of the factor intensities theory which states that under booming conditions, the industries which are comparatively capital-intensive and labour-extensive will be free to expand, whilst those which are labour-intensive and capital-extensive will contract as a result of labour movement from the tradable sector to the booming sector (the resource movement effect) and also because of the re-structuring of capital and labour within the tradable sector.

But the factor intensities theory could be extended to include an expanding tradable sector too if it was more capital -intensive than services-provided that the overall stock of capital and labour in the economy did not change (the Paradox Model) and they were both mobile within the two sectors (Corden, 1984: 363)

Regrettably though the factor intensities theory does not explain contraction in agriculture either compared with commercial operations or of the whole sector. There are several reasons for this. First of all it not at all easy to see clearly whether the decline in agriculture comparative to other sectors in developing economies is due to the Dutch Disease or simply a symptom of normal decline in economies that are developing compensated by the growth of industry. Because it is not easy to ascertain the counterfactual of the Dutch Disease for agricultural performance in developing economies it is just as difficult to say that its contraction is directly due to the Dutch Disease or to suggest that it is due to more permanent causes. Second, the Dutch Disease Model assumes that the sector (and the economy) has a fixed stock of capital and this is a very uncertain position for developing economies under booming conditions just as much as if they were quantity-constrained in capital markets prior to the boom. Third and probably most important is that the reason why peasant farming made more profit may not only have been how intensely factors were employed but the method by which this was done. It probable that the peasant farms were more labour-intensive than the commercial ones and if they were more capital-intensive the likelihood is that they may have been unable to redirect their resources anywhere else because of the immobility of their capital.

Another reason for the predominantly successful persistence of peasant farms under booming conditions was their ability to employ family labour and to engage in quite different work concurrent with working on the farms. It is also true to say that peasant farmers may bear greater reductions in profits than their commercial counterparts before they decide to move into other more profitable types of production.

Government polices and institutional factors also play a major role in this. Trade and prices policies especially have enormous effect as does the amount and quality of public investment in the traded goods sector. This was highlighted by Gelb (1986) in his comparative studies of Indonesia, Iran, Nigeria, Algeria, Ecuador, Venezuela and Trinidad and Tobago and by Scherr (1989) in her examination of Mexico, Nigeria and Indonesia.

There are other analytical problems encountered which beset the Dutch Disease Model's usefulness to examine the response of the agricultural sector under booming conditions. The most outstanding of these is the difficulty of segregating the resource movement of the boom from normal rural-urban migration and while this problem exists it is impossible to test the ability of the Model's accuracy in this respect.

Another problem concerns the difficulty of distinguishing the spending effect of the boom from government spending because of the familiar inclination of government spending towards urban development. Increases in government spending may only have come about as a result of the boom whereas government spending in urban areas may have gone on for some time prior to the boom and could be expected to continue regardless of the boom and may even be increased in these areas regardless of the boom too. So the problems for analysis arising from this are very apparent.

This urban partiality will not only affect agriculture but also manufacturing. Cheaper imports resulting from the boom may eliminate a large number of import-substitutes and the government may feel obliged to make industrial acquisitions. The government may also feel it necessary to increase its spending by investing in agriculture and manufacturing to protect both sectors. The outcome of this would be pressure on tradables generally but the Dutch Disease Theory would not recognise this. It would see only the adjustment imposed on a smaller part of the traded goods sector - simply those that are unprotected. It is not inherent to the Dutch Disease Model to allow for change. Analysis is only feasible through the assumption of fixed coefficients of production. Therefore government spending is only significant where it affects the non-traded sector and ultimately alters relative prices. But if the concept of fixed technical coefficients is omitted it can be seen how government spending, endorsing and incorporating technological changes, can alter the result from that forecast by the Model.

With these problems concerning the Dutch Disease Model in mind, it would seem that the structuralist theories may be more appropriate when dealing with developing economies. These theories presume that the torrent of extra money coming into the economy from the boom would end two of the fundamental constraints afflicting developing economies: namely, the unavailability of foreign exchange and the savings constraint. This could explain the common appearance of a dormant growth sector in developing economies. This is made conspicuously obvious in those economies that benefit from cheap imports as a consequence of currency appreciation during the boom period. The readily accessible abundance of foreign exchange will help in bringing developed technology into the economy. Technological advances then usually work themselves out through increased productivity which, in turn, reduces costs and increases profit (Karshenas, 1990) and a good step for government to take to promote this would be for it to invest in basic technology. Therefore taking the government sector and technological change out of the analysis may yield misleading and incorrect results about the performance of the traded sector and, in countries where the government takes a large part of the resource revenue subsequent to huge windfall gains, it would seriously undermine the possibility that any accurate assessment could be made from the findings of the theory of adjustment (Gelb, 1981).

The ultimate deciding factor emanating from the pressure on the tradable sector is profitability. The Dutch Disease Model does not allow for analysis of the cost function which individual producers face or its change over the course of time because of changes in other producers prices or changes in the technology of production. Therefore the Dutch Disease Model should be combined with both micro and macro-analysis.

Macro-analysis of the boom illustrates the rise in the cost of labour and other non-traded inputs as putting the pressure on profits in the traded goods sector. But because firms differ widely in their use of inputs, rates of return on investment, etc., it is very unlikely that a whole sector would lose its competitiveness. It is therefore valuable to research unit costs across firms and note their movements during the boom. The Heckscher Diagram is a very suitable analytical mechanism to use to do this. It was used to study Sweden's economic problems of 1918 which were caused by foreign competition. Heckscher demonstrated that, with non-flexible capital, such diagrams remain quite stable from one year to another and that they reveal the firms about to be forced out by cost increases or product price decreases (Forsund, 1981). If technical developments occur and capital is malleable then the diagrams do become more complex and less stable. But to answer the question: how do changes in prices, costs and technology during a boom change a firm's profitability? the problem for any analyst would be to say that frankly nothing short of a specifically sectoral input-output mix for the traded sector as a whole and for the main industries within it would answer it.

VI-3 The Performance of Agriculture 1973-1990

VI-3-1 Growth Trends

As mentioned already, before the discovery of oil the Libyan economy was predominantly an agricultural economy. Sedentary farming was practised wherever possible but much of the farming was nomadic.

Poor soil and inadequate water sources had been a fact of life for the people of Libya for millennia. Production was almost merely subsistent. But, since the discovery and exportation of oil in commercial quantities in the early 1960s, Libya started changing into an economy which produced other commodities and services. Consequently, agriculture's share in GDP steadily declined, reaching 9.8% in the early Seventies. During the oil price shock period of 1973-1982, agriculture's share in GDP became very much more reduced and had sunk to 3.1% in the early Eighties. Historical trends in the sector's growth and share in aggregate output and total employment are given in Table VI-1 below.

Table VI-1

Agriculture and GDP Growth Rates and Contribution of Agriculture to GDP and Employment 1962-90

	Average Annual Growth Rates		Agriculture's Share (Period Average) in	
	GDP	Agriculture	GDP	Employment
1962-1972	19.0	4.4	9.8	34.2
1973-1982	13.5	2.5	3.1	20.3
1983-1990	-2.5	14.9	4.5	18.6
1962-1990	11.2	6.7	6.0	25.1

Source: Calculated from Ministry of Planning, Economic and Social Indicators (ibid.) and National Authority for Information and Documentation (ibid.) several issues.

Note: See Appendix AV-1 for aggregate output deflators.

It is obvious from Table VI-1 above that agriculture's share during the boom period of 1973-1982 was far below its share during the pre-boom period. This relative decline in the agricultural sector share may be interpreted as an indication of the Dutch Disease, but it should be mentioned that there are many other considerations that could line-up against this conclusion. First of all, considering the limited supply base of the sector, a 2.5% p.a. growth over the boom period is largely significant, implying an increase of 136% in the sector's output. This also compares impressively with almost the rest of the world during the same period [1]/ Second, and perhaps most importantly, since the Dutch Disease Model is concerned with the overall performance of the tradables, without taking into consideration factor self-efficiency (the proportion of agricultural products that are produced and consumed domestically), it seems that the behaviour of agriculture in Libya during the boom period does not coincide with the Theory's predictions, so long as a significant increase in agricultural production had taken place during that period.

VI-3-2 Domestic Consumption of Agricultural Products

With the advent of a boom as already stated, per-capita income will increase rapidly and so will the demand for both traded and non-traded goods and, consequently, the spending on them. Due to the currency appreciation and the absence of any intervention, imports become cheap relative to domestically produced products. Inevitably, a high proportion of this increasing demand will be taken up by these imports. However, even though this relationship is very pronounced with regard to manufactured goods, it does not appear to be conspicuous for food and agricultural goods because of the low income and price elasticities of demand compared to those for manufactures.

[1] According to the World Bank Development Report of 1983, the average annual growth of agricultural output for low-income, middle-income and developed economies was 2.3% p.a. , 3% p.a., and 1.8% p.a. respectively over 1970-1980 (World Bank, 1983)

The impact of the increase in per-capita income on the demand for food in Libya is shown in Table (VI-2). The most remarkable changes were observed for cereals, eggs, meat, milk and other dairy products, whose per-capita consumption more than doubled, while the per-capita consumption of sugar, coffee, tea and cocoa had increased by 18% and 27% respectively. Libya does not produce rice, sugar, coffee, tea or cocoa and has a low elasticity of supply for cereals. The ratio of imports to domestic consumption during the boom period averaged 100% for sugar, tea, coffee and cocoa, and 90% for cereals (see Table VI-3). This means that a sizeable portion of the increased income was spent on food imports. Meanwhile, the income elasticity of demand for fruits and vegetables, which have a high elasticity of supply, was low. During nearly the entire period under investigation -namely 1973-1990 - the production of all vegetables and fruit had increased substantially and, since the early Eighties, almost all vegetables and fruit produced domestically achieved surplus, and this surplus was processed.

Libya was traditionally self-sufficient in seasonal fruit and vegetables, while it also imported some other types of agricultural products. This was and has persisted to be the case before and after the boom with one qualification and that is that the self-sufficiency factor (the ratio of domestic production to consumption) increased for almost all agricultural products. This is evidenced by the remarkable increase in production of almost all agricultural products. Even so, agricultural imports had continued to increase and the deficit gap continued to widen (see Tables AVI-1-7, AVI-1-8 and AVI-1-9 in Appendix AVI-1). Between 1973 and 1982 the trade deficit in agricultural products - the main components of which are cereals - increased nearly fourfold, reflecting both a substantial increase in domestic demand and low agricultural exports. However, it should be mentioned here that the decline in exports during this period was not merely an outcome of a decrease in production but was a reflection of government policy which aimed to manufacture the surplus of domestic agricultural products as well as to have control of external trade.

Table VI-2
Per-Capita Consumption of Agricultural Goods (K/annum) 1975-90

	(Kg/annum)				Percentage Change		
	1975	1982	1985	1990	1975 1982	1982 1985	1975 1990
Cereals	118.17	232.42	200.46	181.54	96.68	-13.75	53.63
Wheat Flour	100.00	212.90	180.50	159.76	112.9	-15.22	59.75
Rice	18.17	19.52	19.96	21.78	7.43	2.25	19.87
Vegetables	242.7	244.9	245.4	227.54	0.89	0.20	-6.26
Fruit & Citrus	81.12	82.51	83.09	102.72	1.71	0.70	83.04
Meat	21.32	28.16	30.01	30.76	32.08	6.57	44.28
Milk & Dairy Products	15.83	19.06	30.21	57.23	20.40	58.5	261.50
Eggs (mn)	69.07	112.2	178.04	144.58	62.44	58.68	109.30
Sugar	48.93	57.88	45.51	50.12	18.29	-21.40	2.43
Coffee, Tea and Cocoa	2.62	3.33	4.30	4.58	27.10	29.13	74.81

Source: Ministry of Planning, An Analytical Statistical Study on Per-Capita Consumption in Libya 1975-1985, pp.18-19, & Economic and Social Indicators, various issues, and National Authority for Information and Documentation, yearly statistical series particularly for the period 1985-1990.

Table VI-3
Imports, Production and Consumption of Major Agricultural Commodities (Average 1973 – 1984)

	Consumption	Production	Imports	Production/ Consumption	Imports/ Consumption
Cereals	727.2	255.4	653.6	35.12	89.88
Vegetables	462.2	542.5	35.3	117.36	7.64
Fruit & Citrus	185.2	152.6	32.6	82.40	17.60
Meat	54.0	43.4	10.6	80.37	19.63
Milk & Dairy Products	140.1	89.8	50.3	64.10	35.90
Sugar	65.6	0.0	65.6	0.00	100.00
Coffee, Tea and Cocoa	13.2	0.0	13.2	0.00	100.00

Source: As for Table VI-2

VI-4 Factor Input and Output Growth.

VI-4-1 Arable Land

Despite the absence of accurate and reliable data, the information in existence for the 1950's suggests that the amount of arable land available had decidedly declined during that decade. But, due to agricultural development and land reclamation programmes which were begun in the early 1960's, the position considerably improved from then on and it continued that way into the late 1980's - with a particularly remarkable increase in total area of land available for cultivation during the boom years of 1973-1982.

The total agricultural area in Libya had increased from 10,100 hectares in 1970, to 14,615 hectares in 1975 and 16,149 hectares by 1990. Around 11% of this total was arable land whilst the remainder was divided between land under permanent crops, forest and woodland, meadows and pasture (see Table VI-4).

Table VI-4

Development of Land Use in Libya 1966-1990 (1000ha)

	Type of Land (ha)				Percentage of Total				Average Annual Growth		
									1966 1972	1973 1982	1983 1990
	1970	1980	1985	1990	1970	1980	1985	1990			
Total Land in Use	10100	15680	16087	16145	5.7	8.9	9.1	9.2	5.30	1.30	0.20
Arable Land	2375	1753	1787	1805	23.5	11.2	11.1	11.2	-3.70	0.20	0.30
Land under Permanent Crops	142	327	340	350	1.4	2.1	2.1	2.2	17.40	0.60	0.90
Permanent Meadows & Pastures	7050	13000	13300	13300	69.8	82.9	82.7	82.4	8.30	1.50	0.10
Forest and Woodland	533	600	660	690	5.30	3.80	4.1	4.2	1.10	1.40	1.40
Wasteland	165854	160274	159877	159809	94.3	91.1	90.9	90.8	-0.30	-0.10	-0.10
Total Land	175954	175954	175954	175954	100.	100.	100.	100.			

Source: Ministry of Agriculture, Unpublished Agricultural Statistical Reports, various issues

The available evidence regarding land prices highlights the fact that the increase of these in Libya stands as a paramount example of how relative prices, under booming conditions, change in favour of the non-traded goods. Although there are no official figures on the subject there are several indicators suggesting increases ranging from 100% to 1000%, depending on the location, with the higher increases relating to central city areas within and adjacent to Tripoli and Benghazi.

These increases were the direct outcome of two important factors. Firstly, the rise in per-capita income in the Seventies which generated an increase in spending on building and construction and led to an increase in the demand for land and consequently a rapid rise in land prices. Secondly, non-agricultural private enterprise was abolished after 1976. The way that this eventually affected investment in agriculture is hard to assess but it can be said that the sharp increases in land prices increased agricultural production costs.

When summing up it is safe to say that despite modest expansion in the total agricultural land available, the boom period witnessed a substantial improvement in agricultural technology in the method of irrigation, the use of fertilisers, pesticides and herbicides as well as in seeds. These inputs and techniques created substantial increases in the yield per hectare cultivated, and enabled farmers to change the cropping pattern which had customary in traditional rain-fed farming and undertake more remunerative propositions.

VI-4-2 Labour Supply.

As in most oil exporting countries before the discovery of oil, the agricultural sector in Libya was the first most important labour absorbing sector. However, since the discovery and exportation of oil in the early Sixties, it became apparent that there had been a permanent decline in the share of the agricultural sector within the total employed population. Between 1962 and 1982, the labour force in agriculture declined from about one-third to less than one-tenth of the total employment. This decline took place while the total labour force in Libya grew at 2.3% p.a. The main reasons behind this were the increase in rural-urban migration and the vast investment programmes. As a result, labour immigration increased from the early Seventies to almost the mid-Eighties. The number of foreign workers employed in agriculture rose from 14,000 in 1973 to 29,200 in 1982 - an increase of nearly 15% p.a..

Labour shortages appeared to have had different consequences for government projects and private farming activities. Where government projects relied more on foreign labour the majority of foreign labour went to the public agricultural projects.

But it is important to note that despite the decline in the number of Libyans employed in the agricultural sector, there had been an increase in total agricultural employment as a result of the immigration of non-Libyans. The corollary of the above is that the private farming sub-sector bore the full brunt of the decline in the number of workers employed in agriculture as a whole, and that the decline of labour in that sub-sector was more serious than the official employment figures suggested. The resource movement was very serious for the private farming sub-sector, while it was largely alleviated by labour immigration in the public agricultural sub-sector. This seems to be due to the government employment policy which prevented the private farming sub-sector benefiting from foreign labour rather than being due to the low productivity of private farming activity.

Generally speaking however, since output from the whole sector expanded during the boom period, it is safe to conclude that pro-agriculturalisation rather than de-agriculturalisation had taken place. This result is interesting, because labour immigration on its own would not have enabled this outcome to occur. Whereas according to the Dutch Disease Model predictions, (namely the Paradox Model), so long as there is any spending effect in the economy which would be enlarged by immigration workers' spending, real appreciation and higher wages would not be entirely countered by labour immigration and some de-industrialisation would be inevitable (Corden, 1984). In other words, immigration could only increase output in the lagging sector relative to its pre-boom levels, but it would not restore it to its pre-boom levels nor to increase it in any way.

VI-4-3 Capital.

There are generally speaking, two categories of farming in Libya, distinguished from each other by the amount of investment allocated to production. Irrigated farming projects produced examples of the relatively high capital input crops, while rain-fed field crops required a relatively low capital input. Since an important proportion of agricultural investment during the boom period took place in the coastal area, this gave agricultural production a permanent dual structure. Over the entire period under study, the areas cultivated in coastal areas accounted for no more than 15% of the country's total cultivated arable land, but produced an amazing 80% of Libya's total agricultural production.

Government agricultural investment took the form of public large-scale rain-fed projects as well as artificially irrigated ones. Investment in small-scale irrigated farming projects and plastic agriculture was financed mainly by the private sector.

The importance of government investment in agriculture arose from the fact that it could relieve the impact of additional spending on non-traded goods. If government investment embodies technological change, the supply responses of the sector will be altered through the effect of productivity. This effect is as real as the spending effect and yet it cannot be accounted for in the Dutch Disease Model because the Model abstracts from the government sector, and omits the impact of technological changes. To the extent that government investment generates private investment, taking only government investment into consideration understates the degree to which the spending effect is alleviated by investment. (This is especially true if private investment involves a multiplier effect). Accordingly, both sources of investment in agriculture should be considered.

The available data on capital fixed formation revealed that investment in agriculture over the boom period of 1973-1982 was 12.9% of the total investment in all sectors of the economy and about 65% of this was concentrated in irrigation farming alone. Most of this was financed by the government. A laudable accompaniment of this public investment in agriculture was the fast introduction and absorption of advanced technologies, especially in irrigation farming and agriculture under plastic, as well as the utilisation of chemical fertilisation and disease-controlling techniques by both the public and the private sectors (Secretariat of Agriculture, 1988 p.315).

Over the same period private sector investment in agriculture accounted for about 5.7% of total private investment, or 1.2% overall of combined private and public investment. The significance of these figures for private investment in agriculture during the boom period stems from the low share of agriculture in GDP. Where the share of agriculture in GDP during the boom period averaged 3.1%, in real terms, compared with 39.9% for services which received about 69.3% of total investment. Part of this investment would indeed have benefited agriculture. It must be emphasised that the level of private sector involvement in the sector is quite unprecedented. From about LD 7 million over the period 1973-1975, private investment in agriculture rose to LD 15 million over 1976-1980 and furthermore to over LD 45 million in the subsequent Plan Period of 1981-1985 (the Economic and Social Transformation Plans between 1973-1985).

Government investment in basic technology precipitated private investment. This can be deduced from the fact that private investment was directed towards increasing inputs per unit of cultivated land (vertical expansion) and adopting more advanced farming techniques. These types of investment were encouraged by the reduction in risk-associated farming and permitted the use of other embodied technologies such as fertilisers, pesticides, and improved seeds through their complementary relationships. The available data on irrigated areas shows that the total of irrigated area had increased by 24.2% over the period 1973-1985. A total of 27,934 hectares had been irrigated during the first three-year Plan Period of 1973-1975, 93,690 hectares during the first five-year Economic and Social Transformation Plan Period of 1976-1980 and 66,331 hectares during the second five-year Economic and Social Transformation Plan Period of 1981-1985. Accordingly, cropping intensity had increased substantially.

At this point two very important questions present themselves. The first concerns the extent to which agricultural investment could have contributed to the increase in agricultural output per hectare of cultivated land in Libya and the second concerns how this investment stimulated other improvements in cultural practices, thereby further increasing land productivity. To answer the first question we compare the increase in the irrigated area under vegetables with the change in output per hectare. Table VI-5 reveals with sufficient significance the existence of an interrelationship between irrigation and yield: The increase in the former is associated with an increase in the latter. Comparisons with rain-fed crops reveal a certain distinction in output per cultivated hectare between irrigated and rain-fed crops and leaving no question about the superiority of irrigated agriculture in terms of productivity in Libya.

Table VI-5
Irrigation and Land Productivity for Vegetables and Fruit Production, 1973-1984

	Irrigated Area (000,ha)	Ratio of Total Area under Cropping	Yield (ton/ha) Irrigated	Rain-fed
1973	190	61.3	31.2	4.9
1974	195	62.3	33.4	5.5
1975	200	63.5	34.6	6.4
1976	205	64.5	36.6	6.6
1977	210	65.6	36.0	6.9
1978	215	66.6	33.8	6.7
1979	220	67.7	33.8	7.1
1980	225	68.8	36.4	8.1
1981	225	68.8	36.9	8.1
1982	227	69.4	42.9	9.7
1983	230	69.7	45.4	10.4
1984	232	69.3	43.9	9.9

Source: Calculated from the Agricultural and Land Reclamation Secretariat, (May 1981) Statistical Data on the Agricultural Sector between 1966-1980, Tripoli., Agricultural Ministry, of (Feb. 1985) Report., and National Authority for Information and Documentation yearly statistical series, various issues.

With regard to the second question concerning how agricultural investment stimulated other improvements, indeed the impact of irrigation on land productivity goes beyond the straightforward matter of increasing water availability and the reliability of its supply. The advent of irrigation made the adoption of more modern techniques possible, not only because of the technical factors but also because of financial reasons. The increase in productivity increased farmers income and thus enabled more investment in farming technologies and the introduction of another crop, thereby increasing cropping intensity. These factors combined to enable production at different input-output combinations and at higher productivity.

Furthermore, with the help of empirical analysis, many economists have argued for the existence of successive levels of productivity-increase each in step with the intensifying role irrigation plays: first in stabilising harvest fluctuations, second in making possible the introduction of another crop and finally by facilitating the introduction of more advanced farming techniques and improved inputs.

The Libyan case does not differ much from this notion, where the introduction of improved seed varieties and the increased application of fertilisers and manure and other improved farming techniques occurred simultaneously with the improvement in irrigation. This was because of the integrated development techniques adopted by both the public and the private sectors.

VI-4-4 Agricultural Output.

Despite the moderate increase in the cultivated land and the relative smallness of the agricultural share in the labour force, the increase in capital- with its ensuing increase in productivity - gave agriculture enough drive to increase its production from LD 60 million in 1973, to LD 99.7 million in 1976 and then to LD 193 million by 1982. This represented a growth of 2.2% p.a. over 1973-1982, although the performances of some products were highly variable and even sometimes insufficient. The total volume of outputs of major agricultural products are given in Table VI-6 for the period 1968-1991. Over the period of 1973-1982, vegetable output increased by 11.3% p.a. and fruit output by 6.3% p.a. However, despite the remarkable increase in the production of wheat - which increased by nearly 30.5% p.a.- total cereals output showed a 9.4% decline, while meat, milk and eggs outputs had increased by 13.5% p.a., 7.7% p.a. and 25.5% p.a. respectively.

There are both supply-side and demand-side factors responsible for agricultural performance in Libya. On the demand side, because of the boom demand in the domestic market was buoyant and the prices of agricultural products continued to rise, leading to an increase in agricultural production. On the supply-side, investment in large and small agricultural projects by both the Government and the private sector during the Sixties and later, yielded high returns during the boom period. This was enhanced by the use of high agricultural technology and agrochemical inputs and improved irrigation methods. Output growth was very rapid, particularly that of certain products (such as tomatoes, cucumber, potato, onion, watermelon and fruit) which occupied more than 80% of the total irrigated land area in Libya.

Although the picture on the supply-side changed fundamentally during the second half of the Eighties, agricultural production continued to increase at almost the same pace. Where, since the mid-Eighties, it became apparent that public investment in agriculture had come to a standstill, most of the public agricultural projects were either halted or totally demolished. Government subsidy on agricultural equipment, fertilisers and agrochemical input and output prices were also cut off. However, the gap between domestic supply and demand was narrowed further. The rapid increase in production during this period can be attributed to the crucial increase in demand enhanced by the introduction of more liberal trade and also to the open border policy which encouraged exports and consequently production. The source just cited however refuted the argument that the upward exchange rate of the Libyan Dinar and the high cost of Libyan agricultural labour, relative to regional labour costs, rendered Libyan produce more expensive. Yet once trade constraints had relaxed and the open door policy had started, agricultural exports increased and led to further expansion in almost all agricultural products.

This implies the importance of demand factors together with relative price changes in determining farmers incomes, which in turn highlights the limitation of the neo-classical approach in general and the Dutch Disease Theory in particular which considered supply-side factors when demand conditions are far from stable. Also, it indicates that, despite the currency appreciation and the relatively high level of wages, the production costs of some agricultural products in Libya seem moderate, especially when compared with those for neighbouring countries (mainly Egypt Algeria and Tunisia). This was because of considerable gains in labour productivity (see Table VI-7). The last point cannot be over-emphasised in relation to the Dutch Disease analysis where the wage differentiation between Holland and Germany was the definition that Corden (1983: 441) used for currency appreciation, implying that it was the main mechanism through which the squeeze on the Dutch exports was effected.

Therefore it is true to say that the reasons for the expansion of agricultural production in Libya may not be found in a Dutch Disease analysis because it does not allow for productivity changes and technical coefficients are assumed constant. This ends the discussion upon the performance of agriculture during the boom period.

Table VI-6

Change in Agricultural Production 1968-1991

	Production (000MT)			Annual Growth Rate			Share in Total Agri. Crops		
	1968 1972	1973 1982	1983 1991	1968 1972	1973 1982	1983 1991	1968 1972	1973 1982	1983 1991
Cereals Total	978.4	2614	3094	3.0	17.8	2.7	29.4	20.8	18.4
Wheat	216.9	1024	1503	17.1	30.2	3.6			
Barley	223.2	1402	1466	38.4	23.2	16.6			
Maize	6.3	10.6	9.6	5.7	-2.2	0.4			
Legumes	72.6	176.9	115	10.8	-3.5	1.5			
Vegetables Total	1129	5903	8674	9.1	11.3	5.5	33.9	46.9	51.7
Potatoes	77.6	1054	1262	21.0	45.5	7.5			
Tomatoes	648	1445	1603	1.0	4.0	-0.1			
Water Melons	175.3	1430	1280	28.2	11.6	2.7			
Dry Onions	111.1	939	1107	22.2	13.5	9.3			
Other	116.8	1035	3422	32.1	24.8	10.9			
Fruit Trees Total	1224	4063	5019	1.4	6.3	2.8	36.7	32.3	29.9
Fruit & Citrus	492.2	1637	2426	4.2	6.9	2.0			
Olives	389.2	1384	1456	19.9	9.0	3.1			
Almonds	17.3	49.5	52.1	7.7	5.0	1.2			
Dates	293.3	796.4	784	4.2	2.1	4.5			
Grapes	31.8	197	210.7	-0.9	14.2	8.4			
All Agricultural Crops	3331	12419	16760	3.0	8.5	4.0	100	100	100
Meat (Red & White)	185.9	869.1	1349	5.7	13.5	5.8			
Milk	173.8	915.3	1914	4.4	7.7	11.5			
Eggs (Mn.)	248	2256	4781	4.7	25.5	7.6			

Source: Calculated from Ministry of Planning, Economic and Social Indicators 1970-1983, (ibid) and National Authority for Information and Documentation, yearly statistical series, various issues.

Table VI-7
Productivity Growth and Labour/ Capital Ration in Agriculture 1961-1991

	Malmquist Index of TFP		Annual % Growth Rate			Factor Ratio
	start	Finish	Malmquist	Efficiency	Technical	L / K
Libya	0.44	1.95	5.96	3.9	2.5	0.01
Egypt	1.00	1.08	0.48	0.0	0.4	1.92
Tunisia	0.89	1.80	3.78	0.6	2.8	0.08
Algeria	0.88	1.75	2.65	-0.29	2.1	0.07

Source : Adopted from Angela, L., and Colin, T.,(1997), Total Factor Productivity and the Effects of R&D in African Agriculture, Journal of International Development, Vol,9, No,4, 529-37

VI-5 Changes in Agricultural Prices

The Dutch Disease Model predicts a decline in the return to the specific factor in the lagging sector, which is translated as a decrease in profitability. This is because the rise in the wage rate is relative to producers prices which, induced by the resource movement effect, crowds profitability in that sector in absolute terms. If profitability also falls in relative terms, resources will, in the medium term, move out of the traded sector and into the non-traded sector.

How changes in input prices affect resource allocation, however, depends not only upon the relative changes in input and output prices in a static manner, but also on the change in the technical coefficient of inputs, which ultimately disrupts the existing input-output relationship. Thus a dynamic analysis is necessary to explore the interrelationship between changes in prices, costs and profitability.

In doing so, a primary well-known general function cost is used to determine the farming sector net profit. According to this function, net producers' profit, π, can be expressed in terms of total revenue R, and total cost C, as follows:

$$\pi = R - C \qquad (1)$$

Using the broad definitions of both R and C, equation (1) can be rewritten as:

$$\pi = Q.P - (F + L + M) \qquad (2)$$

Where F, L and M, stand for fixed, labour, and material costs respectively. This equation can also be given in terms of unit costs as:

$$\pi = p - (f + l + m) \qquad (3)$$

Equation (3), implies that change in profit per unit π depends on changes in both labour and material costs l and m and on the producer's prices p

First it is necessary to examine how changes in labour cost and the prices of material inputs influence change in variable cost, taking changes in input-output coefficients into consideration. Changes in producers' prices will then be looked at and related them to unit cost changes to arrive at an indicator of profit margins. To facilitate the analysis, wheat and barley will be taken as representative of field farming production, tomatoes, potato, and dry-onion will represent vegetables and citrus will represent fruit.

Tables AVI-2-1 to AVI-2-3 in appendix AVII-2 show the cost structure for major agricultural crops in Libya in 1975, 1977 and 1980. Table AVI-2-4 shows the average cost of major agricultural crops 1975-1980, while Table AVI-2-5 gives the technical coefficients of production for the period 1975-1980. Based on the cost shares, the tables suggest that fruit and vegetables were more labour-intensive than cereals, although all enterprises were more capital-intensive in 1980 than in 1975 because of the resource movement. Material inputs for vegetables and fruit increased significantly over the period, due to the adoption of modernised techniques and were more significant in the production of fruit and vegetables than in the production of cereals.

But before we precede any further, we need to look at changes in the prices of these inputs, to see how they may have effected changes in the cost of production.

Prices paid by farmers for material input in Libya were generally determined by the Government for most crop production input. This included fertilisers and other agro-chemicals as well as investment items such as plastic greenhouses, irrigation equipment and agricultural machinery. With few exceptions agricultural inputs were provided by the National Organisation for Agricultural Equipment (NOAE), and distributed through the agricultural co-operative organisations at subsidised prices.

Table VI-8 shows the changes in prices paid by farmers for some agricultural inputs during the period of 1975-1980. It reveals that the overall increase in the prices of all these inputs was quite modest, showing, as it does, the average increase in price for fertilisers to be 7.4%, seeds 5.8%, materials 4.6% and most remarkable of all - pesticides at only 2.6% increase over the five-year period. The general price level in the economy increased at 10.3% over the same period, meaning that all these costs fell in real terms. More importantly, according to Ministry of Agriculture, prices received by farmers for crops had increased at 8.9% over 1975-1980. Taking 1975 as the base year, the purchasing power of farmers - in relation to fertilisers - therefore increased at nearly 1.5% p.a., pesticides at about 6% p.a., and seeds at 3% p.a.. The same general picture, however, does not apply to machinery which, despite being imported, experienced a price increase of 25% p.a., which was much faster than the rate of output price increase. This may partly explain the position of near stagnation in the adoption of machinery in agriculture during the early - Seventies.

Table VI-8
Index of Prices Paid by Farmers 1975-1980 (1975=100)

	Land	Machinery	Fertilisers	Seeds	Pesticides	Material	Wages
1975	100	100	100	100	100	100.0	100.0
1976	113	106	66	110	104	86.5	125.0
1977	125	113	58	112	85	78.3	148.0
1978	140	118	82	125	63	88.0	175.0
1979	157	122	115	128	86	111.0	218.0
1980	178	275	125	140	106	124.0	245.0
Annual Growth	10.2%	24.6%	7.4%	5.8%	2.60%	4.6%	16.4%

Source: Ministry of Agriculture, Annual Reports, various issues, and National Authority for Information and Documentation yearly statistical series, several issues. and Central Bank of Libya, yearly statistical series, and monthly Bulletin, various issues.

The relatively high share of land (63%) in the total cost of production of wheat and barley compared with that of vegetables and fruit (10% and 18% respectively, see Tables AVI-4 and AVI-5 in Appendix AVI-1) means that the change in relative prices must have squeezed wheat much more than the other two crop-types. The same is true for machinery (5% for wheat, 1% for both tomato, and citrus). The low level of land input per unit output for fruit and vegetables, relative to cereals, may alleviate very considerably the effect of wage increases.

The other factor which must be considered is producers prices. Generally these prices can be affected either directly, through specific policies, or indirectly via macro-economic policies. However, given that there is no explicitly stated government policy for agricultural prices and that agricultural prices change continuously and even sometimes erratically, it is not analytically useful to follow them in detail. Therefore the discussion will be rather stylised.

Broadly, Libya's macro-economic policies had been designed to protect domestic producers from cheap imports, while pricing policies had the purpose of supporting income by ensuring an adequate net return, and stimulating production to improve self-sufficiency. The focus of the pricing policy had been on field crops, the bulk of which were imported.

Because agricultural land and the income from agriculture production were both exempt from tax agriculture was, in effect, subsidised. The sector was, however, taxed indirectly through currency appreciation. Appreciation reduced farm profit margins because it raised the prices of some agricultural inputs such as labour and land relative to their output prices and made competing imports cheaper. Over the period 1970-1980 real currency appreciation, as measured by REER, amounted to 14%.

More directly, cereals were taxed from 1973-1976 when the controlled price offered to local producers was below international market prices. For instance, the percentage ratio of the domestic producers price of wheat compared with the imported c.i.f. price, (or the nominal protection coefficient), increased by more than 20% over this period. This was magnified by the Government's full monopoly over cereal imports. This policy had changed dramatically in the subsequent period where after 1976, external trade came entirely under government control, and a heavy subsidy policy was followed on the domestic production of cereals in particular.

The Government also supported producers' prices for many other agricultural products. Floor prices were paid for agricultural crops either to produce a minimum return to growers during certain periods, or as a means to stimulate production. Incentive prices were also paid temporarily to stimulate the adoption of appropriate production technology.

Such policies, combined with the Government monopoly over external agricultural trade, were very successful in increasing Libya's production of almost all agricultural products and kept domestic prices for almost all agricultural commodities generally high. This more than compensated for the appreciation of the exchange rate during the oil boom period, which would otherwise have worked as a subsidy to imports.

At the local level, those policies combined with the high demand trend during the boom period had been reflected in an increase in the wholesale prices of 6.5% p.a. for cereals, 19.9% p.a. for vegetables and 14.4% for fruit over the period of 1975-1980.

Integrating changes in input and output prices, and taking changes of input-output relationship into consideration, a composite index of profitability (price/cost ratio) has been constructed (see Table VI-9).

It is obvious from Table VI-9 below that the favourable price/cost ratios had been for vegetables and fruit. These were a direct outcome from both an increase in output prices resulting from buoyant demand during the boom, and a reduction in the costs of production associated with increased labour productivity.

Table VI-10 shows the yield per hectare of some agricultural crops for selected years between 1973 and 1990. It reveals that both vegetables and fruit yields, expressed in terms of tons per hectare, increased much faster than for cereals (mainly wheat and barley). How this affected labour productivity however depended on changes in employment in each category. When employment declined, the increase in land productivity would have been expected to be magnified when expressed in terms of labour productivity. Of course the reverse is true. A closer analysis of resources movement suggests that broadly speaking, employment declined in rain-fed farming and increased slightly in irrigated farming. But even allowing for this factor it is unlikely that productivity results would have changed significantly, since capital was increased to a large extent in vegetables and fruit enterprises, while labour was increased only slightly. This argument is difficult to support with historical data, since a breakdown of labour productivity by enterprise is not available. But, other routes to the same result may be possible. Evidence from empirical analysis on some vegetable products using different farming techniques shows that a move from traditional farming to modern high input farming techniques resulted in substantial gains. This analysis is summarised in Table VI-11, which shows that a move from traditional open-field cultivation to modern farming methods, such as cultivation under plastic as well as using high input production techniques, reduced the cost of production and increased the profit margin for almost all considered crops. Since this move away from traditional to modern farming techniques had been the apparent trend for fruit and vegetables but not for field crops, we would expect the effect of increasing land productivity on reducing per unit production cost to be highly conspicuous in regard to vegetables and fruit but not in case of field crops.

Table VI-9

Composite Index of Price/Cost Ratio

	Cereals	Vegetables	Fruit
1975	100%	100%	100%
1976	121%	176%	154%
1977	114%	181%	197%
1978	104%	219%	158%
1979	101%	186%	152%
1980	81%	179%	136%

Source: Calculated from Tables in Appendix AVI-2

Table 10

Trends in the Yield of Crops in Libya (ton/hectare)

	1975	1980	1985	1990
Wheat	0.76	0.52	0.71	1.23
Barely	0.61	0.25	0.33	0.48
Tomato	7.08	14.69	14.75	8.88
Onion-dry	8.02	13.00	17.83	20.00
Water Melon	11.40	12.12	12.78	13.81
Oranges	13.61	14.02	14.15	23.71
Lemon	6.60	8.14	11.59	16.94

Source: Calculated from National Authority for Information & Documentation, yearly statistical series, various issues.

Table VI-11

Comparison of Profitability under Tradition & Modern Farming Techniques

	Yield (ton/ha)	Price (LD/ton)	GR (LD/ton)	ATC (LD/ton)	Net. Profit (LD/ton)
Under Advanced Farming Techniques					
Cucumber	90	214	19.3	11.5	7.8
Tomatoes	145	124	18	11.4	6.6
Green Pepper	55	110	6.1	2.5	3.6
Eggplant	54	98	5.3	2.8	2.5
Potatoes	25	145	3.6	1.8	1.8
Under Traditional Farming Techniques					
Cucumber	40	214	8.6	5.2	3.4
Tomatoes	52	124	6.5	2.6	3.9
Green Paper	20	110	2.2	0.9	1.3
Eggplant	27	98	2.7	1.2	1.5
Potatoes	18	145	2.6	1.3	1.3

Source: Agricultural Research Center (ARC), Unpublished Working Papers 1984.

VI-6 Concluding Perspectives

The foregoing exposition so far has established that a systematic examination of agriculture's performance during the boom period in Libya gives results that contradict the expected outcome of the Dutch Disease Core Model, since agricultural output increased substantially in absolute terms and one would also conclude that the Dutch Disease was not evident in the agricultural sector of Libya.

However, it should be mentioned that there are two arguments by which this outcome may be inconsistent with the Dutch Disease Extended Model, both of which are based upon the notion of factor intensity. The first is the Paradox Model: which states that if both capital and labour are mobile across agriculture and the non-traded sector and if agriculture is relatively better endowed with capital then the movement of labour out of agriculture and the non-traded sector to the booming sector will lead to an expansion of agriculture, on account of its relative capital-intensity, and a contraction of the non-traded sector resulting from its labour-intensity. The spending effect will have a counter-balancing effect, but no pro-agriculturalisation is possible. Agriculture is more capital-intensive than construction or any other services activity. The Paradox Model in theory may therefore be accepted as an explanation of the performance of the sector as a whole.

The second argument is that if agriculture is composed of industries that employ factors with different intensities, then the movement of labour out of the sector leads a reorganisation of capital and labour in favour of the capital-intensive industries whose outputs expand. Since the technical coefficients for agricultural production in vegetables and fruit (1975) were relatively more labour-intensive than cereals, yet the output of both vegetables and fruit expanded significantly. This evidence contradicts the Extended Model of the Dutch Disease and the notion upon which it is built.

Critical analysis of production in the sector shows technical coefficients to be changing during the boom period, because new techniques of production embodying technological change had been adopted. Evidence obtained from such analysis suggests that technological advances increased productivity and therefore profitability in the production of vegetables and fruit. It is highly plausible that this was mainly responsible for the continued increase in supply, while the expansion of demand ensured no excess supply was created, thus maintaining a high level of profitability in the sector. This is a more plausible explanation for the divergence from the Core Model expectations than the Paradox Model assumptions.

CHAPTER VII
THE PERFORMANCE OF THE MANUFACTURING SECTOR UNDER BOOMING CONDITIONS IN LIBYA

VII-I Introduction.

During the boom period of 1973-1982 and in the terms of the Dutch Disease Model industrialisation took place in Libya not de-industrialisation. Some manufacturing expansion is to be expected in developing countries during a boom period but in Libya's case the expansion had been large and definitely not in keeping with the expectations of the Dutch Disease Model for that reason.

The previous chapter asserted that the growth of agriculture was mainly due to the technological progress facilitated by the heavy investment in the sector. This chapter sets out to prove that this was not the only cause but that there was another - namely the fast expansion of the domestic market for manufactures which made possible the innovation of more sophisticated methods of production that allowed dynamic economies of scale to operate. All these factors accelerated the growth of productivity which far outweighed the retardant effects of relative price changes. So the chapter will illustrate that the productivity growth of Libya's manufacturing industries was the reason why the Libyan case did not match the Dutch Disease Model forecast.

The rest of this chapter is arranged with Section Two dealing with whether or not the Dutch Disease Model is suitable for the study of the manufacturing sector performance in industrialising booming economies. The market forces, organisational structure and government policies which shaped manufacturing in Libya are covered in Section Three. Section Four discusses Libya's general manufacturing performance and decomposes the demand for manufactures to domestic demand and expansion import - substitution. Section Five deals with manufacturing growth in the specific quantitative terms of factors input, output and productivity growth. Section Six constructs a system for the setting up of profitability indices, embracing trends in the relative prices of input, output and productivity growth. Section Seven provides an estimation of profitability in some manufacturing companies in Libya and Section Eight discusses the conclusion.

VII-2 Industrialisation and the Dutch Disease. A Theoretical Approach

The Dutch Disease Model does not totally preclude industrialisation. There are circumstances where it can become possible within the tenets of the theory - as described by the Heckscher-Ohlin Model. This states that if the capital and labour within an economy are fixed and the manufacturing sector is more capital-intensive than the services sector the resource movement will draw labour from both manufacturing and services into the booming sector thereby making both sectors more capital-intensive, depressing output in the more labour-intensive sectors and encouraging growth in output of the more capital-intensive sectors. This will be buffered by the spending effect, which increases the price of services relative to manufacturing. (Rybczynski, 1955)

The same phenomenon can also happen if different industries within the manufacturing sector utilise factors in varied proportions. In such a case the relatively more capital-intensive industries will grow even if output in the overall sector is reduced.

There are very tangible as well as theoretical difficulties connected with this explanation. Obtaining relevant and accurate information relating to the manufacturing sectors of developing countries is often far from easy if not impossible. How can the relative capital-intensity of the manufacturing sector of an economy be ascertained if the data on capital stock is at best restricted and often non-existent? Theoretically the notion of capital-intensity for the overall manufacturing sector means little when the usual picture of the manufacturing sector of any given country includes both the highly labour-intensive industries such as clothing, footwear and leather tanning and highly capital-intensive industries such as petroleum-refining and chemicals. In just the same way the non-traded sector can include telecommunications as well as petty trading. However, these disparities within the overall manufacturing sector do allow the Heckscer-Ohlin Model to be tested. But varied factor-intensities do not provide the whole answer as to why industrialisation as opposed to de-industrialisation occurred in Libya. More conspicuous to Libya's case was the web of connected supply-demand effects inherent to the development of industrialisation which were boosted by the boom from the mid-Seventies to the mid-Eighties. The relatively more capital-intensive industries in Libya generally performed better than the labour-intensive ones under these conditions.

In times of boom capital is abundant and makes for rapid capital accumulation. The demand for manufactured goods rises and there is notable increase in per-capita income. All these elements, working together, bring about intensifying industrialisation. The speedy rise in per-capita income is economically good because it keeps manufacturing capital fully employed, productivity efficiency levels maintained and sustains output. Whereas a developing economy without boom and with low per-capita income is more than likely to be functioning with the problems associated with excess supply.

Manufacturing productivity and its growth rate are far more likely to rise under conditions of boom than without it because of the prevailing optimistic demand under conditions which expand the size of the market. The two most important mechanisms through which demand affects the growth rate of productivity are increased capacity utilisation and economies of scale.

Any developing economy which is freshly experiencing booming conditions can increase its output and progress steadily towards the utilisation of its full capacity state without losing competitiveness even in those sectors disadvantaged by international price movements. This is because while production is rising the unit costs of production are diminishing due to better production efficiency. The spending effect would decrease the prices of tradables compared with non-tradables but the rise in productivity could more than redress this. The presence of unemployed labour prior to the boom would reduce the effect of the resource movement because the booming sector would be absorbing the idle resource. The presumption of the full employment of resources at all times, both before and during the boom, which is intrinsic to the Dutch Disease theory, does not sit comfortably with this. (Corden 1984).

A large market can also help to increase efficiency by enabling the use of methods and technologies that could never have been incorporated until per-capita incomes were high enough to expand the market sufficiently to make their use cost-effective.

The latest technologies that were in use in American manufacturing could not be adopted and used in many European economies until after their own per-capita incomes, together with markets, had risen enough to afford them and when the disproportionate allocation of purchasing power was made to products where existing methods of mass-production could be adopted with a higher than average reduction in unit costs. (Denison, 1967:237). The possibility of adopting American technologies moved substantially nearer too when capital became abundant in Europe, since American technology had developed originally in an environment where capital was more abundant.

In developing economies, with their low per-capita incomes and small markets, economies of scale should yield substantial gains in efficiency through greater specialisation. As per-capita spending rises, the extent of these gains in efficiency depends directly upon how this spending is distributed among different products and fluctuating consumption patterns have a lot to do with differences in growth rates. The smaller the existing market the larger the gains will be from economies of scale as the market grows when other things remain unchanged. But the relevance of these changes will not matter if the growth of markets is not matched by changes in technical expertise and management (ibid,) As Adam Smith, Alfred Marshall and Allyn Young have all pointed out, economies of scale should not be examined purely in a static mode because both static and dynamic factors act together to cause profits to increase when production is increased. Because economies of scale also include inputs such as new entrepreneurs as well as new technology and "learning-by-doing" methods of production which are not only drawn from a single industry but also from a general industrial expansion these should all be regarded together as an integrated whole. (Matthews, 1982: 275). The statistical basis of the hypothesis concerning the relationship between the growth rate of productivity and the growth rate of production is known as Verdoorn's Law. As has been said the Dutch Disease Theory is a neo-classical theory and cannot very easily cope with increasing returns within its precepts of perfect competition and marginal productivity and factor pricing for this reason.

The prominence of demand extends beyond the level of per-capita income and income elasticities to embrace total demand for consumer goods. The precipitated increase in domestic purchasing power might be permitted to exceed a consumption threshold in the economy where the income available for consumer goods, particularly manufactures, is enlarged. This has two immediate results. Firstly, it initiates a rapid rise in gross profits which, as internal financing in firms becomes viable, will more than likely encourage additional investment in the sector. Secondly, if the demand pull is very large some of it can be expected to overflow into domestic production which enjoys natural protection against imports.

It is worth remembering that, if consumers do not mind domestically produced products may not need to be perfect substitutes for imports. In many developing economies with lower per-capita incomes than in developed ones consumers are content to buy lower quality domestic products so as long as they are cheaper than imports. This is equivalent to saying that the elasticity of substitution between domestically-produced and imported goods is lower than that predicated by the Dutch Disease Theory, which presumes perfect substitution. In such a case the law of one price does not apply and domestically produced tradables may be capable of competing in their own markets.

If a boom is regional rather than unilateral then a multi-country theoretical model in lieu of a single-country one would be required to predict the outcome of the performance of the tradables. In such an instance the demand pull will be magnified by the other economies involved. The demand for domestic exports from neighbouring countries will multiply the effect of domestic demand and unfavourable price effects will be depressed because differential inflation will be less than otherwise.

However, the supply response of manufacturing can be affected by factors other than demand but which are intrinsically related to the boom conditions. The two most important of these are the abundance of foreign exchange and the change in relative prices. Both these things are consistent with the importing of new technology in the shape of plant, other equipment and management skills - all aiding technological progress and helping to increase productivity by advancing production frontiers. They are also consistent with the import of improved intermediate inputs to production and thus increasing productivity through improving production efficiency.

Government policies, of course, also have a major effect upon the performance of manufacturing. The governments of most developing countries do not just sit back and watch the process of industrialisation take place, they endeavour to direct its course through an overt development strategy. Because this strategy so often places the emphasis on increasing the share of industry in the national output, it creates unbalanced growth. Government consumption and investment behaviour which determines the final demand will also affect the structure and output of manufacturing by means of the customary inter-industry links particularly if it directly receives the foreign exchange windfalls.

Trade policies too have a bearing. It is well established that when foreign exchange is abundant imports will rise fast and this fast increase can have two opposite end-results. On the one hand it will stiffen competition to the domestic products and therefore aggravate the inter-sectoral effects of relative price changes, but on the other hand this increased competition can induce better efficiency in manufacturing output.

Then there is the fact of pricing policies. The oil price shock of the 1970's caused price control policies to be adopted in the majority of non-booming developed economies in order to protect industrial production and the consumer whilst, due to the high rate of inflation in the booming economies, price controls were also imposed and extended to manufactured goods thus intensifying price fluctuations against tradables. This relative price effect could be relieved if the government encouraged investment in manufacturing by providing exemption from income and profit tax and tariffs.

In conclusion, there are three main limitations making the Dutch Disease Model difficult to apply to the study of the manufacturing performance of developing economies. Firstly, the Model's assumption of fixed technical coefficients of production. Secondly, with the exclusion of the allowance for elasticities of demand to work themselves out in the model, it ignores the demand effects of increasing productivity which changes technical coefficients of production and can greatly affect supply conditions and thirdly, the Model omits to take into account government action.

If there is to be an economic model with which to study the short to medium effects of favourable exogenous shocks on the production structure of industrialising economies it must include all the above aspects because they need to be carefully considered in any study. Yet, at the present time not one model exists, including the Dutch Disease Model, which by itself alone, can do this. This chapter demonstrates that an analysis which embodies all the above-mentioned considerations necessarily has to be multi-faceted to such a degree that consistently sustaining an integrated analysis is tenuous.

VII-3 The Manufacturing Sector in Libya: An Overview

In most developing countries, industry has been recognised as the most favourable, the most attractive sector for economic development. Governments have turned to industrial development to generate higher income for their people, to provide much needed employment, open up markets for primary products and relieve foreign exchange constraints through import-substitution. They look to industrial development to generate new sources of revenues for them and they look to it to build economic independence and a deep sense of national pride. However, whether or not a country achieves these wonderful benefits - which are the dreams of modern industrialisation - depends upon many things. It depends upon the historical development of the country concerned and its economic and social environment. It depends on whether or not it adopts reasonable polices in line with these objectives and whether or not it makes sensible choices. Finally, that country may possess the capability to develop industrialisation to its most desirable level but in reality its attainment will rely heavily upon how efficiently this is brought about.

The industrialisation process in Libya encountered many major obstructions. The leading one was its small domestic market, both in expanse and depth, which called for a strong export performance to achieve economies of scale in production. Then there was the lack of skilled manpower and technical know-how and the absence of domestically available raw materials on which to base production other than gas and crude oil. These combined disadvantages had the effect of increasing production costs and reducing profitability.

During the oil price shock period of 1973-1982, Libya's manufacturing sector suffered from the well-versed adverse intersectoral effects of the increasing prices of inputs and declining prices of output relative to that of services. A situation further exacerbated by increasing demand for imported goods, enhanced by the abundance of foreign exchange availability.

At the same time, the manufacturing sector in Libya enjoyed several advantages, facilitating increases in industrial productivity and reductions in production costs. These included the improvement in physical infrastructure such as means of communication, electricity and the establishment of the Industrial Research Centre (IRC). Also the massive inflow of foreign exchange ensured further ready access to imported required inputs and better technology.

The boom's favourable effects (namely, the relief of the foreign exchange constraints and gains from improved infrastructure) combined with government policy appear to have succeeded in reversing the adverse intersectoral effects. This was evidenced by the impressive growth of manufacturing output.

Before the analysis of trends, a comment concerning policy and institutional framework that governed the growth of the manufacturing sector in Libya is necessary.

As in almost all planned economies, the Libyan Government intervened both directly and indirectly in nearly every aspect of economic life including manufacturing activities. In addition to direct government ownership in manufacturing - which amounted to 25% of all manufacturing ownership in 1976- the Government also had indirect influence upon private assets in other manufacturing enterprises through its licensing policy, through the control of prices and its control of internal and external trade.

It's general policies were framed to enhance the contribution of industry in the national income. These included investment encouragement, investment licensing and the control of external trade. Since the early Sixties, great attention was concentrated on developing the industrial sector and huge government investment was earmarked for that. Projects for large-scale plants were embarked upon and private investment in manufacturing enterprises was strongly encouraged. The Government offered several types of inducement to private investors. There was income tax relief, tariff exemption for imported fixed assets, and social security benefits for industrial and manufacturing projects particularly if they were planned to meet the national goals. But many closer studies of the growth of the manufacturing sector in Libya found that the effect of these inducements was minimal. More influential was the direct effect of investment licensing and the granting of monopoly rights which were pursued so effectively during the Sixties and early Seventies. Tobacco products, wool weaving, leather tanning and petroleum refining all enjoyed monopoly rights and competing imports were banned since the early Sixties. Monopoly rights had been based upon the idea that these industries enjoyed economies of scale of which they would have been deprived in the presence of competition given Libya's small market during the pre-boom period. Investment licenses for many prospective manufacturing enterprises were refused to applicants for those reasons. But regulating the market in this way came to a halt after the first oil boom because the fast expansion of domestic demand enlarged the market. But monopoly rights continued in force. Where licenses were granted the Government was able to dictate output prices and these were usually higher than free trade import prices. After the early Seventies the Government imposed a price control policy on almost all manufactured goods but the effect of this, in aggregate terms, was negligible.

The single most effective policy to influence profitability in manufacturing in Libya was without doubt trade regulation. During the pre-oil price shock period import substitution was pursued explicitly. The effective rate of protection was about 66% and this was large enough to convert many otherwise unprofitable enterprises into profitable ones by increasing their value added. In addition to this, quantitative restrictions and outright import bans were also quite common. Restrictive trade policy was tightened further during the first half of the Seventies and by 1977 the Government controlled all external trade.

Bilateral and multilateral trade agreements were a common policy tool adopted by the Government too to encourage industrial improvement. Some of those agreements were quite effective in doing this, notably those with Arab and former East European countries. Although these agreements were mostly entered into in the Sixties and early Seventies, their status changed considerably following the boom. The opportunities for Libya to benefit from foreign trade were enhanced further following the massive injection of foreign exchange created by the boom.

Summing up, it would seem that although the highly restrictive Government polices became pronounced only after 1976, it is clear that the planned industrial strategy of the Government during the boom period was the chief explanatory factor for manufacturing performance during that time for the reasons mentioned above.

VII-3-1 Industrial Development

As already mentioned, by the time of its independence in the late 1950's, Libya was deficient in capital, except for a very few wealthy families. The accumulated capital stock of the Libyan population consisted mainly of livestock, hand tools and private housing. Even this capital had suffered depletion during the Second World War (Higgins, 1953: 6).

This lack of capital precluded any development of Libyan owned industry. Apart from agriculture the only other field of industrial activity controlled by Libyans was handicrafts. In the early 1950's, it was estimated that $ 300,000 or 3% of the entire income of Tripoli was earned by hand-weavers (ibid., 60). Most of the cloth output was produced in the home in extremely crude conditions. A United Nations report on Libya stated that the introduction of simple spinning wheels would result in the unemployment of hundreds of poor workers who where dependent on hand spinning for their basic income (ibid, 61). In fact, before the Italian Occupation took place, no real industry existed in Libya except small-scale handicrafts.

The industries established by the Italians were based on agriculture or on the breeding and utilisation of sea products. According to a 1938 industrial census there were 789 manufacturing establishments operating in Libya; of which 639 were owned and controlled by the Italians and 150 were owned by Libyans and non-Italian foreigners [2]/. Italian factories employed twenty thousand workers [3]/. Libyans also faced competition from the Italian skilled workers. The 1938 industrial census indicated that there were 5,239 handicraftsmen (skilled workers) in Libya, and of this total 1,939 were Italian.

Industrial capital, and its control, changed very little from 1939 to 1956. Most of the post-Cyrenaican (the Eastern region) factories were destroyed during the Second World War, and the departure of the Italian communities from the region between 1940-1942 further reduced the industrial activity there. However, a significant amount of Italian plants in Tripoli survived the war. In the post-World War II period, nearly all of the major industries in Tripoli were still controlled by the Italians. By 1956, manufacturing industries employed between fifteen thousand and twenty thousand workers. The factories that then existed operated on a small scale. In 1956 the average size of each factory, measured in terms of employment, was only about five workers per factory. Only twenty-five factories employed more than fifty full-time workers.

Following the discovery of oil in commercial quantities in the early 1960's, attention was, as has been stated, focused on developing the industrial sector. Under the first five-year Economic and Social Development Plan of 1963-1968 the Government allocated about 7 million Libyan pounds, or 2.4%

[2] A 1935 census indicated that Greeks and Jews owned 21% of the industrial and commercial enterprises.
[3] Twenty thousand workers would present 2% of the total population (see the Italian Empire: Libya , 1940, pp. 60-78)

of the total development expenditure, for industrial credits. This provided an industrial research centre, an industrial estate bank and some funding for training in industry. Additionally it introduced some protective measures such as import restrictions and tax exemptions in order to encourage local industry to compete with imported commodities. The relatively small allocation however, was a sensible decision because the industrial sector's absorptive capacity was extremely limited. Four factors caused a low rate of return in the industrial sector. Firstly, native Libyans had not yet acquired the necessary managerial skills to operate a substantial number of industrial enterprises. The Italian Occupation resulted in the fact that most of the entrepreneurial and managerial positions were held by Italian nationals. Furthermore, the Italians had supplied most of the skilled workers before World War II and the situation tended to perpetuate itself into the 1960's. When the oil wealth appeared, the absence of industrial skills caused the Libyan businessmen to prefer to invest their money in trade or real estate, which offered quick, safe, and relatively high earnings [4]/ Secondly, the extremely backward state of agriculture and variable marketable surpluses placed a constraint on the growth of the existing food-processing industry. Thirdly, the lack of known minerals, apart from oil and gypsum, was another factor that inhibited industrial development. Mineral-based industries were confined to the manufacture of building materials. Fourthly, the size and nature of the domestic market represented a barrier to the development of many types of industries. The market was small because of limited numbers and because of the uneven distribution of the people among the main settled regions. The market was further divided by the social and economic differences between the nomadic, settled rural and urban population.

Nevertheless, since the early 1960's it was very clear that government policy was one of encouraging the private sector to develop the industrial sector, by providing loans and technical information for private investors. In

[4] During the late 1950's and early 1960's, the price of real estate rose rapidly. (see IBRD, 1960, p.185)

1964 there were 7,954 manufacturing companies, employing 27,118 workers in both large and small establishments. Table VII-1 shows that, in the same year, 11,106 people were employed in 622 companies, each one employing more than 5 people. Furthermore, according to the industrial census of 1964, more than 56% of the large establishments were located in the Tripoli region. Benghazi and Khoms are the only two regions that had a considerable number of large manufacturing establishments other than Tripoli.

The major growing manufacturing groups were food manufacturing - including tomato processing, canning of vegetables and fruit, soft drinks, tobacco, wood, furniture and textiles. These industries represented 35% of all establishments and 29% of industrial employment in large establishments. Table VII-1 also illustrates those small industrial establishments which employed less than five persons. In 1964 the total number of small manufacturing establishments was 7,332 engaging 16,012 workers. 53% of these small companies and about 57% of workers were in the Muisurta region and 21% establishments were in the Tripoli region. The main industry of these small establishments was the manufacture of textiles, with 2,860 establishments comprising 39% of the total number of employed workers. The second largest industry of these small companies was food manufacture - comprising 15% of all small establishments and 13% of the workforce. The relatively minor importance of the manufacturing sector is shown by the fact that, in 1964, it contributed only 3.2% to the Libyan GNP, while the petroleum sector contributed a massive 54%.

During the 1970's clearly more attention was paid to the development of the public industrial sector. In 1970 the National Public Organisation of Industrialisation was established as the major organ for implementing the public sector's industrial development plans. Moreover, after the initial years of the Revolution, government intervention and investment in the industrial sector greatly increased. Under the 1973-1975 Economic and Social Development

Plan, for example, nearly 13% of the Plan's investment was devoted to the industrial sector. LD. 329 million was allocated to fund 74 industrial projects in the pursuit of increasing the contribution of industrial production in the national income. The Government considered that the advance of nations was due to their level of industrialisation and so as to achieve these objectives it concentrated its efforts on food manufacturing to provide domestic food products to reduce the import of food products which was a major economic problem for Libya particularly after the discovery of oil and, incidentally, still is today. Also, emphasis was given to producing building materials in order to meet the country's current demand at the time and to lay the basis for further development programmes. Finally, the chemical-processing industry was to be expanded too, since it was closely associated with the oil industry. Consequently, investment in light industry was increased from LD 15 million in 1970 to LD 210,200 million in 1979. Although this strategy was enhanced further in the subsequent Development Plans of 1976-1980 and 1981-1985 as has been mentioned earlier, there had been a remarkable change in government policy since the early-Eighties to favour heavy industry. The total investment in heavy industry between 1980-1985 reached LD 2060.3 million, while the total investment in light industry was only 595.7 million. Table VII-2 shows how these changes occurred.

However, the available data reveals that of the 74 industrial factories projected in the 1973-1975 Development Plan by the end of the Plan period only 24 had been built. Nine of these were for food manufacture, five for textiles and footwear, five for cement and building materials, three for metal products and electrical machinery, one for wood and paper products and one was a refining project. The total number of projects planned for the subsequent Development Plan period of 1976-1980 was doubled to 148, out of which only 56 industrial establishments had been built and completed by the end of that Plan period.

The delay was actually due to many reasons. The paramount one was the fact that factories had to be imported and built by foreign companies and this took several years to be completed, and there were also reasons relating to the lack of the administrative institutions, to corruption and "red tape".

As to the role of the private sector in industrial development, the available data on the legal status of manufacturing establishments shows that, in the late Sixties and early seventies 35.5% of large manufacturing establishments were under individual ownership, followed by 32.2% of establishments in partnership. The small manufacturing sector was mainly under individual and family-run proprietorship. Private factories remained in operation until the second half of the 1970's, (see Table VII-3), but private ownership was severely restricted following the guidelines of the so-called Green Book of 1976, which stated that private ownership led to exploitation through wages, rent and profit and had to be abolished. Then, in September 1978, workers in both the private and public industrial sectors were encouraged to take over the factories that they were working in. So, since that year, workers were told they were partners not wage earners, and set up workers committees to supervise all the administrative functions. By 1979, most private ownership had been abolished.

Table VII-1

Structure of Industrial Sector in Libya 1964

	Establishments		Employment		Output (LD., 000)			
					Gross	Share	Value	Share
	Number	(%)	Number	(%)	Output	(%)	Added	(%)
Large Establishments	911	11.1	30021	65.2	270.7	98.1	171.86	98.6
Petroleum Mining	45	0.5	9662	21.0	238.18	86.3	155.0	88.9
Stone Quarrying	79	1.0	720	1.6	0.535	0.2	0.38	0.2
Manufacturing Industries	622	7.5	11106	24.1	20.28	7.4	10.075	5.8
Construction	153	1.9	7593	16.5	9.182	3.3	5.135	3.0
Electricity & Gas	12	0.2	940	2.0	2.567	0.9	1.274	0.7
Small Establishments	7337	88.9	16012	34.8	5.234	1.9	2.42	1.4
Total	8248	100	46033	100	276.0	100	174.28	100

Source: Department of Statistics, Industrial Survey and Industrial Census 1964

Table VII-1-a

Manufacturing Establishments in Libya 1964

	Large Employing more than 5 Workers				Small Employing 1 to 5 Workers			
	Num. of Estabs,	(%) of Total	Total Workers	(%) of Total	Num. of Estabs,	(%) of Total	Total Workers	(%) of Total
Food Manufacturing	107	17.2	1713	15.4	–	–	–	–
Beverages	32	5.1	562	5.1	1092	14.9	2144	13.4
Textiles	19	3.1	565	5.1	2860	39.0	6752	42.2
Footwear	24	3.9	74	0.7	224	3.1	268	1.7
Manufacture of Wood	27	4.3	427	3.8	436	5.9	960	6.0
Furniture Fittings	16	2.6	124	1.1	–	–	–	–
Printing and Publishing	19	3.1	658	5.9	–	–	–	–
Rubber Products	3	0.5	19	0.2	–	–	–	–
Chemical Products	138	22.1	1699	15.3	492	6.7	896	5.6
Non-Metallic Mineral Products	92	14.8	1877	16.9	116	1.6	328	2.0
Metal Products	21	3.4	286	2.6	184	2.5	292	1.8
Machinery	5	0.8	60	0.5	–	–	0	–
Electrical Machinery	4	0.6	288	2.6	108	1.5	180	1.1
Transport Equipment	99	15.9	1584	14.3	372	5.1	800	5.0
Others	16	2.6	1170	10.5	1448	19.7	3392	21.2
Total	622	100	11106	100	7332	100	16012	100

Source: Kingdom of Libya, Ministry of National Economic, Statistical Department, Industrial Survey, Tripoli, 1964.

Table VII-2

Development of Planned and Actual Government Investment 1963-1990 (LD.000,000)

	Total Investment			Light Industries			Heavy Industries			(%) of Total	
	Plann.,	Actual	Exc. (%)	Plann.,	Actual	Exc. (%)	Plann.,	Actual	Exc. (%)	Light	Heavy
1963	0.5	0.1	20%	0.5	0.1	20%	_	_	_	100%	_
1964	1.3	0.1	7.7%	1.3	0.1	7.7%	_	_	_	100%	_
1965	4.3	0.6	14.0%	4.3	0.6	14.0%	_	_	_	100%	_
1966	5.8	2.0	34.5%	5.8	2.0	34.5%	_	_	_	100%	_
1967	5.3	4.7	88.7%	5.3	4.7	88.7%	_	_	_	100%	_
1968	7.7	7.4	96.1%	7.7	7.4	96.1%	_	_	_	100%	_
1969	7.7	6.3	81.8%	7.7	6.3	81.8%	_	_	_	100%	_
1970	21.8	15.0	68.8%	21.8	15.0	68.8%	_	_	_	100%	_
1971	32.1	29.0	90.3%	32.1	29.0	90.3%	_	_	_	100%	_
1972	68.1	65.1	95.6%	68.1	65.1	95.6%	_	_	_	100%	_
1973	79.7	62.5	78.4%	79.7	62.5	78.4%	_	_	_	100%	_
1974	110.9	107.0	96.5%	110.9	107.0	96.5%	_	_	_	100%	_
1975	129.7	100.0	77.1%	129.7	100.0	77.1%	_	_	_	100%	_
1976	199.4	165.5	83%	199.4	165.5	83%	_	_	_	100%	_
1977	194.7	160.7	82.5%	194.7	160.7	82.5%	_	_	_	100%	_
1978	226.3	157.1	69.4%	226.3	157.1	69.4%	_	_	_	100%	_
1979	203.4	210.2	103%	203.4	210.2	103%	_	_	_	100%	_
1980	614.9	583.2	94.8%	180.9	173.2	95.7%	434.0	410.0	94.5%	29.7%	70.3%
1981	727.1	530.9	73.0%	197.1	128.5	65.2%	530.0	402.4	75.9%	24.2%	75.8%
1982	475.9	409.7	86.1%	124.4	113.2	91.0%	351.5	296.5	84.4%	27.6%	72.4%
1983	494.9	455.7	92.1%	94.9	70.8	74.6%	400.0	384.9	69.2%	15.5%	84.5%
1984	460.4	381.5	82.9%	85.4	65.0	76.1%	375.0	316.5	84.4%	17.0%	83.0%
1985	365.0	306.1	83.9%	64.8	56.1	86.6%	300.2	250.0	83.3%	18.3%	81.7%
1986	270.0	211.6	78.4%	49.8	30.1	60.4%	220.2	181.5	82.4%	14.2%	85.8%
1987	273.0	166.1	60.8%	57.2	18.8	32.9%	215.8	147.3	68.3%	11.3%	88.7%
1988	240.0	134.5	56.0%	47.6	15.6	32.8%	192.4	118.9	61.8%	11.6%	88.4%
1989	189.0	106.8	56.5%	35.3	2.4	6.8%	153.7	104.4	67.9%	2.2%	97.8%
1990	_	142.1	_	_	_	_	_	_	_	_	_

Source: Ministry of Planning, Economic and Social Indicators various issues. and Central Bank of Libya, yearly statistical series, various issues

Table VII-3

Distribution of Large Manufacturing Establishments according to their Legal Status 1967-1979

	Number of Establishments					Percentage of Total				
	1967	1971	1973	1976	1979	1967	1971	1973	1977	1979
Individual Ownership	65	80	93	103	18	35.5	36.2	38.7	36.3	12.3
Partnership	59	69	64	72	9	32.2	31.2	26.7	25.4	6.2
Joint Stock Corporations	38	32	26	25	21	20.8	14.5	10.8	8.8	14.4
Government Corporations	9	25	47	71	98	4.9	11.3	19.6	25.0	67.1
Not Recorded	12	15	10	13	_	6.6	6.8	4.2	4.6	_
Total	183	221	240	284	146	100.0	100.0	100.0	100.0	100.0

Source: Ministry of Planning, Department of Statistics, Industrial Survey and Industrial Censuses, various issues

The exposition so far has established that since the discovery of oil in the early sixties there had been a steady increase in the size of the industrial sector in Libya. The remarkable expansion that developed coincided with the boom period, as the number of large industrial establishments increased from 1969 establishments in the early Seventies to more than 5996 establishments in 1980. Also employment in the manufacturing industry had increased from 19,400 in 1969 to about 73,700 in 1982.

The major light industries established between 1973-1980, were those such as food processing, building materials and clothing which used local raw materials and employed the majority of the work force. According to El-Mehdawi (1981), food processing - which embraced olive-oil processing, milk products, tomato canning, fish canning, sweets, flavour and animal fodder - actually employed about half the total manufacturing labour force.

On the other hand, the heavy industrialisation programmes were begun during the 1976-1980 Development Plan. During this Plan capital investment in public sector manufacturing increased and reached about LD. 1737 million or 24.8% of the total planned investment. Between 1981 and 1985 actual investment in heavy industry alone totalled LD 1715,5 million. This included establishing the Abu-Khammash chemical complex employing about 1,000 workers, the ammonia plant at Marsa el-Brega producing one thousand tons a day and employing 675 people, a methanol plant producing 660,000 tons a year and employing about 175 workers and the Urea plant which was designed to produce around 330,000 tons p.a. and employed about 375 workers. In the oil industry two oil refineries at Ras Lanuf and El-Zawiya started production by the end of the 1976-1980 Plan period. These refineries were estimated to employ more than 700 workers. In addition to them the 1976-1980 Plan allocated more than LD 220 million for the development of the cement and building materials sector.

During the Plan period of 1981-1985 more emphasis was placed on the development of the heavy industries. The biggest establishment by the end of the Plan was the iron and steel complex, which employed more than 600 people and produced about 2,753 tons per annum.

The full picture of Libya's industrial development during the period 1967-1998 is summarised in Appendix AVII-1. This reveals the major industrial establishments and their share in total manufacturing employment Gross value added and gross manufacturing output.

VII-4 The Performance of Manufacturing Under Booming Conditions

VII-4-1 Growth Trends.

The foregoing discussion has illustrated that from the early Sixties until the mid-Eighties the Libyan economy went through a planned and strictly industrialising process. Whilst, in relative terms, the share of the agricultural sector in both aggregate output and total employment had declined, the share of industry over a wider range (mining, manufacturing, construction and public utilities) had tended to rise.

During the boom period of 1973-1982 the share of the manufacturing sector in both aggregate output and employment had increased substantially. In 1970 manufacturing was contributing 1.7% to aggregate output but by 1982 it had increased to 4% and likewise its contribution to total employment increased from 4.7% in 1970 to 6.8% in 1982. This amounts to saying that the manufacturing sector had unambiguously experienced industrialisation rather than de-industrialisation.

The available data indicates that the value added by manufacturing including mining (except crude petroleum), had grown at an average rate of 19.5% p.a. over the period 1973-1982 compared to an average growth rate of 11.5% p.a. over the pre-boom period of 1962-1972, and the average rate of only 5.8% p.a. over the post-boom period of 1983-1990. Table VII-4 and

Figure VII-1 summarise the manufacturing sector's performance during each of these three distinct periods.

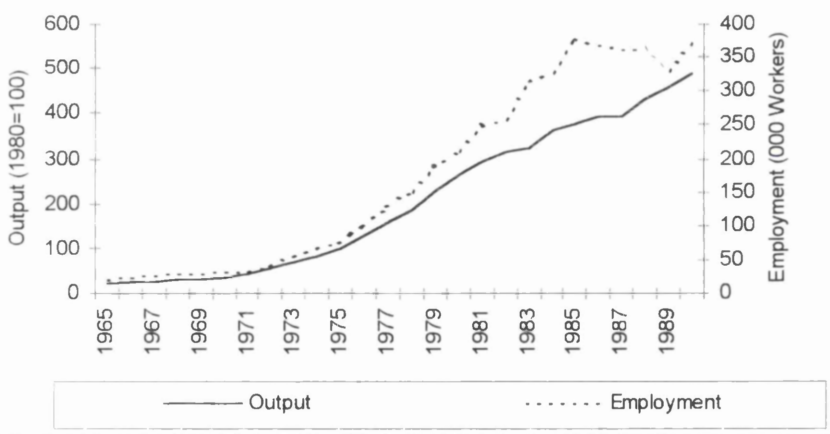
Table VII-4
Manufacturing's Growth Trends and Contribution to GDP and Employment 1962-1990/**

	Average Annual Growth Rates		Manufacturing's Share (Period Average) in	
	GDP	Manufacturing	GDP	Employment
1962-1972	19.0	11.5	2.33	6.33
1973-1982	13.5	19.5	2.76	6.90
1983-1990	-2.5	5.8	6.34	9.56
1962-1990	11.2	13.1	3.71	7.68

Source: Calculated from, Ministry of Planning, Economic and Social Indicators (ibid.) and National Authority for Information and Documentation (ibid.) , various issues.

Note: **/ including mining except extraction of oil and gas

Figure VII-1
Libya's Manufacturing Output and Employment 1965-1990



Source: National Authority for Information and Documentation, Economic and Social Indicators, various issues.

The expansion in manufacturing was experienced over a wide range of industries, as can be seen from Tables VII-5 and VII-6. In terms of contribution to growth (the addition of the total value added attributed to the industry concerned), the industries displaying outstanding performances during the boom were petroleum refining 41.8%, food products 11.9%, non-metallic minerals 11%, fabricated metal 9.8%, industrial chemicals 9.4%, textiles and wearing apparel 5%, footwear and leather products 5%. On the other hand, tobacco, beverages, paper and publishing and furniture and wood products all of which were relatively more labour-intensive in Libya but they had either not contributed so much or had experienced declines.

In the post-boom period the growth patterns for many industries were reversed. Most industries that had experienced rapid growth during the boom period performed badly after it or even declined (with the exception of petroleum refining and industrial chemicals), but some of the industries that suffered during the boom period exhibited improvement immediately following the boom. But over the period 1983-1992 the sector as a whole managed to grow at 8.1% p.a. As can be seen, Libya's manufacturing industries performed well during the boom, sluggishly in the post-boom period, but overall did not decline. The foregoing clearly suggests that manufacturing performance during the boom was the outcome of distinct economic conditions which were apparently reversed in the post-boom period.

Compared with other countries experiences, Libya's manufacturing experience during the boom and post-boom periods was closer to those of Indonesia and Jordan in which the manufacturing sector performed well during the boom, albeit under relatively high effective rates of protection, and sluggishly in the post-boom period, but did not decline in those countries either. While in Iran, although the manufacturing sector growth rate was quite remarkable soon after the boom took place in 1973, it showed a tendency to decline from 1977 onward. Jazayri, (1988) explains this in terms of rising costs and the decline in the relative prices of tradables to non-tradables (the Dutch Disease effects). Nigeria's experience revealed that the manufacturing sector had expanded rapidly over the boom period of 1973-1982, but started to contract from 1982. The availability of cheap imports in the boom period and their scarcity in the post-boom period led to this outcome in Nigeria (Struthers, 1990).

Nevertheless, it is important to mention that all the above industrialising economies experienced industrialisation rather than de-industrialisation under booming conditions. This fact runs counter to both what the Dutch Disease Model predicts, and to the experiences of industrial economies with booms (for instance the experiences of Holland, the UK and Norway). This leads to saying that whether industrialisation or de-industrialisation takes place under booming conditions depends to a large extent, on many other factors, technological gap, per-capita income level and the degree of industrialisation when the boom takes place being undoubtedly the main ones.

Table VII-5
Growth and Contribution to Growth of Value Added in Manufacturing Industries 1965-1992

		Annual Growth Rates				Contribution to Growth 1/			
		1965 1972	1973 1982	1983 1992	1965 1992	1965 1972	1973 1982	1983 1992	1965 1992
300	**Total Manufacturing**	**11.4**	**24.8**	**8.1**	**15.0**	**100%**	**100%**	**100%**	**100%**
311-12	Food Products	11.5	29.5	4.8	15.5	10.3	11.9	4.1	7.8
313	Beverages	2.6	16.5	17.6	12.9	0.6	1.7	7.6	4.6
314	Tobacco	20.7	11.0	4.2	11.3	47.0	4.6	-4.2	3.3
321-22	Textiles (Incl. Wearing Apparel)	4.0	37.2	9.5	17.8	-0.1	5.1	4.1	4.8
323-24	Lather Products & Footwear	51.5	65.0	4.4	39.5	0.7	5.1	2.2	3.2
331-32	Wood Products & Furniture	9.1	37.2	5.3	17.8	1.4	3.6	1.4	2.2
341-42	Paper, Printing & Publishing	9.6	18.6	9.6	12.9	1.9	1.1	1.4	1.2
351	Chemical Products	20.7	37.7	15.7	25.0	6.3	9.4	26.3	17.4
335	Petroleum Refining		21.5	8.2	10.4		41.8	33.8	34.2
369	Non-Metallic Mineral Products	10.3	33.9	-2.9	14.0	4.6	11.1	-4.8	2.8
(371-372)	Basic metal Products		77.8	78.8	78.6		0.7	16.7	8.4
(381-385)	Fabricated Metal	8.5	54.0	9.6	25.2	1.7	9.8	11.3	10.0
390	Other Manufacturing Industries	10.9	9.9	2.6	7.6	25.6	-5.9	0.1	-0.4

Source: Calculated From Ministry of Planning, Department of Statistics, Industrial Census and Statistical Abstract, various issues, and Na
Authority for Information and Documentation, Statistical Book, various issues.

1/ Addition to total value added attributed to industry (V_{i2}- V_{i1})/(V_2-V_1), where V_i is value added in industry (i) and V is total value added for the sector as a whole and 1&2 are the end years for the perspective period

Table VII-6

Growth and Contribution to Growth of Gross Industrial Output 1965-1992

		Annual Percentage Growth Rates				Contribution to Growth			
		1965 1972	1973 1982	1983 1992	1965 1992	1965 1972	1973 1982	1983 1992	1965 1992
300	**Total Manufacturing**	**14.4**	**35.3**	**9.8**	**20.2**	**100%**	**100%**	**100%**	**100%**
311-12	Food Products	15.5	28.6	3.8	16.0	23.0	15.4	2.5	8.5
313	Beverages	13.0	22.8	19.0	18.6	4.9	1.3	4.8	3.1
314	Tobacco	21.7	13.2	3.2	12.0	32.6	3.6	-3.9	1.8
321-22	Textiles (Incl. Wearing Apparel)	11.4	43.4	10.1	22.3	3.7	4.2	2.7	3.6
323-24	Lather Products & Footwear	65.7	50.2	4.7	38.3	2.1	3.0	1.2	1.6
331-32	Wood Products & Furniture	28.6	32.8	9.8	23.4	4.3	2.7	1.2	1.8
341-42	Paper, Printing & Publishing	10.4	21.6	8.2	13.6	2.1	1.0	0.8	0.9
351	Chemical Products	9.6	33.3	15.1	19.9	7.8	10.3	22.6	16.3
335	Petroleum Refining		53.6	12.2	29.6		38.7	35.3	37.3
369	Non-metallic Mineral Products	30.7	33.4	2.5	21.6	14.0	10.0	0.7	4.6
(371-372)	Basic Metal Products	9.4	15.9	91.9	41.2	3.1	0.3	18.0	9.6
(381-385)	Fabricated Metal	6.1	88.1	12.6	37.7	1.6	7.8	13.4	9.9
390	Other Manufacturing Industries	11.8	42.5	9.7	22.9	0.1	1.2	0.1	0.3

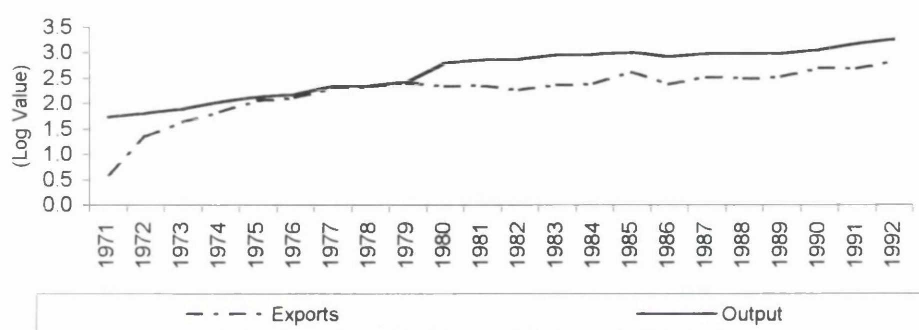
Source: As for Table VII-5

VII-4-2 Exports Expansion

Although the manufacturing sector in Libya had performed well in terms of both the number of industrial establishments and the manufacturing output during the boom period, its expansion was actually not associated with equivalent expansion in manufactured exports (apart from chemical and petrochemical exports). Many reasons were responsible for this outcome. The most prominent of these was that in order to pursue the development programmes in other sectors of the economy most of the industrial plants had been designed to satisfy the domestic demand both in terms of quantities and qualities. Government policy during the first years of the boom period was primarily confined to import substitution rather than to export encouragement. The dominance of the public sector in both internal and external trade and the protection policy pursued had to a great extent prevented the manufactured goods from being more competitive in the export markets.

Nevertheless, since the early Seventies, manufactured exports witnessed some sort of improvement (see Figure VII-2). In 1970, the value of manufactured export amounted to LD 0.7 million or about 0.1% of total exports, increased to LD 17.6 million in 1973 (or 2.9% of total exports), and further to LD 146.5 or 4.9% of total exports in 1982 and to 680.6 million or 22.4% of total exports in 1992 (Table VII-7). The annual rate of growth for manufactured exports amounted to 32.5% over the boom period of 1973-1982 compared with 266% p.a. in the pre-boom period of 1970-1972 and 14.2% p.a. in the post-boom period of 1983-1996 (see Table VII-8).

Figure VII-2
Change in Real Manufacturing Output and Exports
1971-1992 (LD, million)



Source: Ministry of Planning, Economic and Social Indicators 1962-1983 February 1984 and National Authority for Information and Documentation, Economic and Social Indicators various issues.

The largest contributor to Libyan export expansion was petroleum refining, which contributed no less than 63% to the total value of manufactured exports, followed by manufactured gas, whose contribution amounted to 17% and petrochemicals 11.3%. Just like manufacturing output, manufactured exports experienced serious fluctuations in the post-boom period, especially after 1987 which was the period marked by political and economic problems. But even though the manufactured exports continued their upward trend. The most noticeable fluctuation was in petrochemical products and manufactured gas. The expansion of manufacturing exports led to a considerable change in the status of manufacturing exports, from that of a minor share which accounted for only 2.3% of the total manufacturing output in 1970 to that of a significant share of the national economy accounting for 19.2% in 1982 and 37% in 1992.

It should be mentioned here that, by the late Eighties, it became apparent that there had been a steady shift towards a trade liberalisation policy. Consequently, all manufactured exports in addition to chemical and petrochemical exports, witnessed a considerable improvement. This was enhanced further by introducing the so-called commercial exchange rate (1LD =1$) and the acute devaluation in the value of the Libyan Dinnar corresponding to neighbouring countries currencies, particularly Tunisia and Egypt.

Table VII-7

Libya's Exports of Manufactures, Value and Ratio to Domestic Manufacturing Output 1970-1996

	Value (000,000 LD Current Prices)				Proportion of Domestic Output			
	1970	1973	1982	1992	1970	1973	1982	1992
Petroleum Refining	_	14.9	112.9	369.6	_	23.7	14.8	20.1
Manufactured Gas	_	17.1	44.3	83.1	_	27.1	5.8	4.5
Chemicals Products	_	_	16.0	80.5	_	_	2.1	4.4
Petrochemicals	_	_	17.6	91.9	_	_	2.3	5.0
Other	0.7	2.7	_	55.5	1.9	4.3	_	3.0
Total Manufactured Exports	0.7	34.7	190.8	680.6	1.9	55.1	25.0	37.0
Total National Exports	841.8	1196	3909	3039				
Ratio of Manufactured to Total	0.1	2.9	4.9	22.4				

Source: Calculated from Ministry of Planning, Economic and Social Indicators 1962-1996, and National Authority for Information and Documentation yearly statistical series, various issues.

Table VII-8

Growth and Contribution to Growth of Manufacturing Exports 1970-1996

	Annual Growth Rates				Contribution to Growth (*)			
	1970 1972	1973 1982	1983 1996	1972 1996	1970 1972	1973 1982	1983 1996	1972 1996
Total Manufacturing	266.2	32.5	14.2	48.9	%100	%100	%100	%100
Petroleum Refining		81.9	19.1	40.3	15.24	62.74	78.24	73.50
Manufactured Gas		57.6	9.2	40.8	75.61	17.41	-2.37	4.81
Industrial Chemicals		21.1	20.6	23.1		10.24	17.35	13.73
Petrochemicals			9.5			11.27	5.10	6.99
Other	103.8	-13.7	328.1	176.6	9.15	-1.66	1.68	0.97

Source: Calculated from Ministry of Planning, Economic and Social Indicators 1962-1996, and National Authority for Information and Documentation yearly statistical series, various issues.

(*)/ Addition to total value of exports attributed to the commodity, or $(x_{i2}-x_{i2})/(X_2-X_1)$

Where x_i ,is value of exports of commodity, X is value of total manufacturing exports, and 1 & 2 are end years of the period considered.

VII-4-3 Import Penetration

Following the discovery of oil in commercial quantities in the early Sixties as has been mentioned, national income increased rapidly and, with it, spending in both traded and non-traded goods. Because of the inadequate domestic supply of both traded and non-traded goods, the appreciation of the Libyan currency and fast expansion in the investment programmes, the demand for imports in general and for manufactured imports in particular increased dramatically, especially during the boom period of 1973-1982.

The impact of the increase in income on the demand for imported manufacturing goods is shown in Table VII-9. The most notable changes were observed for machinery and transport equipment whose share in total national imports increased from 19.8% in 1974 to more than 39% in 1980. This was followed by basic metal products, whose share in total national imports increased from 6% in 1974 to 18% in 1980. While all other categories of manufactured commodities seem to have presented a backward bias, in terms of their share in total national imports, during the boom period compared with both the pre-boom and post-boom periods. In terms of growth rates, the fastest observed growth rate was in wood and furniture, which increased at an average rate of 154.9% p.a. over the boom period of 1974-1981 corresponding to 6.5% p.a. during the pre-boom period of 1968-1972. This was followed by metal products which increased at an average rate of 107% p.a. during the boom period compared with almost 0.5% p.a. over the pre-boom period, machinery and transport equipment at 83% p.a., tobacco at 50% p.a., textiles and wearing apparel 46% and industrial chemicals 45% p.a. While, metal products, wood and furniture, food products, textiles and wearing apparel and non-metallic minerals were the leading sectors in terms of contribution to the growth (the addition of total manufacturing imports attributed to the items concerned) (see Table VII-10)

VII-4-4. Import Substitution

Import substitution must now be considered in order to reflect more accurately the impact of the boom on Libya's trading position. Import substitution can be measured as the change in the ratio of imports to total available supplies â la Chenery (1960), i.e.

$$M_{1-2} = \left[\frac{M_2}{S_2}\right] - \left[\frac{M_1}{S_1}\right] \qquad (1)$$

Where M and S are imports and total supply respectively, and the subscripts (1 and 2) denote successive time periods, and total supply (S) comprises both domestic production plus imports[5]/.

[5] The plausible measurement to the import substitution that accounts for import spill-over effects would be based on input-output tables as follows

$$[I-A]Q+M=S$$

$$Q+[I+I]^{-1}M=[I-A]^{-1}S$$

Where S, M, Q are total supply, import and production respectively, and S= (M+Q) and I and A are the identity and input-output matrixes respectively. Calling $[I-A]^{-1}M = M^{*}$ and $[I-A]^{-1}S = S^{*}$ the import substitution can be defined as

$$IS^{*}_{i} = (M^{*}_{i} / S^{*}_{I}) - (M^{*}_{i-1} / S^{*}_{i-1})$$

However, given that Input-Output Tables for Libya are not available using such methodology is thus impossible.

The results of import substitution calculations are shown in Table VII-11. It depicts that the reverse of import substitution took place, i.e. there was an increased import penetration by more than 8% over the boom period of 1974-1981 (or 1.06% p.a.), although some industries did partly succeed in substituting their imports. The increased import penetration for the sector as a whole is not surprising though, especially considering the abundance of foreign exchange, the currency appreciation by 14% and the huge expansion in investment programmes. Also because no import substitution took place during the pre-boom period or the early years of the boom period, despite the high degree of protection provided to the domestic industrial production, the fact that import penetration was kept down to such a low level between 1978 and 1982 and after can be regarded as a worthy achievement. If this proposition is accepted, then it follows that the domestic industries maintained and probably increased competitiveness under adverse booming conditions.

Furthermore a close examination of the manufactured trade balance shows that the most significant area in deficit over the period occurred in capital goods machinery and transport equipment which accounted for 48% of the manufactures trade deficit in 1980, against 43% in 1972 followed by basic metal products 22% in 1980 corresponding to 14% in 1972. This is to be expected because Libya was going through a rapid process of industrialisation, while her technological ability to produce capital goods was severely limited. The weak and rudimentary inter-industry linkages which ruled out the production of capital goods were the result of Libya's small market, coupled with the narrow range of domestic product lines during the Seventies (namely light industries). However, the picture changed considerably from 1980 onward, when more attention was focused on establishing and developing the heavy industries.

The exposition thus so far has demonstrated that the domestic output of manufacturing grew substantially during the boom period in Libya, whilst imports substitution declined relatively slowly. In the following sections a quantitative account of the sector's growth in terms of factor input and productivity growth will be investigated.

Table VII-9

Participation of Manufacturing Imports in both Total Manufacturing and Total National Import 1968-1990.

	Value (LD,000)				Percentage of TMI 1/				Percentage of TNI 2/			
	1968	1974	1980	1990	1968	1974	1980	1990	1968	1974	1980	1990
Food Products	14.3	80.0	161	162.4	6.8	16.1	8.6	12.7	6.2	9.8	8.0	10.8
Beverages	0.8	0.1	2.0	0.4	0.4	0.0	0.1	0.0	0.4	0.0	0.1	0.0
Tobacco	1.4	3.0	8.7	0.4	0.7	0.6	0.5	0.0	0.6	0.4	0.4	0.0
Textiles & Wearing Apparel	21.5	41.0	89.4	52.7	10.2	8.3	4.8	4.1	9.4	5.0	4.5	3.5
Footwear & Lather Products	3.8	9.4	21.0	20.7	1.8	1.9	1.1	1.6	1.7	1.1	1.0	1.4
Wood & Furniture	7.1	20.3	84.4	50.5	3.4	4.1	4.5	3.9	3.1	2.5	4.2	3.3
Paper and Products	1.8	8.3	20.9	33.3	0.9	1.7	1.1	2.6	0.8	1.0	1.0	2.2
Industrial Chemicals	11.9	29.9	108.1	102.7	5.7	6.0	5.8	8.0	5.2	3.7	5.4	6.8
Rubber Products	2.9	5.7	19.6	20.1	1.4	1.1	1.0	1.6	1.3	0.7	1.0	1.3
Petroleum Refining	6.8	13.2	13.0	3.3	3.2	2.7	0.7	0.3	2.9	1.6	0.7	0.2
Non-Metallic Minerals	8.7	52.6	64.6	34.8	4.1	10.6	3.4	2.7	3.8	6.4	3.2	2.3
Metal Products	37.7	51.1	360.0	222.4	17.9	10.3	19.2	17.4	16.4	6.2	17.9	14.7
Machinery & Transport Equipment	84.3	161.9	787.9	565.1	40.1	32.7	42.0	44.1	36.6	19.8	39.3	37.4
Other	7.0	19.4	133.4	12.0	3.3	3.9	7.1	0.9	3.1	2.4	6.6	0.8
Total Manufacturing	210	496	1874	1281	100	100	100	100	91.3	60.6	93.4	84.8

Source : Calculated from Department of Statistics. External Trade Statistics, various issues, and National Authority for Information and Documentation, Economic and Social Indicators 1962-1969.: December 1997.

Table VII-10

Growth and Contribution to Growth of Manufacturing Imports 1968-1990

	Annual Growth Rates					Contribution to Growth				
	1968	1972	1974	1981	1985	1968	1972	1974	1981	1985
	1972	1974	1981	1985	1990	1972	1974	1981	1985	1990
Food Products	16.1	70.2	29.0	-11.2	11.5	12.37	29.86	7.35	9.48	32.97
Beverages	-19.5	0.0	-0.5	21.2	14.5	-0.77	0.00	0.00	-0.01	0.09
Tobacco	-3.7	51.7	50.2	-17.1	-12.9	-0.29	1.01	0.48	0.80	-0.66
Textiles & Wearing Apparel	17.3	0.7	46.4	-9.8	-5.6	20.07	0.44	6.02	5.84	-13.16
Footwear & Lather Products	9.6	21.6	35.5	-10.5	8.2	1.99	2.03	1.05	1.19	3.40
Wood & Furniture	6.5	38.4	154.9	-15.3	0.5	2.49	5.98	9.96	12.30	0.70
Paper and Products	13.8	56.0	15.0	10.3	6.4	1.37	2.88	0.40	-0.63	4.62
Industrial Chemicals	7.9	26.5	45.5	-7.7	8.3	5.08	7.27	4.31	3.30	16.99
Rubber Products	4.7	88.3	17.2	-9.2	6.5	0.74	5.27	0.72	0.95	2.79
Petroleum Refining	1.8	-7.6	-2.9	-5.1	-0.7	0.67	-0.92	-0.05	0.09	-0.08
Non-Metallic Minerals	16.9	75.7	33.2	-17.2	9.2	7.94	20.10	5.54	10.39	6.17
Metal Products	0.5	10.7	106.6	-11.3	5.8	1.10	6.82	17.25	16.40	28.58
Machinery & Transport Equipment	9.4	10.3	83.3	-9.3	1.5	42.49	21.01	42.72	34.77	22.69
Other	12.8	-9.4	161.6	-15.0	-7.6	4.86	-1.79	4.25	5.13	-5.06
Total Manufacturing	8.8	20.0	65.1	-10.9	3.1	100.00	100.00	100.00	100.00	100.01

Source : Calculated from Department of Statistics. External Trade Statistics, various issues, National Authority for Information and Documentation, Economic & Social Indicators 1962-1969.: December 1997.

Table VII-11
Growth Rates of Import Substitution in Manufacturing Industries 1972-1990

	1972 1974	1974 1981	1981 1985	1985 1990
Food Products	9.4	-7.19	-33.3	16.2
Beverages	1.2	-0.86	-1.0	1.0
Tobacco	6.8	8.41	-19.4	-3.7
Textiles & Wearing Apparel	-1.3	-8.75	-16.5	-25.2
Footwear & Lather Products	2.9	-28.93	-21.9	8.6
Furniture & Wood Products	-0.1	5.74	-15.5	-2.7
Paper and Publishing	-1.2	-9.51	3.1	4.7
Industrial Chemicals	-21.0	0.76	-31.0	-11.6
Petroleum Refining		49.83	-5.1	-0.9
Non-Metallic Products	-1.2	-9.64	-20.8	5.2
Metal Products	-3.0	6.48	-4.0	-24.4
Machinery & Transport Equipment	-0.3	-1.43	-7.7	-8.3
Total Manufacturing	3.1	1.06	-26.0	-2.3

Source : Department of Statistics. External Trade Statistics, various issues for imports, & Industrial Survey and Industrial Census, various issues for value of goods produced. (see text for methodology).
Note: Value of Goods produced = (Gross output) - (receipts from re-sale + services rendered)

VII-5 Factor Input and Productivity Growth

VII-5-1 Factor Input

1- Labour

The preceding discussion in Chapters IV and V has shown that the most salient features of the Libyan labour market during the period in question were: i) a considerable resource movement (in terms of rural-urban migration) immediately following the discovery of oil in commercial quantities in the early Sixties, ii) a rapid labour absorption into all sectors of the economy during nearly the entire boom period of 1973-1982; and iii) the inflow of both skilled and unskilled foreign labour into the country from the early Seventies until the early Eighties. The boom had, therefore, two combined effects on labour input. On the one hand, the increase in economic activity led to a substantial increase in labour input quantities - thereby relieving labour shortage constraint - and on the other hand, this very same increase in economic activity combined with the abundance of foreign exchange led to a higher growth in the quality of national labour through increases in educational standards. This is shown by the steeper increase in the percentages of educated and skilled employees among the newly-recruited national employees. However, the data available on the labour supply in Libya does not provide for taking into account allowances for quality.

Labour input into manufacturing is shown in Figure VII-3 and the corresponding annual growth rates are shown in Figure VII-4 and Table VII-12. They illustrate that the most rapid absorption of labour occurred during the oil boom period of 1973-1982 at 12% p.a. This is accounted for by the large number of small labour-intensive industries (i.e. footwear and leather products, textiles and wearing apparel and food manufactures, etc.) and the sparsity of very large capital-intensive projects (such as basic metal products, non-metallic minerals, and fertilisers – classified under industrial chemicals).

Table VII-12
Growth and Contribution to Growth of Labour in Manufacturing Industries 1965-1992

	Annual (%) Growth Rates			Contribution to Growth 1/		
	1965 1972	1973 1982	1983 1992	1965 1972	1973 1982	1983 1992
Food Products	2.9	8.7	6.0	11.1	14.2	11.7
Beverages	3.3	7.8	2.5	5.1	4.0	1.6
Tobacco	5.1	0.7	0.9	42.9	0.3	0.5
Textiles & Wearing Apparel	4.6	31.8	9.6	7.6	25.9	18.5
Footwear and Leather Products	4.1	39.1	7.2	0.9	6.9	4.5
Furniture and Wood Products	12.4	8.5	1.0	11.3	3.6	0.1
Paper, Printing and Publishing	0.9	3.5	-1.5	1.1	1.0	-0.4
Industrial Chemicals	-1.1	15.9	12.1	-2.4	8.8	13.2
Non-Metallic Metals	8.3	12.7	4.5	22.4	15.7	9.1
Basic Metal Products	0.8	53.5	4.4	0.0	19.6	7.4
Fabricated Metal Products	–	–	–	–	–	33.8
Total Large-Scale Industries	5.4	12.6	8.0	100%	100%	100%
Other Industries	-2.5	12.9	1.0			
Total Manufacturing	-0.3	12.4	3.8			

Source: Department of Statistics, Industrial Survey, various issues particularly for the period 1965-1980, National Authority for Information & Documentation, Social and Economic Indicators 1962-1996
For the total labour in the manufacturing sector and the private survey for the distribution of labour among large-scale manufacturing industries 1980-1991
Note: 1/ Growth attributed to Industry or $(L_{i2}-L_{i1})/(L_2-L_1)$ where L_i is labour in industry considered

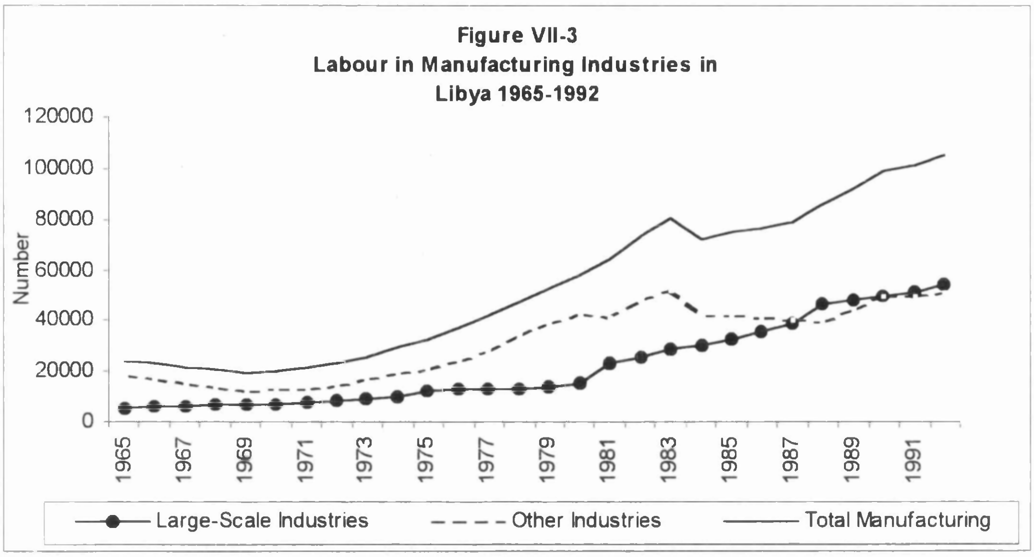


Figure VII-3
Labour in Manufacturing Industries in
Libya 1965-1992
120000
100000
80000
60000
40000
20000
0
Number
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
Large-Scale Industries
Other Industries
Total Manufacturing

Figure VII-4
Growth of Labour in Manufacturing Industries in
Libya 1966-1992
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
-20.0
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
Large-Scale Industries
Total Manufacturing

2- Capital

Capital stock, as discussed here, is taken to mean total fixed assets after allowing for depreciation (to give greater relative weight to investment of more recent date)[6]/. Annual data relating to the accumulation of capital as defined is charted in Figure VII-5, and the corresponding annual growth rates are shown in Figure VII-6. Growth rates during the particular period under study are given in Table VII-13. Comparing the boom period with the pre-boom and post-boom periods demonstrates that the growth rate in fixed capital during the boom period was markedly higher than in any other periods and that, within the boom period, there was a remarkable acceleration from 1980 onward which ran through the post-boom period to 1985.

This high rate of investment in manufacturing should be compared with its quite contrasting position in the pre-boom period when investment in the manufacturing industries was notably low because it was left to the private sector to invest in these industries. It could do very little to develop them then mainly because of a serious lack of infrastructure to assist such development wherever it may have been planned. The huge capital growth between 1979 and 1985 remains higher than that of any other period. This was not a catching-up phenomenon, since it has no historical parallel.

The conditions of the boom were, to some extent, responsible for this exceedingly rapid capital accumulation and an important factor was probably the negative cost of borrowing. Inflation during the boom, measured in terms of the change in the general cost of living between 1970 and 1982, actually

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[6] Capital stock in manufacturing was obtained by taking the output capital ratio for 1973 * the value added for that year as equal s to capital stock value in 1973. Then deflating net fixed capital formation to 1973 prices and adding and subtracting it forward and backward gave an estimated capital stock for the whole period under investigation. Symbolically:

$$K_t = k_0 + \frac{(I-d)_t}{(I+f)}$$

Where K is capital stock, 0 and t are the base year here (1973) and current year, I is investment, d is depreciation (taken as 5% of value added) and f is inflation rate measured in terms of increase in the cost of living averaged at 13.7% whereas the Central Bank of Libya had fixed the interest rate on investment loans at only 7% - thus yielding a negative real lending rate during this period of nearly 7%, compared with a positive lending rate of 3.2% over the pre-boom period. A second contributory factor was undoubtedly the huge inflow of funds which followed the oil price increases by early 1974. These large funds made money readily available to invest in the economy, further relieved the foreign exchange constraints and thus enabled the import of the capital goods which Libya did not produce. Thirdly, and perhaps most importantly, was the influence of government investment behaviour. Most of the investment decisions in Libya were made by the Government and without much influence from market signals. This is confirmed by the fact that whilst clear signs were plainly visible that demand was slowing down as early as 1981, heavy government investment continued until late into 1985. The effect of government investment behaviour on capital accumulation can be seen from the high concentration of gross capital formation in the natural resource-based industries which were largely government-financed: such industries as those involved in chemicals, non-metallic minerals and petroleum refining. Those industries accounted for a high proportion of the total gross capital formation in the manufacturing sector as a whole over the period 1973-1985. Petroleum refining was a monopoly in which the Government held shares, and both the chemicals and non-metallic mineral industries were dominated by one capital-intensive, government-owned enterprise.

It should be noted that, unlike the measure of labour[7]/ input, the measures of physical capital discussed above refer to capital stock but not to capital in use. The reason behind this is the non-existence of a continuous statistical series on the degree of utilisation equivalent to the unemployment percentage of labour. Therefore total factor productivity (TFP) calculated in the next section should be interpreted as to account purely for changes in capital

[7] For further discussion on the differentiation between economic and physical utilisation of capital see Matthews et al., 1982:151-159.

utilisation, and not capital in use because capital in use is not included in the total factor input.

Table VII-13
Annual Growth Rates of Fixed Capital Stock in Manufacturing Industries 1965-1992

	1966 1972	1973 1982	1983 1992
Food Products	6.5	20.2	3.1
Beverages	23.2	33.9	6.2
Tobacco	0.1	7.2	4.4
Textiles & Wearing Apparel	1.9	15.6	5.0
Footwear & Leather Products	17.9	44.5	8.2
Furniture & Wood Products	2.2	24.8	9.1
Paper & Publishing	3.9	32.1	7.1
Industrial Chemicals	2.4	6.6	3.6
Petroleum Refining	–	0.2	3.4
Non-metallic Minerals	5.0	16.2	11.0
Basic Metal Products	–	72.8	26.9
Fabricated Metal Products	0.2	3.2	7.3
Other Manufacturing	28.5	33.8	-0.6
All Manufacturing Excluding NRIs	5.0	25.5	3.2
All Manufacturing	4.2	22.7	2.6

Source: Calculated from Department of Statistics, Industrial Survey and Industrial Censuses, various issues; National Authority for Information and Documentation, Economic and Social Indicators, various issues and Private survey for the period of 1980-1992

Note: see Footnote (6) for methodology.

Figure VII-5
Fixed Capital Stock in Manufacturing Industries in Libya 1966-1992

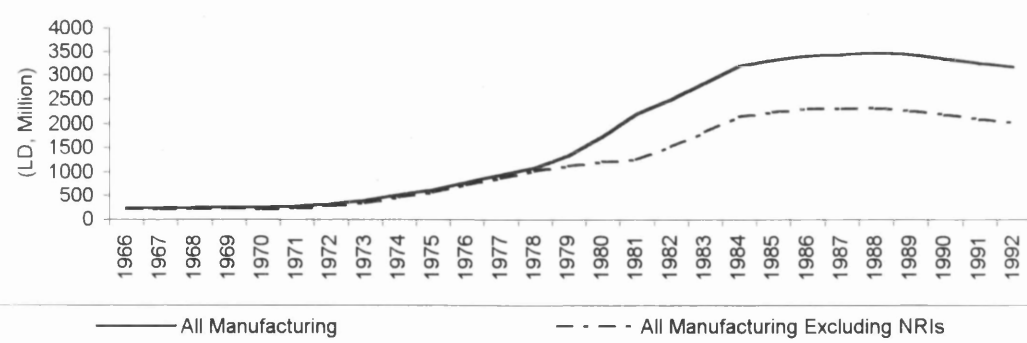
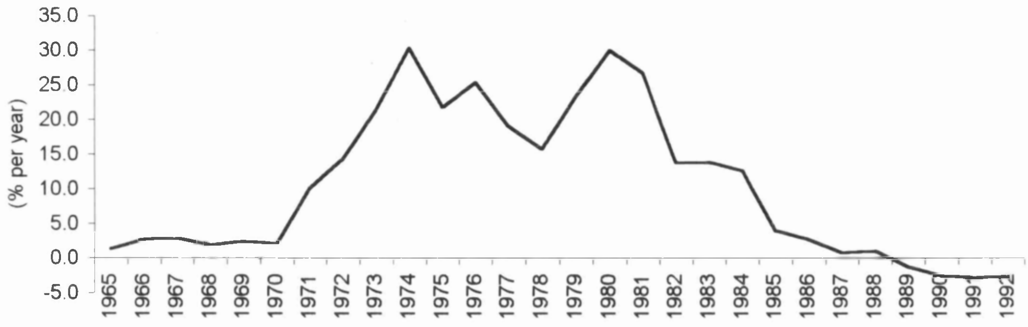


Figure VII-6
Growth of Fixed Capital in Manufacturing Industries in Libya 1965-1992



VII-5-2 Productivity Growth

Because of its comprehensiveness TFP is far more important to the manufacturing sector and to the economy as a whole than partial productivity indices.

The growth of capital had exceeded that of labour by more than 10% p.a. over the boom period of 1973-1982 and, since output was expanding substantially, that would have meant a rapid growth in labour productivity. However, this growth reflected a rising capital-labour ratio rather than an increase in capital productivity (see Figures VII-7 and VII-8). Furthermore, the exceptionally high rate at which capital grew might have undermined capital productivity because of the associated institutional problems and the difficulties in choosing the right technology and this was further intensified by the serious shortages of skilled labour[8]/. Thus a true index of productivity should reflect both labour and capital productivity, which was achieved by total factor inputs, or output per unit of input.

[8] Although it is to some extent true that highly mechanised industries would require less skilled than manual work, However, in the majority of Libyan industries, the limitation of a managerial and skilled manpower persent one of the main obstacles to the effectiveness of technology transfer.

Figure VII-7
Labour Productivity in Manufacturing industries
in Libya 1966-1992

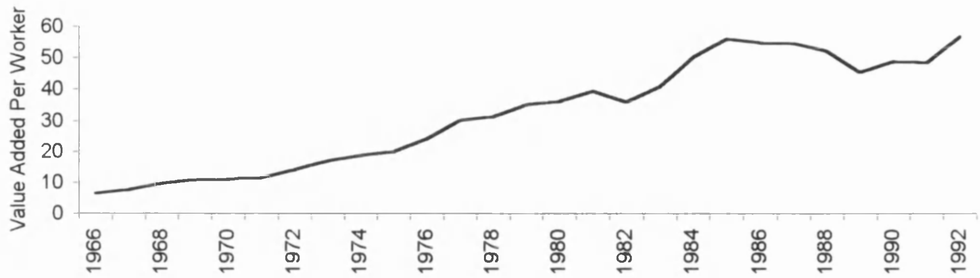
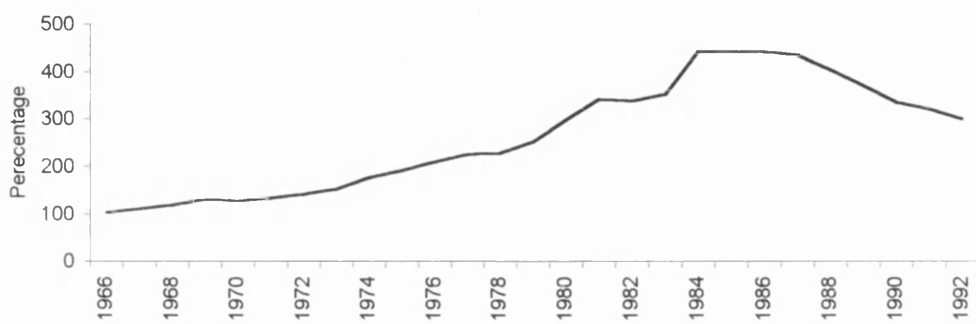


Figure VII-8
Capital Labour Ratio in Manufacturing Industries in Libya 1966-1992



A sufficiently comprehensive index of total factor input would include both the direct and indirect inputs of all resources (i.e. comprising all externalities and unintended by-products, insofar as they affected measured output). The rate of growth of total factor inputs, so defined, would be little if this rate of growth was lower than the rate of growth of output. Any positive value for growth in total factor inputs must then be understood to be due to either errors of measurement, or to an increase in output resulting from the borrowing of innovations which were ultimately attributable to the inputs of scarce resources from countries other than the country considered. Since a statistical estimation of total factor input in its fullest sense is not a practical proposition, more restricted measures of it have to be used and the lines of division between it and total factor productivity (TFP) are bound to be discretionary (Matthews, 1982: 200-201).

The most detailed use of a TFP index, as demonstrated above, is Denison's (1967), who was able to account for twenty three sources of American growth over 1950-1962, including a change in the age-sex composition of labour, hours worked, education levels, improvement of knowledge, economies of scale, cyclical effect of demand and the improved allocation of resources.

Other investigators of this subject, like Jorenson and Griliches, have adjusted both labour and capital inputs for efficiency changes and consequently have further minimised the residual (Kendrick, 1977: 18).

Kendrick (1977), on the other hand, has taken a different position. Instead of regulating input for quality or efficiency to narrow the measure of the omission, he measures inputs unadjusted so that the residual combines the entire change in productive efficiency. He then tries to quantify all the variables that explain productivity change. His approach will be adopted here for two reasons. One is that it is convenient, since no data on input quality or the efficiency of their use is available. The second reason is more to the point because our objective is not to quantify TFP but to show the impact of the boom conditions on the change in its value. To put it another way, our objective is to explore all boom-related changes in the residual, especially those of production efficiency, and then try to decompose them to show the different components of productivity change and their order of magnitude when this is possible.

When measuring TFP in manufacturing industries in Libya, a growth accounting approach similar to that used by Solow (1971) is used. According to this technique output growth can be divided into the growth of total factor inputs and the growth of TFP as follows:

$$\frac{\partial Q}{Q} = \left[\alpha\frac{\partial L}{L}\right] + (1-\alpha)\left[\frac{\partial K}{K}\right] + \left[\frac{\partial A}{A}\right] \qquad (2)$$

Where ∂ denotes the average annual rate of change between two benchmark years, Q is output, L is labour, K is capital, A is TFP, and α is a weighting term taken as equal to the average share of labour in income for the period considered.

This technique is based on two reasonable assumptions. They are that the production function exhibits constant returns to scale and the economy is competitive.

The assumption of constant returns to scale implies that if all inputs increase with equal proportion, output will increase with the same proportion, while the competitive economy assumption assures that the factors of production are paid their marginal products. In other words, this approach involves seeing what remains unexplained under this assumption.

However, despite the existence of valuable arguments which would justify this technique, it has come under a barrage of criticism on the basis that the underlying production function is not a stable function because there are large unexplained changes in it, which should be interpreted as measurement error rather than an indicator for technical progress (Griliches, 1971).

Instead Griliches suggested an alternative econometric approach which accounted for the differences between input and output as changes in the quality of inputs and economies of scale. However, despite the imperfections in the measurement of TFP growth, sustained learning at an industry-wide range should be reflected in the growth of measured TFP. The absence of an alternative framework for analysing the issues of growth and productivity makes it necessary to analyse the trend in TFP, while realising the limitations imposed by the methodological framework of the analysis.

In a few of these points, we have attempted to estimate TFP for some large-scale manufacturing industries using both officially published data and data gathered in a survey and both form an integral part of this study. The results are presented in Tables VII-14.

As seen in Table VII-14 all manufacturing industries experienced 6% p.a. growth in TFP over the boom period 1973-1982, compared with an average of 3.9% p.a. in the pre-boom and of 2.3% p.a. in the post-boom period. Almost all industries that experienced a very high growth rate of output also experienced a substantial growth in TFP. Food products gained 14.7% p.a., beverages 4% p.a. tobacco 5.2% p.a., wood and furniture 21% p.a., paper, printing and publishing 3.2% p.a., textiles (including wearing apparel) 11.7% p.a., leather products (including footwear) 25% p.a., chemicals 27% p.a. and non-minerals 21% p.a. These values may seem unreasonably high but, evidently, output growth in almost all these industries was even higher. Because idle capacity in the pre-boom period was substantial one would expect this to be reflected in a very high TFP, but in fact capacity utilisation is unaccounted for in TFP. Conversely, those industries whose output declined or almost stagnated during the boom period experienced a rapid decline in TFP. There are few exceptions to this rule of association between output growth and productivity growth but notable amongst those exceptions are fabricated metals. Their output grew at 54% p.a. but TFP declined at 7% p.a.

The conclusion drawn so far is that productivity increases were substantial in those industries that experienced rapid growth in output during the boom, which may explain their ability to resist a squeeze on profits stemming from adverse relative price movement and wage rises. This will be investigated further in section VII-5-2. The question addressed in the following section is whether productivity growth was related to the boom conditions or whether it was more autonomous.

Table VII-14

Total Factor Productivity Growth for Large-Scale Manufacturing Industries in Libya 1965-1992

	1965-1992			1973-1982			1983-1992		
	Output	TFI	TFP	Output	TFI	TFP	Output	TFI	TFP
Food Products	11.5	4.9	6.6	29.5	14.8	14.7	4.8	5.4	-0.6
Beverages	2.6	13.6	-11.0	16.5	12.5	4.0	17.6	4.4	13.2
Tobacco	20.7	1.2	19.5	11.0	5.8	5.2	4.2	3.6	0.6
Textiles & Wearing Apparel	4.0	3.5	0.5	37.2	25.5	11.7	9.5	7.8	1.7
Footwear & Leather Products	51.5	7.2	44.3	65.0	40.3	24.7	4.4	7.4	-3.0
Furniture & Wood Products	9.1	7.7	1.4	37.2	15.9	21.3	5.3	4.6	0.7
Paper & Publishing	9.6	2.1	7.5	18.6	15.4	3.2	9.6	2	7.6
Industrial Chemicals	20.7	1.0	19.7	37.7	10.3	27.4	15.7	7.1	8.6
Petroleum Refining				21.5	16.5	5.0	8.2	18.6	-10.4
Non-Metallic Minerals	10.3	7.9	2.4	33.9	13.1	20.8	-2.9	5.3	-8.2
Basic Metal Products				77.8	58.6	19.2	78.8	10.2	68.6
Fabricated Metal Products	8.5	12.6	-4.1	54.0	61.2	-7.2	9.6	6.8	2.8
Other Manufacturing	10.9	10.6	0.3	9.9	21.9	-12	2.6	0.3	2.9
All Manufacturing	11.4	7.5	3.9	24.8	18.8	6.0	8.1	5.8	2.3

Source: Calculated from Department of Statistics, Industrial Survey and Industrial Censuses, various issues; National Authority for Information and Documentation, Economic and Social Indicators, various issues and private survey for the period 1980-1992

VII-5-2-1 Source of Productivity Growth

There have been several presumptions advanced in the literature on the possible sources of TFP change and these include output growth, trade liberalisation, relief of foreign exchange constraints and economies of scale but these hypotheses are not mutually exclusive. Indeed they may all be true but it must also be said that their assumed effects need not necessarily be independent of one another.

A correlation analysis is conducted on some important manufacturing variables in order to examine which of these hypotheses was relevant to the manufacturing sector in Libya during the period under study. In addition to TFP change, these included factor input and output growth, the ratio of exported output to total output, wage levels, capital intensities and the relative prices of tradables to non-tradables (see Table AVII-2-1 for variables definitions). The results of this analysis are given in Tables AVII-2-2 and AVII-2-3 in Appendix AVII-2. Even though using such a simple analytical approach does not make it possible to distinguish precisely which hypothesis was applicable and it does not make it feasible to ascertain the direction of causes, it does reveal the areas which do deserve further attention.

The most noteworthy aspects of Table AVII-2-2 are the existence of a strong correlation between productivity change and output growth, and the flimsy correlation between productivity change and the other variables considered. The same is not true for output growth, which does not seem to be affected by wage levels or capital intensities, all of which have been suggested by the Dutch Disease Model as an explanation for tradables performance.

This outcome supports the existence of dynamic economies of scale associated with output expansion. In other words, it maintains the existence of a positive and linear relationship between productivity growth and output growth (Verdoorn's law). Symbolically this relationship can be expressed as:

$$P = \alpha + \beta * q \qquad (3)$$

Where P and q are productivity and output growth rates respectively and α and β are constants, and $\beta > 0$. Estimating β using (OLS) and across the three periods (given in Table VII-15) gave the following results:

$$p = 1.99 + 0.4q \qquad (2)$$

$$(0.941) \quad (3.366). \qquad R^2 = 0.919$$

With $R^2 = 0.919$, a significant relationship between productivity and output growth can be said to exist. This means Verdoorn's Law was functioning in the context of Libya's manufacturing industries. However, whatever way the cause is operating, whether it was from output to productivity or vice-versa, is a subject of intensive debate and controversy in the literature. (See for instance, Kaldor and Rowthorn, 1975). Though there is no doubt that, under exceptional circumstances, output growth can occur exogenously as underlined by Kaldor, this notion did not totally fit the case of Libya, where productivity increases raised output not only through their effect on relative prices but also through increasing profits, encouraging investment and stimulating domestic demand for industrial goods. Under those circumstances, the impact of dynamic economies of scale cannot be distinguished from other effects using such a simple model, but it requires a simultaneous model (Rowthorn, 1975), "though whether one could be constructed satisfactorily for comparison over a long period of time is problematical" (Matthews et al., 1982).

The presence of a strong relationship between output growth and productivity change in Libya is more readily obvious when examining the level of domestic demand and the constraints encountered by the utilisation of productive capacity in an efficient manner, particularly during the pre-boom and post-boom periods.

Libya's population in 1970 was 1,963,000 and its GDP per-capita at that time stood at LD 656. By 1982 GDP per-capita had grown by an average of 12.6% p.a. to a remarkable LD 2444, but had fallen to LD 1773 by 1992. This decrease represents an annual decline of 2.7% p.a., .The constraint on growth induced by small market conditions is well recognised in development literature, and leads many economists to advocate an export-led growth approach as an economic strategy for development, since it mitigates this particular constraint and allows for economies of scale. Although this strategy had been adopted in Libya as early as 1976, its impact in enlarging manufacturing product markets, apart from carbohydrate industries, was very limited. Nevertheless, in terms of the manufacturing sector as a whole, it is safe to say that the effect of this strategy combined with that of bilateral trade agreements explains the export growth of 32.5% and the modest enlargement of Libya's product markets. The potential effect of cyclical changes in demand on productivity change should thus be evident since the rate of utilisation of fixed plant and overhead labour rises or falls significantly and changes production efficiencies and consequently influences the level of output.

The argument that Libya's economic resources were less-utilised in the pre-boom and post-boom periods is supported by the relative smallness of the Libyan domestic labour force which was engaged in manufacturing industries compared with other sectors of the economy. It was also confirmed by the unemployment figures. The unemployment rate was 2.8% in 1972, 1.7% in 1981, and 3.1% in 1992. According to the 1972 industrial survey, the idle capacity of fixed plant and machinery in manufacturing was substantial in most manufacturing industries and averaged around 56% (Department of Statistics, 1973). This was mainly due to the smallness of the commodity markets and to the lack of capital from the private sector which had the responsibility of developing the manufacturing sector at that time. This situation continued to exist even into the first few years of the first boom period, because the inactive capacity was still considerable (Department of Statistics, 1975). A closer study of industrial capacity utilisation in the post-boom period conducted by the Industrial Research Centre (IRC) in 1987 revealed that only about 50% of total installed capacity in the sector as a whole was actually being used (ICR, 1989). This large capacity under utilisation can be attributed to the rapid capital build-up after the second oil boom (at 23.4% p.a. between 1979-1982), on the assumption that the oil prices would remain high. However, the decline of the oil prices in the early Eighties led to a sudden reversal of the boom which in turn led to a huge contraction in investment and consequently to a downfall in commodity production for Libyan manufactures.

The intervening years between 1971 and 1987 cover the period during the boom for which no data on capacity utilisation is available (see Appendix AVII-3 for an estimation). One piece of evidence, however, allows for the suggestion that the level of demand revealed various degrees of capital utilisation during the boom compared with the pre-boom and post-boom periods. The measure adopted here relied on the assumption that the slower the demand the larger the overhead per unit of output is incurred by enterprises. Therefore, the ratio of fixed to total cost should approximately reveal the degree to which accessible capacity was being utilised.

The results over the three distinct periods are shown in Table (VII-15) which demonstrates that the ratio for the boom period was slightly lower than that of the pre-boom period, but significantly lower than that of the post-boom period. This is consistent with the observation that although plant capacity under-utilisation in the pre-boom and post-boom periods were, to a large extent, of similar magnitudes, the rate of growth of output in the pre-boom period was higher than that of the post-boom period (the average annual rate of growth was 11.4% p.a. for the pre-boom period and 8.1% p.a. for the post-boom period). Output fluctuations were far less conspicuous in the pre-boom period than in the post-boom period and labour overhead (e.g. financial management) would therefore be expected to be lower in the pre-boom period than in the post-boom period.

Table VII-15

Ratio of Fixed to Total Costs for 15 Manufacturing Factories in Libya, 1971-1990

1971	1973	1983
1972	1982	1990
37.3	35.6	44.4

Source: Ministry of Industry, production follow- up reports, various issues, and private survey.

Note: These figures are unweighted average.

Capacity utilisation has been adjusted at the sector level to show the order of magnitude of the contribution to TFP made by cyclical effects. So rates of capacity utilisation obtained for the period 1964 and 1993, are used to adjust for capital input and the TFP recalculated. The results are given in Table (VII-16). The smallest distinction of 0.6% p.a. between adjusted and unadjusted

TFP took place in the boom period and the largest difference took place in the post-boom period at 5% p.a. This is because the boom period represents a period when resources were being highly utilised. After capacity is adjusted for, the 7.3% p.a. growth in TFP during the post-boom period of 1983-1992 was an indicator of the sector's potential productivity growth under conditions of buoyant demand.

These counterfactual figures show the significant effect on output growth of cyclical changes associated with the boom conditions. An increase in the levels of capacity utilisation during the boom period increased output per unit of input, or, on the contrary, reduced input per unit of output.

Table VII-16

Total Factor Productivity Growth (Annual (%) Growth Rate)

	1966 1972	1973 1982	1983 1992
TFP	3.9	6.0	2.3
Adjusted TFP	8.8	6.6	7.3
Difference	4.9	0.6	5.0

Source: Table VII-15, and Appendix AVII-3

Quite apart from the impact of business cycles, a portion of the rise in TFP during the boom period compared with the pre-boom period, is still not accounted for. One of the possible explanations for this rise is economies of scale. A closer extensive study conducted by the IRC in 1987 had shown that, in the pre-boom period, the actual plant size of many firms fell short of the efficient size of plant. In the same period the Government's industrial strategy was aligned to control market structure through restrictive investment licensing policy, where market size was thought to be a constraint. Investment licensing policy withheld growth on the pretext of market saturation. In the cases where market size was a binding constraint investment was not forthcoming, monopoly rights were granted (tobacco and petroleum refining etc.) and competing imports were restricted or totally banned.

Making allowances for the fact that the data available did not allow for empirical analysis to isolate economies of scale's effects on growth, it is sufficient to say that economies of scale had made a significant contribution to increasing the output per unit input through greater specialisation and dealing with larger units.

More important, perhaps, is the impact of a larger market on the application of techniques that could not have been adopted until per-capita incomes were sufficient enough to provide a market justifying the cost of their use. This is what happened in Japan where many known techniques could not be adopted prior to the boom because of Japans' small markets and its lack of capital. It had also occurred in many European economies in the post-war period when they adopted American technology.

As incomes rose very rapidly and capital was abundantly available in the Libyan economy, many advanced techniques were transferred to Libya. Since most of these transferred techniques were developed in economies with more capital available than in Libya, an alteration in the capital-labour ratios in favour of capital was inevitable. This was enhanced by the relative price change (i.e. when capital became relatively cheaper and labour relatively more expensive during the boom compared with the pre-boom period).

In addition to the growth of income and output, the boom may allow other factors to increase TFP, namely foreign exchange availability and the strong value of domestic currency. Both these factors are consistent with rapid advances in technological knowledge and permit more production with the same inputs. This is especially true under conditions of rising demand, because it is easier to innovate when adding to capacity than it is when replacing capacity.

Technological progress should however be distinguished from efficiency improvement, in which known technology is applied to production, even though the two are not systematically distinguishable either in theory or in practice. Technological progress is the change in the best practice production function frontier. However, all other types of productivity change- for example "learning-by-doing", diffusion of new technological knowledge and the short-run adjustment to shocks external to enterprises, which all change techniques of production from average to the best-practice introduced - simply result in increasing technical efficiency. But there is growing evidence that the productivity gain due to technological mastery may be substantial in developing economies and may actually outgrow gains from technological progress. Nevertheless, under the conditions of abundant foreign exchange, technological progress is also expected to import positive TFP change with capital growing substantially during the boom and it is to be readily expected that tangible technology transfer did take place in Libyan manufacturing. Closer inquiries into this possibility show that such transfer had in fact taken the form of purchases of imported equipment and plant machinery but managerial assistance was, on occasions, also imported.

TFP is usually aggregated into technical progress and technical efficiency by applying operation research methods using frontier estimates parametrically or non-parametrically and it would be most desirable to do this but available data prevents it.

When adjustment is made for cyclical changes the trend towards a rising TFP reflects the secular forces underlying productivity advance. Decidedly this would include intangible investment designed to improve the quality and efficiency of tangible human and non-human factors such as, for example, investment in education, labour training, etc., which became embodied in the work-force and capital goods.

This view has come back into vogue again as shown in more recent literature that examines the effect on the growth of externalities associated with investment in human and capital resources. The emphasis in this literature is on the accumulation of knowledge which becomes endogenous to the growth process as intangible capital goods, while, at the same time, exhibiting increasing returns to scale (Lucas, 1993).

The previous comment suggests that rising demand and the availability of relatively cheap foreign exchange during the boom created conditions that were conducive to productivity growth through increases in technical efficiency and technological progress and yet neither can be accommodated in the Dutch Disease Model. But it is precisely these kinds of changes and the effects they have upon unit costs and profitability that explain the performance of manufacturing under booming conditions.

VII-6 Relative Prices and Profitability

The Dutch Disease Theory depicts the effect of relative price changes on production structure through changes in profitability.

In absolute terms profitability is squeezed in the traded goods sector as the result of rises in wages and other non-traded inputs relative to producers prices. If it so happens that the traded goods sector is more labour-intensive than the non-traded goods sector, then a rise in wages will be certain to reduce profitability in the traded goods sector by more than it does in services in the medium term. As a result of this resources will be redeployed from tradables into non-tradables and naturally, a decline in tradables output occurs. This is particularly true if the resource movement effect dominates the spending effect.

In the light of this it is customary for the Dutch Disease literature to test the degree of the squeeze on tradables by the use of a general index of the relative prices of tradables to non-tradables.

The fact that there had been a faster rate of wages increase in the Netherlands compared with Germany was made pivotal to the argument of de-industrialisation by the advocates of the Dutch Disease Theory. Corden asserts that the divergent rise in production cost crowded profits in Dutch manufacturing because output prices were exogenously determined and therefore did not change in the Netherlands relative to Germany. More universally, REER has consistently been used in traditional Dutch Disease literature as an indicator of competitiveness.

However, the REER index and other similar indices of tradables to non-tradables prices are actually quite crude measures of competitiveness and profitability, and could be very misleading if applied to booming developing economies. The shortcoming of these indices stems from three main causes. Firstly, they do not accurately take into account the structure of production cost within the denominator, because they either deflate output price by one variable only, namely wages, or by a general cluster of domestic prices. Secondly, the implicit assumption underlying these measures is that the fixed technical coefficient of production disregards growth in productivity which may rise from increased technical efficiency, or from technological progress or indeed from externalities associated with investment in the sector or in its supporting infrastructure. Thirdly, these indices are proxies for profit margins and provide no information on total profits, which may be rising even when profit margins are falling.

This all amounts to saying that better indicators of profitability are those which consider the relationship between profits, input and output prices and productivity change. Symbolically this can be shown as follow:

$$\pi = P - \left[f + m + \frac{w}{\alpha} \right] \qquad (4)$$[9]

[9] This equation is similar to that produced in previous chapter section VI-5.

Where π is the change in unit profit, and p, α, f, w, m stand for changes in output price, labour productivity, fixed costs, per hour wages, and material costs respectively. This equation implies that changes in unit profits π is directly proportional to change in output prices, P, and labour productivity, α, and inversely to change in fixed costs, f, per hour wages, w and material costs, m. an expression similar to that devised for labour can be devised for material so that productivity is accounted for, which will be done in the following sections.

VII-6-1 Relative Price Movement for Libya's Manufactures Under Booming Conditions

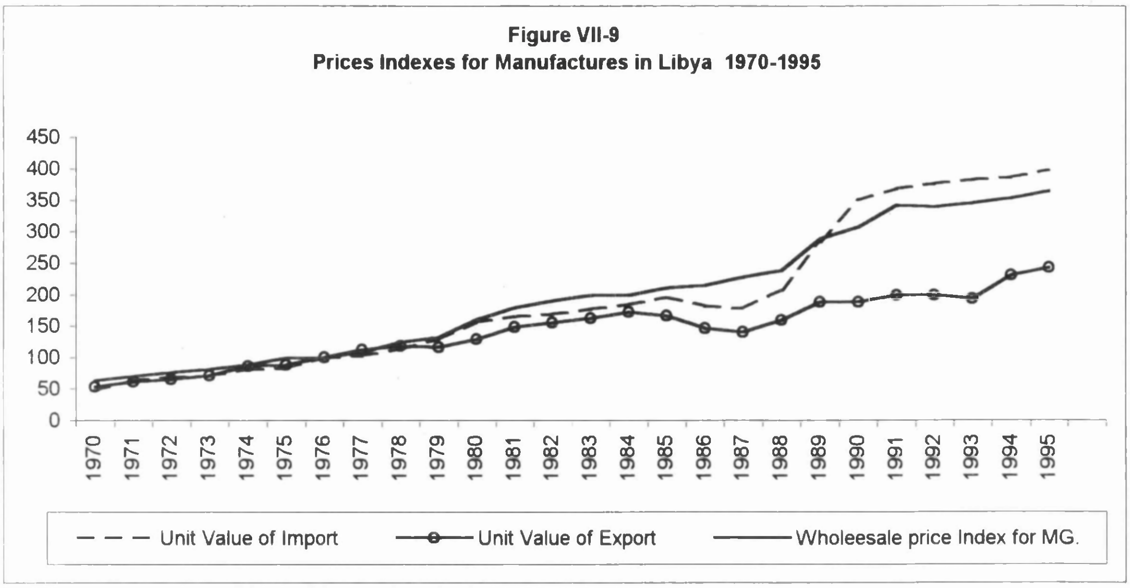
This section will first consider the changes of manufacturing output prices relative to non-tradable prices, to demonstrate that manufactures did suffer from adverse terms of trade in relation to non-tradable sectors over the boom period. It will then turn to investigate the movement of manufacturing output prices relative to input prices, taking into consideration productivity growth. This will be done on large-scale manufacturing industries, with the result that the indices obtained are industry-specific.

The purpose of this disaggregation is to investigate the causes underlying the differential performance of various industries to see why some industries were expanded during the boom period while many others were contracted. The main reasons for these divergent performances may have been differences of productivity growth or relative prices or both of these things.

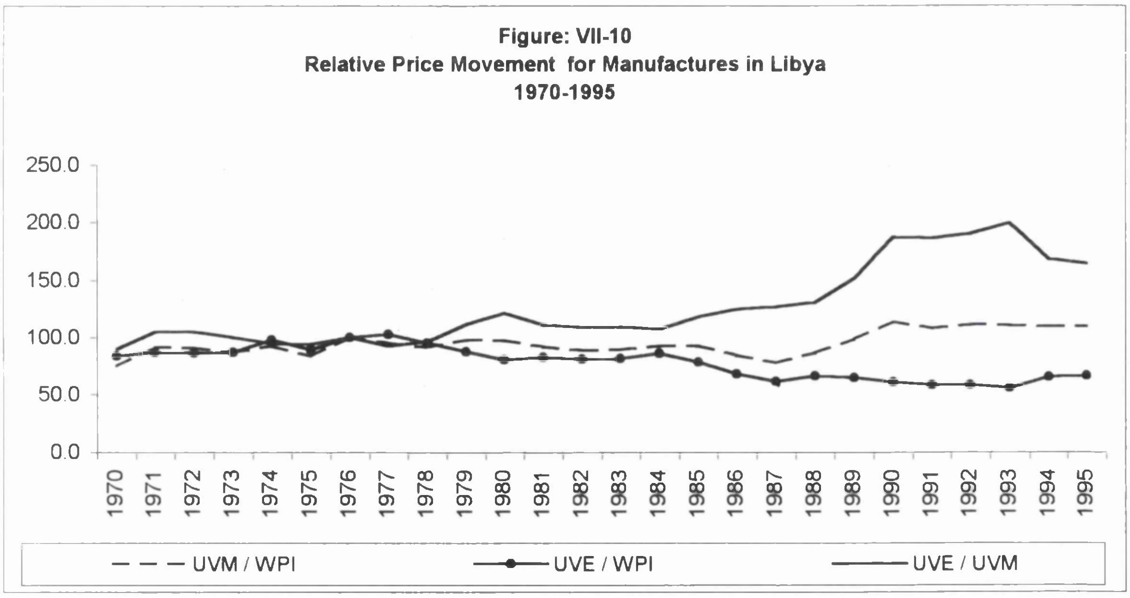
As regards output prices, the available data has shown that export and import prices had deteriorated relative to non-traded prices over the boom period. From the mid-Seventies the growth of manufactures, export and import prices had generally lagged behind domestic wholesale prices with the result that, by 1983, the ratios of the unit value of imports and exports to the domestic wholesale prices had declined by 11% and 19% respectively. By

1987 the import and export ratios were at only 77% and 61% of their 1976 levels. This meant that the competition which domestic products encountered from imports had persisted well beyond the boom period, as the Government did not adjust for currency over devaluation.

It should be added however, that even though the overall indices had shown a downward trend over the boom period, the same was not true for many sub-sector industries (see Figures VII-9 and VII-10 and Tables VII-17 and VII-18)



Source: National Authority for Information and Documentation, annual reports on external trade Index. various issues and census and Statistical Department, statistical Abstract, various issues.



Source: Calculated from Tables AVII-4-1, AVII-4-2 and AVII-4-3 in Appendix AVII-4

Table VII-17

Ratio of Unit Value of Exports to Wholesale Price Index for Manufacturing Industries 1970-92

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Petroleum Refining	157	183	191.1	199.3	233.7	227.6	100.0	111.1	116.8	151.8	243.8	263.9	276.2	239.0	226.1	220.3	141.3	107.1	74.1	79.2	100.8	88.8	89.9
Industrial Chemicals	73.5	82.4	83.2	86.7	94.3	90.0	100.0	105.5	102.7	134.6	228.4	233.8	238.7	252.1	267.7	250.1	171.9	187.2	240.7	220.4	191.7	156.0	125.3
All Manufacturing	83.8	87.0	86.4	87.1	97.8	89.2	100.0	103.0	95.1	87.8	80.3	82.9	81.3	81.5	86.3	78.4	67.9	61.3	66.2	65.0	60.9	58.1	58.5

Source: Calculated from Tables AVII-4-1 and AVII-4-2

Table VII-18

Ratio of Unit Value of Imports to Wholesale Price Index for Manufacturing Industries 1970-92

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food products	62.9	72.0	77.0	83.6	91.7	92.4	100.0	86.3	82.3	81.4	100.3	102.0	90.0	83.4	76.7	74.2	75.7	84.0	83.0	90.5	88.8	76.5	74.7
Beverages	105.2	108.7	113.3	115.3	112.0	96.7	100.0	104.7	111.8	120.7	122.0	125.0	124.6	103.8	94.6	74.9	71.2	79.1	69.6	69.3	61.1	69.4	60.6
Tobacco	124.6	127.2	115.7	120.5	108.1	109.7	100.0	98.1	109.5	119.0	119.2	134.8	132.9	101.6	98.3	81.9	82.3	85.9	78.3	74.5	66.9	77.6	90.5
Textiles	69.0	71.5	72.1	84.2	101.9	107.2	100.0	98.7	94.6	105.4	113.5	122.4	115.9	112.6	107.6	106.0	136.2	141.5	121.3	80.7	77.1	66.4	70.7
Wearing Apparel	69.0	71.5	72.1	84.2	101.9	107.2	100.0	98.7	94.6	105.4	113.5	122.4	115.9	112.6	107.6	106.0	136.2	141.5	121.3	80.7	77.1	66.4	70.7
Leather Products	59.7	59.7	60.3	70.4	90.8	102.9	100.0	106.4	104.0	109.2	113.6	118.1	119.5	109.8	97.7	88.9	106.1	112.4	95.1	77.1	82.1	68.0	72.2
Footwear	59.7	62.9	71.3	83.5	101.4	102.9	100.0	120.2	111.9	112.0	97.9	104.0	115.8	113.5	102.3	72.2	96.9	88.1	71.6	67.0	63.4	58.4	70.1
Wood products	46.7	45.6	51.1	62.3	69.7	73.0	100.0	68.9	74.5	74.3	89.7	73.4	71.4	75.8	79.8	87.2	88.9	104.4	107.4	104.6	91.0	71.2	70.2
Furniture	66.7	69.7	84.9	93.8	99.6	105.0	100.0	108.1	115.1	124.1	114.9	104.9	114.1	109.9	106.5	183.2	172.4	176.3	189.9	170.1	134.6	117.1	146.4
Paper Products	68.8	78.9	90.3	92.3	96.9	102.1	100.0	77.0	89.8	97.1	109.5	125.8	156.5	176.3	158.9	171.1	196.1	194.6	188.7	95.0	93.6	86.0	98.3
Printing and Publishing	68.8	78.9	90.3	92.3	96.9	102.1	100.0	77.0	89.8	97.1	109.5	125.8	156.5	176.3	158.9	171.1	196.1	194.6	188.7	95.0	93.6	86.0	98.3
Industrial Chemicals	52.9	50.9	62.3	70.7	71.2	81.8	100.0	84.7	92.9	107.3	125.6	128.9	132.9	129.1	135.6	152.8	162.3	145.9	145.8	138.4	134.9	93.2	98.2
Petroleum Refining	137.1	123.6	142.8	168.4	233.4	240.0	100.0	107.0	94.7	111.4	143.9	158.6	158.4	126.7	119.3	95.4	107.1	86.5	74.8	65.3	62.4	63.2	66.2
Non-metallic Mineral	77.8	91.3	92.3	96.6	102.2	108.2	100.0	100.2	95.5	102.3	103.4	105.9	105.1	104.7	151.5	135.2	147.4	157.9	158.2	171.2	115.8	120.0	83.2
Basic Metal products	63.1	64.3	67.0	74.2	89.5	85.1	100.0	85.9	90.0	103.8	99.6	105.6	108.9	112.4	118.9	112.2	115.4	108.1	100.3	91.8	86.2	42.4	38.0
Non-Ferrous Metals	75.9	86.2	94.4	97.4	100.9	94.0	100.0	87.6	92.1	103.9	106.2	87.2	103.6	102.6	103.1	97.3	100.0	93.7	87.0	79.6	74.7	36.7	33.0
Manufactures of metal	45.5	60.0	61.6	69.4	95.2	95.1	100.0	93.7	98.7	103.7	90.9	100.4	112.6	112.1	113.1	113.0	139.1	129.9	131.3	114.6	94.1	98.4	84.3
Machinery except Electric	75.9	89.4	94.2	105.1	97.8	100.0	100.0	94.3	100.8	97.9	92.2	93.0	108.0	114.4	119.5	87.7	96.5	94.2	86.6	81.2	70.7	63.9	59.3
Machinery Electric	75.9	89.4	94.2	95.7	116.9	117.2	100.0	110.3	112.9	102.0	93.9	93.7	104.3	109.7	114.9	143.4	228.4	198.2	189.3	175.3	152.3	139.0	137.8
Transport Equipment	75.9	89.4	94.2	95.5	109.0	107.8	100.0	102.5	101.0	107.4	104.7	109.9	121.8	127.9	138.3	158.2	181.8	152.6	109.5	100.8	117.7	79.1	93.9
Machinery & Transport Equipment	75.9	89.4	94.2	99.1	109.0	107.8	100.0	101.8	104.4	102.3	96.9	98.8	111.5	121.0	134.4	157.4	179.7	160.4	135.8	125.3	123.8	96.9	106.9
Other Manufacturing	64.2	73.8	82.4	87.7	98.4	102.1	100.0	124.9	128.2	135.3	124.0	116.9	131.7	121.8	125.8	142.0	182.5	163.7	153.7	128.0	115.5	102.0	106.4
All Manufacturing	75.2	91.5	91.0	87.0	92.7	84.1	100.0	95.3	91.5	98.1	97.4	92.1	88.7	89.3	92.6	92.8	84.6	77.9	86.7	98.6	113.7	107.8	110.9

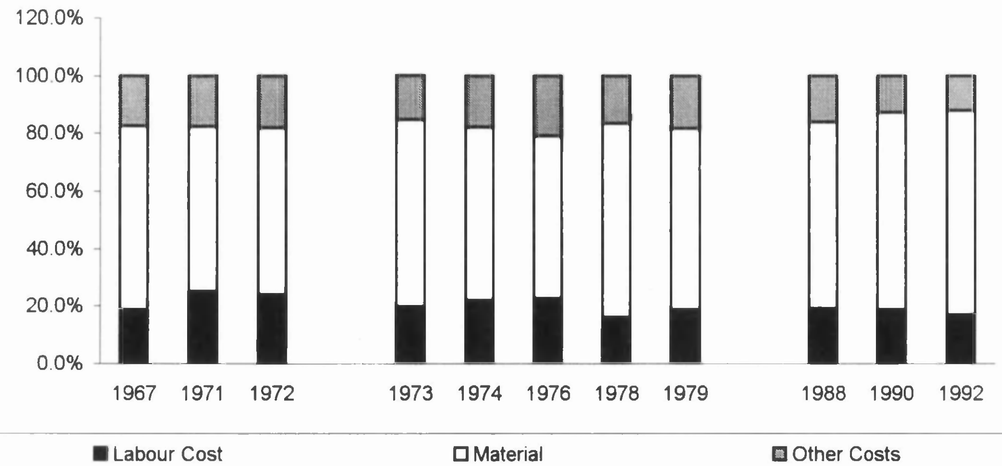
Source: Calculated from Tables AVII-4-1 and AVII-4-3

If one wishes to compare the input prices of various industries and take into consideration the structure of their production costs too it is necessary to construct indices for those industries. A perusal of Figure VII-11 below is enough to make this need quite obvious. But the construction of such indices presents a daunting task.

Figure VII-11 spans the pre-boom, boom and post-boom periods and displays the distribution of total cost over labour, material inputs and other costs for landmark years.

The share taken up by labour within total production cost was an average of 20%. Material inputs occupied a 62% share. Because of Libya's limited natural resources a large volume of material inputs had to be imported and the only exceptions to this were cement and petrochemical industries. Directly imported material accounted for 74% of the total material inputs in 1980 and it is likely that a sizeable part of the remaining 26% was also imported. The remaining 18% share of total production cost was composed of several items embracing-among others- transport, electricity and water within their grouping..

Figure VII-11
Structure of Variable Production Cost in Manufacturing Industries in Libya



It can be seen clearly from what has been said above that it was not wages but changes in input prices that had the predominating effect on the production costs of Libyan manufacturing industries.

It is equally clear that the currency appreciation created by the boom had reduced material prices by vastly increasing the power of manufactures to buy imported inputs.

Because of the overwhelming extent of material inputs and their ultimate effect upon profitability the need for carefully constructed indices is very apparent.

In constructing a composite index of input prices for individual industries, the total costs have been allocated to three main input categories. These are: i) labour input, ii) imported material input and iii) locally purchased material input. Taking the weights of each input for individual industries from the 1980 Industrial Census then gives a Laspeyres Index with the following structure:

$$p_{i_t} = \left\{ \frac{\sum_0^n c_{j1980} P_{jt}}{\sum_0^n c_{j1980} P_{jo}} \right\} \qquad (5)$$

Where p_{i_t} is the composite input price for industry i at time t, C_{j0} is the cost share of input j in the year (1980), P_j is the price of input j and 0 and t are the first year and the current year in the series, respectively.

To deal with the movement in input prices P_j several indices have been constructed:

A wholesale price index has been made for locally purchased material inputs and an index of unit value of imports created for imported materials.

An index of the wage rate has also been constructed for labour input. This has been derived by taking the total wage bill in various industries and dividing it by the number of workers in each respective industry. See Tables AVII-4-1, AVII-4-2 and, AVII-4-3 respectively, in the Appendix AVII-4.

These indices enabled a composite index of input prices for single industries to be constructed. See Table AVII-4-4 in Appendix AVII-4. Relating this index to the index of unit value of exports gives an approximation of the change in profitability. Final results are shown in Table VII- 19. For the sectors as a whole, the price index of profitability declined by 19% over the period of 1973-1982, it remained stable over 1983-1985, but continued its decline thereafter, with a noticeable drop in 1990 following the early 1990 devaluation of the Libyan dinnar as import prices increased substantially. For most of the exportable industries however, the index had an upward trend over the boom period. This was practically the case for chemicals and petrochemicals, all of which achieved a rapid rate of growth in exports during the boom. In all of these industries input costs were largely accounted for by imported material. Setting aside the rapid rise in wages there is no doubt that the high content of imports within industrial production costs greatly benefited those industries during the boom as the price of imports became so relatively cheap.

Table -19

Price Index of Profitability in Manufacturing industries 1/

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Petroleum Refining	113.5	144.7	132.3	118.5	101.8	96.0	100.0	104.0	122.0	136.5	166.1	165.4	174.4	189.0	188.8	215.2	125.2	115.9	96.3	115.3	144.9	124.7	117.0
Manufactured Gas	113.5	144.7	132.3	118.5	101.8	96.0	100.0	123.1	112.8	146.3	153.6	153.0	161.3	174.7	174.6	198.9	115.7	107.1	89.1	106.6	134.0	115.3	108.2
Industrial Chemicals	126.6	146.5	127.2	119.7	129.0	109.0	100.0	115.7	106.4	118.2	177.1	176.2	172.3	185.8	190.6	163.2	108.2	131.0	165.6	159.7	141.6	160.6	125.8
All Manufactures	100.4	106.0	106.4	111.6	120.3	115.5	100.0	106.0	100.1	95.1	75.2	96.8	97.1	97.1	97.9	88.7	80.2	64.7	65.9	69.7	60.9	62.1	62.3

Source: Calculated from tables AVII-4-2 and AVII-4-6

Note: 1/ Is Ratio of Unite Value of Exports to Composite Price index of Production Input

Table-20

Index of Ratio of Unit Value of Exports to Wage Rates, 1970-1995

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Petroleum Refining	100	116	117	120	126	111	100.0	105.8	108.2	140.1	136.1	154.7	175.0	193.2	180.5	120.4	78.8	66.5	73.3	73.1	66.1	54.1	45.1
Manufactured Gas	100	116	117	120	126	111	100.0	125.3	100.1	150.1	125.8	143.1	161.8	178.6	166.9	111.3	72.9	61.5	67.7	67.6	61.1	50.0	41.7
Industrial Chemicals	100	116	117	120	126	111	100.0	84.0	88.5	85.8	143.8	140.6	129.1	135.1	146.3	143.1	107.4	133.3	151.6	147.7	126.7	131.0	116.8
All Manufactures	90.4	104	100	108	107	92.5	100.0	117.1	121.5	76.0	52.5	53.3	51.7	53.6	50.3	45.9	40.1	38.1	42.6	49.8	48.5	49.6	48.7

Source: Calculated from Tables AVII-4-2 and AVII-4-4 in Appendix AVII-4

This result would definitely not have been predicted by the Dutch Disease measures of profitability, which deflate the unit value of exports by domestic wholesale prices (Table VII-19 above) or by wages, and invariably find the profitability of traded goods to have contracted during the boom period. In fact deflating by wages gives erroneous results for Libya as shown in Table VII-20. Over 1976-1982 the wage based index shows profitability to have declined by 56%, as opposed to only 19% according to a total cost based index of profitability, which is an enormous difference. Thus the wage-based index would have wiped out the performance of manufacturing industries in Libya during the boom, when in fact we know that most of them prospered very well.

In short, including the price of imports in the profitability deflator yields results that are contradictory y to Dutch Disease wisdom precisely because the boom period leads to relative price changes in favour of imports and the higher the import content in production costs the less profitability is squeezed.

For industrialised economies, deflating by import prices is less important because the import content of their production costs is likely to be much lower than it is for an industrialising economy, due to their highly developed inter-industry structure of production. A wage rise in a developed economy becomes a deciding factor in export competitiveness under boom conditions. The same is not true of developing economies, as was the case for Libya.

So far the analysis has abstracted from any growth in output per unit input which would lower unit production costs and increase profitability. To address the issue of productivity growth in measuring profitability, a quantity index of profitability has been constructed. Similar to the price index of profitability, the inputs considered in the quantity index of profitability were quantity of labour (number of employees) and the quantity of material input (imported material deflated by the unit value of imports. The resultant index is a Laspeyres Index with the following structure;

$$Q_{i_t} = \left\{ \frac{\sum_{0}^{n} c_{j1980} q_{jt}}{\sum_{0}^{n} c_{j1980} q_{j0}} \right\} \qquad (6)$$

Where Q_{i_t} is the composite quantity index for industry i at time t, C_{j0} is the cost share of input j in the year (1980), q_j is the quantity of input j and 0 and t are the first year and the current year in the series respectively. The results from this are shown in Table VII-21.

For the sector as a whole, the index rose by 23% over the period 1976-1982 and for exportable industries (chemicals and petroleum refining) it indicates a substantial gain in productivity.

Combining the price index with the quantity index gives an accurate measure of the relative change between output prices and the production costs of manufacturing over time on a per unit basis. Table VII-22 shows that profitability had increased in all the sectors where both output and exports expanded during the boom.

Table-21

Quantity Index of profitability in Manufacturing Industries 1/

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food products	159	51.8	64.3	72.4	113	85.3	100	82	79.4	91.3	165	207	248	233	253	263	188	164	170	167	163	115	113
Beverages	182	91.4	103	121	94.9	99.5	100	125	99.7	193	157	166	225	224	218	209	200	315	439	590	580	473	582
Tobacco	269	98.1	70.3	37.9	91.6	58.4	100	86	97.5	126	62.3	52.2	36.7	52.2	43	22	14.3	10.6	7.94	6.13	2.72	1.45	1.09
Textiles & Wearing Apparel	215	69.8	91.8	106	149	129	100	104	92.8	179	427	426	571	515	436	374	448	452	576	584	533	432	418
Footwear & Leather	398	31.1	44.4	56.9	124	116	100	93	89.2	327	599	802	819	674	509	282	194	109	68.5	34.2	17.2	16.6	12.6
Furniture & Wood Products	199	81.5	106	91.8	109	93.6	100	174	521	777	885	832	714	571	357	311	141	124	90.5	75.9	59.4	58.1	56
Printing and Publishing	337	115	122	44.6	105	96.8	100	95.8	127	165	190	173	138	116	80.2	46.7	23.5	16.2	10.3	5.87	3.41	4	2.75
Industrial Chemicals	108	33.2	26.4	43.4	79.5	83.4	100	54.3	41.4	61.4	78.8	111	173	185	218	219	258	311	381	391	464	316	336
Petroleum Refining										100	368	705	619	578	619	634	538	512	373	335	387	275	310
Non-metallic Metals	628	100	113	85.1	189	154	100	242	190	193	180	162	122	113	73.4	39.2	11.9	5.82	3.64	2.26	1.32	1.11	0.73
Basic Metal products											100	71	96.3	199	142	140	56.9	37.9	38	109	458	463	506
Fabricated metal	82.9	32.8	39	36.6	34.4	49	100	39.2	141	243	293	179	228	247	269	220.0	156	146	152	142	108	80.1	75.9
Other manufactures	286	62.5	62.5	125	99.8	78.6	100	197	245	171	64.4	24.8	13.7	6.52	7.66	8.12	9.85	22.2	26.2	17.2	13.3	7.01	4.45
All Manufacturing	176	50.7	55.7	55.3	82.6	66.6	100	129	154	115	135	123	123	123	128	129	98.5	110	111	112	125	95.4	92

Source; Calculated from Tables AVII-8, AVII-4-9 and AVII-10.

Notes: 1/ Index of Output / Index of Material Input * Index of Labour Input.

Table-22

Composite Index of profitability in Manufacturing Industries 1/ 1970-1992

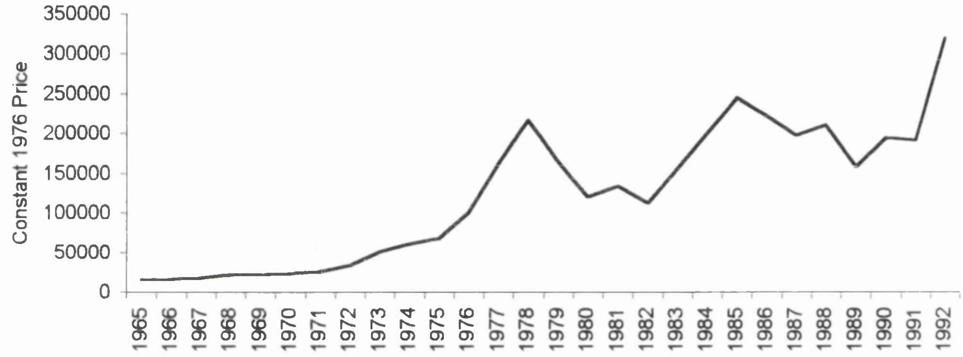
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Petroleum Refining									100.0	136.5	610.8	1167	1081	1093	1169	1365	674.0	592.8	359.5	386.3	560.8	343.1	362.1
Manufactured Gas									100.0	146.3	564.8	1079	999.1	1010	1081	1262	623.2	548.1	332.4	357.2	518.5	317.2	334.8
Industrial Chemicals	136.6	48.7	33.6	52.0	102.6	90.9	100.0	62.8	44.0	72.5	139.5	195.7	298.2	343.0	415.1	357.3	279.1	407.3	631.0	624.3	657.7	507.4	422.9
All Manufacturing	176.9	53.8	59.2	61.7	99.3	76.9	100.0	137.2	153.7	109.7	101.4	119.0	119.5	119.8	125.7	114.0	79.0	70.9	73.3	78.3	75.9	59.2	57.2

Source: Calculated from Tables AVII-4-6 and AVII-4-10

1/ = Price Index of Profitability* Quantity index of profitability.

It should be mentioned though that this combined index measures the profit margin, and therefore only reflects the supply-side effects on profitability. However, the effect of demand pull on investment decision is worth investigating further and this can be done by constructing an indicator of total profit and simply deflating total revenue by a domestic price index, such as the consumer price index. Such an indicator is shown in Figure VII-12.

Figure VII-12
Total Profits in Manufacturing Industries
in Libya 1965-1992



It is meaningless to try to measure profitability in large-scale industries by taking those industries en-bloc. That is something quite obvious and it would be a waste of time to do so. Large industries naturally consist of firms of wide diversity in their size, number of employees, techniques of production, styles of management, efficiency and so on. So clearly profitability is only meaningful when applied to individual businesses.

The index of profitability shown above would have been completely unnecessary had data on profitability for Libya existed at all but it does not.

VII-7 Conclusion

The preceding discourse has revealed quite plainly that – because of the boom- the Libyan manufacturing sector achieved remarkable growth.

Starting from a very humble beginning it grew at an average rate of 19.5% p.a. in real terms.

Manufacturing exports, emerging from an almost negligible base, grew at a the truly astonishing rate of 35.5% p.a.

However, at the same time, import substitution declined distinctly slowly in relation to currency appreciation.

Libyan manufactures competed well not only in their own market but also internationally. As we have seen, there had been a marked increase in the share of manufactured exports in Libya's total national exports. Therefore there is no doubt that Libyan manufactures gained competitiveness during the boom period, and one would be led to suggest that they enjoyed favourable relative prices: for example, a weak currency in comparison to foreign trading partners creating declining wage rates. But findings are that price movement did not, in fact, favour tradables – and this is precisely what the Dutch Disease Model predicts.

Investigation shows that there were substantial productivity gains in all manufacturing industries, especially chemicals and petrochemicals, and that these gains were achieved through technological changes and increased productivity.

A full, properly studied conclusion follows with strong comments to make about the Dutch Disease Model, a model which ascribes growth without considering output per unit of input either because all resources are assumed to be fully employed at all times or assumes no changes in production coefficients and accounts for no other factors. Therefore it follows it cannot be a very useful theoretical model.

Subsequently, if price indicators are to be disregarded in favour of an examination of the effect of boom on the supply response of manufacturing at all, these indicators have to take into account productivity growth.

Another likely logical conclusion could be that the traditional price measures developed in Dutch Disease literature may be inefficient and misleading simply because they do not take into consideration production cost and productivity growth.

CHAPTER VII

SUMMERY AND CONCLUSION

This study constitutes an inquiry into the effects of oil price shocks on the growth and structural changes of an oil-exporting developing economy. Whilst it is based upon research conducted upon Libya, the conclusion may be of relevance to the experiences of other oil-exporting countries. Nevertheless, further research is needed before its findings can be generalised.

The study opens with a survey of literature on the Dutch Disease Theory and highlights its main limiting aspects in analysing the experiences of developing economies. These limitations directly concern the models assumptions, its static nature of analysis and failure to take into consideration some of the major underlying factors, such as the impact of the pre-boom economic conditions and productivity growth. We also review the experiences of a number of other countries' that underwent oil booms.

The investigation elaborates these points and establishes an alternative analytical approach to assess the impact of the Seventies oil price shock on the Libyan economy. This approach has three main elements. First, it challenges the Dutch Disease Theory's assumptions of macro-equilibrium with full employment, perfect factor markets, fixed national stock of both capital and labour and the immutability of technical conditions of production Second, it uses the Dutch Disease Model mechanisms, mainly the resource movement effect and the spending effect, to examine the effect of the oil boom on relative prices. Third, it takes into consideration the new structure of prices, demand and productivity growth on changing the technical conditions of production and thus the profitability of tradable sectors.

The study of Libya's experience begins with an extensive historical investigation into the growth rates and structural changes which have taken place in the Libyan economy over the three decades to 1990. The determination of the investigation within this time-frame is due to two main considerations, first the intention of the study is mainly to trace the changes in growth and structure of the Libyan economy during the oil price shock period between 1973 and 1982. Second, and perhaps most importantly, is that the data in the case of Libya is either inadequate or unreliable. However, it should be mentioned that the period under investigation has been extended throughout the study when it is possible.

The study reveals that before the discovery of oil, Libya possessed most of the salient features of an under-development economy. These included a very low per-capita income, a chronic deficit in the government budget and balance of payments, a high rate of illiteracy, a high degree of resources immobility, a stagnant agricultural sector and low productivity of labour. This picture had changed dramatically with the advent of oil wealth in the early 1960s which caused change to take place in all fields: political, social and economic. Since then the Libyan economy has undergone major structural changes.

Three distinct periods have been discerned within the oil period. In each of these periods, although sometimes overlapping, the growth rates and the source of growth of GDP, the labour force and the accumulation of capital were rapid and different in direction from one period to another.

During 1962-1969, the structure of the economy and its nature can be described as dualistic because there existed a large agricultural sector and an active, modern industrial sector. The main feature of such an economy is the coexistence of a large oil sector overwhelmingly dominating the economy as a financial source, export origin, and the main natural resource available to the country, with the rest of the economy grouped together and viewed as one sector.

Libya's economic growth rate during this period was one of the highest growth rates in the world. Its gross national product (GNP) had increased at an average of nearly 16% p.a. in real terms, with gross domestic product (GDP) and gross fixed investment increasing at an average of 22.6% and 15.6% p.a. respectively. The share of gross fixed investment in non-oil-GDP reached 63%.

At the sectoral level, the most remarkable increase was in mining (including crude oil) which grew at 47% p.a., followed by construction at 20% p.a., transport and communications 17% p.a. and services gathering 13% p.a.

However, apart from the mining and construction sectors, the share of all other economic sectors in aggregate output showed a downward trend and the decline in the share of the productive sectors (manufacturing and agriculture) was relatively more that of services. This can be put down to the limited absorptive capacity of the economy, the lack of infrastructure, the small size of the population and the income effect generated by oil windfalls.

The rapid growth witnessed in this period kept its upward trend in the subsequent period of 1970-1982. This period witnessed a rapid growth rate in real investment (at 15% p.a.) with a 58% average annual share in the non-oil GDP following the massive injection of oil windfalls gained from the two oil booms of 1973/1974 and 1980/1982. Massive capital accumulation during this period led to remarkable structural changes in favour of the tradable sectors.

In terms of growth the most outstanding increase had been in manufacturing which grew at an average rate of 19% p.a., followed by transport and communication at 18% p.a., construction at 15% p.a., services at 14% p.a. and agriculture at 5% p.a. But the shares of both agriculture and manufacturing compared with that of services were still very low. This situation totally changed in the post-boom period of 1983-1990. It was during this period that major transformation in Libya's state and society had taken place and several features of economic bottlenecks had become clearly visible. There was a shortage of technical and skilled labour for the advanced public sector and a marked impermanence and lack of administrative institutions in a climate of instability in the oil market and political crisis. Consequently the period witnessed a sharp fall in economic growth rates. The growth rates of investment, GNP and GDP during that period had been negative.

However, at the sectoral level there was a significant increase in the productive sectors output both in terms of growth and share in aggregate output. In real terms agriculture and manufacturing output had grown at 12% and 7% p.a. respectively. By 1990 the sector share occupied by agriculture was 7% and that of manufacturing was almost the same.

The study then proceeds to investigate factor inputs and productivity growth during the period 1962-1990.

With regard to investment the study shows that during 1962-1969 planning strategy was directed to the regeneration of the poor and defective economy by means of intensifying investment into developing the country's infrastructure and services. But during the second period, from 1970 right through to 1986, the Government's strategy was aimed at reducing the dependence upon oil as the main source of income. It concentrated on the diversification of the economic base and reinforcing Libya's self-sufficiency through industrialisation and increasing agriculture production.

The study also investigates the growth and structure of the Libyan labour force. It shows that the economically active population in Libya had grown at an average rate of 4% p.a. throughout 1962 to 1990 and how it was distributed among the various sectors.

Before 1962 the agriculture sector was the primary labour absorbing sector but after the discovery of oil the sector's share of the labour force dropped significantly and by 1990 it had declined by over 22%. But it ought to be mentioned here that this result should be treated with caution since the official figures on employment did not include those engaged in agricultural activities as a second occupation and those who partook in these activities as unpaid family work. Not only were the higher earnings created by the oil windfalls responsible for crowding out of labour from agricultural sector but also the lack of water resources, the undeveloped market for agricultural products, the imbalances of development expenditure during the period 1962-1969 and the domination of the public sector all contributed to this.

The construction and electricity sectors were the leading labour absorbing sectors. The total share of these two sectors combined had increased by more than 8% by 1990. Their combined growth had been at an average rate of 11% p.a. from 1962 to 1969 but the most remarkable leap took place during the oil shock period between 1973 and 1982 when their combined growth rate averaged at more than 22% p.a..

The second greatest labour absorbing sector was the transport and communications sector. The high increase that was attained in this sector was mainly due to the huge investment in infrastructure.

The story for manufacturing was that its share in overall employment had fallen by 2% between 1962 and 1970, but had increased by an average of 11% p.a. from 1970 to 1990. The relatively low share of manufacturing employment in overall employment can be explained by the manufacturing sector's specific labour requirements and the domestic shortages in these requirements as well as the relatively capital-intensiveness of the sector.

Partial and total productivity growth is also measured over the pre-boom, boom and post-boom periods. With regard to labour productivity (real value added per worker), the study shows that labour productivity had grown at an average rate of 21% p.a. over the period 1962-1969 and at an average rate of 5% p.a. over the period 1970-1982, while it was negative during the post-boom period. On the other hand capital productivity, as measured by the incremental capital output ratio (ICOR), indicates that Libya was efficient in the utilisation of capital during the boom period. However, due to the complexity of measuring capital this result should be treated with some caution.

Total factor productivity growth is also measured. The main finding there is that technical progress, as measured by total productivity gains in Libya, was insignificant despite the country's access to imported technology. The failure of total factor productivity to grow during the boom period was chiefly due to the economy's limited absorptive capacity and its failure to choose the right technology.

The study also discusses sectoral shifts and establishes the counterfactual to the Dutch Disease. The analysis shows that although the manufacturing and agriculture sectors received immense financial allocation during the seventies, their contribution in aggregate output had declined over the period of 1962-1975. This outcome was not related to the Dutch Disease but was mainly attributed to the scarcity of water resources and arable land, the shortages of raw material, the lack of skilled and managerial labour, the limited absorptive capacity of the economy, the smallness of the domestic market and Government policy toward the industrialisation process. This is explained by the counterfactual to the Dutch Disease.

Chapter Five of the study especially focuses on the boom period and attempts to quantify Libya's experience of the Dutch Disease. The increases in oil prices in 1973/1974 and 1979 are shown to have created booming conditions in Libya as the country's foreign exchange earnings expanded very rapidly with each shock. These boom effects were transmitted into the economy via the resource movement and the spending effects, whilst government spending on tradable sectors mitigated these effects. The Dutch Disease index is calculated using Gelb's methodology.

With regard to manufacturing, the results show that up until the early seventies, the index for manufacturing showed a deteriorated trend reflecting a decrease in the degree of industrialisation. But this situation changed entirely since the early Seventies. Starting from 1972, the index for manufacturing shows a continued steady improvement, reflecting a gradual increase in the degree of industrialisation and, by 1990, the index reached its notable peak.

The results for agriculture show that the index of agriculture had deteriorated from as early as our data started (1963) up to the late Seventies despite the intensive investment in irrigation and land reclamation. However, the position changed favourably after 1983 and the trend continued thereafter.

The two Dutch Disease sub-indices are reflected in the overall Dutch Disease index. This index shows a gradual improvement in the degree of industrialisation throughout the boom period and the subsequent period.

An attempt is made to measure Libya's real effective exchange rate and relative price indices. The results indicate that the general movement of prices in the economy, as measured by the change in terms of trade between tradables and non-tradables, was as would have been expected by the Dutch Disease model, being in favour of the latter and against the former, albeit more moderately so than that experienced by many other developing economies under similar conditions.

The study then turns to investigate the agriculture and manufacturing sectors performances under booming conditions.

As has been said, before oil discovery the Libyan economy was predominantly an agricultural economy. However, with the advent of oil wealth Libya started changing into an economy which produced other commodities and services. Consequently, agriculture's share in GDP steadily declined. The most remarkable decline had occurred during the oil price shock period of 1973-1983, but this relative decline does not coincide with the Dutch Disease Theory prediction as long as a significant increase in agricultural production had taken place during that period.

The study also investigates the importance of demand factors, relative price changes and change in the technical coefficients of production in determining agricultural performance. It shows that because of the boom, demand within the domestic market in Libya was buoyant, and that the prices of agricultural products continued to rise and led to an increase in agricultural production. On the supply-side, investment in large and small agricultural projects by both the Government and the private sector during the Sixties and later, yielded high returns during the boom period. This was assisted by using high agricultural technology and agrochemical inputs and improving irrigation methods. It is also shown that even though the supply-side had changed entirely in the post-boom period the gap between domestic supply and demand had narrowed further. The increase in agricultural production during this period was mainly attributed to the crucial demand enhanced by the introduction of more liberal trading and to the open border policy. This encouraged exports and consequently production.

The study examines the manufacturing sector and industrial developments in Libya and discusses Government polices in relation to manufacturing and reveals that from the early Sixties until the mid-eighties the Libyan economy went through a planned industrialisation process. It shows that during the oil boom period of 1973-1982 the share of the industrial sector as a whole, in both aggregate output and total employment, had increased substantially. It grew at an average rate of 19.5% p.a. over the boom period compared to 12% p.a. in the pre-oil price shock period of 1962-1972 and 5.8% p.a. during the post-boom period of 1983-1990. In terms of its contribution to the growth of the economy it is shown that the industries displaying outstanding performance during the boom period were petroleum refining at 42% followed by food products at 12%, non-minerals 11%, fabricated metal 10%, industrial chemicals 9% and textiles including wearing apparel 5%.

The examination reveals that manufacturing exports, which emerged from an almost negligible base prior to 1962, grew at the truly astonishing rate of 35.5%p.a. However, at the same time, import substitution declined distinctly slowly in relation to currency appreciation.

The assessment then develops to include factor inputs and productivity growth. With regard to labour input it is shown that the most rapid absorption of labour in manufacturing occurred during the boom period of 1973-1982 at 12% p.a. This was accounted for by the large number of small labour-intensive industries and the sparsity of very large capital-intensive projects. Dealing with capital inputs the study reveals that fixed capital growth during the boom period was markedly higher than in any other periods and that within the boom period there was a remarkable acceleration from 1980 onward which ran through the post-boom period to 1985.

Investigation also shows that there were substantial productivity gains in all manufacturing industries, especially chemicals and petrochemicals, and that these gains were achieved through technological progress and rising demand.

The study also examines relative price movements for Libya's manufactures under booming conditions and adopts an alternative methodology to the traditional price measures developed in Dutch Disease literature. This methodology takes into consideration production costs and productivity growth.

In the light of this study we can conclude that the problems encountered in the Libyan economy were not those predicted by the Dutch Disease but that they were more directly related to the efficiency of investment and government strategy toward the industrialisation process. Consequently, future research should include more dynamic analysis into the effects of government intervention and investment behaviour. It may also benefit from two issues that emerge from this study. One is the effect of the boom on relative prices and the other is the impact of the boom on pre-boom economic conditions that then alters the supply responses of the economic sectors.

APPENDICES

Appendix AIV-1-1
Aggregated Economic Indicators for Libya

Table AIV-1-1

Gross Domestic product By Kind of Economic Activity Value & (%) Share 1962-1990 (LD. Million, at Current Factor Cost)

	Total GDP	Agriculture Forestry & Fish.	Share	Quarrying (In.Oil)	Share	Manufactur.	Share	Transport and Communic.	Share	Construction	Share	Wholesale & Retail Trade	Share	Other Servic.	Share
1962	155.5	14.9	9.6	38.0	24.4	9.6	6.2	8.6	5.5	10.3	6.6	14.2	9.1	59.9	38.5
1963	235.3	15.1	6.4	99.6	42.3	10.6	4.5	11.3	4.8	12.7	5.4	16.7	7.1	69.3	29.5
1964	364.6	16.7	4.6	195.7	53.7	12.3	3.4	14.9	4.1	21.7	6.0	20.2	5.5	83.1	22.8
1965	492.1	25.2	5.1	270.1	54.9	13.6	2.8	18.5	3.8	34.9	7.1	25.1	5.1	104.7	21.3
1966	634.9	27.3	4.3	356.1	56.1	15.7	2.5	24.8	3.9	45.3	7.1	33.3	5.2	132.4	20.9
1967	747.8	30.9	4.1	402.5	53.8	17.7	2.4	31.6	4.2	66.2	8.9	35.6	4.8	163.3	21.8
1968	1072.6	33.4	3.1	648.6	60.5	21.5	2.0	39.3	3.7	89.2	8.3	45.5	4.2	195.1	18.2
1969	1223.0	37.4	3.1	754.7	61.7	22.3	1.8	40.8	3.3	87.1	7.1	48.5	4.0	232.2	19.0
1970	1288.3	33.1	2.6	812.6	63.1	24.2	1.9	43.2	3.4	87.8	6.8	47.0	3.6	240.4	18.7
1971	1586.5	33.0	2.1	922.7	58.2	32.1	2.0	87.2	5.5	116.8	7.4	75.6	4.8	319.1	20.1
1972	1753.0	43.6	2.5	920.6	52.5	41.4	2.4	100.5	5.7	182.8	10.4	95.8	5.5	368.3	21.0
1973	2182.7	60.0	2.7	1131.8	51.9	55.8	2.6	129.3	5.9	261.2	12.0	124.8	5.7	419.8	19.2
1974	3795.7	64.7	1.7	2385.3	62.8	70.5	1.9	155.0	4.1	376.6	9.9	184.3	4.9	559.3	14.7
1975	3674.3	82.9	2.3	1961.1	53.4	86.2	2.4	175.8	4.8	343.7	9.4	224.6	6.1	800.0	21.8
1976	4768.1	99.7	2.1	2750.0	57.7	114.8	2.4	193.3	4.1	515.1	10.8	263.1	5.5	832.1	17.5
1977	5612.7	90.0	1.6	3275.9	58.4	153.2	2.7	220.1	3.9	602.0	10.7	292.0	5.2	979.5	17.5
1978	5496.1	122.1	2.2	2808.7	51.1	182	3.3	250.9	4.6	682.8	12.4	328.9	6.0	1121.0	20.4
1979	7603.0	140.4	1.8	4545.3	59.8	227.3	3.0	291.2	3.8	726.7	9.6	383.2	5.0	1289.0	17.0
1980	10237.	164.9	1.6	6571.9	64.2	262.7	2.6	335.3	3.3	935.7	9.1	481.7	4.7	1485.0	14.5
1981	9003.3	174.0	1.9	4756.5	52.8	298.9	3.3	420.0	4.7	1147.	12.7	535.0	5.9	1672.0	18.6
1982	8359.2	220.7	2.6	4040.3	48.3	326.6	3.9	403.3	4.8	1054	12.6	535.9	6.4	1779.0	21.3
1983	8139.5	272.2	3.3	3793.7	46.6	340	4.2	387.4	4.8	879.0	10.8	525.4	6.5	1942.0	23.9
1984	7521.7	266.4	3.5	2997.0	39.8	402.5	5.4	392.5	5.2	819.5	10.9	554.5	7.4	2090.0	27.8
1985	8050.2	283.2	3.5	3295.0	40.9	415.9	5.2	399.1	5	920.5	11.4	560.5	7.0	2176.0	27.0
1986	8402.4	320.0	3.8	3634.0	43.3	450.8	5.4	395.5	4.7	895.0	10.7	485.9	5.8	2221.0	26.4
1987	6751.4	348.5	5.2	1982.0	29.4	469	6.9	385.0	5.7	890.0	13.2	400.0	5.9	2277.0	33.7
1988	6904.9	366.5	5.3	1944.0	28.2	532	7.7	395.5	5.7	892.5	12.9	440.0	6.4	2334.0	33.8
1989	6781.5	395.5	5.8	1582.0	23.3	585.5	8.6	411.5	6.1	920.0	13.6	480.0	7.1	2407.0	35.5
1990	7672.0	423.5	5.5	2078.0	27.1	647	8.4	442.5	5.8	1021	13.3	517.5	6.7	2543.0	33.2

Source: Ministry of Planning Economic and Social Indicators, 1962-1983, Tripoli, February 1984, pp.25- 30, and National Authority for Information and Documentation & Central Bank of Libya, yearly statistical series and monthly Bulletins, various issues.

Table AIV-1-2

GDP deflator

	GDP	Agriculture Forestry & Fishing	Mining Quarrying (Incl. oil)	Manufacturing	Transport and Communication.	Construction	Wholesale & Retail Trade	Other Services
1962	39.0	16.6	52.0	56.8	53.7	18.7	49.4	50.2
1963	44.6	16.9	55.8	59.8	56.3	21.9	51.7	52.5
1964	48.0	19.3	56.6	62.5	59	23.1	54	54.8
1965	48.9	21.1	57.9	64.6	62	24.3	57	57.8
1966	52.7	24.1	58.7	65.2	67.1	28.7	62.2	62.2
1967	54.6	25.7	59.9	66.8	71.8	31.9	63.9	67
1968	58.9	29.3	62.7	68.5	74.5	37.7	65.6	69.4
1969	63.8	32.0	67.2	69.8	76.8	44	66.2	72.1
1970	66.9	33.2	70.3	71.5	78.4	48.5	66.9	73.2
1971	69.5	32.9	72	74.3	79.8	53.6	72.2	74.8
1972	70.0	33.5	72.7	77.8	80.5	58	74.1	76.1
1973	71.7	35.2	73.8	81.6	83.5	63	76.7	77.8
1974	80	43.1	82.9	84.6	84.4	66	84.2	84.4
1975	83.5	44.4	85.3	86.5	85.6	79.3	86.3	87.4
1976	86.4	55.5	88.8	90.5	87.7	78.2	88.6	88.6
1977	90.2	52.5	92.3	95.4	90.8	83.4	92.4	92.1
1978	93.2	66.5	93.9	98.7	94.2	92.8	94.7	94.2
1979	96.2	82.7	96.3	99.6	96.7	93.4	97.1	98.4
1980	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1981	102.7	97.0	102.4	102.2	105.3	103.7	101.7	103.0
1982	105.5	145.6	104.2	104	107.2	106.2	104.1	105.0
1983	108.2	131.7	107.5	105.3	105.3	110.5	105.7	107.6
1984	110.8	132.2	109.4	110.6	106.3	113.3	109.1	110.9
1985	111.5	116	111.6	111.2	107.6	110.4	109.3	112.6
1986	114.7	127.6	115.4	115.1	109.8	112	113.7	114.2
1987	118.1	127.2	121.2	119.5	112.9	114.2	116.6	116.7
1988	119.8	121.4	122.7	123.2	115.5	118.6	119.5	117.7
1989	120.8	111.2	125.5	127.9	117.9	119.4	122.1	118.8
1990	123.5	95.4	131.8	132.5	121.5	123.8	124.8	121.2

Source: Salem M. Mustfa. An Econometric Model of the Libya Economy 1962-1975, Unpublished Ph.D. Dissertation, South Methodist University, 1979. & Abusneina, M. Abduljalil. Development Alternatives in Surplus Economy with Skilled Labour Constrants : The Case of Libya, Unpublished Ph.D. Dissertation, Indiana University, 1981, and Economic Research Center, Garyonis University, Resturucture of the Libyan Economy, Unpublished Comprehensive Research 1994.

Table AIV-1-3

Libya's Real Economic Growth 19962-1990

		Consumption			National Trade			Per-capita	
	GNP	Govr.	Private	GFCF	Export	Import	Population.	Consumption	GNP
1962	383.3	87.2	369.2	64.40	161.5	307.7	1451.0	254.4	264.2
1963	500.8	96.4	336.3	74.30	293.7	289.2	1504.0	223.6	333.0
1964	597.1	122.9	343.8	109.0	487.5	339.6	1560.0	220.4	382.8
1965	840.7	163.6	411.0	146.7	611.5	374.2	1617.0	254.2	519.9
1966	1005.5	203	480.1	191.2	702.1	423.1	1677.0	286.3	599.6
1967	1133.3	241.8	551.3	210.4	789.4	463.4	1739.0	317.0	651.7
1968	1434	327.7	602.7	289.7	1154	565.4	1803.0	334.3	795.3
1969	1581.5	402.8	600.3	315.2	1235	656.7	1869.0	321.2	846.2
1970	1602.8	388.6	693.6	242.7	1300	602.4	1922.0	360.9	833.9
1971	1979.1	457.6	674.8	287.9	1403	627.3	1991.0	338.9	944.0
1972	2111.4	512.9	775.7	436.5	1426	788.6	2066.0	375.5	1022.0
1973	2600.7	648.5	980.5	636.2	1729	733.6	2146.0	456.9	1211.9
1974	4195.9	930	1158.8	979.4	3113	1785	2229.9	519.7	1881.7
1975	3921.3	1250	1429.9	1055	2459	1995	2316.5	617.3	1692.8
1976	4919.1	1372	1547.5	1226	3334	1934	2406.0	643.2	2044.5
1977	5649.3	1533	1660.8	1368	3834	2172	2499.7	664.4	2260.0
1978	5355.3	1816	1786.5	1532	3195	2361	2597.6	687.8	2061.6
1979	7395	2086	1969.9	1955	4991	2933	2699.1	729.8	2739.8
1980	9805.2	2351	2328.0	2230	6737	3399	2804.6	830.1	3496.1
1981	8361.5	2650	3044.8	2811	4740	4193	2915.2	1045	2868.2
1982	7540.5	2811	3207.6	2362	3891	3716	3030.3	1059	2488.4
1983	7165.9	2665	3192.1	2093	3423	3090	3150.7	1013	2274.4
1984	6466.3	2338	2792.6	2031	2992	2850	3240.0	861.9	1995.8
1985	7016.3	2352	2788.3	1628	2775	1983	3370.0	827.4	2082.0
1986	7191.9	2539	2755.8	1326	2120	1245	3520.0	782.9	2043.2
1987	5615.9	2857	2558.9	1460	1409	1345	3670.0	697.2	1530.2
1988	5636.3	1977	2517.2	1468	1348	1374	3820.0	659	1475.5
1989	5492.9	1992	2485.8	1462	1804	1615	3980.0	624.6	1380.1
1990	6101.9	2099	2429.8	1466	2603	1737	4150.0	585.5	1470.3

Source: As for Table AIV-1-2

APPENDIX AV-1
Real effective Exchange Rate

Measurement of Libya's Real Effective Exchange Rate

1- Tables AV-1 to AV-6 gives the direction of trade. These tables used to calculate the weights for Libya's trading partners. (value of trade with the country transacted in any specific year).

2- Table AV-7 shows the Nominal Exchange Rate (**NER**) for Libya's main trading partners in $US

3- Table AV-8 gives the Bilateral Nominal Exchange (**BNER**) rates by converts these currencies into a LD through the $US cross rate.

4- Table AV-9 depicts the Wholesale Price Index (**WPI**) for Libya and main trading partners.

5- Table AV-10 shows the Real Effective Exchange Rate (**REER**) which is the **BNER** multiplied by the respective of WPI of the domestic and trading partner's economy as follows:

REER = BNER (LD/F Currency) * WPIF/ WPID

where **F** and **D** refer to foreign and Libya respectively.

6- Table AV-11 gives the Import, export and trade weighted Real Effective Exchange Rate **REER**

Table AV-1-1

Imports (Value in LD. 000)

	1971	1973	1975	1978	1980	1981	1984	1986	1988	1990
USA	17.30	28.60	41.90	85.20	126.20	155.20	0.00	0.00	18.70	18.90
UK	24.90	37.20	57.70	96.60	139.70	172.30	109.70	133.30	142.60	127.30
Japan	15.20	34.40	86.80	101.40	151.30	189.60	176.80	63.40	197.50	65.90
Germany	23.20	56.10	127.30	173.70	267.20	261.00	289.00	161.00	193.20	221.10
Italy	57.70	139.10	271.90	328.30	592.60	750.30	367.80	300.60	361.00	279.70
France	21.40	44.10	92.70	113.40	135.60	155.80	101.20	64.20	78.50	111.30
Spain	2.60	13.50	26.20	14.10	88.40	73.60	n.a.	n.a	30.60	0.00
Greece	4.10	6.80	44.90	46.70	40.60	48.80	n.a.	n.a	29.30	22.00
Turkey	0.90	3.60	8.20	17.30	15.80	56.40	42.90	48.20	60.70	78.30
Yugoslavia	4.50	10.70	15.40	21.20	24.20	38.40	0.00	0.00	26.70	20.20
Holland	7.60	13.10	21.50	85.00	37.60	52.30	49.80	57.70	55.00	84.50
Canada	0.40	3.10	2.00	1.80	12.70	15.30	n.a	n.a	14.00	15.20
Bulgaria	2.70	4.30	29.00	12.90	25.10	26.80	n.a	n.a	0.00	0.00
Sweden	2.10	5.90	9.30	11.10	24.50	35.80	n.a	n.a	12.80	24.90
Romania	7.20	15.80	29.00	28.50	15.50	36.10	n.a	n.a	0.00	0.00
Austria	1.10	7.90	7.30	18.50	29.60	50.70	n.a	n.a	21.80	29.30
Ireland	0.10	0.60	1.00	9.90	36.50	34.10	n.a	n.a	12.70	0.00
Tunisia	8.20	6.30	13.20	16.10	15.00	18.40	n.a	n.a	14.60	33.10
Other Countries	49.20	108.80	163.40	180.90	228.10	310.50	704.50	487.30	415.70	379.20
Total	250.4	539.9	1048.7	1362.6	2006.2	2481.40	1841.7	1315.7	1685.4	1510.9

Source : Calculated from, Ministry of Planning, Economic and Social Indicators(1984 and 1994), and National Authority for Information and Documentation, 1990-94 and Central Bank of Libya, yearly statistical series various issues

Table AV-1-2

Exports (Value in LD. 000)

	1971	1973	1975	1978	1980	1981	1984	1986	1988	1990
USA	57.80	93.20	443.80	1158.0	2298.7	1263.70	n.a.	n.a.	n.a.	n.a.
UK	n.a.	n.a	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	32.30	66.80
Japan	3.00	13.30	68.70	4.30	87.80	97.20	n.a.	n.a.	n.a.	n.a.
Germany	168.30	254.50	394.20	314.70	818.40	474.80	377.10	62.30	135.20	243.10
Italy	231.50	334.90	442.90	638.40	1202.3	1099.20	899.00	797.10	799.20	1792.5
France	119.60	63.60	74.80	159.50	178.80	168.50	428.10	208.00	250.70	320.50
Spain	41.10	21.50	104.00	182.60	319.30	307.00	228.90	308.90	127.70	344.50
Greece	0.01	24.50	2.70	13.30	213.50	232.20	134.20	129.70	144.80	165.10
Turkey	2.20	0.50	33.30	73.20	207.00	235.60	189.70	108.30	22.90	136.70
Yugoslavia	0.05	3.20	13.50	13.10	81.30	84.70	136.50	44.00	44.70	99.80
Holland	56.70	39.50	41.90	84.00	109.70	127.90	n.a.	n.a.	96	104.70
Canada	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bulgaria	0.23	0.00	2.80	10.40	27.50	69.2	n.a.	n.a.	29.30	65.40
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Romania	n.a.	16.10	20.60	63.30	126.30	n.a.	n.a.	n.a.	n.a.	65.30
Austria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ireland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tunisia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	19.50
Brazil	4.50	18.20	55.60	21.70	52.60	94.30	n.a.	n.a.	n.a.	n.a.
Bahamas	n.a.	45.60	89.50	18.50	324.60	42.60	n.a.	n.a.	n.a.	n.a.
Other Countries	277.50	268.50	236.60	178.00	441.40	314.30	906.90	773.20	223.90	321.00

Source: As for Table VA-1-1

Table AV-1-3
Trade (Value LD.000)

	1971	1973	1975	1978	1980	1981	1984	1986	1988	1990
USA	75.10	121.80	485.70	1243.2	2424.9	1418.90	n.a.	n.a.	18.70	18.90
UK	24.90	37.20	57.70	96.60	139.70	172.30	109.70	133.3	174.90	194.10
Japan	18.20	47.70	155.50	105.70	239.10	286.80	176.80	63.4	197.50	65.90
Germany	191.50	310.60	521.50	488.40	1085.6	735.80	666.10	223.3	328.40	464.20
Italy	289.20	474.00	714.80	966.70	1794.9	1849.50	1266.8	1097.7	1160.2	2072.2
France	141.00	107.70	167.50	272.90	314.40	324.30	529.30	172.2	329.20	431.80
Spain	43.70	35.00	130.20	196.70	407.70	380.60	228.90	308.9	158.30	344.50
Greece	4.10	31.30	47.60	60.00	254.10	281.00	134.20	129.7	174.10	187.10
Turkey	3.10	4.10	41.50	90.50	222.80	292.00	232.60	156.5	83.60	215.00
Yugoslavia	4.60	13.90	28.90	34.30	105.50	123.10	136.50	44.0	71.40	120.00
Holland	64.30	52.60	63.40	169.00	147.30	180.20	49.8	57.7	151.00	189.20
Canada	0.40	3.10	2.00	1.800	12.70	15.30	n.a.	n.a.	14.00	15.20
Bulgaria	2.90	4.30	31.80	23.300	52.60	96.00	n.a.	n.a.	29.30	65.40
Sweden	2.10	5.90	9.30	11.100	24.50	35.80	n.a.	n.a.	12.80	24.90
Romania	7.20	31.90	49.60	91.800	141.80	36.10	n.a.	n.a.	0.00	65.30
Austria	1.10	7.90	7.30	18.500	29.60	50.70	n.a.	n.a.	21.80	29.30
Ireland	0.10	0.60	1.00	9.900	36.50	34.10	n.a.	n.a.	12.70	0.00
Tunisia	8.20	6.30	13.20	16.100	15.00	18.40	n.a.	n.a.	14.60	52.60
Brazil	4.50	18.20	55.60	21.700	52.60	94.30	n.a.	n.a.	n.a.	n.a.
Bahamas	n.a.	45.60	89.50	18.500	324.60	42.60	n.a.	n.a.	n.a.	n.a.
Other Countries	326.70	377.30	400.00	358.90	669.50	624.80	1611.4	1360.5	639.60	700.20
Total	1212.9	1737.0	3073.6	4295.6	8495.4	7092.60	5142.1	3747.2	3592.1	5255.8

Source: As for Table VA-1-1

Table AV-1-4
Direction of Imports (% of total)

	1971	1973	1975	1978	1980	1981	1984	1986	1988	1990	Average	Adjusted averag
USA	6.91	5.30	4.00	6.25	6.30	6.30	n.a.	n.a.	1.10	1.30	3.75	4.79
UK	9.94	6.89	5.50	7.09	7.00	6.90	6.00	10.10	8.50	8.40	7.63	9.74
Japan	6.07	6.37	8.28	7.44	7.50	7.60	9.60	4.80	11.70	4.40	7.38	9.42
Germany	9.27	10.39	12.14	12.75	13.30	10.50	15.70	12.20	11.50	14.60	12.24	15.63
Italy	23.04	25.76	25.93	24.09	29.50	30.20	20.00	22.80	21.40	18.50	24.12	30.80
France	8.55	8.17	8.84	8.32	6.80	6.30	5.50	4.90	4.70	7.40	6.95	8.88
Spain	1.04	2.50	2.50	1.04	4.40	3.00	n.a.	n.a.	1.80	n.a.	1.63	2.08
Greece	1.64	1.26	4.28	3.43	2.00	2.00	n.a.	n.a.	1.70	1.50	1.78	2.27
Turkey	0.36	0.67	0.78	1.27	0.80	2.30	2.30	3.70	3.60	5.20	2.10	2.68
Yugoslavia	1.80	1.98	1.47	1.56	1.20	1.50	0.00	0.00	1.60	1.30	1.24	1.58
Holland	3.40	2.43	2.05	6.24	1.90	2.10	2.70	4.40	3.30	5.60	3.41	4.35
Canada	0.16	0.57	0.19	0.13	0.60	0.60	n.a.	n.a.	0.80	1.00	0.41	0.52
Bulgaria	1.08	0.80	2.77	0.95	1.30	1.10	n.a.	n.a.	0.00	n.a.	0.80	1.02
Sweden	0.84	1.09	0.89	0.82	1.20	1.40	n.a.	n.a.	0.80	1.60	0.86	1.10
Romania	2.88	2.93	2.77	2.09	0.80	1.50	n.a.	n.a.	0.00	0.00	1.30	1.66
Austria	0.44	1.46	0.70	1.36	1.50	2.00	n.a.	n.a.	1.30	1.90	1.07	1.37
Ireland	0.04	0.11	0.10	0.73	1.80	1.40	n.a.	n.a.	0.80	0.00	0.50	0.64
Tunisia	3.28	1.17	1.26	1.18	0.70	0.70	n.a.	n.a.	0.90	2.20	1.14	1.46
Total											78.31	100.00

Source : Calculated from, Table VA-1-1

Table AV-1-5

Direction of Exports (% of Total)

	1971	1973	1975	1978	1980	1981	1984	1986	1988	1990	Average	Adjusted averag
USA	6.01	7.79	21.92	39.48	35.42	27.41	n.a.	n.a.	n.a.	n.a.	13.80	16.44
UK	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.69	1.78	0.35	0.42
Japan	0.31	1.11	3.39	0.15	1.35	2.11	n.a.	n.a.	n.a.	n.a.	0.84	1.00
Germany	17.49	21.26	19.47	10.73	12.61	10.30	11.43	2.56	7.09	6.49	11.94	14.22
Italy	24.05	27.98	21.87	21.77	18.53	23.84	27.24	32.78	41.92	47.87	28.79	34.29
France	12.43	5.31	3.69	5.44	2.76	3.65	12.97	8.55	13.15	8.56	7.65	9.11
Spain	4.27	1.80	5.14	6.23	4.92	6.66	6.94	12.70	6.70	9.20	6.46	7.70
Greece	n.a.	2.05	0.13	0.45	3.29	5.04	4.07	5.33	7.59	4.41	3.24	3.86
Turkey	0.23	0.04	1.65	2.50	3.19	5.11	5.75	4.45	1.20	3.65	2.78	3.31
Yugoslavia	0.01	0.27	0.67	0.45	1.25	1.84	4.14	1.81	2.34	2.66	1.54	1.83
Holland	5.89	3.30	2.07	2.86	1.69	2.77	n.a.	n.a.	5.03	2.80	2.64	3.14
Brazil	0.47	1.52	2.75	0.75	0.81	2.05	n.a.	n.a.	n.a.	n.a.	0.84	1.00
Bulgaria	0.02	n.a.	0.14	0.36	0.42	1.50	n.a.	n.a.	1.54	1.75	0.57	0.68
Bahamas	n.a.	4.91	5.00	0.67	3.37	0.99	n.a.	n.a.	n.a.	n.a.	1.49	1.77
Romania	n.a.	1.35	1.02	2.16	1.95	1.95	n.a.	n.a.	n.a.	1.74	1.02	1.22
Total											83.95	100.00

Source :Calculated from, Table VA-1-2

Table AV-1-6

Direction of Trade (% of Total)

	1971	1973	1975	1978	1980	1981	1984	1986	1988	1990	Average	Adjusted Average
USA	6.19	7.01	15.80	28.94	28.54	20.01	n.a	n.a	0.52	0.36	10.74	13.24
UK	2.05	2.14	1.88	2.25	1.64	2.43	2.13	3.56	4.87	3.69	2.66	3.28
Japan	1.50	2.75	5.06	2.46	2.81	4.04	3.44	1.69	5.50	1.25	3.05	3.76
Germany	15.8	17.88	16.97	11.37	12.78	10.37	12.95	5.96	9.14	8.83	12.20	15.04
Italy	23.8	23.84	23.26	22.50	21.13	26.08	24.64	29.29	32.30	39.43	26.63	32.83
France	11.6	6.20	5.45	6.35	3.70	4.57	10.29	4.60	9.17	8.22	7.02	8.65
Spain	3.60	2.02	4.24	4.58	4.80	5.37	4.45	8.24	4.41	6.55	4.83	5.95
Greece	0.34	1.80	1.55	1.40	2.99	3.96	2.61	3.46	4.85	3.56	2.65	3.27
Turkey	0.26	0.24	1.35	2.11	2.62	4.12	4.52	4.18	2.33	4.09	2.58	3.18
Yugoslavia	0.38	0.80	0.94	0.80	1.24	1.74	2.65	1.17	1.99	2.28	1.40	1.73
Holland	5.30	3.03	2.06	3.93	1.73	2.54	0.97	1.54	4.20	3.60	2.89	3.56
Canada	0.03	0.18	0.07	0.04	0.15	0.22	n.a	n.a	0.39	0.29	0.14	0.17
Bulgaria	0.24	0.25	1.04	0.54	0.62	1.35	n.a	n.a	0.82	1.24	0.61	0.75
Sweden	0.17	0.34	0.30	0.26	0.29	0.51	n.a	n.a	0.36	0.47	0.27	0.33
Romania	0.59	1.84	1.61	2.14	1.67	0.51	n.a	n.a	0.00	1.24	0.96	1.18
Austria	0.09	0.46	0.24	0.43	0.35	0.72	n.a	n.a	0.61	0.56	0.35	0.43
Ireland	0.01	0.04	0.03	0.23	0.43	0.48	n.a	n.a	0.35	n.a.	0.16	0.20
Tunisia	0.68	0.36	0.43	0.37	0.18	0.26	n.a	n.a	0.41	1.00	0.37	0.46
Brazil	0.37	1.05	1.81	0.51	0.62	1.33	n.a	n.a	n.a.	n.a.	0.57	0.70
Bahamas	n.a.	2.63	2.91	0.43	3.8	0.60	n.a	n.a	n.a.	n.a.	1.04	1.28
Total											81.12	100.0

Source :Calculated from, Table VA-1-3

Table AV-1-7

Nominal Exchange Rates for Libya's Main Trading Partners 1971-1990 ($USA / domestic Currency)

	Libya	USA	UK	Italy	Germany	France	Greece	Spain	Japan	Holland	Turkey	Tunisia	Canada
1971	3.3722	1.0957	2.5525	0.0017	0.3060	0.0004	0.0333	0.0151	0.0032	0.3069	0.0704	2.0833	0.9978
1972	3.3052	1.0967	2.3481	0.0017	0.3124	0.1953	0.0333	0.0157	0.0033	0.3099	0.0704	2.0661	1.0044
1973	2.9679	1.2063	2.3232	0.0016	0.3700	0.2124	0.0333	0.0176	0.0036	0.3540	0.0704	2.2467	1.0042
1974	2.9679	1.2244	2.3486	0.0015	0.4150	0.2250	0.0337	0.0178	0.0033	0.3990	0.0714	2.4594	1.0089
1975	2.9679	1.1707	2.0235	0.0015	0.3813	0.2229	0.0333	0.0167	0.0033	0.3720	0.0658	2.3513	0.9839
1976	2.9679	1.1618	1.7024	0.0011	0.4233	0.2012	0.0281	0.0146	0.0034	0.4070	0.0599	2.3202	0.9909
1977	2.9679	1.2147	1.9060	0.0011	0.4751	0.2125	0.0270	0.0124	0.0042	0.4386	0.0515	2.4266	0.9909
1978	2.9679	1.3028	2.0345	0.0012	0.5470	0.2392	0.0282	0.0143	0.0061	0.5079	0.0395	2.4789	0.8432
1979	2.9679	1.3173	2.2240	0.0012	0.5775	0.2488	0.0278	0.0151	0.0042	0.5248	0.0282	2.5259	0.8561
1980	2.9679	1.2754	2.3850	0.0011	0.5105	0.2214	0.0261	0.0126	0.0049	0.4696	0.0111	2.3883	0.8370
1981	2.9679	1.1639	1.9080	0.0008	0.4435	0.1740	0.0215	0.0103	0.0045	0.4051	0.0075	1.9391	0.8432
1982	2.9679	1.1031	1.6145	0.0073	0.4173	0.1487	0.0174	0.0080	0.0043	0.3810	0.0054	1.6239	0.8134
1983	2.9679	1.0470	1.4506	0.0006	0.3671	0.1198	0.0142	0.0064	0.0043	0.3263	0.0035	1.3753	0.8036
1984	2.9679	0.9802	1.1565	0.0005	0.3177	0.1043	0.0101	0.0058	0.0040	0.2817	0.0022	1.1539	0.7568
1985	2.9679	1.0984	1.4445	0.0006	0.4063	0.1323	0.0068	0.0065	0.0040	0.3608	0.0017	1.321	0.7156
1986	3.1575	1.2332	1.4745	0.0007	0.5153	0.1549	0.0072	0.0076	0.0063	0.4562	0.0013	1.1902	0.7244
1987	2.9822	1.4187	1.8715	0.0009	0.6323	0.1873	0.0079	0.0092	0.0081	0.5626	0.9794	1.2855	0.7693
1988	2.8646	1.3457	1.8095	0.0008	0.5617	0.1650	0.0068	0.0088	0.0079	0.5001	0.5510	1.1130	0.8384
1989	2.9558	1.3142	1.6055	0.0008	0.5890	0.1728	0.0063	0.0091	0.0070	0.5221	0.4322	1.1055	0.8637
1990	2.8372	1.4227	1.9280	0.0009	0.6693	0.1950	0.0063	0.0103	0.0074	0.5917	0.3413	1.1567	0.8618

Source: IMF,IFS various issues

Note: * in terms of SDR

Table AV-1-8

Bilateral Exchange Rates with Libya for Main Trading Partners 1971-1990 ($US Per Foreign Currency)

	USA	UK	Italy	Germany	France	Greece	Spain	Japan	Holland	Turkey	Tunisia	Canada
1971	0.3249	0.7569	0.0005	0.0907	0.0001	0.0099	0.0045	0.0009	0.0910	0.0209	0.6178	0.2959
1972	0.3318	0.7104	0.0005	0.0945	0.0591	0.0101	0.0048	0.0010	0.0938	0.0213	0.6251	0.3039
1973	0.4064	0.7828	0.0005	0.1247	0.0716	0.0112	0.0059	0.0012	0.1193	0.0237	0.7570	0.3384
1974	0.4125	0.7913	0.0005	0.1398	0.0758	0.0114	0.0060	0.0011	0.1344	0.0241	0.8287	0.3399
1975	0.3945	0.6818	0.0005	0.1285	0.0751	0.0112	0.0056	0.0011	0.1530	0.0222	0.7922	0.3315
1976	0.3915	0.5736	0.0004	0.1426	0.0678	0.0095	0.0049	0.0011	0.1371	0.0202	0.7818	0.3339
1977	0.4093	0.6422	0.0004	0.1601	0.0716	0.0091	0.0042	0.0014	0.1478	0.0174	0.8176	0.3339
1978	0.4349	0.6855	0.0004	0.1843	0.0806	0.0095	0.0048	0.0021	0.1711	0.0133	0.8352	0.2841
1979	0.4438	0.7494	0.0004	0.1946	0.0838	0.0094	0.0051	0.0014	0.1768	0.0095	0.8511	0.2885
1980	0.4297	0.8036	0.0004	0.1720	0.0746	0.0088	0.0042	0.0017	0.1582	0.0037	0.8047	0.2820
1981	0.3922	0.6429	0.0003	0.1494	0.0586	0.0072	0.0035	0.0015	0.1365	0.0025	0.6534	0.2841
1982	0.3717	0.5440	0.0025	0.1406	0.0501	0.0059	0.0027	0.0014	0.1284	0.0018	0.5472	0.2741
1983	0.3528	0.4888	0.0002	0.1237	0.0404	0.0048	0.0022	0.0014	0.1099	0.0012	0.4634	0.2708
1984	0.3303	0.3897	0.0002	0.1070	0.0351	0.0034	0.0020	0.0013	0.0949	0.0007	0.3888	0.2550
1985	0.3701	0.4867	0.0002	0.1369	0.0446	0.0023	0.0022	0.0013	0.1216	0.0006	0.4451	0.2411
1986	0.3906	0.4670	0.0002	0.1632	0.0491	0.0023	0.0024	0.0020	0.1445	0.0004	0.3769	0.2294
1987	0.4757	0.6276	0.0003	0.2120	0.0628	0.0026	0.0031	0.0027	0.1887	0.3284	0.4311	0.2580
1988	0.4698	0.6317	0.0003	0.1961	0.0576	0.0024	0.0031	0.0028	0.1746	0.1923	0.3885	0.2927
1989	0.4446	0.5432	0.0003	0.1993	0.0585	0.0021	0.0031	0.0024	0.1766	0.1462	0.3740	0.2922
1990	0.5014	0.6795	0.0003	0.2359	0.0687	0.0022	0.0036	0.0026	0.2086	0.1203	0.4077	0.3038

Source: IMF,IFS various issues

Table AV-1-9

Wholesale price index for Libya's Main trading Partners 1971-1990

	Libya	USA	UK	Italy	Germany	France	Greece	Spain	Japan	Holland	Turkey	Tunisia	Canada
1971	33.0	42.4	30.3	24.8	64.1	46.9	24.4	30.9	48.0	53.0	5.5	54.3	47.5
1972	34.5	44.3	32.2	25.8	65.1	49.1	26.0	33.0	48.4	57.2	7.8	55.1	49.8
1973	40.2	50.1	34.5	30.1	68.4	56.3	31.7	26.4	56.0	61.7	9.4	58.0	53.5
1974	48.8	59.6	42.6	42.5	78.7	72.7	41.6	43.0	73.7	67.6	12.2	70.8	59.4
1975	65.6	65.0	52.4	49.1	82.3	68.6	45.0	46.9	75.9	74.6	13.5	76.8	65.8
1976	86.4	68.1	60.9	57.1	85.4	73.6	51.3	53.1	79.7	81.3	15.7	77.8	70.7
1977	96.2	72.2	72.0	66.5	87.7	77.7	58.3	63.8	81.2	86.6	19.4	81.6	76.4
1978	94.7	77.9	79.1	72.1	88.7	81.1	64.4	74.3	79.1	90.1	29.1	84.2	83.1
1979	96.4	87.6	87.7	83.4	93.0	91.9	77.9	85.1	84.9	93.9	47.9	90.3	90.8
1980	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1981	102.7	109.1	109.6	116.6	107.8	117.7	126.0	115.6	101.4	106.7	136.0	112.6	112.4
1982	103.8	111.3	118.0	132.7	114.1	123.3	146.0	129.7	103.2	113.0	171.3	131.6	124.6
1983	104.8	112.7	124.4	145.7	115.8	135.9	174.9	148.2	100.9	115.5	223.8	140.3	131.9
1984	103.7	115.4	132.1	160.8	119.2	155.1	212.4	166.3	100.7	120.0	340.2	150.2	137.6
1985	100.2	114.9	139.4	182.6	121.9	161.3	256.1	179.5	99.6	122.7	477.1	161.0	143.1
1986	97.0	116.0	142.7	181.0	118.9	163.2	298.1	181.1	90.5	122.8	618.3	170.2	149.1
1987	95.5	120.4	147.3	185.7	115.9	166.3	327.5	182.7	87.1	122.0	816.3	174.7	155.5
1988	96.4	127.0	152.6	194.5	117.3	173.2	360.3	188.1	86.2	122.8	1391.2	197.4	161.8
1989	97.4	130.2	153.2	206.9	121.0	179.5	408.5	196.0	88.4	124.2	2281.5	211.8	169.8
1990	99.4	131.6	152.4	222.2	123.1	182.1	473.8	200.1	90.2	127.2	3474.7	225.0	178.0

Source: As for Table VA-1-8

Table AV-1-10

Bilateral Real Exchange Rates for Libya's Main Trading Partners 1971-1990 (L.D. Per Domestic Currency)

	USA	UK	Italy	Germany	France	Greece	Spain	Japan	Holland	Turkey	Tunisia	Canada
1971	0.4174	0.6950	0.6950	0.1762	0.0001	0.0073	0.0042	0.0013	0.1462	0.0035	1.0166	0.4259
1972	0.4261	0.6630	0.6630	0.1783	0.0841	0.0076	0.0046	0.0014	0.1555	0.0048	0.9983	0.4387
1973	0.5065	0.6718	0.6718	0.2122	0.1003	0.0088	0.0039	0.0017	0.1831	0.0055	1.0922	0.4504
1974	0.5038	0.6908	0.6908	0.2255	0.1129	0.0097	0.0053	0.0017	0.1862	0.0060	1.2023	0.4137
1975	0.3909	0.5446	0.5446	0.1612	0.0785	0.0077	0.0040	0.0013	0.1740	0.0046	0.9275	0.3325
1976	0.3086	0.4043	0.4043	0.1409	0.0578	0.0056	0.0030	0.0010	0.1290	0.0037	0.7040	0.2732
1977	0.3072	0.4806	0.4806	0.1460	0.0578	0.0055	0.0028	0.0012	0.1331	0.0035	0.6935	0.2652
1978	0.3577	0.5726	0.5726	0.1726	0.0690	0.0065	0.0038	0.0018	0.1628	0.0041	0.7426	0.2493
1979	0.4033	0.6818	0.6818	0.1877	0.0799	0.0076	0.0045	0.0012	0.1722	0.0047	0.7972	0.2717
1980	0.4297	0.8036	0.8036	0.1720	0.0746	0.0088	0.0042	0.0017	0.1582	0.0037	0.8047	0.2820
1981	0.4166	0.6861	0.6861	0.1568	0.0672	0.0088	0.0039	0.0015	0.1418	0.0033	0.7164	0.3109
1982	0.3986	0.6184	0.6184	0.1546	0.0595	0.0083	0.0034	0.0014	0.1398	0.0030	0.6938	0.3290
1983	0.3794	0.5802	0.5802	0.1367	0.0524	0.0080	0.0031	0.0013	0.1211	0.0026	0.6204	0.3408
1984	0.3676	0.4964	0.4964	0.1230	0.0525	0.0070	0.0032	0.0013	0.1098	0.0023	0.5631	0.3384
1985	0.4244	0.6771	0.6771	0.1665	0.0718	0.0059	0.0039	0.0013	0.1489	0.0029	0.7152	0.3443
1986	0.4671	0.6870	0.6870	0.2000	0.0826	0.0071	0.0045	0.0019	0.1829	0.0025	0.6613	0.3526
1987	0.5997	0.9680	0.9680	0.2573	0.1094	0.0089	0.0059	0.0025	0.2411	2.8070	0.7886	0.4201
1988	0.6189	1.0000	1.0000	0.2386	0.1035	0.0090	0.0060	0.0025	0.2224	2.7752	0.7955	0.4913
1989	0.5943	0.8544	0.8544	0.2476	0.1078	0.0088	0.0062	0.0022	0.2252	3.4246	0.8133	0.5094
1990	0.6638	1.0418	1.0418	0.2921	0.0259	0.0105	0.0072	0.0024	0.2669	4.2053	0.9229	0.5440

Source: Calculated from Tables VA-1-8 & VA-1-9

Table AV-1-11

Real Effective Exchange Rate for Libya , 1971-1990 (LD. per $US)

	Import Weighted	REER Index 1971=100	Export Weighted	REER Index 1971=100	Trade Weighted	REER Index 1971=100
1971	35.21	100	34.06	100	34.40	100
1972	34.75	99	33.93	100	34.15	99
1973	36.43	104	36.28	107	36.33	106
1974	37.68	107	37.23	109	37.36	109
1975	29.41	84	29.01	85	29.12	85
1976	22.32	63	22.13	65	22.19	65
1977	25.45	72	24.84	73	25.01	73
1978	30.14	86	29.46	87	29.63	86
1979	35.25	100	34.36	101	34.57	101
1980	39.98	114	38.70	114	38.99	113
1981	34.65	98	34.06	100	34.19	99
1982	31.67	90	31.30	92	31.38	91
1983	29.54	84	29.27	86	29.32	85
1984	25.70	73	25.93	76	25.86	75
1985	34.54	98	34.07	100	34.17	99
1986	35.85	102	35.82	105	35.79	104
1987	55.99	159	58.31	171	58.00	169
1988	57.80	164	59.25	174	58.93	171
1989	53.84	153	56.11	165	55.60	162
1990	64.20	182	66.39	195	65.96	192
Change between						
1971-1975		-16%		-15%		-15%
1973-1982		-14%		-15%		-15%
1983-1990		98%		109%		107%
1971-1990		82%		95%		92%

Source: Calculated from Tables AV-1-1 to AV-10

APPENDIX AVI-1
Agriculture Statistical Data

Table AVII-1-1 Production of Principle Crops 1968-1991 (000 tons)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Cereals Total	164	216.5	205.2	213.5	179.2	292.9	206	289	350	130.4	319	223	225	282	296	425.7	329	364	383	368	292	331	282	320
Wheat	52	78.4	27.2	17.7	41.6	67.3	38.7	75.1	130	48.1	99.3	110	140.5	132	183	209.7	189	202	215	84.7	161	185	128	129
Barley	98.4	124	52.3	32.1	116.4	204.5	145	192	196	59.2	197	100	71	138	99.6	203	127	148	151	265	119	134	141	178
Maize	1.3	1.6	1.3	0.8	1.3	1.2	1.2	1.2	1.1	1.1	1.2	1.1	0.9	0.9	1.0	1.0	1.0	1.2	1.2	1.2	1.0	1.0	1.0	1.0
Legumes	12.3	12.5	12.4	15.5	19.9	19.9	21.6	21.1	22.2	22	21.8	12	12.6	11.7	12	12	12	12	16	17	11	11	12	12
Vegetables Total	185.5	202.7	205.2	252.4	283	477.6	517	562	591	565.4	564	583	658	661	724	773	820	827	959	989	1015	1042	1083	1166
Potatoes	11.8	12	10	22.8	21	117	100	102	102	102	103	103	103	109	113	115	93	131	183	157	127	131	145	180
Tomatoes	125	130	131	131	131	135	136	136	138	143	136	136	163	140	182	195	195	207	210	196	135	147	151	167
Watermelons	24	22.3	21	50	58	117	127	132	138	143	147	150	171	180	125	118	125	140	142	145	147	150	155	158
Dry Onions	11.7	21.4	24	26	28	39	60	85	96	114	110	111	122	131	71	78	82	125	132	131	136	136	140	147
Other	13	17	19.2	22.6	45	69.6	94	107	117	63.4	68	83	99	101	233	267	325	224	292	360	470	478	492	514
Fruit tree Total	297.6	188.4	220.9	235	282	345.7	316	372	421	461	420	388	427	424	489	516	543	535	552	549	568	574	560	622
Fruit & Citrus	92	90.2	90.3	108.1	111.6	115.7	135	130	160	191.4	162	160	162	170	250	270.2	280	260	268	261	267	274	253	293
Olives	140	33	71.2	50	95	149.3	95	151	155	142	143	100	150	155	143	147.9	149	156	160	160	162	165	169	187
Almonds	2.6	3.6	3.8	3.7	3.6	3.8	4.2	4.2	5.4	4.6	5.3	5.5	5.2	5.8	5.5	5.1	5.0	6.0	6.0	6.0	6.0	6.0	6	6
Dates	56.7	55.1	49.1	66.2	66.2	66.2	66.2	68	82	100	87	98	87	68	74	72	90	92	97	100	101	106	108	108
Grapes	6.3	6.5	6.5	6.5	6	11	15.6	18.4	18	23	23	24	23	25	16	21	19	20.5	21	22	32	23	24	28.2
All Agricultural Crops	647.1	607.6	631.3	700.9	744.2	1116.2	1017	1202	1339	1135	1281	1182	1297	1355	1495	1703	1679	1713	1879	1976	1864	1936	1914	2096
Meat (Red & White)	34.5	37.6	54.1	26.3	33.4	54.1	69	75	84	87	88	97	117	95	103	125	136	141	143	150	157	162	166	169
Milk	48.2	50.5	65	53.4	56.7	65	72.3	86.6	93.7	81.9	86.9	93.9	110	110	115	120	143	150	210	220	234	246	299	292
Eggs (Mn)	42	44.3	72.7	47	42	72.7	109	160	231	218	240	273	285.4	327	340	390	446	454	500	540	557	600	640	654

Source : Ministry of Agriculture, Annual Report of Agricultural Production, several issues, and National Authority for Information and Documentation, yearly statistical series, varies issues.

Table AVI-1-2 Number of Livestock (Thousand)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Cattle	119	105	108	301	306	321	150	189	196	179	183	180	162	145	130	170	190	200	210	212	215	218	220	150	135	140
Goats	1336	1299	1234	1141	1109	1000	1147	1697	1857	1514	1617	1463	1500	1529	1675	1672	1000	900	950	960	965	970	980	1200	1190	1230
Sheep	1667	1928	2163	2284	2274	3100	3500	4185	4496	3826	3982	5445	500	5490	5129	5280	5000	5500	5700	5793	5800	5800	5880	5500	5700	5900
Camels	235	206	163.0	120	122	120	64	71	75	69	71	134	136	278	103	109	73	170	180	180	190	190	140	150	155	160

Source: As for Table AVI-1-1

Table AVI-1-3

Production of Fish 1975-1985 (000,tons)

	Tuna	Other	Total
1975	680	4803	5483
1976	799	4059	4858
1977	336	2046	2382
1978	977	4355	5332
1979	424	4500	4924
1980	398	5200	5598
1981	271	6418	6689
1982	160	7425	7585
1983	270	7588	7858
1984	274	4755	5029
1985	337	2755	3092

Source: Ministry of Planning, Economic Resources in Libya, Tripoli, 1986, p. 23.

Table AVI-1-4

Number of Major Fruit Brining Trees and their Rate of Production 1968-1984

	Dates			Olives			Almonds		
	No, of	Production		No, of	Production		No, of	Production	
	Tree	Tons	Avere.(kg/tree)	Tree	Tons	Avere.(kg/tree)	Tree	Tons	Avere.(kg/tree)
1968	5888	25880	4.4	3135	14.1	4.5	2639	5673	2.2
1969	5708	35691	6.3	3336	33.1	9.9	2531	5513	2.2
1970	6589	37873	5.8	3247	70	22	2547	3561	1.4
1971	7100	35600	5.0	3310	50.0	15.1	2395	6619	2.8
1975	4639	68149	14.7	7627	151	19.8	2081	4236	2.1
1976	4642	82396	17.8	7630	155.1	20.3	2093	5387	2.6
1977	4646	99623	21.4	7513	42	5.6	2105	4690	2.2
1978	4650	86523	18.6	7535	143.4	19	2114	5275	2.5
1979	4653	97694	21.0	7483	100	13.4	2114	5500	2.6
1980	4650	86523	18.6	7559	161	21.3	2114	5275	2.5
1981	3054	67449	22.1	7166	155.3	21.7	2031	14543	7.2
1982	3554	73500	20.7	–	73.1	–	2435	–	–
1983	4172	72400	17.4	8383	78.1	9.3	2567	–	–
1984	4216	74201	17.6	8383	82	9.8	2778	–	–

Source: Ministry of Planning, Economic Resources in Libya, Tripoli, 1986, pp.15,16 and 17

Table AVI-1.5

Development of Agricultural Subsidy Rates

	Rates of Agricultural Subsidy			
	1963-1974		1975-1984	
	Individuals	Agricultural Associations	Individuals	Agricultural Associations
Agrochemical	40%	60%	40%	80%
Pesticides	40%	60%	40%	60%
Agricultural Machinery	25%	50%	25%	60%
Water Projects	50%	60%	50%	50%
Animal Fodder's	40%	60%	40%	80%
Bees Equipment	40%	60%	40%	80%
Other	50%	50%	50%	50%

Source: Agricultural Bank, Annual Report of 1975, No, 19, p. 63 Tripoli, 1975.

Table AVI-1-6

Proposed Agricultural Improvement Objectives 1976-1980

Sub-Sector	By the End of 1975	By the End of 1980	Growth Rate
Agricultural Land (000,ha)	719	1076	50
Irrigated Land (000, ha)	168	268	60
Dry Farming (000, ha)	551	808	47
Wheat (000, tons)	75	336	348
Barley (000, tons)	180	245	36
Vegetables (000, tons)	620	825	32
Fruits (000, tons)	141	255	81
Meat (000, tons)	46	98	133
Dairy Products (000, tons)	85	290.00	241
Eggs (000, tons)	9	28.00	211
Improved Cattle (000, heads)	19	92.00	384
Sheep (000,000, heads)	3	4.5	50
Honey (tons)	350	600	71
Poultry (000,000, Broiler Birds)	11	16	45

Source: Ministry of Planning, Economic and Social Transformation Plan of 1976-1990, p. 10

Table AVI-1-7

Composition of Food and Agricultural Imports, 1973 & 1982

	1973		1982	
	Value (000,$)	(%) of total	Value (000,$)	(%) of total
Total Food and Agricultural Products	437.40	100.00	1466.6	100.00
Food and Live Animals	277.60	63.50	1068.2	72.80
Live Animals	44.80	10.20	297.20	20.30
Meat	10.10	2.30	50.50	3.40
Dairy Products and Eggs	28.90	6.60	85.10	5.80
Cereals	88.70	20.30	266.10	18.10
Vegetables and Fruit	34.80	8.00	85.90	5.90
Sugar and Honey	24.50	5.60	44.10	3.00
Coffee, Tea and Cocoa	22.00	5.00	86.80	5.90
Feeding Stuffs	21.30	4.90	137.40	9.40
Miscellaneous Food	2.50	0.60	15.10	1.00
Beverages and Tobacco	5.93	1.4	34.80	2.40
Beverages	0.03	0.01	0.01	0.00
Tobacco	5.90	1.40	34.80	2.40
Crude Materials	6.80	1.60	13.20	0.90
Hides and Skins	0.00	0.00	0.00	0.00
Oil Seeds	0.50	0.10	2.30	0.20
Natural Rubber	0.90	0.20	0.20	0.00
Textiles Fibbers	0.30	0.10	0.90	0.10
Crude Materials	5.10	1.20	9.80	0.70
Animal Fat and Vegetables Oil	31.80	7.30	94.90	6.50
Animal Fat	0.10	0.02	0.01	0.00
Fixed Vegetable Oils	31.40	7.20	92.50	6.30
Processed Oils	0.30	0.10	2.40	0.20
Fish and Fishery Products	3.40	0.80	16.00	1.10
Forest Products	78.80	18.00	120.30	8.20
Agricultural Requisites	33.10	7.60	98.20	6.70
Crude Fertilizers	0.10	0.02	0.10	0.01
Manufactured Fertilizers	8.00	1.80	7.30	0.50
Pesticides	4.70	1.20	6.10	0.40
Agricultural Machines	20.30	4.60	84.70	5.80
Total Agricultural Products	321.40	73.48	1211.1	82.60

Source: Calculated From National Authority for Information and Documentation, yearly statistical series various issues and Central Bank of Libya, yearly statistical series, and monthly Bulletin various issues

Table AVI-1-8
Composition of Food and Agricultural Exports, 1973 & 1982

	1973		1982	
	Value (000,$)	(%) of total	Value (000,$)	(%) of total
Total Food and Agricultural products	8.720	100.00	12.100	100.00
Food and Live Animals	0.150	1.72	0.000	0.00
Live Animals	0.030	0.34	0.000	0.00
Meat	0.000	0.00	0.000	0.00
Dairy products and Eggs	0.010	0.11	0.000	0.00
Cereals	0.100	1.15	0.000	0.00
Vegetables and Fruit	0.002	0.02	0.000	0.00
Sugar and Honey	0.003	0.03	0.000	0.00
Coffee, Tea and Cocoa	0.000	0.00	0.000	0.00
Feeding Stuffs	0.000	0.00	0.000	0.00
Miscellaneous Food	0.001	0.01	0.000	0.00
Beverages and Tobacco	0.440	5.05	0.000	0.00
Beverages	0.004	0.05	0.000	0.00
Tobacco	0.040	0.46	0.000	0.00
Crude Materials	8.100	92.89	0.000	0.00
Hides and Skins	4.600	52.75	0.000	0.00
Oil Seeds	0.100	1.15	0.000	0.00
Natural Rubber	0.000	0.00	0.000	0.00
Textiles Fibbers	3.200	36.70	0.000	0.00
Crude Materials	0.20	2.29	0.000	0.00
Animal Fat and Vegetables Oil	0.000	0.00	0.000	0.00
Animal Fat	0.000	0.00	0.000	0.00
Fixed Vegetable Oils	0.000	0.00	0.000	0.00
Processed Oils	0.000	0.00	0.000	0.00
Fish and Fishery Products	0.030	0.34	0.000	0.00
Forest Products	0.000	0.00	0.000	0.00
Agricultural Requisites	0.000	0.00	9.000	74.38
Crude Fertilizers	0.000	0.00	0.000	0.00
Manufactured Fertilizers	0.000	0.00	3.100	25.62
Pesticides	0.000	0.00	0.000	0.00
Agricultural Machines	0.000	0.00	0.000	0.00
Total Agricultural Products	8.300	95.18	12.100	100.00

Source: Ibid.

Table AVI-1-9

Food and Agricultural Trade Balance, 1973 & 1982

	1973	1982
Total Food and Agricultural products	-428.7	1454.5
Food and Live Animals	-277.5	1068.2
Live Animals	-44.8	-297.2
Meat	-10.1	-50.5
Dairy products and Eggs	-28.9	-85.1
Cereals	-88.6	-266.1
Vegetables and Fruit	-34.8	-85.9
Sugar and Honey	-24.5	-44.1
Coffee, Tea and Cocoa	-22.0	-86.8
Feeding Stuffs	-21.3	-137.4
Miscellaneous Food	-2.5	-15.1
Beverages and Tobacco	-5.5	-34.8
Beverages	0.0	0.0
Tobacco	-5.9	-34.8
Crude Materials	1.3	-13.2
Hides and Skins	4.6	0.0
Oil Seeds	-0.4	-2.3
Natural Rubber	-0.9	-0.2
Textiles Fibbers	2.9	-0.9
Crude Materials	-4.9	-9.8
Animal Fat and Vegetables Oil	-31.8	-94.9
Animal Fat	-0.1	0.0
Fixed Vegetable Oils	-31.4	-92.5
Processed Oils	-0.3	-2.4
Fish and Fishery Products	-3.4	-16.0
Forest Products	-78.8	-120.3
Agricultural Requisites	-33.1	-89.2
Crude Fertilizers	-0.1	-0.1
Manufactured Fertilizers	-8.0	-4.2
Pesticides	-4.7	-6.1
Agricultural Machines	-20.3	-84.7
Total Agricultural Products	-313.1	1199.0

Source: As Table VII-4

Appendix AVI-2

Index of Real Producers' Prices of Agricultural Production in Libya 1975-1980

This appendix summarises the main steps followed in constructing an index of real producer's price. This index is obtained by deflating the wholesale price index (WPI) by a composite cost index for three groups of agricultural products: cereals, vegetables and fruit. In order to accommodate the impact of technology on productivity growth, we take technical coefficients of production into consideration.

In other words the total cost of production, C, for individual products, r, in respective years, n, can be expressed as a sum of input prices p_i weighted by technical coefficients α_{1n} as follows:

$$C_{in} = \Sigma\,(p_{in}\,.\,\alpha_{in}) \qquad (1)$$

(1) An estimated average production cost for some agricultural products in Libya is available for the period 1970-1980 at 1975 constant prices, from the Department of Statistics and Agricultural Research Centre (Table AVI-2-1). These figures had been deflated using the general cost of living index (COL) at 1975, thus establishing the real cost of production for the period 1975-1980 in 1975 constant prices.

(2) Cost shares of inputs were taken as the technical coefficient of production α, considering 1975 as a base year (Table AVI-2-2)

(3) Input prices p_{in} for the same period are taken from the Ministry of Agriculture and Land Reclamation statistical series various issues (Table AVI-2-3).

(4) The total cost for single crops, C, can be then obtained according to the identity (1) above. (Table AVI-2-4).

(5) Indexes for the main agricultural groups (cereals, vegetables, and fruit) were then constructed (Table AVI-2-5).

(6) Real producers prices can be then obtained by deflating the wholesale price index for agricultural commodities (Table AVI-2-6) by the composite cost index for the respective commodity group, (Table AVI-2-7).

Table AVI-2-1

Per Hectare Production Cost for some Agricultural Crops, in Libya 1975-1980

(An Average at constant 1975 prices)

	Land	Machinery	Material	Water	Labour	Total
Wheat	120	9.4	17.57	27.5	16.45	190.42
Barely	120	9.4	16.87	27.37	17.45	190.59
Tomatoes	120	15.1	482.9	390.93	157.4	1165.8
Potatoes	120	13.67	352.3	205.4	113.17	804.04
Watermelon	120	35.87	632.1	565.33	503.87	1856.7
Citrus	120	7.3	195.4	229.7	97.0	647.90
Onion	120	5.67	164.8	51.5	59.83	401.30

Source: Calculated from Department of Statistics, Agricultural Statistics, various issues.

Table VI-2-2

Input Share in Production Cost For some Agricultural Crops in Libya, 1975-1980, (LD per hectare)

	Land	Machinery	Materia l	Water	Labour	Total
Wheat	0.63	0.05	0.09	0.14	0.09	1.00
Barely	0.63	0.05	0.09	0.14	0.09	1.00
Tomatoes	0.10	0.01	0.41	0.34	0.14	1.00
Potatoes	0.15	0.02	0.44	0.26	0.14	1.00
Watermelon	0.06	0.02	0.34	0.31	0.27	1.00
Citrus	0.18	0.01	0.30	0.36	0.15	1.00
Onion	0.30	0.01	0.41	0.13	0.15	1.00

Source: Calculated from Table VI-1

Table AVI-2-3

Index of Prices Paid by Farmers 1975-1980 (1975=100)

	Land	Machinery	Fertilizers	Seeds	Pesticides	Material	Wages
1975	100	100	100	100	100	100.0	100.0
1976	113	106	66	110	104	86.5	125.0
1977	125	113	58	112	85	78.3	148.0
1978	140	118	82	125	63	88.0	175.0
1979	157	122	115	128	86	111.0	218.0
1980	178	275	125	140	106	124.0	245.0
Annual Growth	10.2%	24.6%	7.4%	5.8%	2.60%	4.6%	16.4%

Source: Agricultural Research Center, National Authority for Information and Documentation, yearly statistical serious, several issues. and Central Bank of Libya, yearly statistical series, and monthly Bulletin, various issues

Table AVI-2-4

Cost Index for Some Agricultural Crops in Libya 1975-1980 (1975=100)

	Wheat	Barely	Tomatoes	Potatoes	Onion	Watermelon	Citrus
1975	100	100	100	100	100	100	100
1976	108	107.7	94.8	97.2	100.5	98.9	97.3
1977	116	115.8	93	96.5	103.1	100.7	97.5
1978	130	130.1	105.7	109.5	117	115.3	110.8
1979	150	150.1	130.6	134.2	140.9	142.8	135.5
1980	177	176.5	147.9	153.3	141.9	159.7	153.4

Source: Calculated from Tables AVI-3 and AVI-4.

Table AVI-2-5

Composite Cost Index for Groups of Agricultural Products (1975=100)

	Cereals	Vegetables	Fruit
1975	100.0	100.0	100.0
1976	107.7	97.5	97.3
1977	115.8	97.5	97.5
1978	130.1	110.7	110.8
1979	150.1	135.2	135.5
1980	176.5	147.7	153.4

Source: Calculated from Tables AVI-4

Table AVI-2-6

Wholesale Price Index For Major Agricultural Products Groups 1975=100

	Cereals	Vegetables	Fruit
1975	100	100	100
1976	130	172	150
1977	132	185	192
1978	135	242	205
1979	138	252	206
1980	142	264	208

Source: National Authority for Information and Documentation, yearly statistical series various issues, and Central Bank of Libya, 1984, yearly statistical series 1970-1990

Table AVI-2-7

Index of Real Producers Prices 1975=100

	Cereals	Vegetables	Fruit
1975	100%	100%	100%
1976	121%	57%	57%
1977	114%	53%	53%
1978	104%	45%	45%
1979	92%	54%	54%
1980	80%	56%	56%

Source: Calculated from Tables AVI-5 & 6

APPINDEX VII-1
Statistical Data for Manufacturing Industries in Libya

Table AVII-1-1
Definition Remarks

Code	Industry
311-312	Food products
313	Beverages
314	Tobacco
321-322	Textiles and Wearing Apparel
323-324	Footwear and Leather Products
331-332	Furniture and Wood Products
341-342	Paper, Printing and Publishing
351-352	Industrial Chemicals
353	Petroleum Refining
369	Non-Metallic Minerals
371-372	Basic Metal Products
381-385	Fabricated Metal Products
390	Other Manufacturing
300	All Manufacturing

Table AVII-1-2
Gross Output 1965-1992 (LD 000, at Current Factor Cost)

Code	311/12	313	314	321/22	323/24	331/32	341/42	351/52	353	369	371/72	381/85	390	300
1965	3681	1626	3122	905	50	357	690	2561		703	1053	1610	1022	17380
1966	5140	2140	4227	1010	60	898	560	2940		1090	1288	1830	440	21623
1967	6490	2260	6792	1249	141	891	825	3480		1400	1138	1180	211	26057
1968	7690	3170	8650	1540	110	898	928	4780		1580	1404	1730	172	32652
1969	7470	3970	8040	1800	210	830	963	5090		2270	1587	1980	210	34420
1970	8260	2170	9220	1974	355	1090	1051	5060		2520	1694	1890	277	35561
1971	10221	2252	11286	2011	200	1529	1211	4925		2899	1747	1809	499	40589
1972	11072	3218	13585	2107	753	1742	1390	5086		5217	2070	2150	1058	49448
1973	12823	4265	17077	2236	384	3172	1836	7294		6145	3487	3660	619	62998
1974	20806	5301	21146	3056	904	3739	2773	10535		12641	4096	4220	1561	90778
1975	26070	5590	30370	4710	1436	3832	3470	13660		15190	4315	5180	1645	115468
1976	32145	6744	33065	7196	2895	3943	4372	14458		16250	3704	3900	5788	134460
1977	33290	3200	33110	3283	3005	5435	4662	21641	63842	20390	3874	3970	6810	206512
1978	35578	3480	33405	4020	5687	7687	5808	23812	64921	22226	4473	4008	6983	222088
1979	46584	7885	36867	4921	7240	13432	5097	25744	75934	27527	3783	4110	6032	265156
1980	81408	8575	44471	14057	11923	23118	6876	37098	314542	43093	2233	33872	6612	627878
1981	95302	9667	50490	26274	17777	24860	7861	45157	350591	65204	3740	37013	7179	741115
1982	120683	13686	42953	31935	21508	22145	8975	79530	270973	76818	5656	58849	9547	763258
1983	137289	14602	72786	43009	19474	22205	10079	96429	362634	78143	13411	62713	6703	939477
1984	166044	14885	68745	34461	23514	16196	11194	121388	400558	77680	7400	77080	12171	1031316
1985	170297	13301	43077	35810	20492	18171	10323	111647	546025	63195	9354	70963	12774	1125429
1986	125343	12300	44423	54610	23552	8763	7448	122283	410308	43223	2490	84256	13574	952573
1987	125861	23126	50767	57881	24618	15323	9337	170331	466871	55678	3231	107182	33760	1143966
1988	146212	32275	55951	82801	28517	14791	10065	211240	345722	69029	4711	134668	34957	1170939
1989	139497	42733	66153	79264	23054	19373	11271	209623	389365	75802	19251	144789	19423	1239598
1990	149520	37732	35478	68044	21563	21416	11339	270741	535880	76310	101118	148769	16921	1494831
1991	140420	41616	31122	65935	26281	27580	14339	272934	510071	77748	143713	156020	12202	1519981
1992	160297	58794	36865	67500	30837	33869	17575	300948	681479	84877	176544	183717	8233	1841535

Source: Ministry of Planning Statistical Abstract, various issues, and National Authority for Information and Documentation yearly statistical series, various issues, and Private survey for the period 1980-1992

Table VII-1-3

Value Added in Manufacturing Industries 1965-1992 (LD, 000 at Current Factor Cost)

Code	311/12	313	314	321/22	323/24	331/32	341/42	351/52	353	369	371/72	381/85	390	300
1965	1400	1530		760	30	470	410	460		1020		600	5920	12600
1966	1430	1020	3160	330	20	245	340	1010		570		1050	5225	14400
1967	1199	1048	4868	401	9	441	508	1430		666		521	5309	16400
1968	1433	1281	3158	326	10	513	339	1014		573		1047	10306	20000
1969	2070	1530	5760	760	68	270	680	1970		880		900	5912	20800
1970	2190	960	6810	620	90	360	673	1840		1120		920	6917	22500
1971	2885	1300	8287	631	88	615	707	1905		1251		646	6185	24500
1972	3353	1810	8071	782	168	773	758	1364		2059		964	11898	32000
1973	3823	2503	6892	819	236	1020	389	2924		1789		1142	22263	43800
1974	6366	2623	11758	981	620	1242	1078	4731		4732		1586	19283	55000
1975	6960	2620	11830	1742	950	1082	1572	5520		5250		2465	25509	65500
1976	9280	2681	23285	1742	955	1222	2022	6139		7318		1884	34072	90600
1977	6730	3410	14370	1823	987	1815	2110	3760		8230		1616	79849	124700
1978	7016	2067	14844	1470	1055	6416	2181	2984		8796		9452	92419	148700
1979	8774	4649	14477	2732	4033	8156	2257	5649		12875		13252	81946	158800
1980	22550	4335	17120	5974	7154	9247	2407	12551	94363	16375	737	15242	2314	210369
1981	26399	4882	18996	11180	10666	9944	2751	17224	105177	24778	1234	16656	2513	252400
1982	33429	6846	17488	13588	12905	8858	3141	27367	81292	29191	1866	26482	3341	265794
1983	38029	7404	33981	18279	11684	8882	3528	33825	108790	29694	4426	28221	2346	329089
1984	45994	7450	36906	14105	14108	6478	3918	41344	120167	29518	2442	34686	4053	361169
1985	51089	6651	25465	14682	12500	7268	3612	37974	163807	25278	3087	32059	4254	387726
1986	37603	6150	23497	21844	14131	3505	2979	46384	123092	8645	722	26962	4751	320265
1987	37758	11563	26075	23152	14771	6129	3735	60331	140061	11136	937	34298	11766	381712
1988	43864	16137	32762	33120	17110	5916	4026	73524	103717	13806	1366	43094	12235	400677
1989	41849	21366	35642	31706	13832	7749	4508	71913	116809	15160	5583	46332	6798	419247
1990	44856	18866	19986	27218	12938	8566	4536	90956	160764	15262	29324	47606	5922	486800
1991	42126	20808	10858	26374	15769	11032	7537	92106	153021	15550	41677	49926	4271	491055
1992	48089	29397	19614	27000	18502	13548	7030	101905	204444	16975	51198	58789	2882	599373

Source: Ministry of Planning Statistical Abstract, various issues, and National Authority for Information and Documentation yearly statistical series, various issues, and Private survey for the period 1980-1992

Table AVII-1-4

Distribution of Labour Among Manufacturing Industries in Libya 1965-1992

Coded	311/12	313	314	321	323	331	341	351	369	371	380	300	Other	Total
1965	1464	667	0	505	67	253	534	721	742	508		5461	18239	23700
1966	1474	686	837	525	69	269	548	721	719	508		6356	16744	23100
1967	1489	536	1120	547	71	250	557	620	718	512		6420	15580	22000
1968	1557	546	1122	555	70	250	524	627	760	639		6650	14150	20800
1969	1397	635	1129	572	70	245	520	629	850	667		6714	12686	19400
1970	1520	637	1135	620	86	394	481	627	1004	687		7191	13209	20400
1971	1904	645	1177	713	89	497	539	650	1140	534		7888	13512	21400
1972	1773	811	1201	718	91	570	566	654	1369	509		8262	14638	22900
1973	1948	902	1208	621	166	687	621	713	1738	507		9111	16789	25900
1974	2073	1341	1267	494	249	745	632	741	1878	436		9856	19444	29300
1975	2574	1289	1474	1057	686	771	746	818	2170	534		12119	20781	32900
1976	2675	1296	1496	1795	1058	787	789	861	2260	364		13381	24019	37400
1977	2678	1283	1354	1797	1462	807	785	634	2279	387		13466	28034	41500
1978	2624	1219	1347	1799	1465	887	782	634	2280	437		13474	33926	47400
1979	2699	1124	1236	1798	1233	987	782	766	2994	493		14112	38688	52800
1980	3463	1278	1251	1794	1106	1087	768	1518	2930	530		15725	42275	58000
1981	3680	1549	1251	4800	1280	1258	768	1856	3712	3200		23354	40646	64000
1982	4238	1548	1262	4825	1288	1273	784	2137	4275	3685		25315	48385	73700
1983	4333	1546	1261	6624	1406	1371	774	3012	4278	3688		28293	52207	80500
1984	4852	1573	1261	6772	1580	1384	756	3364	4581	3706		29829	42171	72000
1985	5274	1593	1264	8069	1864	1406	730	4097	4865	3741		32903	42097	75000
1986	5469	1606	1265	9612	2042	1426	709	4504	5214	3767		35614	41386	77000
1987	5752	1612	1266	10919	2280	1432	691	5038	5546	3833		38369	40631	79000
1988	6632	1617	1266	11452	2413	1467	638	5420	5704	3867	5745	46221	39579	85800
1989	6689	1698	1281	11598	2484	1415	628	5587	5896	3887	6726	47889	44311	92200
1990	6749	1685	1331	11627	2474	1384	672	5901	6403	4436	7272	49934	49466	99400
1991	7059	1809	1345	11545	2492	1384	678	6125	6229	5199	7332	51197	49903	1E+05
1992	7334	1974	1381	11378	2556	1397	673	6409	6612	5590	8680	53984	51416	1E+05

Source: Ministry of Planning Statistical Abstract, various issues, and National Authority for Information and Documentation yearly statistical series, various issues, and Private survey for the period 1980-1992

Table AVII-1-5

Value of Wage and Salary in Large-Scale Manufacturing Industries in Libya, 1965-1992 (LD, 000)

	300	311/12	313	314	321/22	323/24	331/32	341/42	351/352	353	369	371/72	381/83	390	Total
1965	3010	662	323		270	13	160	325	200		535		443	79	6020
1966	3312	560	332	464	189	10	149	291	435		291		482	109	6624
1967	3940	702	371	805	233	30	154	346	401		369		459	70	7880
1968	4560	749	503	890	229	24	109	386	506		476		640	48	9120
1969	5324	860	551	989	312	36	162	479	575		559		731	70	1064
1970	5821	903	459	1113	356	74	224	492	728		677		709	86	1164
1971	6156	1242	540	988	373	60	289	385	759		821		613	86	1231
1972	7335	1395	633	1149	396	202	425	388	807		1227		631	82	1467
1973	8348	1502	833	1370	383	135	636	568	929		1294		622	76	1669
1974	11475	2090	1218	1520	718	422	801	828	1111		2029		653	85	2295
1975	15309	3101	1586	1873	1053	700	736	1159	1426		2677		830	168	3061
1976	18341	3469	1739	2182	1058	745	816	1190	1904		3373		832	1033	3668
1977	19348	3923	660	2206	1060	771	994	1195	2460		3924		847	1308	3869
1978	20080	4101	641	2930	1294	1124	1112	1202	1199		3788		854	1835	4016
1979	39406	5056	2164	3257	1260	1845	2380	1224	2796	4689	6740	175	6514	1306	7881
1980	69460	11861	3030	3113	3602	3935	6935	1264	6085	8207	12281	369	7621	1157	13892
1981	87253	13886	3413	3115	6740	5866	7458	1444	8490	8056	18583	617	8328	1257	17450
1982	107951	17584	4775	3181	8523	7098	6644	1649	13297	7462	21893	933	13241	1671	21590
1983	118790	20003	5150	4281	11461	6426	6662	1852	16334	7349	22271	1075	14111	1815	23758
1984	127598	24193	5178	5023	9897	7759	4859	2057	17723	8272	22139	1195	17343	1960	25519
1985	132328	25238	4589	4901	10277	7200	5451	1896	20692	12310	20324	1189	16144	2117	26465
1986	118375	13161	4030	9260	20756	8209	2300	1816	19222	12309	14751	983	9135	2443	23675
1987	139770	13297	7577	8264	22000	8222	4021	2277	22132	14006	19000	1276	11621	6077	27954
1988	148029	17789	5921	9170	15460	8109	4682	2277	29534	10372	22520	1188	14715	6292	29605
1989	169912	19580	8191	12657	16406	8609	4238	1500	30546	12070	25552	9222	17845	3496	33982
1990	188370	18554	8070	8562	20008	8124	3905	1500	34887	17148	26551	18837	19178	3046	37674
1991	198536	20378	9543	7346	20930	8646	4008	1639	37689	16832	26715	22338	20276	2196	39707
1992	210466	23121	12657	8663	16618	9391	3013	1662	37203	20444	25868	27996	22348	1482	42093

Source: Ministry of Planning Statistical Abstract, various issues, and National Authority for Information and Documentation yearly statistical series, various issues, and Private survey for the period 1980-1992

Table AVII-1-6

Distribution of GFCF Between Manufacturing Industries 1966-1992 (LD Million at Purchasing Value)

Code	311/12	313	314	321/22	323/24	331/32	341/42	351/52	353	369	371	381	390	Total
1966	2104	221	51	223	74	90	57	839		859	219	201	3962	8900
1967	1347	421	171	228	84	101	76	941	102	961	302	275	4532	9540
1968	1002	513	258	225	109	107	85	702	175	743	365	290	4044	8618
1969	1008	611	322	252	131	113	91	707	224	760	435	333	4418	9405
1970	987	626	334	255	135	112	103	693	233	749	445	338	4385	9397
1971	1343	984	515	1482	224	145	135	426	345	987	437	405	16711	24140
1972	2182	1157	1204	2921	810	347	206	445	437	2337	769	591	32253	45660
1973	2995	1356	1439	3550	1577	419	345	510	531	3250	1553	756	48067	66348
1974	8412	2894	1679	3913	1922	901	982	747	1016	3710	3553	1200	78110	109039
1975	10494	4979	2482	4590	2091	2626	1701	994	1236	3769	4698	1790	76301	117750
1976	12819	5329	3080	5345	2378	3433	2011	1575	1454	3822	5083	3231	105637	155196
1977	13141	6968	4106	5228	2979	3490	2351	1856	1580	3300	4643	3718	108420	161779
1978	13159	7414	4386	5162	3140	3486	2438	1928	1608	3126	4484	3840	108603	162774
1979	11996	7787	4963	8157	4833	2563	2715	2403	2159	3249	4697	4818	176793	237132
1980	12570	8155	5562	9560	5991	2819	3048	3481	2697	3646	4942	5565	303475	371509
1981	13185	9901	6586	10691	7810	5583	4535	5047	10075	17316	14171	18185	337526	460613
1982	13733	12999	8390	11131	9291	7249	4861	7888	13412	16540	13944	21359	241057	381854
1983	12624	12503	9592	12888	11033	8953	5250	9361	14531	18862	15586	22440	240094	393716
1984	12172	11236	9835	14719	13069	10872	5595	9129	16516	20573	18156	24369	244544	410785
1985	10126	9634	8724	10153	10163	9339	4450	7786	16317	21258	20695	25206	119954	273805
1986	8408	8085	6186	7438	5678	6599	3261	6410	13902	18787	20079	21169	81019	207022
1987	6586	6357	4557	5555	3693	4350	2285	4961	12165	16573	16321	17780	55424	156607
1988	5356	5131	4124	4569	3146	3340	1996	4014	10405	15198	15354	17417	53666	143717
1989	4084	3936	2884	3397	2156	1850	1216	3002	4992	10839	10230	14960	37179	100725
1990	2547	2459	1743	2100	1294	1007	694	1860	2495	6204	8563	12155	17826	60947
1991	1896	1833	1275	1556	942	689	490	1380	1603	3831	7179	10398	11532	44604
1992	1903	1818	1525	1578	1113	853	639	1396	3339	5788	8036	10526	22185	60701

Sources: As for Table: AVII-1-5

TableAVII-1-7

Number of Large Manufacturing Establishments and Number of Persons Engaged (End Year 1975-1981)

		1975		1976		1977		1978		1979		1980		1981	
		Number of		Number of		Number of		Number of		Number of		Number of		Number of	
		Est.	EM.,	Est.	EM.	Est.	EM.	Est.	EM.	Est.	EM.	Est.	EM.	Est.	EM.
3112	Dairy Products	_	_	_	_	_	_	_	_	6	359	6	363	6	395
3113	Canning of Vegetables & Fruit	5	211	5	214	5	186	4	396	8	434	7	635	8	665
3117	Grain mill Products	4	331	5	461	6	541	6	536	5	515	6	744	7	886
3118	Macaroni	5	279	5	204	5	205	5	205	5	232	5	317	5	403
3121	Bakery Products	_	_	_	_	_	_	_	_	3	448	3	495	3	467
3128	Animal Feed	_	_	_	_	_	_	_	_	5	638	6	651	6	772
3134	Soft Drinks	6	1167	6	1038	6	963	6	1219	6	1062	6	1065	5	1318
3140	Tobacco	1	1466	1	1452	1	1354	1	1117	1	1237	1	1224	1	1253
3211	Spinning & Weaving of Textiles	6	338	5	273	6	303	6	352	9	1711	11	1648	11	2600
3411	Paper and products	2	72	2	65	2	30	2	32	1	23	1	35	1	25
3521	Paints, Varnishes & Lacquers	2	246	2	233	2	222	2	193	2	202	2	208	2	228
3523	Sop and Detergent materials	3	186	3	180	3	189	2	218	2	307	3	340	3	303
3631	Cement	2	836	2	357	2	357	4	1691	4	1951	4	2297	5	2737
3632	Cement Tiles	8	836	8	192	8	183	7	137	12	412	12	368	9	365
3691	Building Materials	_	_	_	_	_	_	_	_	2	365	2	328	2	407

Source: Ministry of Planning Statistical Abstract, various issues

Table AVII-1-8-a

Manufacturing Output (In Physical terms 1970-1983)

	PU	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Dairy products	(000, T)	_	_	_	4.5	4.5	8.5	28.3	35.3	37.0	37.6	39.9	47.6	45.3	55.0
Grain Mill Products	(000, T)	32.0	64.0	70.3	76.2	168	187	199.0	226.0	245.0	188	146	212	294	291
Macaroni	(000, T)	31.5	31.5	30.5	28.3	43.3	45.1	44.3	48.7	50.0	56.5	59.7	61.6	65.0	72.8
Canning of Fish	(000, T)	186	276	383	582	650	800	858	474	1109	662	1334	1752	1512	1081
Animal Feed	(000, T)	24.7	34.5	55.0	57.0	148.0	230.0	212.0	263	263.5	349.0	348.0	581.0	649	774
Canning of Veg., & Fruit	(000, T)	0.3	0.3	1.3	2.8	3.9	5.8	20.1	5.7	6.0	18.9	18.0	27.0	36.4	56.5
Olive Oil	(000, T)	_	_	_	_	_	32.0	33.0	9.0	31.0	18.0	34.0	32.0	32.0	27.0
Confectionery	(000, T)	_	_	_	_	_	3.6	7.0	8.0	8.0	10.4	12.5	7.5	9.7	15.8
Soft Drinks	(000, T)	26	31.3	44.8	43.5	75.5	84.5	84.3	80.9	90	91.5	100	102.0	121.0	747.
Tobacco	(000, T)	_	_	_	2.7	2.8	2.8	2.8	2.2	2.2	2.0	2.4	2.4	3.1	4.1
Textiles	(Mill,M)	_	_	_	_	_	_	2.5	14.2	9.9	8.5	10.8	15.3	20.7	20.6
Clothiung	(000, U)	617	625	597	592	678	762	834	806	700	804	1500	1900	2200	2700
Leather	(Mill,F)	_	_	_	0.1	1.2	2.0	1.9	2.2	1.3	3.4	3.5	3.8	5.1	6
Footwear	(000 Pa)	_	_	_	40.0	100.0	380.0	530.0	840.0	2000.0	2923	4100	6400	5200	5800
Industrial Detergents	(000, T)	6.4	6.6	9.0	9.6	10.2	11.1	12.8	17.1	17.0	17.3	16.6	17.0	16.5	20.0
Sop	(000, T)	_	_	_	_	_	_	_	_	_	_	_	_	2.4	2.1
Paints	(000, T)	7.2	7.5	10.5	13.9	15.4	19.4	21.6	23.5	23.8	25.4	26.1	26.4	26.9	31.2
Petrochemicals	(000, T)								318.0	338.0	517.0	414	438	882	1205
Oil refining	(000, T)	0.3	0.4	0.4	1.6	1.4	1.8	1.9	4.6	5.5	4.9	28.2	58.8	88	71.9
Cholered Sodium	(000, T)	_	_	_	_	_	_	_	_	_	_	_	4.0	12.3	26.8
Plastic	(000, T)	_	_	_	_	_	_	_	_	_	_	_	1.5	17.8	36.9
Salt	(000, T)	7.5	7.8	8.2	8.6	7.5	9.4	8.5	8.6	8.0	8.0	2.4	16.1	15.4	17.3
Sodium Hypochlorite	(000, T)	_	_	_	_	_	_	_	_	_	_	3.5	6.4	8.8	9.1
Cement	(000, T)	95	72.9	60.7	78.5	485.0	622.0	675.0	708	1300	1600	1900	2720	3200	3200
Other non-metallic	(000, T)	3.4	4	7.7	4.6	20.6	33.1	71.7	141	247.3	227.0	226	330	353	244
Metal Products	(000, T)	_	_	_	_	_	_	3.5	8.9	7.9	16.9	31.6	44.3	38.9	78.1
Trucks	(truck)	_	_	_	_	_	_	_	_	_	_	_	_	221.0	358.
Bicycles	(000, U)	_	_	_	_	_	_	_	_	_	_	_	_	9.4	30.2
Tractors	(Tract.)	_	_	_	_	_	_	_	_	_	670.0	2514	2742	2933	243
Lorry and Buses	(unit)	_	_	_	_	_	_	_	_	_	_	_	136.0	357.0	206
Refrigerators	(000, U)	_	_	_	_	_	_	_	_	_	_	_	_	1.7	3.0
Ovens	(000, U)	_	_	_	_	_	_	_	_	_	_	_	_	11.3	9.4
Washing Mach	(000, U)	_	_	_	_	_	_	_	_	_	_	_	_	6.3	4.5

Source: See: Table AVII-1-8b

Table AVII-1-8b

Manufacturing Output (In Physical terms 1984-1996)

	PU	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Dairy products	(000, T)	74.0	54.6	50.0	47.5	53.0	59.0	73.4	42.0	71.0	85.0	56.8	80.5	62.0
Grain Mill Products	(000, T)	351.0	366.5	348.7	308.5	389.7	408.4	393.0	414	502	477	473	458	478
Macaroni	(000, T)	65.4	65.1	69.7	65.2	65.9	77.9	69.0	75.8	77.3	77.5	81.0	91.0	70.0
Canning of Fish	(000, T)	240.0	580.0	742.0	858.0	n.a.	1215	n.a.	3521	2717.0	540.0	2212	1861	1557
Animal Feed	(000, T)	776	857	732	775.0	600.0	620.0	870.0	610.0	585.0	656.0	n.a.	n.a.	n.a.
Canning of Veg., & Fruit	(000, T)	49.6	28.1	19.4	17.4	24	27.2	37.0	32.4	16.1	13.9	13.1	12.7	
Olive Oil	(000, T)	27.0	12.0	9.0	7.0	7.0	8.0	7.0	9.0	10.0	8.0	7.0	5.0	11.0
Confectionery	(000, T)	17.9	12.0	15.8	11.2	13.9	9.5	8.7	5.3	5.3	5.2	4.6	6.1	4.4
Soft Drinks	(000, T)	737	737	737	737	737	737	737	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tobacco	(000, T)	2.1	2.8	3.9	4.2	4.6	4.9	3.6	3.3	3.3	4.2	3.8	4.4	4.0
Textiles	(Mill,M)	19.6	17.3	20.9	17.2	23.3	20.3	13.4	16.7	16.0	12.9	9.8	5.7	8.1
Clothing	(000, U)	1900	1600	1500	1800	2001	1600	733.0	800.0	800.0	100	800.0	800.0	n.a.
Leather	(Mill,F)	6.2	7.1	4.6	4.6	6.7	5.1	5.1	6.1	6.3	4.6	6.1	4.9	5.0
Footwear	(000 Pa)	7500	6600	8500	8700	8400	5600	3400	5400	4000	5900	5300	5600	5600
Industrial Detergents	(000, T)	16	12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sop	(000, T)	2.7	1.2	0.9	1.6	1.9	2.2	1.9	2.4	2.7	1.8	2.1	n.a.	n.a.
Paints	(000, T)	27.0	27.0	27.0	27.0	27.0	27.0	27.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Petrochemicals	(000, T)	1586	1506	1615	1783	1137	1061	1372	1501	1805	1542	1901	2203	2230
Oil refining	(000, T)	98.8	113	154	188	117	149	79.1	72	138.3	125	96.6	63.8	55.4
Cholered Sodium	(000, T)	25.1	21.4	21.7	22.5	33.4	33.3	37.0	36.8	38.1	36.7	36.6	36.0	37.8
Plastic	(000, T)	38.5	31.7	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	43.1	49.0	40.0
Salt	(000, T)	15.3	20.3	22.0	21.3	16.5	21.1	16.0	11.7	12.7	15.3	17.0	13.0	15.0
Sodium Hypochlorite	(000, T)	7.2	4.1	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Cement	(000, T)	3200	2800	2900	2700	3300	3800	4000	4300	3900	4300	3700	3200	3500
Other non-metallic	(000, T)	239	175	156	149	211	177	156	167	103.2	104	113	109	121
Metal Products	(000, T)	64.5	63.5	18.7	23.9	62.7	113	373	434	389.8	504	447	405	423
Trucks	(truck)	949.0	913.0	1891	1304	842.0	907.0	940.0	1104	965.0	650.0	700.0	600.0	800.0
Bicycles	(000, U)	23.6	47.1	35.7	19.8	68.0	94.0	52.0	280.0	39.0	64.0	46.2	68.6	52.0
Tractors	(Tract.)	3364	2164	3168	3504	3900	2736	3576	3360	2812	n.a	1600	1500	1200
Lorry and Buses	(unit)	724	784	690	780	1378	1463	955	1871	1904	2848	1300	1900	3000
Refrigerators	(000, U)	9.4	17.1	23.0	28.6	33.2	44.9	20.9	20.0	22.5	18.4	29.8	18.8	20.8
Ovens	(000, U)	8.7	9.4	16.8	32.1	42.2	70.4	38.0	66.0	69.7	52.5	35.0	43.8	45.0
Washing Mach.	(000, U)	3.0	5.0	7.0	9.5	10.1	5.0	10.1	7.6	5.1	5.8	5.8	5.8	8.0

Source: National Authority for Information and Documentation, yearly statistical series, various issues, and Ministry of Planning, Economic and Social Indicators 1962-1983. February 1984: Tripoli.

Note : T= tons, Mill = million, F = Feet, M = Meter, p = pairs and U = unit. (-) Production not started (n.a.) not available

Table AVII-1-9

Development of Gross Output in Manufacturing Partnership Industries 1985-1993 (LD000)

	1985		1987		1989		1991		1993		Average Growth Rate	
		% of		% of		% of		% of		% of	1985	1989
	Value	Total	Value	Total	Value	Total	Value	Total	Value	Total	1988	1993
Food Products	1.22	1.2	1.74	1.4	2.67	1.6	4.31	2.0	10.9	3.4	16.1	39.9
Textiles & Waving	3.42	3.5	5.02	4.0	7.13	4.4	11.8	5.4	13.4	4.2	15.6	19
Furniture and Paper	0.37	0.4	0.97	0.8	2.38	1.5	6.98	3.2	19.4	6.0	43.3	68.2
Chemical industries	2.68	2.7	4.44	3.5	6.83	4.2	12.3	5.6	27.6	8.6	20.6	38.3
Building Materials	1.59	1.6	2.51	2.0	3.86	2.4	6.87	3.1	21.70	6.7	19.00	51
Fabricated Metal	2.93	3.0	4.63	3.7	6.83	4.2	12.3	5.6	24.40	7.6	19.10	33.7
Beakers	80.5	81.6	96.9	77.1	119	72.7	138	62.7	164.7	51.2	6.64	9.77
Garages	6.0	6.1	9.5	7.6	14.9	9.1	27.3	12.4	39.70	12.3	19.50	28.00
Total	98.7	100.0	125.7	100.0	163.4	100.0	219.5	100.0	321.7	100.0	9.24	18.2

Source: Private Survey.

APPENDIX AVII-2
Capacity Utilisation in Manufacturing Industries in Libya 1964-1993

This appendix presents a measurement of capacity utilisation in Libya under the assumption of the existing linear correlation between capacity utilisation and the unemployment. Symbolically this can be defined as follows:

$$CU = \alpha + \frac{\beta}{UE},$$

where CU and UE are capacity utilisation and overall employment rate, α and β are constants.

1- for 1972 CU is given at 54 % (IRC, industrial survey, 1973)
2- for 1981 CU is assumed to be maximum at 95%.

Using these figures gives the following structure:

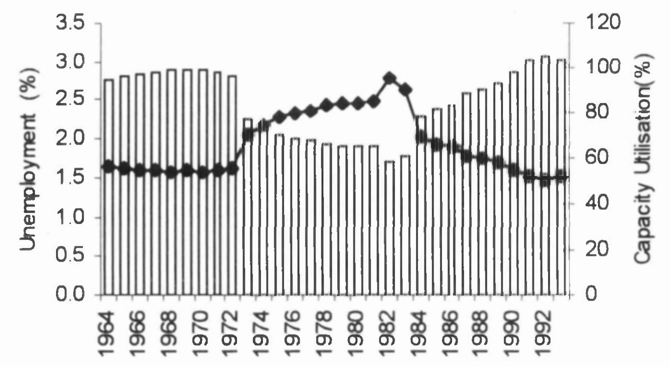
for 1972 we get $54 = \alpha + \frac{\beta}{2.9}$ and for 1981 we get $95 = \alpha + \frac{\beta}{1.7}$

Solving these two equations simultaneously gives α = (-4.07) and β (168.4). Applying them to the period of 1964-1993 gives the CU as shown in the Table AVII-2-1 and Figure AVII-2-1 below.

Table AVII-2-1
Relationship Between Capacity Utilisation and Unemployment

	Unemployment	Capacity Utilisation
1964	2.8	57
1965	2.8	56
1966	2.8	55
1967	2.9	55
1968	2.9	54
1969	2.9	54
1970	2.9	54
1971	2.9	55
1972	2.8	56
1973	2.3	70
1974	2.1	75
1975	2.1	78
1976	2.0	80
1977	2.0	81
1978	1.9	83
1979	1.9	84
1980	1.9	85
1981	1.9	85
1982	1.7	95
1983	1.8	91
1984	2.3	69
1985	2.4	66
1986	2.4	65
1987	2.6	61
1988	2.6	60
1989	2.7	58
1990	2.9	55
1991	3.0	52
1992	3.1	51
1993	3.0	52

Figure AVII-2-1
Relationship Between Unemployment and Capacity Utilisation in Libya's Manufacturing Sector 1964-93



Source : Calculated from National Authority for Information and Documentation, yearly statistical

APPENDIX AVII-3
Correlation Coefficients Between Variables of Manufacturing Industries

This appendix presents the results of a simple correlation between growth rates of output, labour, capital, total factor productivity, export etc. and absolute values of other variables. These are listed in the Table AVII-3-1. The correlation is performed on large-scale manufacturing industries discussed in the chapter (VII) for three periods, the pre-boom period 1965-1972, the boom period (1973-1982), and the post-boom period 1983-1992. The analysis is in two parts i) correlation coefficients between two different variables in the same period and ii) Correlation coefficients between the same variables in the successive periods. The results are shown in Tables (Table AVII-3-2) and (AVII-3-2) respectively.

Table AVII-3-1
Definition of the Variables Used in Correlation Estimation

Variable	Abbreviation
Annual Percentages Growth Rates of:	
Output	q^
Labour	L^
Capital	K^
TFP	P^
Labour Productivity	q^ / L^
Capital Productivity	q^ / K^
Capital per unit output	K^ / q^
Capital per workers	K^ / L^
Exports	X^
Absolute Value of:	
Output per worker (First year of period)	q / L
Capital per worker (first year of period)	K / L
Capital / Output ration (first year of period)	K / q
Proportion of output exported (first year of period	X / q
Ratio of imported input to intermediate input	M/c
Wage rate (first year of period)	W
Wage rate (Last year as a percent of first year of period)	W ^

Table AVII-3-1

Within-Period Correlation Coefficient for Manufacturing Industries in Libya 1967-72, 1973-82 & 1983-1992

	K^	L^	f^	P^	q / L	q^/L^	K / L	K^ / L^	K/ q	K^/q^	q^/K^	x/q	x^	w^
Variable	0.495	0.155	0.372	0.907	0.242	0.628	0.212	0.325	-0.155	-0.637	-0.164	0.696	0.025	0.068
q^	0.226	-0.107	0.228	0.974	-0.494	0.978	-0.530	0.206	0.083	-0.806	-0.734	0.138	0.509	-0.53
	0.203	0.026	0.227	0.950	0.228	0.752	-0.434	0.122	-0.461	-0.758	0.464	0.455	0.721	0.328
		0.721	0.945	0.099	0.730	-0.207	0.759	0.084	-0.578	0.354	0.709	0.911	0.485	0.646
K^		-0.591	0.982	0.005	-0.194	0.334	-0.096	0.974	0.408	0.391	0.381	-0.091	0.053	-0.00
		-0.361	0.798	-0.019	-0.502	0.412	0.417	0.815	0.602	0.478	0.922	-0.634	0.026	-0.69
			0.908	-0.224	0.740	-0.671	0.666	-0.630	-0.708	0.471	0.575	0.670	0.942	0.736
L^			-0.430	-0.011	-0.241	-0.313	-0.235	-0.758	0.127	-0.282	-0.287	-0.172	0.046	-0.21
			0.273	-0.068	-0.343	-0.637	-0.410	-0.832	-0.154	-0.261	-0.342	0.321	0.185	-0.12
				-0.046	0.790	-0.442	0.773	-0.248	-0.684	0.436	0.700	0.867	0.738	0.738
f^				0.003	-0.273	0.302	-0.162	0.914	0.487	0.372	0.359	-0.142	0.070	-0.05
				-0.063	-0.739	0.013	0.165	0.303	0.522	0.324	0.731	-0.447	0.146	-0.80
					-0.131	0.860	-0.161	0.424	0.177	-0.889	-0.500	0.352	-0.285	-0.29
P^					-0.445	0.935	-0.507	0.001	-0.027	-0.913	-0.837	0.175	0.506	-0.53
					0.470	0.769	-0.472	0.048	-0.613	-0.851	0.270	0.592	0.713	0.549
						-0.409	0.985	-0.238	-0.970	0.389	0.462	0.750	0.702	0.984
q / L						-0.413	0.966	-0.077	-0.563	0.344	0.160	-0.221	-0.882	0.866
						0.381	-0.138	-0.083	-0.611	-0.518	-0.266	0.533	0.295	0.795
							-0.377	0.727	0.443	-0.858	-0.580	-0.018	-0.721	-0.53
q^/L^							-0.449	0.352	0.048	-0.714	-0.646	0.165	0.471	-0.45
							-0.052	0.653	-0.234	-0.401	0.601	0.126	0.425	0.323
								-0.100	-0.930	0.446	0.523	0.748	0.599	0.969
K / L								0.000	-0.332	0.432	0.251	-0.367	-0.862	0.959
								0.496	0.865	0.648	0.407	-0.530	-0.057	-0.52
									0.364	-0.273	-0.032	0.059	-0.808	-0.32
K^ / L^									0.292	0.400	0.389	-0.035	0.017	0.072
									0.446	0.428	0.766	-0.559	-0.093	-0.32
										-0.351	-0.378	-0.602	-0.721	-0.96
K/ q										0.151	0.228	-0.381	0.464	-0.09
										0.795	0.470	-0.721	-0.201	-0.84
											0.814	0.052	0.399	0.500
K^/q^											0.945	-0.164	-0.432	0.487
											0.790	-0.824	-0.622	-0.76
												0.365	0.337	0.473
q^/K^												-0.087	-0.223	0.317
												-0.399	0.323	-0.50
													0.518	0.646
x/q													0.173	-0.55
													0.633	0.742
														0.733
x^														-0.78
														0.219

Source: Calculated from Department of Statistics, Industrial Survey and Industrial Censuses, various issues; & External Trade Statistics; various issues

Note: Figures corresponding to each variable refer to pre-boom, boom and post-boom periods respectively

Table AVII-3-3

Between -Periods Correlation Coefficient for Manufacturing Industries

Variable	1967/1972 and 1973/1982	1967/1972 and 1983/1992	1973/1982 and 1983/1992
q^	-0.437	0.286	-0.183
K^	-0.805	-0.609	0.210
L^	0.158	0.321	-0.067
F^	-0.703	-0.373	-0.023
P^	-0.527	0.345	-0.236
q / L	0.904	0.519	0.493
q^ / L^	-0.567	0.733	-0.056
K / L	0.923	0.427	-0.738
K^ / L^	-0.114	0.209	0.267
K / q	0.635	-0.045	0.084
K^ / q^	-0.683	-0.221	-0.274
q^ / K^	-0.761	-0.444	-0.213
x/ q	0.374	0.523	-0.108
x^	-0.867	-0.706	0.254
M /c	0.366	0.205	-0.213
r	-0.122	-0.194	-0.015
w	0.805	0.455	0.816

Sources: As for Table AVII-222

APPENDEX AVII-4
Statistical Tables for Relative price Movement

Table AVII-4-1 - Wholesale Price Index for Libyan Manufacturing 1967-1992

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food products	41.5	46.9	53.9	60.7	66.8	70.4	79.4	86.0	94.9	100.0	112.3	125.3	133.9	141.9	157.0	168.8	173.9	180.3	183.9	187.6	179.4	180.2	184.0	185.1	218.9	229.2
Beverages	67.0	75.3	75.6	77.5	79.7	81.7	84.8	87.7	106.2	100.0	102.8	109.1	116.4	122.1	153.0	173.6	210.4	225.8	266.7	288.0	295.9	309.5	346.0	379.9	391.9	403.9
Tobacco	60.9	62.9	64.9	65.5	68.2	79.9	81.1	90.8	93.6	100.0	109.7	111.4	118.0	125.0	141.9	162.8	215.0	217.3	243.9	249.2	272.5	275.3	321.8	347.1	350.3	270.3
Textiles	64.3	65.5	67.7	70.0	70.0	72.9	75.9	83.5	92.2	100.0	111.3	117.7	122.4	130.1	137.6	155.6	151.4	149.1	144.4	136.3	145.7	164.7	218.3	260.8	271.2	271.2
Wearing Apparel	64.3	65.5	67.7	70.0	70.0	72.9	75.9	83.5	92.2	100.0	111.3	117.7	122.4	130.1	137.6	155.6	151.4	149.1	144.4	136.3	145.7	164.7	218.3	260.8	271.2	271.2
Leather Products	76.7	78.0	79.5	80.9	83.9	87.0	90.7	93.8	96.0	100.0	103.2	107.1	118.1	130.1	142.6	150.8	155.1	164.3	172.3	175.1	183.5	210.2	228.5	244.9	264.4	265.4
Footwear	76.7	78.0	79.5	80.9	83.9	87.0	90.7	93.8	96.0	100.0	103.2	107.1	118.1	130.1	142.6	150.8	155.1	164.3	172.3	175.1	183.5	210.2	228.5	244.9	264.4	265.4
Wood products	69.1	72.2	73.7	76.7	78.6	81.1	85.1	90.1	93.9	100.0	103.3	108.9	114.4	127.2	163.1	194.0	182.6	173.5	168.0	164.3	161.0	158.8	170.1	207.3	240.3	247.1
Furniture	69.1	72.2	73.7	76.7	78.6	81.1	85.1	90.1	93.9	100.0	103.3	108.9	114.4	127.2	163.1	194.0	182.6	173.5	168.0	164.3	161.0	158.8	170.1	207.3	240.3	247.1
Paper Products	69.7	69.5	73.3	76.7	78.7	82.1	87.7	91.0	96.4	100.0	97.5	102.7	111.7	113.9	115.3	103.6	98.8	104.7	105.5	97.9	102.5	109.4	208.9	222.5	219.8	223.4
Printing and Publishing	69.7	69.5	73.3	76.7	78.7	82.1	87.7	91.0	96.4	100.0	97.5	102.7	111.7	113.9	115.3	103.6	98.8	104.7	105.5	97.9	102.5	109.4	208.9	222.5	219.8	223.4
Industrial Chemicals	67.3	68.7	70.0	71.5	74.2	78.5	81.7	90.8	97.5	100.0	103.7	112.6	113.9	114.1	124.4	127.7	131.4	130.1	130.7	136.4	151.2	155.2	165.7	173.7	226.1	244.8
Petroleum Refining	32.0	32.4	32.9	33.4	33.4	34.2	35.5	36.6	38.6	100.0	100.3	100.8	102.8	108.8	112.2	112.4	141.1	156.9	159.8	163.1	206.6	243.5	264.5	267.0	243.5	243.5
Non-metallic Metals	68.0	69.4	70.8	72.2	75.3	78.4	81.5	85.1	90.7	100.0	101.4	112.6	127.6	146.0	152.0	157.6	159.7	162.3	163.4	161.4	167.5	165.6	173.5	207.3	216.7	357.4
Basic Metal products	73.7	74.1	75.7	77.3	79.7	81.8	84.2	87.3	96.9	100.0	104.6	111.6	127.1	141.8	152.8	156.6	158.8	150.1	151.1	157.7	172.3	188.4	212.2	224.7	266.2	318.1
Non-Ferrous Metals	73.7	74.1	75.7	77.3	79.7	81.8	84.2	87.3	96.9	100.0	104.6	111.6	127.1	141.8	152.8	156.6	158.8	150.1	151.1	157.7	172.3	188.4	212.2	224.7	266.2	318.1
Manufactures of metal	70.5	72.9	74.0	77.4	80.4	82.9	89.3	92.5	95.8	100.0	101.3	111.2	127.4	148.6	155.9	158.3	159.1	163.4	164.6	161.0	167.8	165.5	195.6	202.3	176.8	218.1
Machinery except Electric	72.6	73.8	65.9	67.2	70.1	72.9	76.0	84.4	91.1	100.0	104.0	111.5	128.1	144.6	158.2	159.3	157.6	154.7	151.4	152.3	157.6	174.5	191.5	209.3	232.3	254.7
Machinery Electric	72.6	73.8	65.9	67.2	70.1	72.9	76.0	84.4	91.1	100.0	104.0	111.5	128.1	144.6	158.2	159.3	157.6	154.7	151.4	152.3	157.6	174.5	191.5	209.3	232.3	254.7
Transport Equipment	72.6	73.8	65.9	67.2	70.1	72.9	76.0	84.4	91.1	100.0	104.0	111.5	128.1	144.6	158.2	159.3	157.6	154.7	151.4	152.3	157.6	174.5	191.5	209.3	232.3	254.7
Machinery & Transport Eq.	72.6	73.8	65.9	67.2	70.1	72.9	76.0	84.4	91.1	100.0	104.0	111.5	128.1	144.6	158.2	159.3	157.6	154.7	151.4	152.3	157.6	174.5	191.5	209.3	232.3	254.7
Other Manufactures	74.6	75.6	77.9	79.4	82.4	86.4	89.3	93.5	96.2	100.0	102.0	112.6	118.5	135.2	157.3	174.5	187.7	194.0	194.0	207.1	218.1	230.7	276.7	305.0	337.2	349.9
All Manufactures	55.2	58.8	61.2	62.8	70.2	75.6	81.3	87.5	98.4	100.0	108.1	123.3	131.6	159.7	178.7	189.8	198.1	198.6	210.7	215.0	227.6	238.8	288.0	307.8	341.8	338.9

Source: Ministry of Planning, Statistical Abstract, various issues, Central Bank of Libya, yearly Statistical series and Monthly Bulletin, various issues, and National Authority for Information and Documentation, Annual Reports on Trade Indices, 1973-1982, 1985-1995 and 1994-1997.

Table AVII-4-2- Index of Manufactured Unit Value of Exports,1970-1995

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Petroleum Refining	52.6	61.1	65.3	70.8	85.6	87.8	100.0	111.3	117.7	156.0	265.2	296.1	310.3	337.2	354.6	352.1	230.5	221.3	180.5	209.6	269.1	216.3	218.8	191.8	229.4	240.4
Manufactured Gas	52.6	61.1	65.3	70.8	85.6	87.8	100.0	131.8	108.9	167.2	245.2	273.8	286.9	311.8	327.9	325.6	213.1	204.6	166.9	193.8	248.9	200.0	202.3	177.4	212.1	222.3
Industrial Chemicals	52.6	61.1	65.3	70.8	85.6	87.8	100.0	109.4	115.7	153.3	260.6	290.9	304.9	331.4	348.4	326.8	234.5	282.9	373.5	365.2	333.1	352.6	306.6	257.8	312.5	434.8
All Manufactures	52.6	61.1	65.3	70.8	85.6	87.8	100.0	111	117	116	128	148	154	161	171	165	146.0	140	158	187	187	199	198	192	230	243

Source: Ministry of Planning, Statistical Abstract, various issues, Central Bank of Libya, yearly statistical series and Monthly Bulletin, various issues, National Authority for Information and Documentation, Annual Reports on Trade Indices, 1973-1982, 1985-1995 and 1994-1997 Department of Statistics, External Trade Statistics, Various issues

Table AVII-4-3 - Index of Manufactured Unit Value of Imports,1970-1995

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Food products	38.2	48.1	54.2	66.4	78.8	87.7	100	96.9	103.1	109.0	142.4	160.2	152.0	145.1	138.2	136.4	142.1	150.7	149.6	166.6	164.4	167.4	171.1	179.6	194.5	235.2
Beverages	81.6	86.7	92.5	97.8	98.2	103	100	107.6	122.0	140.5	149.0	191.3	216.3	218.4	213.6	199.7	205.0	234.1	215.5	239.9	232.2	271.9	244.6	246.5	276.0	268.7
Tobacco	81.6	86.7	92.5	97.8	98.2	103	100	107.6	122.0	140.5	149.0	191.3	216.3	218.4	213.6	199.7	205.0	234.1	215.5	239.9	232.2	271.9	244.6	246.5	276.0	268.7
Textiles	46.3	50.1	52.5	63.9	85.1	98.8	100	109.8	111.4	129.0	147.7	168.4	180.3	170.4	160.5	153.1	185.7	206.3	199.8	176.2	201.1	179.9	191.7	208.8	213.3	215.2
Wearing Apparel	48.3	50.1	52.5	63.9	85.1	98.8	100	109.8	111.4	129.0	147.7	168.4	180.3	170.4	160.5	205.9	291.0	269.2	268.5	266.6	263.9	249.0	273.5	269.2	268.1	324.1
Leather products	48.3	50.1	52.5	63.9	85.1	98.8	100	109.8	111.4	129.0	147.7	168.4	180.3	170.4	160.5	118.8	162.0	154.3	143.7	146.2	148.3	147.3	177.7	222.0	222.6	257.9
Footwear	48.3	52.8	62.1	75.8	95.1	98.8	100	124.1	119.8	132.3	127.3	148.3	174.6	176.1	168.1	124.4	169.6	161.5	150.5	153.1	155.3	154.3	186.1	232.5	233.2	270.1
Wood products	35.8	35.8	41.4	53.0	62.8	68.6	100	71.2	81.2	85.0	114.2	119.6	138.4	138.4	138.4	146.5	146.1	168.1	170.6	178.0	188.6	171.1	173.3	227.6	285.5	306.4
Furniture	51.1	54.8	68.8	79.8	89.7	98.6	100	111.7	125.4	142.0	146.1	171.1	221.4	200.6	184.8	307.8	283.4	283.9	301.7	289.5	278.9	281.3	361.7	378.5	383.9	437.0
Paper and products	52.8	62.1	74.2	80.9	88.2	98.4	100	75.1	92.2	108.5	124.7	145.0	162.2	174.3	166.3	180.5	192.0	199.4	206.4	198.4	208.3	189.1	219.7	211.4	228.6	230.2
Printing & Publishing	52.8	62.1	74.2	80.9	88.2	98.4	100	75.1	92.2	108.5	124.7	145.0	162.2	174.3	166.3	180.5	192.0	199.4	206.4	198.4	208.3	189.1	219.7	211.4	228.6	230.7
Industrial Chemical	37.8	37.8	48.9	57.8	64.6	79.8	100	87.9	104.7	122.2	143.3	160.4	169.7	169.7	176.4	199.7	221.4	220.5	226.4	229.4	234.3	210.7	240.5	263.8	271.5	347.0
Petroleum Refining	45.8	41.3	48.8	59.8	85.5	92.6	100	107.2	95.5	114.5	156.6	177.9	177.9	178.8	187.1	152.5	174.7	178.7	182.2	172.7	166.5	153.8	161.1	182.4	264.5	177.2
Rubber products	52.8	52.6	58.4	71.9	92.8	104	100	125.8	110.2	147.8	189.9	206.4	217.3	217.3	217.3	209.7	238.6	249.1	259.9	258.0	238.0	247.8	257.3	263.8	293.4	288.0
Non-metallic Minerals	56.2	68.7	72.4	78.7	87.0	98.2	100	101.6	107.5	130.5	150.9	161.0	165.7	167.2	246.0	220.9	237.9	264.4	262.0	297.1	240.1	260.0	297.4	294.0	392.6	396.3
Basic Metal products	48.8	51.2	54.8	62.5	78.2	82.5	100	89.9	100.5	131.9	141.3	161.3	170.5	178.5	178.5	169.5	182.0	186.3	189.0	194.9	193.8	112.8	121.0	119.6	134.0	138.8
Non-ferrous metals	58.7	68.7	77.2	82.0	88.1	91.1	100	91.6	102.8	132.0	150.7	133.2	162.2	163.0	154.7	146.9	157.8	161.5	163.8	168.9	168.0	97.8	104.9	103.6	116.2	120.3
Manufacture of metal	35.2	48.2	51.1	62.0	88.1	91.1	100	95.0	109.7	132.1	135.0	156.6	178.4	178.3	184.9	186.0	223.9	218.0	217.2	224.1	190.4	174.0	183.8	180.1	190.2	241.3
Machinery except elect	51.0	62.6	68.7	79.8	82.5	91.1	100	98.1	112.4	125.4	133.4	147.1	172.1	180.2	184.8	132.7	146.9	148.4	151.2	155.4	148.1	148.4	151.0	186.9	188.7	213.7
Machinery electric	51.0	62.6	68.7	72.7	98.6	107	100	114.7	125.9	130.7	135.9	148.2	166.2	172.8	177.8	217.1	347.8	312.2	330.4	335.7	318.8	322.9	351.0	355.5	359.7	383.9
Transport equipment	51.0	62.6	68.7	72.5	92.0	98.2	100	106.5	112.5	137.6	151.4	174.0	194.1	201.5	214.0	239.5	276.9	240.5	191.1	193.0	246.3	183.8	239.2	196.2	197.3	238.4
Machinery & Transport Eq.	51.0	62.6	68.7	75.3	92.0	98.2	100	105.8	116.4	131.0	140.1	156.4	177.7	190.7	208.0	238.3	273.7	252.7	236.9	240.0	259.1	225.0	272.2	264.3	267.9	300.1
Other Manufactures	51.0	60.8	71.2	78.2	92.0	98.2	100	127.3	144.4	160.3	167.7	183.9	229.8	228.6	243.9	275.6	378.0	357.1	354.6	354.1	352.2	343.9	372.2	400.5	428.5	478.3
All Manufactures	47.2	64.2	68.8	70.8	81.1	82.8	100	103	113	129.1	155.6	165	168	177.0	184.0	195	182.0	177	207	284.0	350	368	376	382	386	398

Source: Ministry of Planning, Statistical Abstract, various issues, Central Bank of Libya, yearly statistical series and Monthly Bulletin, various issues, National Authority for Information and Documentation, Annual Reports on Trade Indices, 1973-1982, 1985-1995 and 1994-1997 Department of Statistics, External Trade Statistics, Various issues

Table AVII-4-4- Index of Wage Rates in Manufacturing Industries 1965-1992 (at 1976 constant Price)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food Products	36.4	37.1	47.5	52.8	55.7	60.7	61.0	77.7	92.9	100.0	113.0	120.5	144.5	264.1	291.0	319.9	356.0	384.5	369.0	185.6	178.3	206.8	225.7	212.0	222.6	243.1
Beverages	51.6	53.8	57.2	58.2	62.4	65.6	68.8	71.4	91.7	100.0	112.9	113.7	143.5	176.7	208.9	229.9	248.3	245.3	289.2	336.1	342.8	347.4	359.5	364.4	393.1	477.8
Tobacco	49.3	54.4	60.1	60.4	61.0	65.6	77.8	82.3	87.1	100.0	111.7	149.1	180.7	170.6	170.7	172.8	232.8	273.1	265.8	433.3	447.5	496.6	471.7	441.0	374.5	361.5
Textiles & Wearing Apparel	61.3	63.6	78.4	82.6	83.9	86.5	88.7	94.0	95.8	100.0	100.6	103.4	108.0	185.2	201.9	239.6	248.8	267.7	276.6	310.5	289.7	266.0	260.9	247.5	217.6	210.0
Leather & Footwear	45.8	62.9	73.0	93.8	95.7	96.5	99.9	99.8	99.9	100.0	104.7	109.0	212.5	221.2	366.8	498.6	507.0	527.0	548.5	570.9	512.1	505.6	492.2	466.3	492.7	521.8
Wood and Furniture	59.4	61.3	63.8	64.5	65.7	71.9	79.6	89.2	92.1	100.0	118.8	120.9	232.6	264.3	282.4	310.5	372.2	373.3	373.9	348.5	328.7	307.8	288.9	272.1	231.1	208.0
Paper, Publishing	41.2	48.8	61.1	67.8	47.4	45.5	60.6	86.9	103.0	100.0	100.9	101.9	103.8	109.1	124.7	139.5	158.6	180.4	172.2	169.8	218.5	236.6	158.4	148.0	160.3	163.7
Industrial Chemicals	29.2	36.5	41.3	52.5	52.8	55.8	58.9	67.8	78.8	100.0	130.2	130.7	178.6	181.3	206.9	236.2	245.2	238.2	228.4	218.3	212.2	246.4	247.2	262.8	269.2	262.5
Petroleum Refining	29.3	36.5	41.3	52.5	52.8	55.8	58.9	67.8	78.8	100.0	105.2	108.8	111.4	195.0	191.4	177.3	174.6	196.5	292.4	292.4	332.7	246.4	286.7	407.3	399.8	485.6
Non-metallic Mineral	34.4	42.0	44.1	45.2	48.3	48.7	49.9	72.4	82.7	100.0	108.7	111.3	150.8	280.8	335.4	343.1	348.8	323.8	279.9	256.6	229.5	264.5	290.4	277.8	287.4	262.1
Basic Metal	43.6	43.8	47.9	49.5	50.2	53.8	58.0	65.5	68.0	100.0	95.8	103.0	112.3	117.1	122.3	137.7	140.8	151.5	198.3	143.8	134.1	116.1	111.6	142.1	148.8	154.3
Fabricated Metal	39.2	43.8	47.9	45.2	50.2	54.2	53.7	65.5	68.0	100.0	95.8	85.5	112.3	117.1	122.3	168.3	180.1	218.8	202.7	117.5	147.2	72.4	111.6	142.1	148.8	154.3
all Large-scale	44.8	50.0	57.9	59.1	64.2	64.8	66.8	84.9	92.2	100.0	104.8	108.7	203.7	249.3	272.6	303.8	306.3	312.1	293.4	242.5	251.2	255.5	258.9	275.2	282.9	284.4
Other Manufactures	10.4	7.9	12.8	15.1	14.8	13.0	10.5	10.2	18.8	100.0	108.5	125.8	78.5	63.6	71.9	80.3	80.8	108.1	116.9	137.3	347.8	369.6	183.4	143.2	102.3	67.0
All Manufactures	36.5	44.7	56.0	58.2	58.7	65.3	65.7	79.9	94.9	100.0	95.1	96.6	152.2	244.2	278.0	298.7	300.9	341.0	359.8	364.5	365.9	371.2	375.8	386.4	400.4	407.2

Source: Calculated from Ministry of Planning, Statistical Abstract, Industrial Survey, and Industrial Census, various issues, and National Authority for Information and Documentation Social and Economic Indicators, various issues

Table AVII-4-5 Cost Shares of Labour, Raw Material in Total Costs 1980

	Input Value (000, LD)				Share in Total (%)			
	Labour	Total Material	Imported Material	Total Cost	Lab	Total Mat	Imp Mat	Loc. Mat
Food products	5510	37810	16418	43320	12.7	87.3	37.9	49.4
Beverages	2311	3236	1643	5547	41.7	58.3	29.6	28.7
Tobacco	3538	22390	21079	25928	13.6	86.4	81.3	5.1
Textiles & Wearing Apparel	1368	2189	1968	3557	38.5	61.5	55.3	6.2
Footwear & Leather Products	2006	3213	2480	5219	38.4	61.6	47.5	14.0
Wood & Furniture	1264	2374	1542	3638	34.7	65.3	42.4	22.9
Paper, Printing & Publishing	610	1566	1253	2176	28.0	72.0	57.6	14.4
Industrial Chemicals	3163	20095	18736	23258	13.6	86.4	80.6	5.8
Petroleum Refining	5174	59012	59012	64186	8.1	91.9	91.9	0.0
Non-metallic minerals	7856	22679	4645	30535	25.7	74.3	15.2	59.1
Basic Metal products	1143	2522	2389	3665	31.2	68.8	65.2	3.6
Fabricated Metal	2355	7542	4515	9897	23.8	76.2	45.6	30.6
Other Manufactures	354	1789	553	2143	16.5	83.5	25.8	57.7
All Manufactures	36652	2E+05	1E+05	2E+05	16.4	83.6	61.3	22.3

Source: Ministry of Planning, Department of Statistics, Industrial Survey and Industrial Census 1980

Table AVII-4-6 -Composite Price Index of Manufacturing production Inputs 1/

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food products	51.1	58.2	63.0	72.1	82.2	91.9	100.0	106.5	116.3	125.8	158.0	175.7	182.1	186.6	190.9	189.9	170.1	168.4	172.0	182.8	180.7	199.8	209.0
Beverages	70.6	74.5	78.2	82.0	84.0	99.1	100.0	108.5	114.9	135.0	153.1	188.0	210.0	228.7	230.3	256.0	283.3	297.1	297.2	319.8	329.1	356.4	387.1
Tobacco	77.8	82.2	88.1	94.1	95.6	100.1	100.0	108.3	125.3	145.0	150.8	185.9	207.6	220.2	222.1	211.2	239.2	265.9	257.9	276.4	267.2	290.2	262.2
Textiles & Wearing Apparel	63.0	64.5	67.0	74.3	88.5	97.2	100.0	106.3	108.7	120.4	161.3	179.6	201.9	199.8	201.6	200.8	231.4	235.2	223.5	211.8	222.8	200.1	203.6
Footwear & Leather Products	70.1	73.5	78.7	87.0	96.7	98.8	100.0	113.8	113.9	160.8	163.4	230.6	294.4	298.9	303.9	292.3	322.9	297.8	293.8	292.5	286.1	298.3	324.8
Wood & Furniture	61.7	64.1	72.7	81.0	89.6	95.2	100.0	112.2	120.0	167.3	183.1	208.2	246.3	256.5	248.2	298.8	278.8	271.3	271.0	261.8	260.1	254.3	281.6
Paper, Printing & Publishing	60.4	60.3	67.2	76.1	88.2	99.4	100.0	85.6	96.4	107.6	118.7	135.0	147.5	159.2	161.6	167.5	172.4	191.1	201.3	188.6	193.2	185.3	204.4
Industrial Chemicals	41.5	41.7	51.3	59.1	66.4	80.6	100.0	94.6	108.7	129.7	147.1	165.1	176.9	178.4	182.8	200.3	216.7	215.9	225.6	228.7	235.3	219.6	243.8
Petroleum Refining	46.3	42.2	49.4	59.8	84.1	91.5	100.0	107.1	96.5	114.3	159.7	179.0	177.9	178.5	187.8	163.7	184.1	191.0	187.3	181.8	185.8	173.5	187.0
Non-metallic minerals	62.8	67.3	69.8	72.9	82.1	89.7	100.0	103.3	111.5	134.1	181.8	201.1	207.1	210.0	216.9	202.3	197.6	198.1	205.8	222.5	230.5	241.6	323.6
Basic Metal products	50.2	52.0	55.6	62.0	74.6	78.6	100.0	92.3	101.7	125.7	133.8	148.9	159.8	166.0	169.0	177.7	169.2	169.6	166.4	169.7	179.0	130.1	139.2
Fabricated Metal	50.2	58.3	61.4	68.2	84.0	87.0	100.0	97.1	104.3	125.9	134.8	148.2	169.9	173.0	186.6	183.6	179.5	185.9	166.9	188.5	182.4	168.8	187.0
Other Manufactures	61.1	65.3	70.0	73.0	78.9	83.6	100.0	109.7	123.1	122.6	131.5	149.7	172.9	180.2	192.3	202.1	239.7	276.3	286.6	281.0	289.7	299.0	307.6
All Manufactures	52.4	57.6	61.4	63.4	71.2	76.0	100.0	105.0	117.2	121.5	170.7	152.9	159.0	166.2	175.1	186.2	182.1	215.6	240.1	268.8	307.5	320.0	318.4

Source: Calculated from Tables AVII-1 to AVII-4 see text for Mythology

Note: 1/ is a Laspeyer price index where price indices of inputs (labour, Imported Martial and other material inputs) are weighted by their cost shares in 1980

Table AVII-4-7 - Price Index of Profitability in Manufacturing industries1/

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Petroleum Refining	113.5	144.7	132.3	118.5	101.8	96.0	100.0	104.0	122.0	136.5	166.1	165.4	174.4	189.0	188.8	215.2	125.2	115.9	96.3	115.3	144.9	124.7	117.0
Manufactured Gas	113.5	144.7	132.3	118.5	101.8	96.0	100.0	123.1	112.8	146.3	153.6	153.0	161.3	174.7	174.6	198.9	115.7	107.1	89.1	106.6	134.0	115.3	108.2
Industrial Chemicals	126.6	146.5	127.2	119.7	129.0	109.0	100.0	115.7	106.4	118.2	177.1	176.2	172.3	185.8	190.6	163.2	108.2	131.0	165.6	159.7	141.6	160.6	125.8
All Manufactures	100.4	106.0	106.4	111.6	120.3	115.5	100.0	106.0	100.1	95.1	75.2	96.8	97.1	97.1	97.9	88.7	80.2	64.7	65.9	69.7	60.9	62.1	62.3

Source: Calculated from tables AVII-4-2 and AVII-4-6

Note: 1/ Is Ratio of Unite Value of Exports to Composite Price index of Production Input

Table AVII-4-8 - Index of Material Input to Manufacturing Production (at 1976 constant Price) 1/

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food products	63.62	58.93	56.48	57.14	74.9	89.8	100	105	107	108	131	137	144	185	203	221	266	287	301	303.2	328.2	465.6	518.9
Beverages	59.34	52.17	58.08	70.08	101	97	100	94	88.4	71.1	103	96.6	92.4	118	130	124	117	117	121	117.2	118.5	177.1	187.1
Tobacco	31.09	33.58	53.79	98.96	102	99.1	100	94.8	77.2	55.4	141	192	270	314	459	741	1012	1410	2254	3259	5227	5996	9800
Textiles & Wearing Apparel	54.03	62.98	53.08	51.12	50.4	76.5	100	104	101	67	49.3	45.3	41.7	81.4	95.1	103	93.5	96	105	115.4	114.1	205.8	232.1
Footwear & Leather	35.7	43.49	52.06	55.34	65	84.6	100	98.3	119	97.8	111	130	181	226	375	696	1139	2234	4098	7449	13788	16024	24464
Furniture & Wood Products	50.5	51.35	46.84	83.68	96.5	99.8	100	66.2	63.5	52.9	52.5	63.3	77.9	110	167	206	326	496	735	1126	1678	2169	2798
Printing and Publishing	17.54	18.91	18.15	53.58	55.6	70.9	100	122	89.6	64	56.4	77.6	126	182	319	560	995	1642	2853	5571	9950	12560	19089
Industrial Chemicals	95.8	100.2	102.2	101.5	103	106	100	149	152	147	232	237	233	276	287	270	256	262	256	257.7	255.5	453.7	464.2
Petroleum Refining											100	66.2	76.8	82.3	84.7	109	110	121	141	165.4	184.5	291.1	326.1
Non-Metallic mineral	6.062	6.717	11.49	16.49	27.9	31.1	100	30.4	56.3	76.8	125	219	388	459	748	1311	2327	4141	7370	13118	23350	28354	46507
Basic Metal products	99.09	97.9	89.47	153.2	150	138	100	106	98.8	81.4	98.1	115	140	185	241	300	414	541	722	926.9	1152	2112	2595
Fabricated metal	99.42	102	109.1	151.1	216	248	100	260	299	272	276	318	367	408	485	654	895	1157	1727	2049	2838	4038	4864
Other manufactures	31.05	28.46	51.43	43.77	81.2	99.1	100	105	105	117	124	118	109	148	157	162	145	134	137	148	152.1	233.6	263.3
All Manufacturing	57.19	57.18	65.57	91.03	104	117	100	105	106	166	179	246	278	322	356	388	460	451	470	486.6	493.3	687.9	843.6

Source : Ministry of Planning, Industrial Survey, and Industrial Census, various issues, Ministry of Industry, Unpublished Production Follow up Reports , various issues, and National Authority for Information and Documentation Economic and Social Indicators, yearly Statistical series, various issues.

Note: 1/ deflated by Composite Price Index of Manufacturing Table AVII-4-6.

Table AVII-4 9 - Index of Labour Input to Manufacturing Production (Number of Workers), 1976=100

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food Products	55.7	58.2	52.2	56.8	71.2	66.3	72.8	77.5	96.2	100.0	100.1	98.1	100.9	129.5	137.6	158.4	162.0	181.4	197.2	204.4	215.0	247.9	250.1	252.3	263.9	274.2
Beverages	41.4	42.1	49	49.2	49.8	62.6	69.6	103.5	99.5	100.0	99.0	94.1	86.7	98.6	119.5	119.4	119.3	121.4	122.9	123.9	124.4	124.8	131.0	130.0	139.6	152.3
Tobacco	74.9	75	75.5	75.9	78.7	80.3	80.7	84.7	98.5	100.0	90.5	90.0	82.6	83.6	83.6	84.4	84.3	84.3	84.5	84.6	84.6	84.6	85.6	89.0	89.9	92.3
Textiles & Wearing Apparel	30.5	30.9	31.9	34.5	39.7	40.0	34.6	27.5	58.9	100.0	100.1	100.2	100.2	99.9	267.4	268.8	369.0	377.3	449.5	535.5	608.3	638.0	646.1	647.7	643.2	633.9
Leather & Footwear	6.7	6.6	6.6	8.1	8.4	8.6	15.7	23.5	64.8	100.0	138.2	138.5	116.5	104.5	121.0	121.7	132.9	149.3	176.2	193.0	215.5	228.1	234.8	233.8	235.5	241.6
Wood & Furniture	31.8	31.8	31.1	50.1	63.2	72.4	87.3	94.7	98.0	100.0	102.5	112.7	125.4	138.1	159.8	161.8	174.2	175.9	178.7	181.2	182.0	186.4	179.8	175.9	175.9	177.5
Paper, and Publishing	70.6	66.4	65.9	61.0	68.3	71.7	78.7	80.1	94.6	100.0	99.5	99.1	99.1	97.3	97.3	99.4	98.1	95.8	92.5	89.9	87.6	80.9	79.6	85.2	85.9	85.3
Industrial Chemicals	72.0	72.8	73.1	72.8	75.5	76.0	82.8	86.1	95.0	100.0	73.6	73.6	89.0	176.3	215.6	248.2	349.8	390.7	475.8	523.1	585.1	629.5	648.9	685.4	711.4	744.4
Non-Metallic mineral	31.8	33.6	37.6	44.4	50.4	60.6	76.9	83.1	96.0	100.0	100.8	100.9	132.5	129.6	164.2	189.2	189.3	202.7	215.3	230.7	245.4	252.4	260.9	283.3	275.6	292.6
Basic Metal products	140.7	175.5	183.2	188.7	146.7	139.8	139.3	119.8	146.7	100.0	106.3	120.1	135.4	145.6	879.1	1012	1013	1018	1028	1035	1053	1062	1068	1219	1428	1536
Fabricated Metal																						100.0	117.1	126.6	127.6	151.1
All-Large-Scal Manu.	48	49.7	50.2	53.7	58.9	61.7	68.1	73.7	90.6	100.0	100.6	100.7	105.5	117.5	174.5	189.2	211.4	222.9	245.9	266.2	286.7	345.4	357.9	373.2	382.6	403.4
Other Manufacturing	64.9	58.9	52.8	55.0	56.3	60.9	69.9	81.0	86.5	100.0	116.7	141.2	161.1	176.0	169.2	201.4	217.4	175.6	175.3	172.3	169.2	164.8	184.5	205.9	207.8	214.1
All Manufacturing	58.8	55.6	51.9	54.5	57.2	61.2	69.3	78.3	88.0	100.0	111.0	126.7	141.2	155.1	171.1	197.1	215.2	192.5	200.5	205.9	211.2	229.4	246.5	265.8	270.3	281.8

Source: Calculated from Ministry of Planning, Statistical Abstract, Industrial Survey, and Industrial Census, various issues, and National Authority for Information and Documentation Social and Economic Indicators, various issues

Table AVII-4-10 - Index of Manufacturing Output (at 1976 constant prices) 1/

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food products	15.0	16.4	22.0	24.7	31.3	37.1	42.8	84.8	77.3	100.0	85.7	83.8	97.8	216.0	283.3	361.7	423.3	507.7	575.2	483.8	457.7	500.4	496.5	520.3	504.8	549.5
Beverages	40.9	46.1	54.2	41.6	46.8	61.8	84.6	97.0	97.5	100.0	120.0	90.5	149.8	159.3	176.6	233.6	265.5	276.2	258.4	239.8	377.1	538.9	725.5	715.5	763.7	1005
Tobacco	20.6	17.4	25.7	31.9	39.0	40.3	36.6	91.2	57.8	100.0	81.0	77.0	74.5	83.1	92.4	89.8	147.6	175.3	143.0	126.3	130.5	155.4	173.2	122.9	75.4	92.2
Textiles & Wearing Apparel	25.1	21.2	38.2	37.5	37.7	44.1	47.6	61.8	89.7	100.0	106.5	93.6	142.7	293.4	557.1	737.2	988.1	888.2	882.4	1181	1326	1787	1866	1702	1617	1618
Footwear & Leather	1.45	1.2	5.58	8.58	9.32	15.7	22.8	61	89.2	100.0	105.7	112.6	343.1	651.6	1014	1294	1284	1467	1399	1503	1584	1787	1597	1471	1651	1914
Furniture & Wood Products	33.9	40.5	28.1	29.7	45.2	59.2	78.0	104	92.9	100.0	137.1	419.9	607.4	728.1	805.4	764.5	753.7	608.5	611.6	390.4	478.9	492.9	605.3	687.2	857.4	1057
Printing and Publishing	25.4	20.6	32.2	35.5	37.7	40.4	27.0	65.8	75.1	100.0	110.9	116.8	121.5	128.7	144.0	163.6	184.3	205.4	200.0	174.2	195.4	212.9	236.6	244.8	362.3	378.1
Industrial Chemicals	21.5	18.7	29.3	30.9	32.2	26.1	43.0	79.9	87.3	100.0	75.2	58.4	85.5	176.5	260.0	407.1	528.8	655.7	653.3	753.7	951.5	1169	1215	1458	1545	1689
Petroleum Refining													100.0	390.3	552.2	561.0	600.6	677.3	880.8	773.4	811.4	672.5	684.9	870.5	894.1	1114
Non-metallic Metals	10.3	9.2	12.1	15.6	18	27.3	27.3	79.7	73.5	100.0	117.7	129.0	175.8	227.2	332.1	410.6	439.5	446.3	403.1	213.0	182.5	201.8	222.0	229.2	234.4	251.1
Basic Metal products														100.0	197.4	312.4	694.1	539.5	580.6	272.1	208.8	247.9	831.8	4228	6922	9022
Fabricated metal	32.5	47.1	46.2	46.6	37	45.4	54.3	66.4	110	100.0	87.6	362.9	580.9	717.2	808.4	1186	1361	1644	1635	1451	1657	2032	2260	2374	2490	2841
Other manufactures	17.3	28.5	21.9	22.2	20.7	33.1	60.3	81.0	76.3	100.0	210.7	272.4	212.5	85.4	31.3	17.0	10.4	12.3	13.3	14.7	31.1	37.0	26.5	21.4	16.1	11.3
All Manufacturing	19.1	22.9	24.7	26.7	29	36.1	48.4	82.6	74.6	100.0	136.8	168.4	186.6	236.2	287.1	326.1	376.1	422.2	458.8	412.0	450.6	478.5	502.7	567.9	591.1	690.8

Source : Ministry of Planning, Industrial Survey, and Industrial Census, various issues, Ministry of Industry, Unpublished Production Follow up Reports , various issues,
and National Authority for Information and Documentation Economic and Social Indicators, yearly Statistical series, various issues.

Note: 1/ deflated by Manufacturing Wholesale Price Index Table AVII-4-1 .

Table VII-4-11 - Quantity Index of Profitability in Manufacturing Industries 1/

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Food products	159	51.8	64.3	72.4	113	85.3	100	82	79.4	91.3	165	207	248	233	253	263	188	164	170	167	163	115	113
Beverages	182	91.4	103	121	94.9	99.5	100	125	99.7	193	157	166	225	224	218	209	200	315	439	590	580	473	582
Tobacco	269	98.1	70.3	37.9	91.6	58.4	100	86	97.5	126	62.3	52.2	36.7	52.2	43	22	14.3	10.6	7.94	6.13	2.72	1.45	1.09
Textiles & Wearing Apparel	215	69.8	91.8	106	149	129	100	104	92.8	179	427	426	571	515	436	374	448	452	576	584	533	432	418
Footwear & Leather	398	31.1	44.4	56.9	124	116	100	93	89.2	327	599	802	819	674	509	282	194	109	68.5	34.2	17.2	16.6	12.6
Furniture & Wood Products	199	81.5	106	91.8	109	93.6	100	174	521	777	885	832	714	571	357	311	141	124	90.5	75.9	59.4	58.1	56
Printing and Publishing	337	115	122	44.6	105	96.8	100	95.8	127	165	190	173	138	116	80.2	46.7	23.5	16.2	10.3	5.87	3.41	4	2.75
Industrial Chemicals	108	33.2	26.4	43.4	79.5	83.4	100	54.3	41.4	61.4	78.8	111	173	185	218	219	258	311	381	391	464	316	336
Petroleum Refining										100	368	705	619	578	619	634	538	512	373	335	387	275	310
Non-metallic Metals	628	100	113	85.1	189	154	100	242	190	193	180	162	122	113	73.4	39.2	11.9	5.82	3.64	2.26	1.32	1.11	0.73
Basic Metal products											100	71	96.3	199	142	140	56.9	37.9	38	109	458	463	506
Fabricated metal	82.9	32.8	39	36.6	34.4	49	100	39.2	141	243	293	179	228	247	269	220.0	156	146	152	142	108	80.1	75.9
Other manufactures	286	62.5	62.5	125	99.8	78.6	100	197	245	171	64.4	24.8	13.7	6.52	7.66	8.12	9.85	22.2	26.2	17.2	13.3	7.01	4.45
All Manufacturing	176	50.7	55.7	55.3	82.6	66.6	100	129	154	115	135	123	123	123	128	129	98.5	110	111	112	125	95.4	92

Source; Calculated from Tables AVII-8, AVII-4-9 and AVII-10.

Notes: 1/ Index of Output / Index of Material Input * Index of Labour Input.

Table AVII-4-12 Composite Index of Profitability in Manufacturing Industries 1/ 1970-1992

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Petroleum Refining									100.0	136.5	610.8	1167	1081	1093	1169	1365	674.0	592.8	359.5	386.3	560.8	343.1	362.1
Manufactured Gas									100.0	146.3	564.8	1079	999.1	1010	1081	1262	623.2	548.1	332.4	357.2	518.5	317.2	334.8
Industrial Chemicals	136.6	48.7	33.6	52.0	102.6	90.9	100.0	62.8	44.0	72.5	139.5	195.7	298.2	343.0	415.1	357.3	279.1	407.3	631.0	624.3	657.7	507.4	422.9
All Manufacturing	176.9	53.8	59.2	61.7	99.3	76.9	100.0	137.2	153.7	109.7	101.4	119.0	119.5	119.8	125.7	114.0	79.0	70.9	73.3	78.3	75.9	59.2	57.2

Source: Calculated from Tables AVII-4-6 and AVII-4-10

1/ = Price Index of Profitability* Quantity index of profitability.

BIBLIOGRAPHY

<u>Official Publications and Government Documents</u>.

Ministry of Agriculture, (1993) *Report on Agriculture and Land Reclamation,* Statistical Data on Agriculture Sector Between 1986-1990, (November): Tripoli.

__________. (1994), *A Report on Agriculture and Land Reclamation,* Statistical Data on Agriculture Sector Between 1966-1980, (July): Tripoli.

__________. (1981), *A Report on Agriculture and Land Reclamation,* Statistical Data on Agriculture Sector Between 1966-1980, (May): Tripoli.

__________. (1995), *A Report on Agriculture and Fishing, May*: Tripoli

__________. (1979), *First Seminar on Research of Wheat Production in Libya,* Agriculture Research Centre: Tripoli.

Agricultural Bank, *Report of The Director Board*, various issues: Tripoli.

Census and Statistics Department, *Statistical Abstract*, various issues: Tripoli.

__________. (1965), *Population Census, Paper No, 3, The Labour Force of Libya,* Tripoli

__________ *Report of the Annual Survey of Large Construction Units*, various issues: Tripoli.

__________. (1984), *Economic and Social Indicators* (1962-1983), February: Tripoli.

__________. *Report of the Annual Survey of Large Manufacturing Establishments: various issues* Tripoli.

__________. (1969), *Report on the First Phase of the Household Sample Survey, Tripoli-Town:* Tripoli.

__________. (1970), *Report on the Second Phase of the Household Sample Survey, Tripoli-Town:* Tripoli.

__________. (1970), *Report on the second Phase of the Household Sample Survey, Benghazi-Town:* Tripoli

__________. (1970), *Supplement to the Report of the Annual Survey of Petroleum Mining Industries:* Tripoli

__________. (1970), *Survey of the National Economy of the Libyan Arab Republic,*(1964-1968*):* Tripoli.

__________. (1969), *Trends on Libyan Imports and Exports*, (1962-1968): Tripoli.

Central Bank of Libya, *Yearly Statistical Series*, various issues: Tripoli.

__________. *Monthly Statistical Bulletin,* various Issues: Tripoli.

__________. *Annual Report,* various Issues: Tripoli.

__________. (1965), *The Development of Public Finance in Libya*, (1944-1963): Economic Research Department: Tripoli.

Ministry of Education, *The General Account On Educational Development in Libya, from the Academic Year 1958/1959 to 1971/1972*. Tripoli.

Ministry of Industry and Mining, (1994), *Evaluation to the Performance of Industrial Sector:* August, Tripoli.

__________. *A Report on the Development of Industrial and Mining Production:* various issues: Tripoli.

__________. *Annual Report of Production Follow-up:* various issues: Tripoli

__________ *1994 A Comparison between Value and Volume of production of Industrial Firms (1986-1993)*: Tripoli.

__________. (1994), *Value of Industrial exports by Kind of Products (1982-1993):* Tripoli.

__________. (1994), *Development of wage and Salary in Manufacturing Industries (1987-1993):* Tripoli.

__________ (1994), *Comprehensive Industrial Survey* (part one), May: Tripoli

__________.(1987), *Comprehensive Industrial Survey,* (August): Tripoli.

__________ (1966), *Industrial Encouragements in Libya*, Industrial Guidance Section: Tripoli.

Ministry of Planning, *Three Year, Development Plan* 1973-1975: Tripoli.

__________. *Five Year, Economic and Social Transformation Plan* 1976-1980: Tripoli.

__________. *Five Year, Economic and Social Transformation Plan* 1981-1985: Tripoli.

__________. *The National Accounts*, various issues: Tripoli.

__________. (1977), Economic Growth During the Period of the Three-Year Plan (1973-1975): June.

__________. (1979), *Follow-up and Evaluation of Economic and Social Transformation Plan* (1976-1980), During its Years 76,77, 1978: February.

Ministry of Petroleum Affairs, *Petroleum Development in Libya*, (1954-1963): Tripoli.

__________. *Results of the Annual Survey of Petroleum Industry*, various issues Tripoli.

National Planning Council, (1965), *Second Annual Report on Development Activities for the Year Ending 31st of March 1965*, Multi Press: Tripoli.

__________. (1964), *First Annual Report on Development Activities for the Year Ending 31st of March 1964*, Multi Press: Tripoli

National Authority for Information and Documentation, (1987), *Economic and Social Indicators*, Yearly Statistical series (1962-1996), December: Tripoli.

__________. (1985), *The Statistical Book,* Yearly Statistical Series, (1985-1994): Tripoli.

__________. (1998), *Statistical Book,* Yearly Statistical Series, (1994-1996): Tripoli.

__________. (1985*), Foreign Trade Index,* Yearly Statistical Series (1985-1994): Tripoli.

__________. (1997), *Foreign Trade Index,* Yearly Statistical Series (1994-1996): Tripoli.

Technical Planning Authority, (1971), *Estimates of Private Final Consumption Expenditure of the Libyan Arab Republic*, (1962-1969): Tripoli.

International Organisations

FAO, *Production Yearbook*, various issues.

__________. (1989), Agricultural Price Policies in the Near East; Lessons of Experiences, FAO, *Economic and Social Paper* No.82.

__________. (1969), Development of Tribal Land and Settlement Projects. Report to The Libyan Government, No, 3, Rome.

IMF, International Financial *Statistics, various issues.*

__________. (1972), Libyan Arab Republic: Recent Economic Development: A Report Prepared by IMF Staff Mission to Libya, June.

__________. (1976), Libyan Arab Republic: Recent Economic Development: A Report Prepared by IMF Staff Mission to Libya, July.

The International Bank For Reconstruction and Development, (1960), *The Economic Development of Libya*, Washington, D. C.

<u>Articles, Books and Theses</u>

Abozrida, S. (1981), *Price Support for Agricultural Products*, Unpublished M.A Thesis, Garyonis University, Libya.

Allan, J.A (1981), *Libya: The Experience of Oil*, Groom Helm: London.

______. (1983), 'Libya Accommodates to Lower Oil Revenues: Economic and Political Adjustments', *International Journal of Middle East Studies*, 15: 377-85.

______. (19882), *Libya Since Independence*, St. Martin's Press

Allan, J., and Mclachlan, K.S. (1976), Agricultural Development in Libya after Oil, *African Affairs*: 331-45.

______ (1973), Land Use and Cropping Patterns: Present Position and Recent Change, in Allan, J.A. et.al. (ed.), *Libya Agriculture and Economic Development*, Frank Case Company: London.

Allan, J.A.., Mclachlan, KS., and Penrose, E. (1973), *Libya: Agriculture and Economic Development*, Frank Case Company, Ltd: London.

Angela, L., and Colin T. (1997), 'Total Factor Productivity and the effect of R&D in Africa Agriculture, *Journal of International development*, 9 (4): 529-37.

Amjad, R. (1989), The Economic Impact of Migration to the Middle East on the Major Spending Countries; An Overview', in Amjad, R. (ed.), *To The Gulf and Back*, ILO: Geneva.

Atiga, A.A. (1972), *The Impact of Oil On The Libyan Economy During (1965-1969)*, Al-Talia: Beirut Lebanon.

Bank of England, (1982), 'North Sea Oil and Gas: Costs and Benefits', *Bank of England Quarterly Bulletin*, (March): 56-73.

Banks, F. E. (1986), 'Natural Gas in Australia', *Energy Policy*, 14: February, 86-88.

Barker, T.; Brailovsky, V. (eds.), *Oil or Industries? Energy, Industrialisation and Economic Policy in Canada, Mexico, the Netherlands, Norway and the United Kingdom*, in Barker, Academic Press: New York.

Barker. T. (1981), 'De-industrialisation, North Sea Oil and Investment Strategy for the United Kingdom', in Barker, T. Brailovsky, V. (eds.), *Oil or Industry?*, Academic Press: London.

_________. (1981), 'Policy Issues in Energy Rich Economies', in Barker, T. Brailosky, V.(eds.), *Oil or Industry?*, Academic Press.

Barioun, N., (1971), *Studies in The Libyan Economy*, Thought Library, Tripoli.

Benjamin, N.C., and Devarajan, S. (1986), 'Oil Revenues and the Cameroonian Economy', in Zartmann, I. W., Schatzberg, M. G. (eds.), *The Political Economy of Cameroon,* Praeger, New York.

Benjamin, N.C; and Weiner, R.J. (1989), 'Oil Revenues and the Dutch Disease in a Developing Country: Cameroon', *Development Economies*, 30, 1: January, 71-92.

Bevan, D.; Collier, P.; and Gunning, J. W. et.al. (1990), *Controlled Open Economies: A Neo-classical Approach To Structuralism*, Clarendon Press: Oxford.

Bjerkholt, O. et.al., (1981), 'Using the Oil and Gas Revenues: The Norwegian Case', in Barker, T. Brailovsky, V. (eds.), *Oil or Industry'*, Academic Press: London.

Blackaby, F. (1979), (eds.), *De-industrialisation,* London: Heinemann.

Bound, M.E. and Knobl, A. (1982), 'Some Implications of North Sea Oil for the UK Economy', *IMF Staff Working Paper 29*, September.

Bruno, M., and Sachs, J. (1982), 'Energy and Resource Allocation: A Dynamic Model of Dutch Disease', *Review of Economic Studies*, 49, 5: 845-59.

Buiter, W.; and Purvis, D. D. (1982), 'Oil, Disinflation, and Export Competitiveness: A Model of the Dutch Disease', in Bhandari, J.s. and Putnam, B,H. (eds.), *Economic Interdependence and Flexible Exchange Rate*, MIT Press: Massachusetts.

Cairnes, J.E. (1859), 'The Australian Episode', Fraiser's Magazine, Reprinted in Taussing, F.W. (ed.), *Selected Readings in International Trade and Tariff Problems,* 1921, Ginn and company: New York.

Caves, R.E; and Jones, R.W. (1985), *World Trade and Payment*, Little, Brown and Company: Boston.

Cassing, J.; and Warr, H. (1982), *The Distributional Impact of Resource Boom*, Working Paper No. 065 (April), Working papers in economic and Econometrics, Faculty of Economics and Research School of Sciences, Australian National University: Canberra.

Chatterji, M., and Price, S. (1988), 'Unions, Dutch Disease and Unemployment", *Oxford Economic Papers*, 40, 2:June.

Chenery, H. (1960), 'Patterns of Industrial Growth', *American Economic Review*, September, 50: 624-52.

__________. (1967), 'Foreign Assistance and Economic Development', in *J. Alder, and P. Kuznest, (eds.), Capital Movement and Economic Development, Proceeding of a Conference held by the International Economic Association*, MacMillan and Company: New York.

Chenery, H., S., Shishido, T.; and Wantanabe, T. (1962), The Pattern of Japanese Growth, 1914-1945', *Econometrica, 30, January*: 98-139.

Chrystal, K.A. (1984), 'Dutch Disease or Monetarist Medicine?: The British Economy Under Mrs. Thatcher', *Review the Federal Reserve Bank of Saint Louis*: 66, 5: June.

Collier, P. (1983), 'Oil and Inequality in Rural Nigeria', in Ghar, D. and Radwan, S. (eds.), *Agraian Policies and Rural Poverty in Africa*, ILO: Geneva.

Corden, W.M. (1981), "The Exchange Rate, Monetary Policies and North Sea Oil: The Economy Theory of the Squeeze on Tradeables", *Oxford Economic Papers*, 33 (July): 24-46.

__________. (1981), "Exchange rate Protection" in R.N.. Cooper et.al., (eds.), *The International Monetary system Under Flexible Exchange Rates: Global, Regional, and National*, Publishing Company: Massachusetts.

__________. (1982), 'Exchange Rate Policy and Resources Boom', *Economic Record*, 58 (March): 18-31.

__________.(1982), "Booming Sector and Dutch Disease Economies: A Survey', *Working Paper No.* 079 (November), Working papers in economic and Econometrics, Faculty of Economics and Research School of Sciences, Australian National University: Canberra.

__________.(1982), 'Booming Sector and Dutch Disease Economies: Survey and Consolidation", *Oxford Economic Papers*. 36, :359-380.

Corden, W.M., and Neary, P.J. (1982), 'Booming sector and De-industrialisation in a Small Open Economy', *Economic Journal* 92 (December): 825-848.

Corden, W.M.; and Warr, P.G. (1981), 'The Petroleum Boom and Exchange Rate Policy in Indonesia: a Theoretical Analysis', *Ekonomi dan Keuangan Indonesia* 29 (September): 335-59.

Denison, E. (1962), *The Source of Economic Growth in the United States and the Alternatives before Us*, Brookings: New York.

__________. (1967), *Why Growth Rates differ*, Brookings Institution: Washington D.C.

Denison, E., and Chung, W. (1967), *How Japan's Economy Grew So Fast*, Brookings Institution: Washington D.C.

Dornbusch, R. (1980), *'Exchange Rate Economies: Where Do We Stand?'* Brooking Papers of Economic Activities: 143-185.

Dornbusch, R., and Leslie Helmers, F. (1988), The Open Economy: Tools for Policymakers in Developing Countries, Oxford University Press: Oxford.

Edwards, S., and Aoki, M. (1983), 'Oil Export Boom and Dutch Disease: A Dynamic Analysis', *Resource and Energy*, 5, 3: (September).

Ellman, M. (1981), 'Natural Gas, Restructuring and Re-industrialisation: The Dutch Experience of Industrial Policy', in Barker, T. Brailovsky, V. (eds.), *Oil or Industry?*, Academic press. London.

El Mehdawi, M. (1981), The Industrialisation of Libya, *in Clark J.I., and Bowen-Jones, H. (eds), Changes and Development in the Middle East*, Methuen: London and New York.

Estwood, R.K.; and Venables, A.J. (1982), 'The Macroeconomic Implications of a Resource Discovery in an Open Economy', *Economic Journal*, 92 (June): 285-99.

Evans, H.D., and Greenaway, D. (1991), *Developing Countries and The International Economy: Issues in Trade, Adjustment and Debt*, Cass: London.

__________. (1989), *Comparative Advantage and Growth: Trade and Development in Theory and Practice, Harvester* Wheatsheaf: London and New York.

Fajnzylber, F (1981), Comment on Ellman, M., in Barker, T. Brailovsky, V. (eds.), *Oil or Industry?,* Academic press: London.

Farley, R. (1971), *Planning for Development in Libya*, Praeger Publishers: New York

Findlay, R. (1983), 'Primary Exports, Manufacturing and Development', in Lundahl, M., (ed.), *The Primary sector in Economic Development*, St. Martin's Press: New York.

Findlay, R.; and Grubert, H. (1959), 'Factor Intensities, Technological Progress and the Terms of Trade', *Oxford Economic Paper*, 11, (February): 111-121.

First, R. (1975), *Libya: The Elusive Revolution*, Africana Publishing Company: New York.

Flemming, J.S. (1982), 'UK Macro-policy Response to Oil Price Shocks of 1974-1975 and 1979-1980', *European Economic Review*, 18: 223-34.

Foursund, F. (1981), 'Comments on Bjerkholt, O. et.al., in Barker, T. Brailovsky, V. (eds.), *Oil or Industry?,* Academic press: London.

Forsyth, P.J. (1986), Booming Sectors and Structural Change in Australia and Britain: A Comparison', in Neary, J.p., Van Wijnbergen, S. (eds.), *Natural Resources and The Theoretical Framework*, Basil Blackwell: Oxford.

Forsyth, P.J., and Kay, J.A. (1980), The Economic Implication of the North Sea Oil Revenues' *Fiscal Studies*, 1, (July): 1-28.

__________. (1981), 'Oil Revenues and Manufacturing Output' *Fiscal Studies*, 2, (July): 9:17.

Forsyth, P.J., Nicholas, S.J., 1983, 'The Decline of Spanish Industry and The Price Revolution: A Neo-classical Analysis' *Journal of European Economic History*, 12, (Winter), 601-9.

Gelb, A.H. (1981), *Capital Importing Oil Exporters: Adjustment Issues and Policy Choices*, World Bank Staff Working Paper No: 475 (August), Washington D. C.: The World Bank.

_________. (1986), Adjustment to Windfall Gains: A Comparative Analysis of Oil- Exporters Countries', in Neary, J.P., Van Wijnbergen, S. (eds.), *Natural Resources and The Macroeconomy*, Basil Blackwell: Oxford.

_________. (1988), *Oil Windfalls: Blessing or Curse*?, Oxford University press: Oxford.

Gregory, R.G. (1976), 'Some Implications of the Growth of the Mineral Sector', *Australian Journal of Agricultural Economics*, 20, (August): 71-91.

Griliches, Z. (1971), "The Sources of Measured Productivity Growth: United States Agriculture, 1940-60", in Rosenberg, N. (ed.), *The Economics of Technical Change,* Penguin Books: Harmondsworth.

Griliches, Z.; and Ringstad, V. (1971), *Economic of Scale and The form of Production* Function: An Econometric Study of Norwegian Manufacturing Establishments Data, North-Holland Publishing Co.: Amsterdam.

Habib, H. (1979), *Libya: Past and Present*, Edam Publishing House, Ltd: Valleta, Malta.

Hajjaji, S.A. (1967), *The New Libya*: A Geographical, Social, Economic and Political Study, Government Printing Press: Tripoli.

_________. (1974) Agricultural Development and Land Settlement in the Kufra Region of Libya, *in Land Settlement and Cooperative of Libya*, United Nations: New York.

Harberger, A.C. (1983), 'Dutch Disease: How Much Sickness, How Much Boom?', *Resource and Energy*, 5, 1: (March): 1-20.

Harvie, C. (1987), The Structural Effects of North Sea Oil Upon the UK Economy: Alternative Viewpoints and Evidence', *Journal of Energy and Development*, 11, 1:(Autumn).

Higgins, B. (1968), *Economic Development*, Norton and Co.: New York.

_________. (1953), The Economic and Social Development of Libya, *United Nations Document ST/TAA/K/Libya/3*: New York.

Higgins, B., and J. Royer. (1967), 'Economic Development with Limited Supplies of Capital: The Libyan Case', *The Libyan Economic and Business Review*, Vol. III. No. 2, (Autumn).

Ishikawa, S. (1972), *Economic Development in Asian Perspective*, Kinokuniya Bookstore Co. Ltd.: Tokyo.

Jazayeri, A. (1988), *Economic Adjustment in Oil-Based Economies*, Avebury: Aldershot.

Jones, R.W. (1965), 'The Structure of Simple General Equilibrium Models', *Journal of Political Economy*, vol.73 (December): 557-572.

__________. (1971), 'A Three-factor Model in Theory, Trade and History', in Bhagwati, J.N., et. al. (eds.), *Trade, Balance of Payments, and Growth: Essays in Honour of C.P. Kindleberger*, North Holland: Amsterdam.

Jorgenson, D., and Griliches, Z. (1967), 'The Explanation of Productivity Change', *Review of Economic Studies*, 34, .3: 249-84.

Jungenfelt, K., and Hague, D. (1985), *Structural Adjustment in Developed Open Economies*, St. Martin's Press: New York.

Kaldor, N., (1975), 'Economic Growth and Verdoorn's Law: A Comment on Mr Rowthron's article', *Economic Journal*, 58.340 (December): 891-96.

__________. (1967), *Strategic Factors in Economic Development*, Ithaca: N.Y

__________.(1981), 'The Energy Issue' in Barker, T. Brailovsky, V. (eds.), *Oil or Industry?*, Academic Press: London.

Karshenas, M. (1990), *Oil, State, and Industrialisation in Iran*, Cambridge University Press: Cambridge.

Karshenas, M., and Pesaran, M.H. (1994), Exchange Rate Unification, The Role of Market and Planning in The Iranian Economic Reconstruction, *in Coville, T. (ed), The Economy of Islamic Iran Between State and Market*, Institut Francais De Recherche En Iran: Teheran.

Katouzian, M.A. (1978), 'Oil Versus Agriculture, A Case of Dual Resource Depletion in Iran', *Journal of Peasant Studies*,:347-69.

Kendrick, J.W. (1977), *Understanding Productivity, An Introduction to the Dynamics of Productivity Change*,, The Johns Hopkins University Press; Baltimore.

Kim. (1977), *Source of Industrial Growth and Structural Change in Korea*, Development Institution, Working Paper 77-03; Seoul.

Kremers, J. M. (1986), 'The Dutch Disease in The Netherlands' in Neary, J.P., and Van Wijnbergen, S. (eds), *Natural Resources and The Macroeconomy*, Basil Blackwell: Oxford.

Krueger, A. O.; and Tuncer, B. (1980), 'Estimating Total Factor Productivity Growth in a Developing country', *World Bank staff Working Paper* 422, October.

Krugman, P. (1987), 'The Narrow Moving Band, The Dutch Disease and the Competitive Consequences of Mrs. Thatcher', *Journal of Development Economics*, 27,1-2: October.

Labini, P.S. (1957), 'Relative Prices and Development Programmes', *Banca Nazionale del lavoro Quarterly Review*: 423-33.

Lewis, S. R. (1984), 'Development Problems of the Mineral-Rich Countries' in M. Syrquin, L. Taylor and L. Westphal, (eds.), *Economic Structure and Performance: Essay in Honor of H. B. Chenery*, New Yourk.

Lindberg, J. (1952), A General Economic Appraisal of Libya, United Nations Technical Assistance Administration: New York.

Long, N.V. (1983), 'On the effects of Booming Export Industry on the Rest of the Economy', *Economic Record*, 59, (March): 57-60.

Lucas, R.E. (1993), 'Making Miracles', *Economica*, 61, 2: 251-72.

Maddison, A. (1987), 'Growth And Slowdown in Advanced Capitalist Economics: Techniques of Quantitative Assessment', *Journal of Economic Literature*, 25(June): 649-98.

__________. (1991), *Dynamic Forces in Capitalist Development*: A Long Run Comparative View, Oxford University Press: Oxford.

Maguire, J. F. Report on Survey of Wages and Salaries in Libyan Arab Republic, ILO: Tripoli.

Majd, M.G. (1991), 'The Oil Boom and Structural Transformation in Sugar Industry of Iran', *Journal of Rural Studies*, 7, 4: 397-409.

Marston, R.C. (1986), 'Real Exchange Rate and Productivity Growth in the United States and Japan', *National Bureau of Economic Research, Working Paper* 1922 (May).

Matthews, R.; Feinstein, C.; and Odling-Smee, J. (1982), *British Economic Growth* 1856-1973, Clarendon Press: Oxford.

McKinnon, R.I. (1976), 'International Transfers and Non-traded Commodities: The Adjustment Problem', in Leipziger, D. (ed.), *The International Monetary System and the Developing Nations*, Agency for International development: Washington D C.

Moussavian, M. (1985), 'Growth Rates with an Exhaustible Resource and Home Goods', *Journal of International economics*, 18, 3 (May): 281-93.

Murray, G.L. (1981), 'Analysing the Implications of a Resource Boom', *Economic Society of Australia and New Zealand, Tenth Conference of Economists*, (August), Australian National University: Canberra.

Neary, P.J. (1985), 'Real and Monetary Aspects of the Dutch Disease', in Jungenflt, K., and Hague, D., *Structural adjustment in Developed Open economics*, St. Martin's Press: New York.

Neary, P.J.; and Van Wijnbergen, S. (1984), 'Can An Higher Oil Revenues Lead to a Recession? A Comment On Eastwood and Venable', *Economic Journal*, 94 (June):390-395.

__________. (1986), 'Natural Resources and The Macroeconomy: A Theoretical Framework', in Neary, P.J.; Van Wijnbergen, S. (eds), *'Natural Resources and The Macroeconomy,* Basil Blackwell: Oxford.

Nishimizu, M.; and Page, J. (1982), 'Total Factor Productivity Growth, Technological Progress, and technical Efficiency Change: Dimensions of Productivity Change in Yugoslavia, 1965-1978', *Economic Journal*, 92 (December):920-36.

Pack, H. (1971), *Structural Change and economic Growth in Israel*, Yale U. Press: New Haven.

Parvin, M., and Deshbakhsh, H. (1988), 'Trade, Technology Transfer, and Hyper-Dutch Disease in OPEC: Theory and Evidence', *International Journal of* Middle East Studies, 20: 469-477.

Pinto, B. (1987), 'Nigeria During and After the Oil Boom: A Policy comparison with Indonesia', *World Bank Economic Review*,.1,34: 439-445.

Pratten, B. (1971), *Economies of scale in Manufacturing Industries*, Cambridge University Press: Cambridge.

Dasgcepta, P.s., and Heal, G.M. (1979), *Economic Theory and Exhaustible Resources,* Cambridge University press: Cambridge.

Roberts, J. (1986), 'The Effect of the Oil Price Collapse on the Gulf Cooperation Council Economies', *Journal of Economic Development*, XII, 1 (Autumn): 103-14.

Roemer, M. (1983), 'Dutch Disease in Developing countries: Swallowing Bitter Medicine', *Discussion Paper* 156, Harvard Institute for International Development, Harvard University, Cambridge, US. Reprinted in Lundahl, M. (1985), (ed), *The Primary Sector in Economic Development*, 234-52, St. Marin's Press: New York.

Romer, P. (1986), "Increasing returns to Scale", *Journal of Political Economy*, 94,5: 1003-1037.

Rowthorn, R.E. (1975), 'What Remains of Kaldor Law?', *Economic Journal*, 85.337 (March): 10-19.

__________. (1975), 'A Reply to Lord Kaldor's Comment', *Economic Journal*, 85.340 December: 897-901.

Rowthorn, R.E.; and Wells, J.R. (1987), *De-industrialization and Foreign Trade*, Cambridge University Press: Cambridge.

Rybzynscki, T.M. (1955), 'Factor Endowment and Relative Commodity Prices', *Economica,* 22 (November), 336-41.

Salehi-Esfahni, H. (1988), 'Informationally Imperfect Labour Markets and the Dutch Disease Problem', *Canadian Journal of Economics*, XXI, 3 (August): 617-24.

__________. (1989), 'Oil Exports, Real Exchange Rate Appreciation, and Demand for Imports in Nigeria', *Economic Development and Culture Change*, 37, 3 (April): 495-512.

Salter, W.E.G. (1966), Productivity and Technical Change, University of Cambridge, *Department of Applied Economics*: Cambridge U.P.

Sayeigh, Y. A. (1978), *The Economies of Arab World; Development Since 1945*, Croom Helm: London.

Scherr, S. (1989), 'Agriculture in Export Boom Economy: A Comparative Analysis of Policy and Performance in Indonesia; Mexico and Nigeria', *World Development*, 17, 4: 543-60.

Seers, D. (1962), 'The Mechanism of an Open Petroleum Economy', *Social and Economic Studies*, 13: 233-42.

Singh, A. (1981), 'Introduction : Oil and alternative Economic strategies for Mexico', in T., Barker, V., Brailovsky, *Oil Or Industry: Energy, Industrialization and Economic Policy in Canada, Mexico, the Netherlands, Norway and the United Kingdom,* academic Press: London.

Snape, R (1977), 'Effects of Mineral Development of The Economy', *Australian Journal of Agricultural Economics*, 21,3 (December): 147-156.

Solow, R. (1971), 'Technical Change and the Aggregate Production Function' in Rosenberg, N. (ed), *The Economics of Technical Change*, penguin Books: Harmondsworth.

__________. (1957), 'Technical Progress and Productivity Change', *Review of Economic and statistics,* 39: 312-20.

Staehle, H., 1942, 'The Measurement of Statistical Cost Function: An Appraisal of Some Recent Contributions', *American Economic Review*, (June): 321-?

Stolper, W.F.; and Samuelson, P.A. (1941), 'Protection and Real Wages', *Review Economic Studies*, 9 (November): 58-73.

Struthers, J. (1990), 'Nigerian Oil and Exchange Rates: Indicators of Dutch Disease', *Development and Change*, 21,2: 309-341.

Syrquin, M. (1989), 'Sector Proportions and Economic Development: The Evidence Since 1950', In *Jeffery G. Williamson and Vadira, R. Panchaukhi* (eds.), *The Balance Between Industry and Agriculture in Economic Development.* Proceedings of the Eight World Congress of the international Economic Association, Delhi India, Vo, 2; Sector Proportions, Macmillan Press.

Van Wijnbergen, S. (1982), 'Optimal Capital and the Allocation of Investment Between Traded and Non-Traded Sectors in Oil Producing Countries', *Development Research department, World Bank.*

__________. (1984a), 'The Dutch Disease: A Disease After All' *Economic Journal*, 94 (March): 41-55.

__________. (1984b), 'Inflation, Employment, And The Dutch Disease in Oil Exporting Countries: A Short-Run Disequilibrium Analysis', *Quarterly Journal of Economics,* XCIX, 2 (May): 232-50.

__________. (1984c), 'Can Oil Discovery Lead to a Recession? A Comment on Eastwood and Venable', *The Economic Journal*, 94 (June): 290-95.

__________. (1985), 'Optimal Capital and the Allocation of Investment Between Traded and NonTraded Sectors in Oil-Producing Countries', *The Scandinavian Journal of Economics*, 87,1: 89-101.

Warr, P.G. (1986) 'Indonesia's Other Dutch Disease: Economic Effects of the Petroleum Boom' in Neary, J.P., and Van Wijnbergen, S. (eds), *Natural Resources and The Macroeconomy,* Basil Blackwell: Oxford.

__________. (1992), ' Exchange Rate Policy', in Booth, A. (ed), *The Oil Boom and After*, Oxford University Press: Singapore.

Weeks, J. (1989), *A Critique of Neo-Classical Macroeconomics*, St. Martin's Press: New York.

Wright, J. (1960), *Libya*, Praeger Publishers: New York.

Young, A. (1928), 'Increasing Returns and Economic Progress', *The Economic Journal*, 38, 152 (December): 527-43.

Zagallai, F. (1973), *Resent Urban Trends in the Libyan Arab Republic (1954-1964)*: Unpublished Ph.D. Thesis, Colorado State University.