Favourable Exogenous Shocks and Industrialisation in a Small Open Economy: The Case of Jordan

by

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Abstract

The subject of this study is the influence of favourable exogenous shocks on the structure of prices and output composition in small open economies. The study is based, theoretically, on the Dutch Disease theory; and, empirically, on research conducted on Jordan.

Under general equilibrium conditions, a boom in a traded sector is likely to produce a contraction of output and employment in non-booming traded sectors - *de-industrialisation*. This is the essence of the Dutch disease theory, its conclusions valid only within its particular set of assumptions about factor-market underpinnings of the model, including macro-equilibrium and full employment, fixed national stock of labour and capital, and perfect capital markets; and unchanging technical conditions of production. Furthermore, changes in the structure of demand that underlie the process of industrialisation are ignored, as the model assumes growth, other than that generated by the windfall gain, away.

The present study contests this analytical approach, and offers an alternative that considers initial conditions of disequilibrium and conducts dynamic analysis to show the effects of demand expansion, with its disproportionately large stimulus to manufacturing, on these conditions. Demand-led output growth combined with supply-side changes induced by booming conditions leads to rapid productivity growth in manufacturing, by both increasing production efficiency and inducing technological advance. The outcome of these inter-linked supply-demand changes is an acceleration of industrialisation. The study thus presents an antithesis to the Dutch disease hypothesis.

After an overview of the Dutch disease theory, the study discusses the necessary modifications when certain characteristics of industrialising economies are taken into consideration. The focus of the analysis is the Dutch disease theory's assumptions, its level of abstraction, and the static nature of its analysis. Various countries' experience of booms are presented to show that the outcome of sectoral shifts is crucially dependent on the pre-boom economic conditions; and thus to show also that boom experiences of industrial and industrialising economies differ considerably.

The discussion of Jordan starts by outlining that country's historical experience of sectoral shifts. The counterfactual to the Dutch disease is established with the aid of trend analysis, and it is shown that at the end of the boom, the share

in aggregate output of agriculture was smaller, and that of manufacturing larger, than 'expected' from historical trends. Dutch disease analysis is used to show that resource mobility and the spending effect have induced currency appreciation, as would have been predicted by the theory. Contrary to the theory's predictions, however, the examination of the commodity trade balance reveals significant growth in agricultural and manufacturing exports during the boom. The study then examines the reasons behind the discrepancy between the theory and this empirical observation.

The performance of agriculture and manufacturing are examined separately. In both sectors booming conditions brought about rapid technological advance which expanded profits in these sectors. In addition, the disproportionately large demand for manufactured goods, both for consumption and investment, led to a rapid expansion of this sector's share in aggregate output; which was compensated for by a decline in that of agriculture. Seen in this light, the decline in the share of agriculture was a manifestation of successful industrialisation, rather than the Dutch disease effect.

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CHAPTER I

Introduction

The subject of this study is the influence of favourable exogenous shocks (henceforth booms) on the structure of prices and output composition in small open industrialising economies. The theoretical starting point of this study is the Dutch Disease theory as developed by Corden and Neary (1982), and Corden (1983; 1984); research on Jordan constitutes its empirical basis. The study thus extends the empirical literature on booming sector economics.

The Dutch disease theory is built on a general equilibrium model. As such, it exploits the dual relationship between factor endowment and mobility and commodity output, on the one hand, and commodity prices and factor prices, on the other. The focus of the theory is a boom's effect on profitability and the size of the manufacturing sector. Specifically, the theory predicts a pull of resources from non-booming sectors, both traded and non-traded, to the booming sector where factor productivity has risen - *the resource movement* - and a further pull of resources from the traded sector into the non-traded sector, where output prices have risen - *the spending effect*. Combined, these two processes produce *de-industrialisation*.

This type of analysis was prompted by the experience of Holland with the Schlochteren natural gas discoveries in the sixties, which allegedly led to a contraction of manufacturing output and employment. Wider application of the theory ensued from the oil-price rises in the seventies which constituted a favourable exogenous shock to a large number of economies, both already industrial and newly industrialising. Whilst this application conveys an acceptance of the theoretical construct of the Dutch disease, empirically the theory showed weak explanatory power of most of these experiences. Yet this finding has not prompted serious criticism of the Dutch disease theory; nor, as a consequence, have alternative approaches been developed for the analysis of booms.

The foregoing makes clear the *raison d'être* of the present study; it establishes the analytical aspects necessary for the study of booming industrialising economies, either by elaborating the Dutch disease theory itself, or by conducting a different type of analysis altogether. Empirically, the study documents an era of rapid sectoral shifts in the economic history of Jordan. It should be noted that this study is positive, not normative. It provides some of the positive analysis required for the full normative analysis of policies used by industrialising economies benefiting from favourable exogenous shocks.

Critique of the Dutch disease theory has generally centred around two issues, both of which are driven by normative concerns. First, the short-to-medium term, one-period nature of its analysis does not accommodate important

intertemporal issues of adjustment. In most economies that benefit from favourable exogenous shocks, the cost of adjustment to non-booming conditions has proven to be quite high. This is especially true if the boom is transient, and the economy adjusts fully to the boom, as recommended by Dutch disease theorists. Second, the Dutch disease theory models private agents' behaviour only, while a significant proportion of the boom windfall revenue accrues to the public sector. This constitutes a serious oversight given that government action can influence resource allocation both directly, through investment and spending behaviour, and indirectly, through fiscal and monetary policies. In the context specifically of developing economies, the theory has also been critiqued for its full employment assumption, whereas most developing economies are likely to have an excess supply of labour in the pre-boom period, which can neutralise the resource movement effect on de-industrialisation.

In addition to lending support to this critique with empirical analysis, the present study extends the Dutch disease critique into two main analytical areas: dynamic analysis, and the effect of changes in the structure of demand on sectoral output. The static nature of Dutch disease analysis does not take into consideration the effect of productivity growth on resource allocation and, consequently, on the structure of production. Bearing in mind that productivity differentials between sectors are the main cause, on the supply side, of sectoral shifts over time, to ignore productivity growth is a serious omission from the Dutch disease model. Similarly on the demand side, changes in the demand vector, which might be induced by the booming conditions, would directly change the structure of production. Demand patterns can change in three ways during a boom (bear in mind here that the discussion concerns industrialising economies). First, and perhaps most important, the share of manufactured goods in total expenditure tends to grow, as *per capita* income rises, at the expense of that of agricultural commodities. Second, expenditure on investment goods rises as economic activity increases, which benefits the manufacturing sector. Third, demand for the country's exports may change if the boom is regional, as was the case for many Middle East economies.

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 as the Dutch disease model since the only important variable in such a case would be the new structure of prices. Any change in demand for tradeables can be met through imports, whose prices are lower under booming conditions than otherwise.

The elaboration of these points of critique in the body of the thesis establishes an alternative analytical approach to the Dutch disease theory. The new approach has four main strands. First, it challenges the Dutch disease theory's assumptions about factor-market underpinnings of the model - macro-equilibrium with full employment and perfect factor markets, and fixed national stock of labour and capital; and about the immutability of technical conditions of production. Second, it uses the two main analytical tools of the Dutch disease model, namely the spending effect and the resource movement, to examine the boom effect on altering relative prices. Third, taking into consideration the new structure of prices and of demand, productivity analysis is conducted to show the effect of booming conditions on changing the technical conditions of production. And fourth, it analyses profitability in tradeables.

There are eight chapters. After this introduction, chapter two establishes the analytical framework for the rest of the study. Starting from the conclusions of the Dutch disease theory, the chapter discusses the modifications needed when certain characteristics of industrialising economies are taken into considerations. The focus of the analysis is the assumptions of the model, its level of abstraction and the static nature of its analysis. The dynamics of productivity change constitute a pervasive element that in some ways links these three aspects of the critique.

Historical and contemporary experiences of booms are presented in chapter three. Two types of booms are considered: those arising from a new discovery of a natural resource, and those from a 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 transitory booms on the grounds that they require different levels of adjustment. The chapter brings out the main difference between industrial and industrialising economies, with regard to the boom's effect on the structure of production. Emphasis is placed on how economic conditions preceding a boom may differ, including the level of *per capita* income and the degree of industrialisation; the economy's position on the business cycle; and the existence of constraints in capital markets. The problem of the counterfactual is also discussed: since all economies go through sectoral shifts continuously, attributing change in sectoral shares to the Dutch disease effect is not justifiable unless the counterfactual has been established. A similar problem arises with macro-economic policies: where the policy counterfactual is not established, the debate on the Dutch disease effect remains inconclusive.

Chapter four starts the discussion of the Jordanian economy by outlining its growth and structural change over 1921-1992. The analysis is done within a time-frame composed of three distinct periods, determined mainly by exogenous shocks. An effort is made to incorporate demand-side factors in 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 has contributed to the growth of the Jordanian economy. Particular emphasis is placed on labour, which constitutes the mobile resource in the Dutch disease model for Jordan. The rôle 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 Jordan, with a disproportionately large share of service sectors, are studied. Finally, the Dutch disease counterfactual is established with the aid of trend analysis.

Because Jordan does not produce the natural resource - oil - that was responsible for its booming conditions in the seventies, a case needs to be made for the use of Dutch disease theory at all in an analysis of Jordan's economic history. This is done in chapter five in two steps. First, it is shown that the sudden inflow of Arab aid and workers' remittances in the wake of the 1970s oil booms constituted a favourable exogenous shock. Second, I demonstrate that through the spending effect and resource mobility the effects of foreign exchange inflows were fully transmitted to the economy; and that change in the structure of prices was as would have been predicted by the Dutch disease model. Comparisons with other industrialising countries, themselves oil producers already discussed in the Dutch disease literature, are made to strengthen further the case for the appropriateness of the model in Jordan's case. The commodity trade balance is examined next to show whether or not in the process of adjustment to the boom a deterioration in this balance occurred.

Chapters six and seven examine the respective performance of agriculture and manufacturing during the boom. The sequence of analysis followed in both chapters is as follows. The sectors' growth and contribution to output and employment over time are examined to show whether or not performance during the boom was different from what would have been predicted on the basis of historically observed patterns. Trends in output, import substitution and export growth are established to show the effect of changes in domestic demand and trade on the structure of production. Factor input (land, capital and labour for agriculture, and capital and labour for manufacturing) and output growth are

compared to see whether productivity growth has been significant in changing the sectors' growth and contribution to aggregate output. The effect of changes in output prices, factor cost and productivity on profitability are analysed in two ways: indirectly, by constructing profitability indexes and examining their trends over time; and directly, by examining actual profitability accounts from financial records, where available. The analysis is done at the enterprise level in agriculture (fruit, vegetables, wheat, etc.) and at both two-digit manufacturing industries and firm-level in manufacturing. In constructing profitability indexes a new methodology is presented which improves on traditional Dutch disease measures in two ways, firstly by considering the structure of production cost in each industry (factor prices are weighted by the factor's share in total production cost); and secondly by accounting for the effect of productivity growth on changing unit costs. The latter aspect gives these profitability indexes a dynamic quality.

Although the main outline for the analysis of agriculture and manufacturing is similar, the analytical treatment of each sector differs considerably, and follows mainly from the technology of production in each sector. For example, whilst the main source of technological change in manufacturing is equipment and machinery, the same is not true in agriculture where agrochemicals can be more instrumental than tractors in inducing technological advance. Also, where land is a major factor input in agricultural production, the same is not true for manufacturing. The complementarity between investment in equipment - irrigation - and in new material inputs does not have exact parallels in manufacturing. Nor does the effect of irrigation on expanding the land frontier - by allowing double cropping - which increases total factor input. On the other hand, the presence of dynamic economies of scale in manufacturing, and their apparent absence in agriculture, considerably changes the effect of factor input on output growth between the two sectors.

Finally, it is important to note the complications arising from the differential effects of a rise in *per capita* income on the demand for agricultural and manufacturing commodities. As the rise in *per capita* income induced by the boom reduces the share in total expenditure of agricultural commodities and increases that of manufacturing, it is expected that resources will be drawn from agriculture to manufacturing. It follows that the interpretation of a change in each sector's share in total output and employment is different. In manufacturing, a decline is attributed to the Dutch disease effect and a rise to successful industrialisation. In agriculture, a decline could be the result *either* of the Dutch disease effect *or* of successful

industrialisation. It follows that the interpretation of agriculture's performance during the boom remains problematical.

CHAPTER II

Favourable Exogenous Shocks in Small Open Economies: A Theoretical Framework

Introduction

This chapter outlines the Dutch disease theory and presents my critique of it. Together, these form the analytical framework of this study. My critique constitutes the main burden of this thesis, in which lies its originality, and thus the contribution of my work to an understanding of favourable exogenous shocks in industrialising economies.

The theoretical literature on booming sectors is quite extensive, and since the aim of this study is to redress the balance on the empirical side, only those aspects of the theory that are highly relevant to applied studies are presented here. Reference to more elaborate theoretical work will be made when appropriate.

The Dutch disease theory is a comparative statics model that assesses the general equilibrium effect of a favourable exogenous shock (henceforth boom) in a small open economy. More specifically, the theory examines how the boom alters the structure of prices and output composition; and, more specifically still, how and why profits in manufacturing diminish in such circumstances. The theory relates, on the one hand, factor mobility and sectoral output with, on the other, factor and output prices; and predicts that, given a fixed national stock of capital and labour, a boom will create a pull on the mobile resource used in other sectors and thus crowds out their output. This is called the *resource movement* effect. In addition, when income gained from the boom is spent on non-traded goods, output prices and, accordingly, profitability rises in that sector, relative to the traded goods sector. More resources are drawn from the traded sector, further crowding out its output. This is known as the *spending effect.* Combined, these two effects lead to a contraction of employment and output in the traded sector, known in the Dutch disease literature as *de-industrialisation*.

This type of analysis gives valuable insights to the mechanisms through which the boom effects are transmitted to the rest of the economy. However, the theory does not accurately predict the outcome of sectoral composition in booming industrialising economies. There are numerous reasons for this shortcoming, which can be related to three analytical aspects: the model's assumptions; its level of abstraction; and the static nature of its analysis.

First, the theory assumes competitive product and factor markets and full employment, whereas a pre-boom industrialising economy may be quantity constrained in world and domestic capital markets. Low *per capita* income, combined with the unavailability of capital, increases the likelihood of slack labour markets. In this case, the resource movement, and maybe even the spending effect,

need not take place. The theory also assumes technology to be given and unchanging, whereas greater capital availability under the boom, combined with a real appreciation, making capital and other imported inputs relatively cheap, can change the technology of production quite significantly in favour of pro-industrialisation.

Second, in the model there are only optimising rational agents and no governments. Governments, however, generally loom large in these economies and by exercising their control over a significant share of the market are able to influence its behaviour markedly. Government's rôle becomes even more significant under booming conditions if it captures a large share of the windfall.

Third, the static nature of the model does not accommodate productivity growth and productivity differentials between sectors. These underly sectoral shifts over time in any economy, and become increasingly important in a booming economy when *per capita* income rises rapidly. This is especially true if the economy starts from low *per capita* income, excess capacity and backward technology. These three aspects will be discussed in more detail in the last section of this chapter.

The plan of this chapter is as follows. Section one is an empirical and theoretical background to the Dutch disease theory. Section two presents the core model of the Dutch disease, as developed by Corden and Neary (1982) and Corden (1983; 1984). Section three presents extensions to the core model, as developed by Corden (1984). Section four is the critique.

II.1 An Empirical and Theoretical Background to the Dutch Disease Theory

The Dutch disease theory falls within a wider realm of literature on booming sectors, which itself draws on other trends in literature, namely: international trade theories; open economy macro-economics; and resource depletion. The focus of booming sector literature is the general equilibrium effects of a change in the price or availability of exportable natural resources. Specifically, discussion centres on how a favourable exogenous shock in one export sector changes intersectoral resource allocation in the economy, *via* relative price alterations; and what policy implications of such changes might be.

The empirical circumstances that prompted this type of literature go as far back as the 16th century, when the sudden inflow of American precious metal into Spain left Spanish industries in disarray (Forsyth and Nicholas, 1983). Similar

circumstances occurred in Australia, when the 19th century gold discoveries led to a loss of competitiveness in Australia's more traditional agricultural exports and eventually to their decline (Cairnes, 1859). Two other mineral resource booms took place in Australia in this century; a major one in 1968-74 and a minor one in 1978-82. Australia's latter experience with booms prompted an interesting theoretical debate between Gregory (1976) and Snape (1977). This debate formed the cornerstone of the Dutch disease model, itself developed a few years later by Corden and Neary (1982) and Corden (1983; 1984) to analyse Holland's experience with North Sea gas discoveries in the 1960s. It is within this latter framework that more recent literature has addressed and analysed the effects on a wide range of developed[1] and developing[2] countries of booms associated with a number of commodities - including the seventies oil boom (these are reviewed in detail in Chapter III). Some of the theoretical points raised in this literature are consolidated in Corden's paper (1984) on booming sector and Dutch disease economics, in which his original core model is extended by varying the core model's restrictive assumptions.

Thus, the evolution of the Dutch disease model seems to have been triggered by Gregory's theoretical work on Australia, which was developed further by Snape. Gregory addressed the question of how discovery of an exportable resource would impact on agricultural exports and manufacturing import substitutes, *via* the balance of payment effect. For his analysis, Gregory developed a partial equilibrium model (reproduced in Figure II.1) that describes supply and demand in the traded sector market. He assumed constant international terms of trade, and that import-competing goods are perfect substitutes for imports. The vertical axis shows relative price between traded and non-traded goods, and the horizontal axis the quantity of traded goods. The curves X_0 and M_0 indicate the supply of exports

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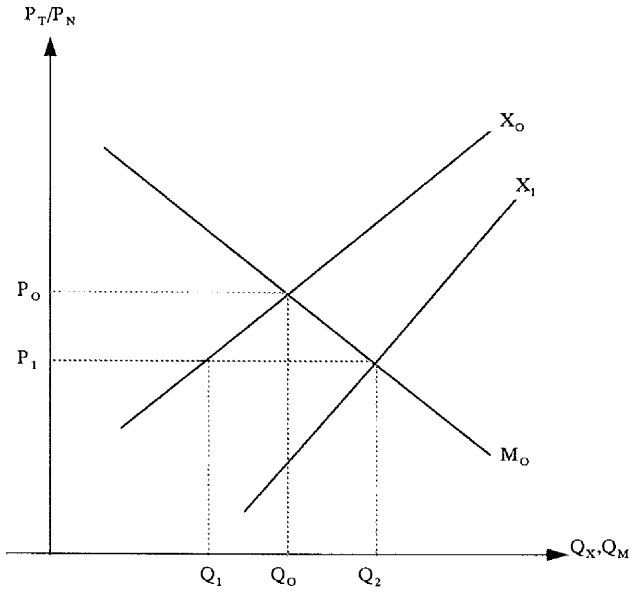
1On Britain: Forsyth and Kay (1980, 1981); Corden (1981); Flemming (1982); Bank of England (1982); Eastwood and Venables (1982); and Neary and van Wijnbergen (1984). On Holland: Corden (1983, 1984); Corden and Neary (1982); Ellman (1981); Fajnzylber (1981); Kremeres, (1986); and Rowthorn and Wells (1987, Appendix 13: 374-81). On Norway: Bjerkholt, *et. al.* (1981). On comparisons between Britain and Australia: Forsyth (1986). The British experience has also been discussed extensively under the de-industrialization literature. For more, see Blackaby (1979), Barker and Brailovsky (1981), and Rowthorn and Wells (1987).

[2]On Nigeria: Collier (1983) and Pinto (1987). On Indonesia: Corden and Warr (1981) and Struthers (1990). On Iran: Katouzian (1978); Karshenas (1990); and Majd (1991). On comparisons between Indonesia, Mexico and Nigeria: Scherr (1989); on comparisons between Nigeria and Iran: Jazayeri (1988); and on comparisons between a number of oil-exporting capital-importing countries: Gelb (1986; 1988).

and the demand for imports, respectively, at various price ratios prior to the mineral discovery.

Figure II.1
Boom Effect on Exports, Imports, and Relative Prices



With mineral discoveries, the export curve shifts to the right to X_1, leading to a lower equilibrium traded/non-traded price ratio, P_1, domestic inflation or exchange rate revaluation could change the price ratio in the required manner. This price reduction has the effect of: increasing the quantity supplied of non-tradeables; reducing the quantity supplied of traditional exports from Q_0 to Q_1; and increasing the quantity demanded of imports from Q_0 to Q_2. Hence, with mineral discoveries both import-competing industries and pre-existing exporting industries will be reduced in size: "the adjustment made depends on the extent of the mineral discoveries; the price elasticity of supply of mineral exports; and the price elasticity of imports and traditional exports" (Gregory, 1976: 76).

Snape (1977) noted the problems inherent in the application of Gregory's partial equilibrium analysis to questions of a general equilibrium nature.[3] Specifically, import and export curves are not shifted in Gregory's model as aggregate *income* and, hence, total demand changes. Also, the impact of mineral

[3]For partial equilibrium analysis of traded and non-traded goods markets - which assumes general equilibrium conditions - see Corden (1981) section V.

development on the *costs* of import-competing and pre-existing export industries is not considered. Consequently, Snape developed a simple general equilibrium model which enabled him to consider these effects (Snape's model is the prototype of Corden and Neary's (1982) model, its detailed exposition is therefore deferred to the following section). Snape confirmed Gregory's general conclusions that: (i) the price of non-tradeables increases, relative to tradeables, and (ii) non-mineral tradeable production contracts; but in contrast to Gregory he showed that (iii) production of non-tradeables either increases or decreases (Snape, 1977: 155). These points, which will become clearer in the following section, remain the most important conclusions of the Dutch disease model, to which we now turn.

II.2 The General Equilibrium Effects of The Boom: The Dutch Disease Model

As already mentioned, the Dutch disease theory explores the short-to-medium term structural effects of a windfall gain from an exportable natural resource, be it through a new discovery or a price increase.[4] More specifically, the question addressed in the model concerns the effect of the boom on the functional distribution of income, and on the size and profitability of the manufacturing sector.

The framework of the model is one of a small open economy that produces three goods. Two are traded internationally at exogenously determined world prices. These are the natural resource or booming sector (denoted B) and the lagging sector (denoted T) (henceforth, I shall use lagging sector and traded sector interchangeably, bearing in mind that B is also tradeable). The third is a non-traded good whose price is determined domestically (denoted N). All prices move flexibly to clear markets; and so do real wages,[5] thus ensuring full employment at all times.

The non-oil traded good output is taken as the numeraire, so that factor prices are measured in terms of T, although real wage are measured in terms of both traded and non-traded goods. To highlight the structural aspects of the boom,

[4]The analysis is equally applicable to technological progress in one industry that leads to a replacement of older industries, as happened in Japan, Switzerland, and Ireland (see Corden, 1983; Corden and Neary, 1982). However, for technological progress to be equal in effect to the natural resource boom, it has to be neutral, i.e. elasticity of substitution between labour and capital in the booming sector must remain the same after the boom as before it.

[5]In Corden (1981) nominal wages are sticky downward and macro-equilibrium is brought about through Keynesian style demand management.

monetary considerations are ignored and the model focuses on the boom's implications for real, rather than nominal, variables.[6]

Other assumptions of the model include constant terms of trade and perfect substitution between imports and importables, so that, with given tariffs, export subsidies, etc., relative prices of traded goods (exports, exportables consumed domestically, imports, and import substitutes) do not change.[7] However, the price of non-traded goods relative to that of traded goods can change, and an increase in this relative price corresponds to real appreciation. National output and expenditure are equal so that trade is always balanced overall. There are no distortions in factor and commodity markets; and all commodities, including the natural resource, are used for final consumption only.

The core model of the Dutch disease follows Jones (1971) and Snape (1977) by assuming that each of the three sectors employs a single specific factor (raw material, capital, skilled labour, etc.), as well as a factor that is perfectly mobile between sectors. The mobile factor is referred to here as labour, the mobility of which tends to equalise wage in all sectors. Finally, the total amount of capital stock and labour endowment in the economy is fixed, that is, labour and capital are internationally immobile.

These are the core model assumptions, variations on which can lead to different, and sometimes counter-intuitive, results. Of these varied assumptions, relevant to LDCs' experience are to allow both capital and labour to be mobile between the lagging and the non-traded sectors; or, indeed, within the lagging sector itself. A third variation that is particularly relevant to Jordan is the international mobility of labour. These cases are considered in section II.3.

The central feature of the Dutch disease model is the two, analytically different, mechanisms through which changes in the economy induced by the boom work themselves out. These are the *resource movement* and the *spending*

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[6]For a discussion of the monetary effects of the boom see Buiter and Purvis (1983); Neary and van Wijnbergen (1984); and Corden (1981) sections I-IV.

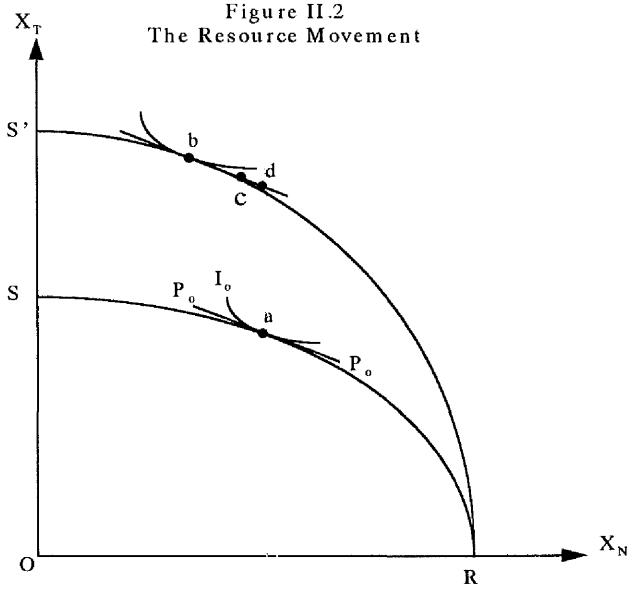
[7]The small country assumption may not hold if the country is able to increase its export prices or lower its import prices, after currency appreciation. This may have taken place in the UK (see Forsyth, 1986). Terms of trade may also change if the boom brings about a change in trade policies towards more liberalisation as foreign exchange availability increases. For a model that allows such changes see Bevan, Collier and Gunning (1990) on Kenya and Tanzania. Corden (1981) discusses a case where, once appreciation has taken place, reduction in non-oil exports improves terms of trade.

effect. These two mechanisms and the final adjustment in the economy are discussed in the next sections.

II.2.1 The Resource Movement

A boom in B entails an increase of the marginal product of factors employed in that sector, which increases its demand for these factors. Consequently, B draws the intersectorally mobile resource out of both T and N, thus crowding out their output. This is called direct de-industrialisation (for reasons to be discussed later). Figure II.2 depicts the effect of this resource movement by measuring the output of both T and B on the vertical axis, and of N on the horizontal axis.

Figure II.2
The Resource Movement



Before the boom, production was at point a on the initial production frontier RS, as determined by the relative price line P_0P_0 and the highest attainable collective indifference curve I_o (this is only valid in the absence of product and factor market distortions). The boom shifts the production possibilities curve outward to RS' in an asymmetrical manner, reflecting changes in factor proportions as factor productivities change in B.

The analysis can now be conducted in two stages: first the real exchange rate is held constant, and then it is allowed to vary to restore equilibrium in the market for N. At constant P_N/P_T production moves to point b on RS', which lies to the left

of point a: less N is now produced.[8] Consumption, on the other hand, and in the absence of any spending effect, lies vertically above point a, at d.[9] Hence, the resource movement has created excess demand for N, thus bidding P_N up to restore equilibrium in the N market,[10] while P_T is fixed by the small country assumption: there is real appreciation. Wage in terms of N drops, and suppliers are encouraged to produce more in this sector, thus drawing on the mobile resource from T and causing further de-industrialisation. Final production thus moves to the right of point b, say to point c, but will not reach point d. In other words, the fall in N production cannot be completely reversed - for the reasons stated above, namely the decline in the opportunity cost of producing B (Cordon and Neary, 1982).

If B behaves like an enclave, that is, production of B goods is not a function of inputs of factors other than B itself, the resource movement does not take place and direct de-industrialisation is avoided.

II.2.2 The Spending Effect

This effect is the result of spending the additional income generated in B. To abstract from the resource movement, we assume B to be an enclave. In this case the boom works as a transfer from abroad that shifts the production possibilities curve vertically upward to $R'S'$ as shown in Figure II.3; the marginal cost of producing tradeables at any given point of N remains unchanged after the boom. With the exchange rate initially fixed, production shifts to b, which now lies directly above a. Production of both T and N has not changed, but total domestic availability of output has expanded by B - the magnitude of the windfall.

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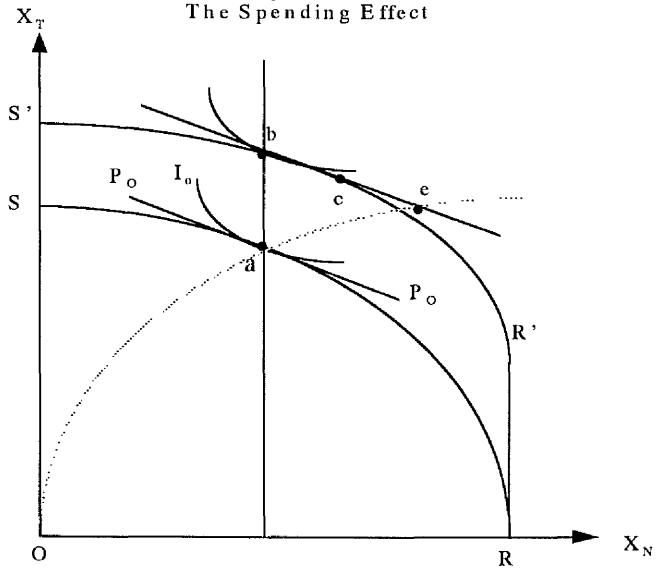
[8]This occurs because at any given level of N production the marginal opportunity cost of producing B has decreased after the boom, and at point d, directly above the old production point a, there are still profits to be gained from producing more B.

[9]Since the "spending effect" is abstracted from momentarily, the income elasticity of demand for N goods is zero; the income consumption line is a vertical line passing through point a.

[10]If market rigidities are introduced in the system, excess demand for N goods may be exacerbated by supply lags in that sector leading to further real appreciation. There may also be lagged supply in T, but not as prolonged (see Struthers, 1990: 324). Such market imperfections are abstracted from in the model, as stated in the assumptions.

Figure II.3
The Spending Effect



Equilibrium in this model is determined solely in terms of the market clearing conditions for the non-traded goods, as shown in equation (1).

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

where X_N is total production of N goods; C_N is total demand for N goods; q is prices of N relative to T - the inverse of the real exchange rate; y is income in terms of T, and is determined exogenously - by the full employment assumption.

As the windfall revenue is spent, there will be a rise in demand for N and T, both of which are assumed to be normal goods. Since production, and therefore income, are now determined at b, desired consumption must lie along the price line tangential to b. Furthermore, since relative prices are unchanged, consumption must take place at point e, where the price line intersects the income-consumption line extending from the origin and passing through a. The resulting excess demand for N drives up their price relative to T until a new equilibrium is reached at point c. In equation (1) q rises and there is real appreciation.[11] The characteristics of this new equilibrium, as regards the production structure, are: an increase in the output

[11]Real appreciation can occur even if increased spending is spread evenly between T and N, because P_T is determined by world markets while P_N increases to clear home markets. However, if the income elasticity of demand for N is greater than that for T, which is normally the case, the spending effect will be magnified, and real appreciation will be higher than would otherwise be the case.

of the non-traded good and, therefore, of welfare as compared to point *b;* and a decline in that of the traded good (Neary and Van Wijnbergen, 1986: 16-17).

If we relax the assumption of non-shiftable resources, i.e. labour becomes intersectorally mobile again, the spending effect has yet another outcome. Labour moves out of T into N, because of real appreciation, and wage in terms of N drops accordingly. Under these circumstances, equation (1) has to be modified since equilibrium in the domestic market now depends on wage as well as income and relative prices, as reflected in equation (2):

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

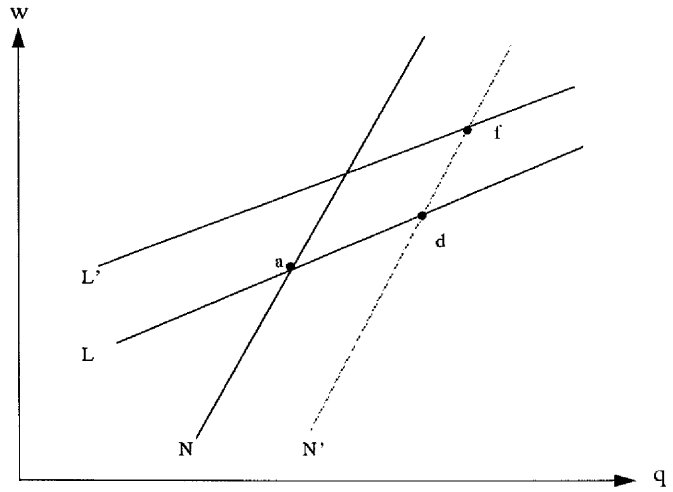
where w is wage in terms of T. This is an equation with two endogenous variables, q and w. To solve it we can use equation (3), which describes equilibrium in the labour market:

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

where L is the total supply of labour, which is exogenously determined; Li is the labour demand in sector i; b is the additional demand for labour from the boom effect.

Equations (2) and (3) can be plotted in a (q, w) space as two loci, the first, N, representing equation (2), and the second, L, representing equation (3) as shown in Figure II.4. From the two equations, one can see that an increase in w depresses demand for labour in all sectors - equation (3); and reduces the supply of N goods - equation (2). An increase in q is required to restore equilibrium. The two loci must, therefore, be upward sloping. Moreover, the increase in q must be more than proportional in the N locus, since a proportional increase leads to an unchanged supply of, but a decreased demand for, N goods, leading to excess supply. Thus the slope of the N loci is >1. The equilibrium in the labour market, however, requires a slope that is <1 since less than a proportional increase in q is required to re-equilibrate the labour market when there is an increase in w. A proportional increase in both leaves L_N unaltered, while depressing both L_T and L_B, and thus leading to unemployment (ibid: 17-18).

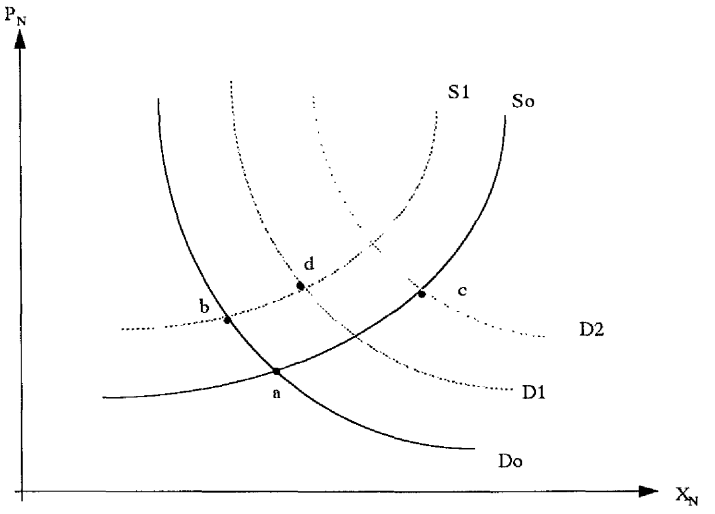
Figure II.4
Resource Movement and Spending Effect of a Boom



The spending effect and the resource movement can also be traced in Figure II.4. The spending effect has relocated the pre-boom equilibrium point from *a* to *d*, at higher wage and prices. The resource movement further relocates equilibrium from *d* to *f*, thus reinforcing the spending effect in terms of higher *q* and *w*. Both effects, therefore, unambiguously lead to real appreciation. This was shown in Figures II.2 and II.3 where the new point of production *c* in both figures had a steeper slope of relative prices than the original point of production *a*.

As regards the combined effect of the resource movement and the spending effect on employment and output in *N*, the result is rather ambiguous. Whilst the resource movement diminishes production and employment in *N*, the spending effect has the reverse effect. The final outcome depends on which effect dominates. This can be deduced from Figure II.5, which plots the supply and demand curves for *N* as a function of P_N. The 0 and 1 indicate conditions in pre- and post- boom, respectively, The new equilibrium point *d* might lie either to the left or right of *a*, the point of original equilibrium.

Figure II.5
Supply And Demand for Nontradeables



The dominance of either the spending effect or the resource movement in turn depends on a number of factors:

- Factor mobility: if *B* employs factors specific to it, the resource movement effect diminishes, and output and employment in *N* tend to rise, *via* the spending effect. Also, the more mobile the shiftable resource between *T* and *N*, the more expansion in *N* and contraction in *T* will take place.

- The income elasticity of demand for *N;* the higher this elasticity the more pronounced the spending effect will be.

- The magnitude of change in the ratio q/w in equation (2); the greater q/w is, the less resources move out of *N* into *B*, and the more resources move out of *T* into *N*.[12,13]

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[12]A high rate of change in q/w means, tautologically, a higher rate of change of q than of w; that is, the drop in wage in terms of *N* goods is more pronounced than would otherwise be the case (remembering that q is P_N/P_T, and that w is wage in terms of *T*, so q/w is the inverse of wage in terms of *N*). It follows that the resource movement out of *N* into *B* is lower, and out of *T* into *N* is higher, than would otherwise be the case.

[13]Changes in q and w in turn depend on: the magnitude of the boom; factor intensities in terms of value shares; factor distribution among sectors; elasticity of substitution between capital and labour in all sectors; income elasticity of demand; and price elasticity of supply of services (see mathematical appendix in Corden and Neary (1982).

The combined effect of the resource movement and the spending effect on the output of T, and in contrast to that of N, is unambiguous. Both mechanisms draw resources out of T, the output of T thus unequivocally falls.[14] This is called de-industrialisation. The Dutch disease literature distinguishes between two types of de-industrialisation, direct and indirect. Direct de-industrialisation is caused by the movement of resources out of T into B without involving the market for N. Indirect de-industrialisation is caused by real appreciation of the exchange rate, which itself is caused by the combined effect of resource movement and the spending effect.

II.2.3 Factor Income Distribution

II.2.3.1 The Impact of the Boom on Real Wage

To see how the boom affects labour welfare we resort to the following equation:

$$w = P_i \cdot MPP_i l \qquad (4)$$

where w is still nominal wage; P_i is price in sector i; and $MPP_i l$ is marginal physical product of labour in sector i.

In the traded sector T, both the resource movement and the spending effect lead to a fall in P_T relative to P_N, and to a consequent move of labour out of T into B and N. $MPP_T l$ rises as less labour is employed per unit of capital. The increase in nominal wage must exceed the fall in P_T for $MPP_T l$ to rise at all, i.e. $\hat{w} > \hat{P}_T$, where a circumflex indicates the rate of change (Jazayeri, 1988: 11-12).

In the non-traded sector N, the same happens under the resource movement: as labour moves into B output of N declines, and wage rises in terms of P_N. Since, as we saw above, wage has also risen in terms P_T, real wage rises, at least until we introduce the spending effect. The spending effect has an adverse effect on the real wage in the N sector since w/P_N would actually drop as the output, and hence the prices, of N rise. When both effects are considered, the impact of the boom on the real wage is uncertain. A fall in the real wage is more likely the stronger the spending effect is relative to the resource movement effect - i.e. the less mobile labour is; and the greater the share of services in wage-earners' consumption (Corden and Neary, 1982: 831).

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[14]However, to the extent that T and N are substitutable, real appreciation makes T goods relatively cheaper than N, and the substitution effect shifts demand from N to T, thus reducing contraction in T.

II.2.3.2 The Impact of the Boom on the Specific Factor

Return to the specific factor in each sector can be thought of as a measure of profitability in that sector. Factor immobility negatively impacts on its return when prices in the sector in which it is employed fall. Thus, in T, both the spending effect and the resource movement lower P_T relative to P_N. Real return to the specific factor in T is thus lowered. This can be seen by rewriting equation (4) as follows:

$$r_i k = P_i \cdot MPP_i k \qquad (5)$$

where $r_i k$ is return to capital in sector i; P_i is prices in sector i; and $MPP_i k$ is marginal physical product of capital in sector i.

A fall in P_T, with labour mobile and capital immobile, means there is more capital per unit labour. Marginal physical product of capital in T diminishes, i.e. $MPP_L k$ falls. Return to capital r inevitably falls, and by a greater amount than the drop in P_T, i.e. $\hat{P}_T \rangle \hat{r}_T k$. The same happens under the resource movement: as labour moves out of N into B, $MPP_N k$ falls and so does $r_N k$, with $\hat{r}_N k \rangle \hat{P}_N$. On the other hand, the spending effect has a positive effect on return to the specific factor in N, as more labour is absorbed in this sector when its prices go up, and thus $MPP_N k$ goes up. The final result of these two opposing effects on profitability in N is again ambiguous, as was the effect on employment and output, the results depending on the dominance of either effect. The reverse is true for T, where profitability unambiguously falls. In the booming sector B, profitability must rise because of the resource movement effect, but it must fall because of the spending effect.

The order of changes in all these variables can now be summed up as:

$$\hat{r}_N k \rangle \hat{P}_N \rangle \hat{P}_T \rangle \hat{r}_T k$$

That is, return to the fixed factor in the traded sector suffers both in terms of P_N and P_T, while that in the non-traded sector gains most. This also means that any change in P_N has a disproportionately large effect on increasing return to capital in N (Jazayeri, 1988: 12).

So far we have investigated absolute changes in profitability. However, in the medium-to-long run, resource allocation depends on relative profitability; in which case factor intensities in terms of value shares become important. Consider a relatively capital-intensive T compared to N. The resource movement raises real wage and reduces return to capital in both sectors. However, return to capital in T

would fall by less than it would in N, since the value share of capital is larger in the former than the latter. Profitability in T would thus rise relative to N. If we now allow capital mobility between T and N, it is easy to see that it would move out of the latter and into the former: de-industrialisation would thus be averted (capital mobility will be further explored in section II.3.2). The spending effect, on the other hand, is not influenced by factor intensities. Output of T would still be squeezed by the spending effect and its profitability decline in both absolute and relative terms. Whether de-industrialisation takes place or not in the medium-to-long run depends on which effect dominates.

II.3 Extensions to The Model

The extended model relaxes some of the restrictive assumptions of the core model, by way of investigating different economic conditions and thus expanding the applicability of the model. Only those extensions that are relevant to the Jordanian experience are investigated below; the full range of extensions can be found in Corden and Neary (1982) and Corden (1984).

II.3.1 International Labour Mobility (Immigration)

Immigration takes place if the national stock of labour is allowed to vary, and if true real wage W^* (real wage defined in terms of a consumption basket of T and N) rises.[15] Immigration continues until W^* is restored to its pre-boom level. At that point, we want to investigate whether or not immigration can avert de-industrialisation, or even achieve pro-industrialisation. Since what is important for the restoration of T is W, the answer depends on what happens to W when W^* is restored to its pre-boom level; if it had risen T would have fallen, and vice-versa.[16]

Ignoring the spending effect for the moment, immigration replaces the labour that had left N for the booming sector B, and thus restores its supply curve

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[15]As mentioned in section II.2.3.1, W^* may rise or fall because of the boom. We know that both the spending effect and the resource movement raise W - wage in terms of T. Bearing in mind that N falls because of the resource movement and rises because of the spending effect, the resource movement must raise W^* while the spending effect may either raise or lower it.

[16]What happens to W is not clear because immigration on its own increases both supply of, and demand for, N.

in Figure II.5 to its original position - assuming W^* is fully restored.[17] That is, product and factor prices are restored, and de-industrialisation is averted.

Once the spending effect is introduced, to which we must now add the spending of migrant labour, the picture changes. The demand curve for N moves to the right beyond D_1D_1, say to D_2D_2. At the new equilibrium point c both output and prices of N are higher than the pre-boom, pre-immigration conditions (point *a)*. Real wage in terms of N must fall, since output of N has risen, and so wage in terms of T must rise (i.e., condition (ii) in the previous footnote is satisfied). Consequently, output of T must fall, and some de-industrialisation must take place.

Another variation on the core model is the mobility of more than one factor across and within sectors. In such cases, factor intensities become important, and the economy resembles a Hecksher-Ohlin model. Two cases are investigated below: in the first, capital moves between T and N and, in the second, capital moves within the lagging sector T. In both cases labour is still mobile between and within all sectors, as assumed in the core model.

II.3.2 Two Factors Intersectorally Mobile

If the analysis is concerned with the medium-to-long run, it is more reasonable to allow capital full mobility between T and N. The two sectors behave like a Heckscher-Ohlin economy facing a variable supply of labour (labour available to the two sectors is equal to total labour supply less labour employed in the booming sector). Output and employment in the T and N sectors after the boom depend entirely on the sectors' relative factor intensities. To consider the resource movement first, the boom moves labour out of the two sectors into *B,* making the resource structure facing these two sectors more capital-intensive. The Rybczynski (1955: 339) theorem states that under such conditions and at constant prices,

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[17]The restoration of W^* requires the fulfilment of one of the following conditions:

$$\hat{P}_N = \hat{w} = 0;\ \hat{N} = 0 \qquad \text{(i)}$$

$$\hat{P}_N > \hat{w} > 0;\ \hat{N} > 0 \qquad \text{(ii)}$$

$$\hat{P}_N < \hat{w} < 0;\ \hat{N} < 0 \qquad \text{(iii)}$$

where a circumflex denotes the rate of change from the pre-boom to the post-boom, post-immigration conditions. The new point of equilibrium in Figure II.5 must be at a: before reaching point a, $\hat{P}_N > 0$ but $\hat{N} < 0$, while beyond point a the reverse is true, so conditions (ii) and (iii) above are not fulfilled. At point a, however, condition (i) is fulfilled and it is, therefore, the only point at which W^* is fully restored (Corden, 1984: 366).

output of the relatively labour-intensive sector, be it T or N, contracts, while that of the relatively capital-intensive sector expands. Thus, if N is the relatively labour-intensive sector, which is normally the case, in Figure II.5 the supply curve moves from S_0S_0 to S_1S_1, equilibrium moves from point a to point b, less N goods are now produced. This is as in the core model. However, output of T in the present case expands, i.e. pro-industrialisation takes place as a result of the resource movement alone - in Dutch disease literature this is called the paradox model. This result will be opposed by the spending effect, because of real appreciation and the movement of both capital and labour out of T into N. Nevertheless, the expansion of T remains a possibility.

A yet more paradoxical outcome obtains if N is relatively more capital-intensive than T. As labour moves into B, there is less of it available for N and T, so output of N expands while that of T contracts. De-industrialisation is still taking place. However, since N is capital-intensive, a rise in wage leads to a decline in P_N, and the real exchange rate falls (the Stolper-Samuelson condition). There is real depreciation. The spending effect, on the other hand, raises output and prices of N and squeezes T, irrespective of factor intensities in the two sectors (Corden and Neary, 1982: 833-4; Corden, 1984: 363).

II.3.3 Decomposition of the Lagging Sector

If the lagging sector T is decomposed into sub-sectors or industries; if each industry employs capital and labour in different proportions; and if the two factors are mobile between its sub-sectors, then the sector as a whole behaves like a mini Heckscher-Ohlin economy. The same forces as above will be operative here, albeit at an intra-sector rather than inter-sector level. The boom brings about the usual movement of labour out of T as a whole; however, within the sector there will be a rearrangement of factors. With the stock of capital for the sector as a whole fixed (an assumption of the core model) and its labour reduced, it follows that the labour-intensive sub-sectors contract, while the capital-intensive sub-sectors expand, as for the Rybczynski theorem (1955: 339).

II.4 Critique of The Dutch Disease Theory

The critique given here of the Dutch disease model is of an empirical rather than an abstract nature, the place for which would be the more theoretical literature (see, for example, Weeks 1989). The critique has been motivated by the Dutch disease model's weak explanatory power of the empirical observations concerning a number of recent booms, especially that of Jordan (to be discussed in later chapters). The discussion here will be very general but will become more detailed in subsequent chapters as it considers the model's applicability to a number of countries (chapter III), and then to specific sectors: agriculture (chapter VI) and manufacturing (chapter VII) in Jordan.

The critique is made in three main respects: the model's assumptions; its level of abstraction; and the static nature of its analysis. As will be shown, productivity growth is a pervasive element that in some ways links these three aspects and, as such, its absence from the model is considered, from my perspective, to be the main shortcoming of the Dutch disease theory.

The first point concerns modelling in general and relates to the *ceteris paribus* assumption. All other things may change, and simultaneously, rendering the model far removed from reality. In our context, sectoral changes that all countries go through, for reasons extraneous to the model, make it difficult to ascertain the existence and magnitude of the Dutch disease effect. It follows from above that establishing the counterfactual to the Dutch disease is a necessary condition for the correct testing of its hypothesis.

Because the model does not show the 'extent' of change in sectoral contributions, its advantage over Gregory's (1976) partial equilibrium analysis is somewhat undermined. It is important to distinguish in this regard between the two types of booms considered here, i.e., between booms caused by a new discovery and those caused by a favourable price change. The most salient difference between the two is resource transfer, which would take place in the first type of booms but not necessarily in the second. Where some degree of resource transfer is involved, the Dutch disease general equilibrium model does not add much to partial equilibrium analysis, except to show the effect of changes in income and cost on the 'potential' demand for, and supply of, traded and non-traded goods. However, what the general equilibrium model sets out to do is to explain sectoral shifts, and this it does only partially by showing that the traded goods sector declines, which Gregory's model has shown already. The resource movement, on the other hand, obscures the effect on output and employment in the non-traded

goods sector. This is not a statement on the general equilibrium nature of the model as such - the advantage of general, as opposed to partial, equilibrium models is well taken. Rather, it is to show that in particular cases where there is resource transfer, no advantage is gained by moving from partial to general equilibrium analysis.[18]

More important is the Dutch disease model's set of assumptions, especially those relating to factor markets. The model is built on macro-equilibrium with no unemployment before, during or after the boom (see section II.2).[19] This immediately precludes a large number of booming economies from its application. If the boom takes place in a low *per capita* income economy, or, if *per capita* income is high, the economy is on the downswing of its business cycle, then the boom starts when a certain fraction of resources is idle. Inevitably, demand expansion induced by the boom leads to an expansion of the traded sector, both in absolute and relative terms. This is because under conditions of repressed demand it is usually the traded sector, especially manufacturing industries, that suffer most in terms of depressed share in aggregate output. Services, on the other hand, would have a larger than usual proportion in aggregate output during a recession (see Rowthorn and Wells, 1987: 24-25).[20] Conversely, as demand rises and unemployment is reduced, incremental demand has a disproportionately larger impact on manufactures, especially consumer durables, than on agriculture or services. Moreover, with a faster rate of growth, the share of investment in GDP

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[18]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.

[19]A post-boom unemployment case is discussed by Corden (1984) and Neary and Wijnbergen (1986) - using disequilibrium analysis - where unemployment is caused by downward rigidity of wages. In this case, labour is specific to the traded, T, and nontraded, N, sectors. In T, 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. If, furthermore, workers in T seek real wage increases to maintain their wage relative to those of workers specific to B, where market forces will have raised real wage, unemployment in T intensifies. The reverse takes place in N, *via* the spending effect, which increases P_N and, therefore, return to the specific factor.

[20]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 manufacturing, in aggregate output. This is due both to the Dutch disease effect and to the same factors that cause de-industrialization in these economies, namely higher productivity growth in manufacturing compared with that in services (see Rowthorn and Wells, 1987, chapter one). In industrialising economies, a further increase in *per capita* income leads to a continuation of industrialisation, *provided* the Dutch disease effect is overcome. I will show later that industrialising economies are more likely than not to continue industrialisation under booming conditions, for reasons other than resource utilization.

is greater, and this too implies a relative increase in the demand for manufactures (ibid: 242-3).

The existence of excess supply of labour at the start of the boom means that the resource movement need not take place: the booming sector, *B,* can draw on the pool of surplus labour, rather than on labour employed in *N* and *T*. The spending effect itself may be neutralised: *N* can expand without an increase in P_N since the absorption of excess capacity means that output can expand without increasing costs. In equation (4) above, the marginal physical product of labour in *N* ($MPP_N l$) is rising, if wage rises in line with productivity but not more, P_N need not rise at all. Similarly, in the lagging sector *T* the marginal physical product of capital $MPP_T k$ rises because production is taking place at higher productivity levels. In equation (5) the return to the specific factor $r_T k$ does not decline even though P_T is fixed. Therefore, resources do not move out of *T* to *N*. Both direct and indirect de-industrialisation are thus averted.

A further point relates to the assumption of perfect capital markets. A pre-boom developing economy is likely to be quantity-constrained in world capital markets, or indeed in its own market if saving is not forthcoming and there is credit rationing. The boom relieves these constraints by increasing the country's creditworthiness and by making capital more abundant domestically. In this case, capital, combined with the hitherto surplus labour, can be used to accelerate industrialisation.

There is another aspect to relieving the foreign exchange gap, if we relax the assumption of fixed technical coefficients of production. The relative abundance of foreign exchange is consistent with both increasing production efficiency, as improved imported inputs are now available, and with technological advance, embodied in imported machinery and material. Both these aspects, in turn, are consistent with rapid productivity growth which would increase returns to specific factors employed in tradeables.

We turn now to the model's level of abstraction. As in all neo-classical models, in the Dutch disease model there is no government, only agents that optimise rationally in a competitive environment.[21] Yet in most cases of resource booms a significant proportion of resource rents are returned to the government through taxation. From a neo-classical point of view, availability of this rent

[21]See Corden (1981) for a discussion of fiscal policy's effect on functional income distribution and resource allocation.

lowers the shadow price of public revenue, which in turn increases the optimal proportion of publicly provided commodities in national income (Please's Law: see Neary and Wijnbergen, 1986: 328). In principle, even if governments supplanted markets, this should not affect the conclusions of the theory, provided that governments' actions mirror the market's mechanisms. In reality, governments do not behave in this way, both because it is impossible for them to do so, and because they have a political agenda to pursue. Once removed from the market image, government action can affect the model's outcome in unpredictable ways. It may emphasise sectoral changes, or it may counter them. The important thing to note is that without the inclusion of government in the model - as in two agents models - the outcome of the boom cannot be determined.

Government action that directly relates to the Dutch disease hypothesis includes spending and investment behaviour (the spending effect), and trade policies (which may impinge on tradeability). A related set of actions is macroeconomic 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 them (e.g. a devaluation leading to currency depreciation). Ideally, the effect of such policies would be modelled separately to test the Dutch disease hypothesis correctly. That is, a counterfactual to the effect of macroeconomic policies on output and employment should be established before the Dutch disease effect is assessed (it will be shown in the following chapter that empirically this is quite difficult).

The static nature of the model[22] is perhaps its most limiting aspect, since the dynamics of productivity growth and productivity differentials between sectors are the supply-side factors that determine growth and sectoral shifts over time.[23] Under booming conditions the factors underlying productivity growth themselves undergo significant change, as I have already noted. To recapitulate, in industrialising economies booming conditions can induce rapid productivity growth for three main reasons. First, the boom relieves economic constraints such as the foreign exchange and saving gaps by making capital more abundant. Production can now

[22]Some Dutch disease literature discusses dynamic aspects such as intertemporal adjustment to the boom, or the 'learning-by-doing' effect in manufacturing (see for example Neary and Wijnbergen, 1986: 23-28). According to this source, learning by doing in manufacturing justifies subsidies to the sector during the boom.

[23]On the demand side, the factors that determine growth and sectoral shares are the rise in *per capita* income and the differential income elasticities of demand for sectoral output. These issues are discussed further in the following chapter.

take place with better quality investment and production inputs. The same result obtains because relative price movement makes imported capital and material cheaper relative to pre-boom conditions. Second, these conditions are consistent with technological advance, which is more likely to take place with new investment than otherwise. Third, the existence of idle capacity in the pre-boom period, which is rapidly absorbed as the boom expands demand, means that production can rise without additional inputs, i.e. output per unit input rises. More generally, the rapid expansion of demand generates rapid productivity growth through dynamic economies of scale (Verdoorn's law) that arise from learning-by-doing, embodied technology, new entrepreneurs, etc.. These changes are likely to promote industrialisation because of the higher-than-average productivity level and growth rates in manufacturing.

Finally, it is important to note that 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. I am specifically referring to the higher income elasticity of demand for manufactures than for agriculture (Engel law). Thus, as income rises, the share of expenditure on agricultural products declines, and that on manufactures rises. The effect of demand expansion on the above mentioned supply changes is magnified in manufacturing and diminished in agriculture, whose output and employment are expected to decline in relative terms as *per capita* income rises. It is inaccurate, therefore, to consider agriculture and manufacturing in one category of analysis under booming conditions in these economies. Whilst the two sectors are influenced in the same way by relative price changes, they are influenced in opposite ways by the income and demand effects. Corden's (1984: 362-3) assertion that the theory can be applied equally to agriculture and manufacturing is correct only within the Dutch disease formulation, where there is neither growth nor change in productivity over time. Once the model's assumptions are relaxed and/or dynamic analysis is adopted, the two sectors behave in vitally different ways; a subject that the next chapter discusses in more detail.

CHAPTER III

Literature Review: The Experience Of Industrial And Industrialising Economies With Booms

Introduction

This chapter reviews the literature on a number of countries' experiences of favourable exogenous shocks (henceforth booms). The survey is by no means exhaustive, but serves its two-fold purpose, namely, firstly, to enhance our understanding of these experiences by examining them together and thus permitting comparisons to be made; and, secondly, to advance the critique of the Dutch disease theory began in chapter II.

The literature is reviewed within the framework presented in the previous chapter, including the Dutch disease argument and my own critique of it. To recapitulate the Dutch disease argument: the boom brings about real appreciation *via* two, analytically different, mechanisms: the *spending effect* and the *resource movement*. The most likely outcome of changes induced by these mechanisms is a squeeze on profits in the traded sector and a contraction of its output and employment. This outcome, however, is not inevitable. If tradeables are relatively more capital-intensive than non-tradeables, profits will be less squeezed in the former than in the latter. In the medium-to-long run when capital becomes mobile, it will move out of non-tradeables into tradeables leading to the latter's expansion. Against this outcome works the spending effect which increases the prices, and consequently profits, of non-tradeables. Whether or not de-industrialisation takes place, therefore, depends on which effect dominates.

I have noted the main shortcomings of this type of analysis, some aspects of which can be accommodated within the Dutch disease framework. For instance, government action which impinges on resource allocation and profitability can be endogenised. Or, the counterfactual to the Dutch disease model can be established, to determine whether or not the boom has resulted in a decline of output and employment in tradeables. The latter would be necessary since in both industrialising and industrial economies this sector's share in aggregate output is changing over time.

There are, on the other hand, three other analytical considerations, crucial to an understanding of booming sector economics, that cannot as easily be accommodated within the framework of the Dutch disease model. These are, firstly, dynamic aspects of productivity change and technological advance; secondly, the view of booms as originating in positions of dis-equilibrium, with unemployment and capital market constraints; and thirdly, the effects of demand growth and of changes in the structure of demand on these initial conditions, mainly through productivity growth.

The foregoing sets out the framework within which countries' experiences with booms are examined here. The question underlying the analysis is, to what degree do industrial and industrialising economies' experiences with booms reflect the relevance of the Dutch disease model? A related question is whether the sectoral outcome can be expected to differ in industrialised from industrialising economies. It will be shown that the answers to these questions depend crucially on the economic conditions at the start of the boom; and, in that respect, experiences of developed and developing economies differ considerably. It will also be shown that despite the extensive literature critical of applications of the Dutch disease model to developing countries, many of the critiques do not adequately confront the analytical framework inherent in the model. The Jordanian experience, the subject of this study, is strongly suggestive of the need for dynamic rather than static analysis of sectoral shifts; which, if Jordan is at all representative of industrialising economies, is likely to have important implications for the interpretation of booms in other industrialising economies.

Section one discusses historical experiences of booms, which are presented chronologically until the 1970s, when the two oil shocks took place. In section two a cross-section of industrial countries' experiences are compared, followed by a similar analysis for a group of industrialising economies in section three. Section four synthesises.

III. 1 Historical Experiences With Booms

The decline of Spanish industry in the 16th and 17th centuries in the wake of American discoveries of treasure is one of the earliest examples of a boom to have been referred to in the literature. Two approaches to the description and analysis of this phenomenon are identifiable: a monetary approach by the American economic historian Earl Hamilton dating from 1928, and a neo-classical approach by Forsyth and Nicholas (1983). According to the former, imports of gold and silver from America into Spain were regarded as amounting to an expansion of the money supply, while actual production of goods and services was constant or only growing slowly. The familiar situation of "too much money chasing too few goods" was observed. The consequent price rise reduced Spanish manufactures' competitiveness and by the mid 17th century very little remained of the traditional industries. The implicit assumption in this analysis is that had the government sterilised the impact on the domestic economy of monetary inflows, inflation would have been avoided as would the decline in manufacturing.

Forsyth and Nicholas' approach is closer to the general equilibrium analysis of Corden and Neary (1982). In their view, the Spanish transformed the windfall gain into consumable goods through both trade and the increased production of non-traded goods, so diverting resources from manufactures. Changes were affected through the price mechanism, whereby the price of non-traded goods rose relative to traded goods to facilitate the flow of trade (the exchange rate was fixed), and factor prices in the non-traded sector rose relative to the traded sector to stimulate factor flows. There was also a change in factor rewards, whereby those factors used relatively intensively in the traded sector experienced a decline in their rewards, while other factors experienced a rise.

It was mainly government spending that influenced structural changes in the economy, since about 26% of American treasure accrued to the Crown, thus raising the share of this source in total revenue from 11% in 1554 to 20% in 1590, and redistributing income towards the state. The government had a high propensity to spend on wars, public works, civil service, and extravagant buildings. Similarly, private treasure was used to consume more goods and services either directly (e.g. on ornamentation) or through the purchase of return cargoes to the Americas. There was a consequent pull of labour into services out of manufacturing, whose decline was manifested by a balance of payments deficit and an eventual desertion of the urban centres that had historically been home to textiles, glass, sugar, leather and copper industries. When the treasure flow was exhausted, manufacturing industries failed to revive. Forsyth and Nicholas attribute this to the loss of technical edge and human skills; to the deterioration of the capital stock; and to the fact that any sustained industrial revival would have required substantial capital stock.

In the foregoing example, the boom was like manna from heaven in that it did not entail any transfer of resources to the booming sector. Adjustment to the boom was confined to services and manufacturing, without involving the booming sector, and was brought about *via* the spending effect. On the other hand, in Spanish America itself, where the discoveries were made, resource transfer to the gold fields was quite significant. As recorded by Cairnes (1859), the discoveries helped populate this area at a pace so fast as to result, paradoxically, in agriculture flourishing in areas otherwise considered undesirable. This is a significant theoretical point, as it highlights one of the difficulties of applying the Dutch disease model to developing countries. Had agriculture been well-established in Spanish America, this expansion in cultivation would probably not have taken

place. But as America was at that time largely unsettled (i.e., it was at an initial stage of development), these discoveries of precious metal can be viewed as facilitating agricultural expansion and thus bringing a hitherto idle resource - land - into productive use, perhaps not only because of labour immigration but also because of the availability of capital.

On the other hand, travellers' accounts note that in the settled areas where land *was* already being cultivated, some agricultural areas were neglected as a result of the boom. Institutional factors were given a rôle in bringing about this outcome, where laws prevented the creation of a class of small proprietors. However, Cairnes refutes this suggestion on the basis that a great portion of land sold was not brought under cultivation. Instead, the new discoveries were a premium against agriculture and industry, as high wages prevented these traded sectors from being able to compete internationally.

The Australian experience with gold discoveries in the 19th century, as recorded by Cairnes (ibid), brings up the interesting question of whether immigration can avert de-industrialisation or even lead to over-shooting, i.e. bring about pro-industrialisation. The discoveries brought about two changes; namely, firstly, labour immigration, and secondly an immediate disorganisation of industry, as Australia tried to capture her new comparative advantage by turning capital and labour to the production of gold, away from dairy farming. Cairnes records that a two-to-four fold increase in prices of pastoral products was needed if farmers were to recoup their increased labour cost. The wool industry was thus placed in serious jeopardy and was only saved by the increase in demand for meat brought about by immigration. The price of meat rose four-fold, which covered the increase in outlay on sheep farming, and worked as an inducement to continue supplying sheep and, therefore, wool.

This example highlights the effect of immigration on both the supply of, and demand for, non-traded goods. It has been shown in section II.3.1 that immigration should neutralise the resource movement, but not the spending effect, in which we must include the spending of migrant workers. Theoretically, de-industrialisation can be avoided if immigration is sufficient to restore wages in terms of tradeables to their pre-boom level. This does not seem to have been the case in Australia, since Cairnes records a significant rise of wages in terms of traded goods thus indicating that both the resource movement and the spending effects were operative, the latter augmented by the spending of migrant workers. However, as migrant workers' spending on meat - a non-traded good at that time - also meant

the continued production of wool, de-industrialisation seems to have been attenuated, quite fortuitously, by immigration, but was not averted, nor indeed was it reversed.

III.2 Experiences of Industrial Economies With Booms

Australia's rich endowment of gold, silver, lead, copper and coal has permitted two further mineral resource booms this century. A major one in 1968-74 (off-shore oil, iron ore and bauxite alumina), and a minor one in 1978-82 (coal and uranium). According to Forsyth (1986: 268), the second boom in Australia might be better regarded as stemming from expectations of increased mineral production that failed in the event to materialise; yet there was real appreciation, especially through a rapid rise in wages and investment in the sector. As mentioned in chapter II, Australia's more recent experience with booms prompted an interesting theoretical debate between Gregory (1976) and Snape (1977) that culminated in the formulation of the Dutch Disease model by Corden and Neary (1982) and Corden (1983; 1984).

The booms in Australia increased the share of minerals in GDP from 2% to only 4%. Nevertheless, this small percentage entailed long term adjustment problems since, because of the nature of the boom, revenues were sustainable over a long period of time. Relative price movement was as to be excepted, i.e. there was real appreciation through higher inflation rates in Australia than her trading partners, as the exchange rate was fixed. Appreciation was more marked during the second, compared with the first, boom, apparently due to rapid wage rises because of optimistic expectations regarding the size of the boom. From 1982 there was a depreciation consistent with the view that earlier price forecasts had been optimistic (Forsyth, 1986: 256 & 264-5).

Since most of Australia's minerals were exported (apart from oil, which went into import substitution), the boom changed her trading position. As mining exports grew in the two decades after the first discoveries, wool exports declined contemporaneously. The decline might have been more than warranted by the boom conditions, since the government granted a 25% across the board reduction in tariffs (Gregory, 1976; Forsyth, 1986: 264).

Like the 19th century gold boom, the main aspect of this boom was the substantial resource movement, manifested mainly in immigration, and also in the pull to mining and away from other sectors of labour and the capital needed for

investment. Theoretically then, the outcome for the non-booming traded sector is unambiguous with regard to its output and employment: both decline. On the other hand, the outcome for the non-traded sector is ambiguous, as shown by Snape (1977) and Corden (1984) (see section II.2.2). This sector may contract or expand, depending on the magnitude of change in relative prices and on the movement of labour, including immigration (see section II.3.1). The outcome in non-traded goods was also ambiguous empirically. Forsyth (1986: 264) speculates that the non-traded sector was left unaffected, while structural changes took place between booming and non-booming traded sectors.

We now turn to the experiences of North Sea oil and gas which, generally speaking, exemplify the enclave type of booms, where little or no resource transfer is involved, while resource rents are very large. The spending effect, especially that of the government, thus dominates, leading to an expansion of output and employment in the non-traded sector. Such experiences demonstrate the difficulty of establishing the Dutch disease effect without establishing the counterfactual, because the boom started at a time when these economies were experiencing de-industrialization. It is perhaps worth digressing here to explain the difference between Dutch disease effect and longer term de-industrialization.

De-industrialisation in mature industrial 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 rates of growth in labour productivity in manufacturing compared with services (see Inman, 1985: 2-5; 17-19). As per capita income rises, demand for services rises at higher rates than that of aggregate demand. Furthermore, with productivity in services lagging behind that of manufacturing, labour will be drawn from the latter into the former, and not from agriculture, whose small share in aggregate output cannot be reduced any further (see Rowthorn and Wells, 1987: 14-15). The two effects combined lead to an increase in the share of labour in services and to its decline in manufacturing. This is the true definition of de-industrialisation. In addition, prices in services will rise and in manufacturing fall because of the productivity differential between the two sectors, thus increasing the former's, and reducing the latter's, share in aggregate output (ibid).

The Dutch disease effect, on the other hand, is caused by relative price movement induced by the boom, which makes tradeables less profitable to produce that non-tradeables. This movement in prices in turn is caused, in North Sea oil cases, by spending of the additional income gained from the boom on both

tradeables and non-tradeables, and by the rise in non-tradeables' prices relative to those of tradeables - whose prices are determined by world markets - to eliminate excess demand in domestic markets. It should be clear now how the same phenomenon - de-industrialisation - may have two entirely different causes; and why it is crucially important to establish the counterfactual before testing the Dutch disease. However, the line of demarcation between the two effects is more apparent than real, since the sudden rise in income from the boom can be expected to strengthen the tendencies underlying de-industrialisation. Theoretically, the Dutch disease theory avoids these complexities by, first, ignoring the effect of growth on general equilibrium and, second, ignoring productivity growth altogether. Empirical analysis is thus left with no theoretical grounds on which to base an accurate assessment of the boom effect on sectoral output.

I shall start the discussion of North Sea oil experiences with the country that inspired the Dutch disease theory's name, Holland. The Dutch experience shows how governments can largely replace market forces and still effect the same structural changes predicted by the model, and perhaps even aggravate them. By contrast, the controversy over the effect of government policy on output and employment in manufacturing in England left the model more or less open - indeterminate. In both cases, we are reminded that care should be exercised in attributing government behaviour to the accrual of large rents, rather than, more correctly, to other factors that pre-date the boom and that may be social and political in nature, rather than economic.

In Holland the government sector looms large and became even more significant with the discovery of cheap energy (first made in the late 1950s). About 80% of gas rents accrued to the government, making up 14% of its total income in 1981. Public expenditure grew more rapidly than growth in revenue, especially transfer payments. The share of central and local governments and social security expenditures rose from 34% of national income in 1964 to 50% in 1979 (while gas accounted for 5.5% of national income in 1981) (Ellmen, 1981: 153-4). Note that while government's share in total expenditure rose during the boom, it had already reached an exceptionally high level (by West European standards) prior to the boom.

Another prominent feature of the Dutch boom was the rapid increase in wages. Wage indexation, that includes indirect taxes and household energy consumption, had started in the 1960's. Wage bargaining was centralised and based on an aggregate measure of labour productivity, including the gas sector, where

labour inputs were minimal and production very high. This brought pressure to bear on product wages in all except the most productive sectors. Inevitably, the rise in wages exceeded that of labour productivity, as evidenced from the increase of wage share in value added. In addition, employers' contributions to social security increased, leading to a general increase in labour costs (Kremeres, 1986: 112-3).[1] It is precisely the increase in labour costs that constituted the Dutch disease according to Corden (1983: 441), where wages in Holland were much higher than those in its most important trading partner, Germany (30% of Holland's exports go to Germany). The wage differential between the two countries, which exceeded nominal appreciation, put pressure on production costs and squeezed profits in export and import-substituting industries in Holland. Consequently, rapid structural changes were observed in the economy, one aspect of which was de-industrialization (Ellman, 1981: 157-9). It was especially the labour-intensive, internationally competitive manufactures that experienced low profits or losses - for example, ship building, vehicles, mechanical engineering, and metal manufacturing. The textiles, clothing, and shoe industries virtually disappeared in the seventies, as they could no longer compete with South Korean and Taiwanese prices. Thus the capital-intensive, labour-extensive sectors (energy) replaced the labour-intensive sectors (clothing, etc.). The service sector, meanwhile, continued to grow but was not able to absorb all the labour that industry shed. Unemployment, which had not existed prior to the boom, stood at 6% in the early eighties (ibid).

Despite this neat presentation of Holland as a case for the Dutch disease, the Dutch experience is far from being ideal. The boom was super-imposed on long-drawn structural changes in the Dutch economy. De-industrialization did not start with the energy boom, but much earlier in the mid-sixties, as evidenced by a decline in the share of manufacturing, a balance of payments deficit, and the rapidly increasing share of services. These trends in the Netherlands have been observed in other advanced economies. So have other symptoms: increasing participation of the public sector in GDP; internationalisation of leading industrial enterprises; modification of sectoral structures within manufacturing industry; a decrease in the rhythm of growth of industrial productivity in the mid-1960s; and

[1]Ellman (1981: 156-7) argues that labour costs in Holland were the highest in the world, and were substantially higher that those in the US (total labour cost per hour was DM 21.18 in Holland, and DM 16.95 in the US in 1981). This does not mean that labourers benefited more, as wages in Holland were lower than those in the US. (average hourly wage was DM 12.01 in Holland, and DM 12.24 in the US in 1981). Rather, it was the beneficiaries of the social security system who gained.

the fall of the profit rate since the end of the 1960's. All these factors appeared before gas exports became relevant to the Dutch economy (Fajnzylber, 1981: 167-9), 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-industrialization problem in Europe.

It is generally accepted that Holland is the example to be avoided, and Norway the one to be followed, in managing energy rents (Kaldor, 1981: 6; see also chapters 3, 7 & 11 in Barker and Brailovsky, 1981). Norway's oil reserves, which became substantial in the late 1970s, are larger than Holland's relative to the economy (one-third of exports, and an equal output share in GDP as manufactures) and are expected to last well into the next 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 various forms were given to some of the struggling industries when traditional exports stagnated. In 1978 there were fears that industry's competitiveness might decline because of the uncertainty of future oil prices, and accordingly the then policy of demand expansion was reversed: domestic demand was reined in and a comprehensive prices and incomes freeze was instituted (Bjerkholt *et. al.*, 1981: 172).

From a purely neo-classical point of view, this non-adjustment stance entails resource waste, especially since Norway's 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.

The British case is far more complicated, and brings out the need for macroeconomic, rather than structural, analysis, as the boom came at a time of poor economic performance. The British experience also shows the need for further disaggregation of the non-booming traded sector, as the oversimplified presentation of the economy in two sectors, trade and non-traded, hides much of what happened during the boom (Forsyth, 1986: 266-7). In addition, as in all industrial economies the counterfactual problem is considerable not only in terms of sectoral shifts, but also in terms of government policies.

Forsyth and Kay (1980) stirred controversy in the way they analysed the economic implications of the North Sea oil revenues. Basing their analysis on a neo-classical model, they showed that if domestic resource use is to rise in line

with notional income, a balance on external trade must be maintained. This implies that a move from deficit to surplus on the primary account must be reflected in a move from surplus to deficit in other accounts, which consists largely of manufactures. Moreover, since manufactures make up a much larger fraction of the tradeable sector than 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 that then reduce the production of manufactures. The benefit to the UK citizens - a rise in their real income - comes indirectly through changes in the terms of trade: "the value of British output measured in terms of its purchasing power for the goods Britain wants to buy" rises. Such a rise in income allows a further rise in total domestic resource utilisation. As regards the use of the additional income, investment is desirable, and the most ideal type of investment is one that uses tradeables to produce non-tradeables, imported machinery for use in services, for example. Investment in manufacturing, or indeed any type of protection to manufacturing such as import controls or restraints on the upward movement of the exchange rate, is counterproductive. Structural unemployment is likely to increase if reductions in wages in manufacturing are resisted.

The controversy stemmed mainly from the implication of a reduced rôle for manufacturing in the future development of the UK. Criticisms did not, however, challenge the logic of the argument in any fundamental way (Forsyth and Kay, 1980; 1981). Because Forsyth and Kay's exposition, a hypothetical case based on comparative statics analysis, was basically microeconomic, while the UK's contemporary problems were of a macroeconomic nature, the article did not answer many normative questions,[2] such as what fiscal, monetary, and wage policies the government should follow. Since a large portion of the rent accrued to

[2]The debate over North Sea oil's macro-economic effects in the UK. remains inconclusive for the simple reason that there is no agreement as to how oil discoveries influenced government policies, which can be traced back to disagreement about the policy counterfactual. Some economists claim that North Sea oil allowed the government to pursue a more expansionary policy than would otherwise have been possible, with the result that total employment is greater than it would have been in the absence of oil. Others argue the reverse. Wells and Rowthorn (1987) view lies in the middle, as they contend that North Sea oil had no significant medium-term effect on employment, because government action was such that it neutralised such effects. However, there has been changes in structural patterns of employment in accordance with sectoral shifts induced by the boom. Estimates of employment lost in manufacturing range between 380,000 to 600,000, which was offset by an equal gain in non-manufacturing employment.

the government, the failure to address government spending (and other government policies) rendered the analysis unduly partial.

The complexity of the British case stems from the presence of other real changes taking place during the boom, the effects of which cannot be distinguished from the boom effect. These effects were not large enough to be unambiguously evident in the data (Forsyth, 1986: 262). Their existence, however, is evidenced from a larger decline in manufacturing than warranted by the increase in oil and gas production. Manufacturing fell from 30% of GDP in 1974 to 23% in the early eighties,[3] while oil and gas production rose by only 5% in the same period (Barker, 1981). The theoretical ambiguity, regarding how large any particular change from the boom should be, casts a shadow on the matter, especially since expectations of the changes would themselves have had real effects. For example, expectations of large oil production after the mid-seventies in the UK., just as in Norway, led to currency appreciation even before actual production had taken place, and when the balance of payments was still in deficit (Forsyth and Kay, 1980). In contrast, modest expectations of the importance of North Sea oil over 1974-76 explain the low exchange rate in that period, which led to a revival of industrial production until 1979 (Forsyth, 1986: 268).

The British experience brings out other important points missed in the Dutch disease model because of its level of aggregation and its assumptions of perfect market and of small country. Within manufacturing, performances differed significantly. Whilst some manufacturing industries expanded (chemicals, electrical and industrial engineering, and food), some declined at faster than the average rate for the sector as a whole (man-made fibres, clothing, and textiles) (Forsyth, 1986: Table 8.15: 267).

According to Forsyth (ibid: 268) some markets may have had a lagged response to the boom which manifested itself in the overshooting of the exchange rate. The rapid appreciation of the pound and its subsequent rapid decline revealed that some overshooting did take place. This is a plausible explanation of the larger than merited de-industrialization.

Forsyth (ibid: 267) 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

[3]Primary production increased in this period, but this was a special case because of the effect of the Common Agricultural Policy (Forsyth 1986: 263).

prices for exports, and lower than world prices for imports. In such a case appreciation would have been exacerbated, and adjustment would have been forced on a smaller number of industries.

III.3 Experiences of Industrialising Economies With Booms: New Evidence

Developing countries' experiences of booms raise a number of important theoretical issues, some of which have already being discussed in connection with industrial countries. It is, first of all, clear that government action plays a crucial rôle in determining the impact effect of the boom on resource allocation. Secondly, they reveal the importance of fine-tuning the traded and non-traded dichotomy on the basis of careful examination of trade policies and institutional aspects that impinge on tradeability - e.g. low capacity, or high cost, of transportation. And thirdly, they demonstrate the importance of establishing the counterfactual. The latter point merits further consideration since in the case of industrialising economies the direction of sectoral shifts is different, and the boom effect on these shifts may also be expected to be different.

Industrialisation in developing economies is caused mainly by the differential income elasticity of demand for manufacturing and agriculture (greater-than-unity in the former and less-than-unity in the latter), a statistical regularity known as Engel's law. There are also supply-side factors underlying industrialisation, the most important of which is the above average rate of growth in labour productivity in manufacturing. As per capita income rises, the stimulus given to, and the supply response of, manufacturing output is disproportionately larger than that for agriculture, whose output declines and is compensated for by a rise in the share of manufacturing.

Thus, the industrialisation process which continues during the boom works in the opposite direction to the Dutch disease effect. This is contrary to the experience of industrial countries where the two processes work in the same direction. However, the difficulty of distinguishing between the two effects is no less in the case of industrialising, than it is for industrial, economies, unless the industrialisation effect overcomes the Dutch disease effect, which we will see shortly is the case for most industrialising economies despite claims in the literature to the contrary.

There are other ways in which the experience of industrialising economies differ markedly from those of industrial ones. These are connected with the initial

conditions on which the boom is superimposed, and include low level of per capita income, small markets, excess supply of labour, and constrained borrowing ability. The boom changes these conditions, either directly through making capital more available and through inducing a rapid expansion of demand that absorbs excess capacity, or indirectly through relative price changes, which makes imported inputs relatively cheaper. The likely outcome of these changes is an acceleration of industrialisation, or reversed Dutch disease.

Although a large number of developing countries experienced booms in the seventies, including Arab Gulf countries, Egypt, Libya, Nigeria, Indonesia, Iran, Algeria, Ecuador, Trinidad and Tobago, Venezuela, Mexico, Cameroon and Gabon, only a few of them are discussed thoroughly in the literature. And those are the ones considered in what follows.

Nigeria attracted a lot of attention because of its poor performance during and after the 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 96%. None the less, over the same period only in three years did Nigeria have a current account surplus (Pinto, Table 1, 1987). With 80% of the population living in rural areas, agriculture's performance seems more relevant than manufacturing for Dutch disease analysis.

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 1981 and 1973 the real effective 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, bidding up rural wages three-fold during the period 1970-82 (Scherr, 1989). Consequently, CPI-deflated food prices rose by 46% over 1968-77 (Struthers, 1990). The result was that food production, which constitutes 90% of total agricultural production, increased at a modest rate of 2.7% during the two booms, which is less than population growth; while the formerly dynamic agricultural export sector declined at an average annual 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 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 55% (from 49% to 22%), and its share of total employment declined by 21% (from 75% to 59%)

(Scherr, 1989). Although the decline in agriculture in Nigeria had commenced prior to the boom, there are reasons to believe that during the boom the decline intensified. During 1976-77 alone it fell by 22.7%.

Gelb (1986: 338) 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 shielded from international markets by inadequate port facilities. If so, then the Nigerian case comes closer to the theoretical model of the Dutch disease. However, this oversimplifies the Nigerian case. The decline in export agriculture in Nigeria was the result not only of resource transfers out of agriculture, and of increased spending on services, but also of numerous other factors. During the boom Nigeria was embracing 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 hurt exporters. Government investment policies were biased against rural development (Struthers, 1990). Throughout most of the decade, government spending on agriculture and rural development amounted to only 3-5% of its total expenditure, rising to 9-10% in 1980-82. The largest proportion of government expenditure during the boom went to transport, primary education, a major steel complex, construction and auto assembly (Pinto, 1987). Construction of a new federal capital was also planned (Gelb, 1986). Furthermore, investment in agriculture was dominated by large-scale capital-intensive projects, including mechanised state-run food farms. Scherr (1989) contends that most of these projects were inefficiently managed and drew resources away from small-holders. Only 17% of federal agricultural expenditures went to small farm activities.

Trade, pricing and marketing policies were erratic and seem to have further confused farmers who were already overwhelmed by wild fluctuations in prices (Pinto, 1987; Scherr, 1989). For example, between 1978 and 1982, import duties on maize, rice, wheat and sorghum were raised to between 50-100%. But trade was already controlled through quantitative restrictions *via* import licensing. Export taxes were maintained until 1976, but were replaced with 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, more generally, agricultural tariff rates were lower than those for manufacturing.

Manufacturing output in Nigeria, contrary to that of agriculture, grew at 13.4% p.a. over 1970-82. This is partly explained by tariff protection, but also by availability of imported inputs, cheapened by high currency overvaluation. New capital-intensive industries were created during the boom such as iron, steel, and petroleum refining. After 1982, however, output of manufacturing declined sharply as imported raw and intermediate materials were no longer available (Struthers, 1990). Thus the entire growth of manufacturing in Nigeria hinged on relaxing the foreign exchange constraint 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 compared with non-oil GDP growth at 5.3% p.a. over 1972-81 (Gelb, 1986, table 2.11: 79) by necessity meant a large increase of manufacturing's share in aggregate output; compensated by a decline in that of agriculture. Seen in this light, a 2.3% p.a. growth in food agriculture, which makes up 90% of the agricultural sector, seems quite reasonable. The crucial point is that Nigeria's experience during the 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 and not entirely a manifestation of it.

Indonesia's experience is diagonally opposed to Nigeria's in that government action reversed the boom's effect on agriculture, rather than add to it, as we found in the case of both Nigeria and Holland. The share of oil in Indonesia's national income is as important as that of Nigeria's (rising from 5% in 1970 to 25% in 1980), and the urban/rural ratio is identical (20:80 in 1980). The share of oil in total exports, however, features less prominently in Indonesia than it does in Nigeria (40% in 1970 and 66% in 1982) (Pinto, 1987, Table 1). The boom revenues were completely monetised, as a consequence of which there was currency appreciation, which led the government to devalue twice, in 1978 and in 1983 (Warr, 1986: 298-301).

Despite appreciation, agricultural production in Indonesia grew by 3.8% p.a. over 1970-82, and rice production increased by two-thirds over the same period, approaching self-sufficiency (reached in 1984). Maize production increased by

50%, and cassava by 25%. Among major food crops, only sweet potato production declined, although there was substantial substitution of rice for other foods. 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 over 40% (Scherr, 1989).

Indonesia's performance seems to be explained, partly, by the fortuitous coincidence of the green revolution, foreign exchange availability from the oil shock which enabled the purchase of fertilisers necessary for the new rice varieties, and the effective establishment of rural institutions just before the start of the boom (Gelb, 1986: 337-8); and, partly, by government action which was committed to the development of the rice sector. Its efforts included extending subsidies for the purchase of fertilisers to promote "green revolution" technologies, technical extension programs, small-scale infrastructure improvements and smallholder irrigation rehabilitation in Java (Scherr, 1989). More generally, government spending priorities favoured rural areas heavily. The proportion of government spending on agriculture rose from 16% prior to the boom to 22% in 1979-80 (compared with 5% in Nigeria). In addition, price and trade policies were used to stabilise agriculture. Prices generally followed international markets, but a guaranteed floor price was maintained. The costs of world price uncertainty were borne by the government, although there were not large net public subsidies. Imports were targeted to cover only domestic production shortfall. Many traditional export taxes were abolished or lowered in 1976 and 1978 (ibid). Thus the story of agriculture in Indonesia is closer to the question of resource rents and technological change, as Gelb has argued (1986: 337), than it is 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 declined at faster rates during the boom than would have been expected had past trends continued (Warr, 1986: 307).[4] Thus, even in Indonesia the boom period seems to have been one of rapid industrialisation, since growth in

[4] According to Warr (ibid), "the same decline that took a decade in Indonesia (from 44% to 31% of GDP from 1971 to 1981), took 25 years in Japan ".

manufacturing's share in aggregate output was also higher than past trends.[5] According to Gelb (1988, Table 6-3: 88) the average annual change in manufacturing's share over 1972-81 in Indonesia was 0.77%, while the 'norm' change - as calculated on the basis of Chenery-Syrquin methodology - in this share should have been only 0.34%. Conversely, agriculture's share declined at 1.5% p.a. instead of the 1.31% p.a. predicted by the norm. For Nigeria these differentials are even more striking: manufacturing increased its share at 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% p.a. (similar results obtained for Algeria and Ecuador).

Despite a recognition by many Dutch disease economists, including Gelb, that a rise in manufacturing's share is 'normally' accompanied by a decline in that of agriculture, the accelerating decline in agriculture's share is still perceived as a symptom of the Dutch disease only, rather than merely a concomitant of accelerating industrialisation. The confusion in the literature seems to have been spurred by Corden's (1984) assertion that the Dutch disease theory applies equally to agriculture and manufacturing, since both produce tradeables; "the term 'de-industrialisation' can thus be misleading .... and should be regarded as no more than a shorthand" (262-3). This, of course, is only valid within the assumptions of Corden's static model, with no growth and structural change over time, apart from those induced by the change in relative prices, and no productivity change. The same is not true in real 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 expected that the two sectors would behave similarly in response to changes in the structure of prices, their behaviour should be expected to differ in responding to the income-demand effect (because of differential income elasticities of demand, which would instigate different supply responses; and because of differential productivity growth in the two sectors, as I have already mentioned).

Iran's experience lies somewhere between the two extremes of Nigeria and Indonesia (only performance during the first oil-boom will be considered since the second oil boom coincides with political upheaval in Iran). Above all, it reveals the

[5]Nevertheless, Warr (ibid) argues that compared with South-East Asian neighbours, Indonesia's expansion of manufacturing contribution was not particularly 'dramatic', and that perhaps the boom *did* have the effect of holding back rapid growth in manufacturing that would otherwise have occurred. Needless to say this comparison is quite arbitrary, since there is no presumption that these economies should behave in the same manner.

importance of incorporating micro-analysis, a study of socio-economic institutions, and an awareness of government policy reaction (especially since oil revenues accrued in their entirety to the government).

Iran was highly dependent on oil prior to the first boom, but this dependence increased with the oil price revolution. The ratio of oil to total exports rose from 75% prior to the boom to 84% during it. Oil revenues were used for both consumption (government consumption increased by 12.2% p.a., and private consumption by 10% p.a., both in real terms) and investment (GFCF increased by 10% p.a.). However, the share of consumption was larger than that of investment, and was equally divided between military spending and subsidies. Investment was skewed towards construction and services. Investment in agriculture stood at 3% of GDP during the boom; if credit to agriculture is included, the figure rises to 5% of GDP (Majd, 1991).

The share of agriculture in non-oil GDP during the boom declined from its pre-boom levels by about 6.4% between 1973/4-78/9 (Jazayeri, 1988, Table 2.6: 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 1972-81 declined by 0.42% p.a. more that it should, 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 2.5% p.a. - the problem of the counterfactual revisited.

The most interesting feature of agriculture's performance in Iran is that in many agricultural enterprises small farmers performed better than large commercial farmers. This indicates the importance of micro-analysis in understanding the mechanisms by which a boom's effects are transmitted to agriculture, a type of analysis that seems to have been pioneered by Scherr (1989), who tried to explain the strong performance of Tabascan peasant farmers of Mexico, in contrast to large land-holders and commercial farmers. Similarly, Majd (1991) has found that while the output of large sugar-beet producers fell substantially in Iran, there was a strong increase in the output of peasant and medium farmers. What brought this about in Iran were the phenomena of family labour and dual employment, with rural labour engaged simultaneously in agriculture and rug making or construction.[6] Thus, despite high transportation costs

[6]Around one-quarter to one-third of all farmers owned and operated a carpet workshop on their premises. Amongst small farmers the percentage is 40% (Majd, 1991).

and wage growth twice as fast as increases in sugar prices, total production costs rose more slowly on small farms than on large farms. Consequently, the break-even yield per hectare for small farms was below that for large commercial farms, and much lower than for mechanised farms (14 tons for small farmers, 27 tons for large farmers, and 38 for mechanised farmers).[7]

The picture in manufacturing is less equivocal than that of agriculture. According to Jazayeri (1988), the general performance is in line with the Dutch disease model. Prices of manufactures lagged behind all other prices in the economy, especially those of construction, while labour costs increased by 13% p.a. in real terms. Having been the fastest growing sector in the economy in the decade preceding the oil boom (12.3% p.a. in real terms), manufacturing lost this position to services (growing at only 5.9% p.a. over 1973/4-78/9, compared with non-oil GDP growth of 9.8% p.a. over the same period). Thus Iran seems to have been de-industrialising during the boom, since the share of manufacturing in total output declined by about 6.7% over the first oil shock period; and as such is the only industrialising economy reviewed that seems to have behaved as predicted by the Dutch disease model.

Within manufacturing, performances varied amongst industries, as in agriculture. Jazayeri argues that growth took place in industries that had low value added and high percentages of imported inputs. For example, whilst the labour-intensive textile industry faced serious competition from cheap imports from Taiwan and Korea, and production started declining from 1976 onwards, the relatively capital-intensive footwear production was able to resist such a squeeze. Similarly, in transport equipment and metal products, both of which have a high import content as well as being capital-intensive, output grew rapidly. Other industries that did well, such as non-metal mining products (mainly bricks), were non-traded in nature. Thus even at the micro-level, Jazayeri is able to explain the performance of traded goods production while staying strictly within Dutch disease analysis, by using the factor intensity argument and the de-composition of the traded sector (see section II.3.3).

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[7]Scherr (1989) argues other factors that change the supply response of small farmers, such as high short-term labour mobility; the ability to exploit family labour by accepting lower returns than the going market rates; the immobility of small farmers' capital; the exclusion of land value from their cost of production; operating at a lower fixed cost; and having a flexible production schedule due to smaller scale (Majd, 1991).

Gelb (1986: 54-93) examines how closely the experiences of seven booming industrialising economies fit the Dutch disease model. These countries are: Venezuela, Trinidad and Tobago, Algeria, Iran, Indonesia, Nigeria and Ecuador. There were deviations from the model both in terms of sectoral shifts and exchange rate movements; the correlation between these two variables was not always very good. The study strongly suggests government action to be the single most important determinant of performance during and after the boom.

The estimated average size of the windfall in these seven economies was about one-quarter of non-oil GDP; about four-fifths of this windfall accrued to producer governments, whose reaction therefore primarily determined the ultimate effects of the price increase. All the countries studied showed a striking alacrity to use about half the windfall 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.

Government action varied considerably from country to country. At one extreme, central government and public enterprises accounted for 90% of domestic investment. At the other, the rôle of the Ecuadorian public sector has been quite limited. Nevertheless, all these oil exporters saw an unprecedented growth in the size of the public sector after 1973 and, in most, the public sector participated directly in industrial production. Investment was intended to increase growth and attenuate currency appreciation and, therefore, sectoral shifts of the non-oil output. This, however, depends on the efficacy and distribution of capital formation, and the factor intensity of various sectors. Generally speaking, in the countries investigated by Gelb, the impact of investment on growth has been disappointing. Most infrastructure investments were subject to long gestation lags. The oil price shock itself rendered some of the initial capital stock obsolete. Much public investment was in large-scale, complex projects, which were prone to substantial cost overruns and disappointing operating performance. 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.

On average, the non-oil economies in these countries were 4.1% 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 investments undertaken in the period 1975-1978 would begin to contribute to output (ibid).

Finally we turn to Jordan, whose experience brings to light an analytical aspect of booms neglected in all the literature reviewed above, namely dynamic analysis. Furthermore, empirical findings on Jordan lend support to Karshenas' (1990) argument that boom conditions are conducive to rapid technological advance. Jordan's experience also shows that investment in non-traded sectors - e.g. transport, telecommunications, etc. - can be complementary to that in the traded sector and, therefore, increases returns to factors employed in the production of tradeables.

The boom in Jordan was caused by a sudden and large inflow of foreign aid and workers' remittances, coinciding with the two oil shocks (see chapter V). The ratio of grants and remittances to GDP peaked in 1979 at 73% (42% grants, 31% remittances); and to exports averaged 317% during 1974-1981. Thus the potential impact of the boom on the economy was larger than that in any of the countries reviewed thus far.

During the boom investment in traded sectors - agriculture and manufacturing - were considerable. In mining and manufacturing, investment was 25.9% of total investment, of which the government contributed 33%. Investment in agriculture and irrigation stood at 10.2% of total investment, with the government share as high as 60% (World Bank, 1980: 5; 1983a: 21). In addition, a significant proportion of the remaining government investment went into infrastructure, such as the Port of Aqaba and major feeder roads. This type of investment directly enhanced production and distribution efficiency in the two traded sectors, as it increased the handling capacity of exporters and imports of raw and intermediate inputs.

Jordan's general performance during the booms was quite remarkable, with GDP growing at 12.7% p.a. in real terms in the period 1974-81. Growth in agriculture was the slowest at 5.7% p.a., but agricultural production rose uninterruptedly, despite a 78% decline in agricultural employment. Mining and manufacturing were two of the fastest growing sectors, at 19.5% and 18.6% p.a. in real terms, respectively. Export growth was even more impressive. Over 1975-82, agricultural exports grew by 50% in real terms and 100% in nominal terms; and exports of manufactures grew at 36% p.a. in real terms.

My findings on the performance of agriculture show that public and private investment in the sector brought about significant technological advance. Public investment in primary irrigation schemes, which started in the sixties but continued well into the eighties, induced private investment in on-farm irrigation, improved agricultural inputs (fertilisers, improved seeds, pesticides, and herbicides) and modern production techniques (hot-house farming). These technology-embodying investments changed technical conditions of production, which was now taking place at much higher levels of productivity and, therefore, profitability.

In manufacturing, excess capacity prior to the boom was of the order of 50%. The rapid expansion of demand induced by the boom allowed industries to expand very rapidly without increasing their production costs, by utilising more of the existing capacity. Econometric investigation has shown that productivity growth was highly dependent on output expansion, that is, dynamic economies of scale - Verdoorn's law - was in operation. The Dutch disease model was thus found to be unsatisfactory for the study of manufacturing in Jordan mainly because it employs comparative static analysis, whereas in industrialising booming economies dynamic models seem to be more appropriate.

III.4 Synthesis

The most remarkable feature of experiences with booms is the influence on the final sectoral outcome of the initial conditions on which the boom is super-imposed. These conditions can be grouped in three classes: the level of per capita income and the degree of industrialisation; the economic constraints; and the phase of the business cycle at which the economy is operating.

Broadly speaking, economies can be divided into two groups on the basis of the extent of industrialisation obtaining at the start of the boom; those whose share of manufacturing in aggregate output was on an upward trend - industrialising economies - and those whose share was on a downward trend - mature industrial economies. The forces that underlie industrialisation or de-industrialization, as the case may be, are related to the level of per capita income; differential income elasticities of demand for sectoral output; and differential productivity growth between sectors, a subject that has already been discussed in sections III.2 and III.3. These forces do not stop operating during the boom; on the contrary, they do so more powerfully since the boom translates to a demand shock, if the windfall is partially or wholly monetised. However, since these forces work in the same direction as the Dutch disease effect in industrial economies, and in an opposing

direction in industrialising economies, we would expect them to augment the Dutch disease in the former and to counter them in the latter.

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 capital markets. These constraints may hold back industrialisation so their removal can only accelerate it. Furthermore, availability of capital and imported inputs is consistent with both technological advance and rapid productivity growth, both of which feed into further industrialisation.

Sectoral shifts are also strongly influenced by the economy's position on the business cycle at the start of the boom. As noted in chapter II, the Dutch disease model assumes the economy to be in macro-equilibrium with no unemployment at any time. If, on the other hand, prior to the boom there exists idle capacity in the economy, be it industrial or industrialising, the boom is likely to induce industrialisation. This is because under conditions of repressed demand the share of services is disproportionately larger, and of manufacturing disproportionately smaller, than under conditions of equilibrium (see section II.4 in previous chapter).

On the question of employment, experiences of industrial and industrialising economies differ considerably. In industrial economies, it is likely that they start the boom with fully employed resources, but that the boom creates unemployment because of wage increases and downward rigidities in wages, and because of the replacement of labour-intensive sectors (manufacturing) with labour-extensive sectors (energy). In this case, a more useful model would be one in which the full employment assumption is dropped, and employment is made dependent on, among other things, oil revenues, government spending, and the wage rate (see Seers, 1962).

Developing economies are likely to start the boom from unemployment because of the economic constraints referred to above. 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 this outcome leading again to excess supply of labour. In this case a 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 (see Salizu, 1990, for an application of this model to Nigeria during the oil boom). It is important to note that as far as employment is concerned, the outcomes for industrial and industrialising economies will differ because industrialising economies' idle capacity starting point will ensure that productivity gains associated with the boom will be highly

significant, leading to an expansion of manufacturing (where productivity growth can reasonably be expected to be fastest).

If we synthesise all these factors; namely, firstly, growth in per capita income and its effect on changing demand structure; secondly, the existence or not of economic constraints; and thirdly the state of the economy in regard to its position on the business cycle, we come up with two plausible scenarios. One is representative of the majority of industrialising economies' experiences, and the other of the majority of industrial economies' experiences. The two scenarios follow.

In a pre-boom industrialising economy, per capita income is low; demand is constrained by a balance of payments deficit and lack of investible funds; and there is, therefore, an excess supply of labour. If, in addition, the economy is very small there may be idle physical capacity because of the efficient size of plant constraint. Furthermore, much production technology will not be state of the art 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 continuous decline and that of manufacturing a continuous rise. However, the above mentioned economic constraints will hold back industrialisation. The boom changes these conditions all at once. Per capita income rises rapidly inducing a rapid 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; that is, 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 is unlikely to reverse them. The experiences of Jordan, Indonesia and even Nigeria (where currency appreciation was the strongest, yet its industrialisation was accelerated during the boom period) all fit this scenario.

In a developed economy, per capita income is high and demand is buoyant enough to absorb any excess capacity in the economy. Technology is state of the art, and production takes place at the frontier. The economy experiences de-industrialization, because productivity growth in services lags behind that of manufacturing. The rise in per capita income induced by the boom can only

accelerate these patterns. In addition, the Dutch disease effect also reduces the share of manufacturing in aggregate output, *via* the change in the structure of prices. Continued de-industrialisation is the most plausible outcome. This scenario is consistent with the experiences of all industrial booming economies reviewed, namely Holland, Australia, the UK, and Norway.

Our conclusion is that the question asked by the Dutch disease theory should be modified from: Does the boom reduce the share of manufacturing output and employment? to: What is the extent to which the boom accelerates the decline in the shares of manufacturing output[8] and employment in industrial countries; and accelerates the rise in these shares in developing countries?[9]

In the next chapter I will begin the discussion on the Jordanian experience with booms. I will first examine historical trends in sectoral shifts and, having established them, I will geometrically construct the counterfactual to the Dutch disease.

[8]To recapitulate, the share of manufacturing output in national income declines in industrial countries because of a shift in demand in favour of services as income rises; and because productivity growth is faster in manufacturing than in services, so that as output grows differential productivity between the two sectors leads to a decline in manufacturing prices, relative to those of services, and deflects employment away from the dynamic sector - manufacturing - to the less dynamic sector - services.

[9]In developing economies, as incomes rise there will be a noticeable shift in demand away from agriculture towards manufacturing, in terms of value shares in total income spent. Starting from a relatively large share of agricultural output in national income, the rise in per capita income is concomitant with a decline in the share of agriculture and a rise in that of manufacturing. This is true in both nominal and real terms, although as productivity in manufacturing exceeds that in other sectors, sectoral shifts will be much larger when expressed in real, rather than in nominal, terms.

CHAPTER IV

Economic Growth And Structural Change In Jordan: 1952-1992

Introduction

This chapter discusses trends in economic growth and sectoral changes in the Jordanian economy from its inception to date. Such an analysis is made necessary by two considerations.

First, as a developing economy Jordan was going through a process of industrialisation when the boom took place - sectoral contributions to growth were changing over time, with manufacturing share expanding and agricultural share declining. Under these circumstances, experiencing the Dutch disease (a squeeze on the tradeable sector) may merely mean that the manufacturing sector grew more slowly, and the agricultural sector declined more quickly, than would otherwise have been the case. Therefore, establishing the counterfactual to the Dutch disease is a first necessary step in assessing whether or not Jordan experienced a squeeze on the tradeable sector. This is done by first establishing the historical trends of growth and sectoral change, and then projecting these trends onto the boom period.

Second, the Dutch disease theory stresses the effect of relative price changes on altering supply conditions, which then determine the pattern of sectoral shifts. Demand conditions, beyond those required to equilibrate markets, are implicitly assumed to be stable, and thus have no significant effect on the observed shifts among products. For an economy with a high per capita income, most of the change in demand patterns has taken place in the past. In these economies, demand conditions are expected to be stable under booming conditions, and the change in production would be determined largely by supply factors. The same is not true for developing economies. Starting from a low per capita income, a sudden increase in available resources would have significant effects on demand patterns. A host of literature has addressed exactly this question:[1] how does the change in per capita income influence the observed final demand vector, *via* the change in demand patterns and the ensuing interaction between demand and supply factors. Thus a full understanding of the causes of

[1]For example Chenery (1960); Chenery, Shishido, and Wantanabe (1962); Kim (1977); and Pack (1971).

sectoral shifts necessitates the reconciliation of these two types of literature: the Dutch disease and the structural models,[2] which is the intent in this chapter.

Although structural models have traditionally explained changes in demand largely in terms of consumption elasticities (Engel law) and changes in technology, it will be shown here that government policy, especially its investment behaviour, has had a significant effect on influencing patterns of growth and sectoral change.

IV.1 Background[3]

No economic study of Jordan could be regarded complete without a consideration of exogenous shocks.[1] These shocks were mostly political (directly, the 1948 and 1967 wars with Israel, and the 1970 civil unrest; and, indirectly, the 1979 Iran/Iraq war and the 1990 Gulf war). But economic shocks also played a rôle (the two oil price shocks in the seventies, which themselves may have been politically induced). Both these sets of shocks are linked to Jordan's geopolitical position *vis-à-vis* Israel, on the one hand, and the rest of the Arab countries, on the other. The most salient effect of the shocks on the country has been to alter the size and condition of factor and commodity markets. Also important has been the impact on the construction sector, as with each new influx of refugees a construction boom has been spurred. The recurrent nature of external shocks helped to perpetuate two more features of the Jordanian economy.

First, foreign aid has always been forthcoming (from the UK. and the US. prior to the oil boom, and from Arab oil-exporting countries after the boom). Together with the rapidly growing population, high per capita foreign aid has meant that Jordan has lacked neither labour nor capital for development. *Second*, and intimately linked with the first factor, a large public administration has been created mainly to serve as a means of distributing foreign aid to the economy,

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[2]This is not to say that structuralist models such as Chenery's, to which the paragraph above refers, ignore supply conditions. Rather, it is not where the stress lies.

[3]For an elaborate political economy background to Jordan see Sayigh (1978: 187-228), and Mazur (1979: 1-15).

but also to provide social services (health, education, etc.) to the rapidly growing population, not least because of refugee influxes. In addition, political insecurity entailed the maintenance of a large army which further expanded the public administration.

The economic history of Jordan is best studied in three distinct periods:

1. **1921-1950**, from Jordan's inception until its annexation of the 'West Bank'. This period encompasses the loss of the greater part of Palestine in 1948, with which Jordan had maintained, up to that point, close economic ties.
2. **1950-1967**, when the Jordanian economy and the 'West Bank' behaved as one unit. Within this period two sub-periods can be discerned:

   1) 1950-1955, a period of adjustment to the severing of links with the Palestinian economy; the annexation of the 'West Bank'; and the influx of refugees into Jordan.

   2) 1955-1967, a period of steadier growth than previously achieved. Rapid rates of expansion were experienced in all sectors of the economy.
3. **1967-present**, when the Jordanian economy no longer includes the 'West Bank'. This period may be divided into three sub-periods:

   1) 1967-1972, a period of dislocation and adjustment to the war of 1967 and the loss of the 'West Bank'; the influx of refugees into Jordan; and the civil war of 1970/71.

   2) 1973-1982, a period of great prosperity, with indirect windfall gains from the two oil booms.

   3) 1983-present, up until 1992 the period was one of economic slowdown, culminating in a debt-induced economic crisis in 1988. The economic slowdown deepened further with the Gulf war in 1990/91, and major disruptions in the economy took place as a result of the influx of refugees into Jordan. From 1992 to-date, a rapid expansion in all economic activities is taking place. The main impetus seems to have come from increased human and capital resources, provided by the Palestinian "returnees" from Kuwait.

In what follows, a highly stylised analysis of economic growth and structural changes in the Jordanian economy is given, within the time frame set above (Tables IV.1-1 & IV.1-2). It must be stressed that the following analysis is

Table IV.1-1
Sectoral Shares in Aggregate Output, 1951-1992
(% at constant 1975 prices)

	GDP	Agriculture	Mining & Quarrying	Manufacturing	Electricity & Water	Construction	Transport & Communication	Trade & Business	Government Services	Other Services
1954	100.0	32.4	2.2	4.6	0.3	1.1	8.7	27.8	16.5	6.4
1961	100.0	23.7	2.5	6.7	0.5	2.6	11.2	30.2	15.6	7.1
1966	100.0	18.0	3.7	9.7	0.8	6.6	9.4	29.9	14.7	7.3
1972	100.0	13.9	5.5	9.7	0.9	4.2	9.0	28.9	24.0	3.9
1978	100.0	7.6	8.9	12.9	0.8	7.8	11.0	31.6	16.4	3.0
1982	100.0	7.0	6.8	15.2	1.6	9.8	10.6	29.1	17.5	2.4
1988	100.0	8.3	10.9	9.3	2.3	5.6	15.4	31.6	17.9	3.8
1992	100.0	9.3	5.8	11.7	2.5	3.9	15.3	28.2	24.1	3.7

Source: Calculated from Appendix AIV.1.

Table IV.1-2
Compounded Growth Rates of the Jordanian Economy by Sector, 1952-1992
(at constant 1975 prices)

	GDP	Agriculture	Mining & Quarrying	Manufacturing	Electricity & Water	Construction	Transport & Communication	Trade & Business	Government Services	Other Services
1955-1960	10.01	5.04	7.41	9.38	16.44	19.89	12.02	12.98	10.15	12.76
1961-1966	8.16	6.32	19.16	17.85	19.01	22.01	2.63	7.19	6.20	7.69
1967-1972	4.06	-0.28	9.60	2.18	13.39	-5.86	7.58	4.20	6.46	12.51
1973-1982	11.89	4.39	19.18	16.66	17.16	18.22	13.61	13.06	6.32	2.46
1983-1988	3.01	11.99	17.67	-4.00	17.36	-10.96	6.82	1.67	3.21	2.93
1989-1992	7.95	-1.94	-18.64	6.99	6.60	7.86	6.12	13.74	22.88	5.31

Source: Ibid.

mainly descriptive, with relatively little explanation of the underlying determinants of the observed changes. It is designed to illuminate the overall intersectoral background necessary for the intensive analysis of individual sectors in subsequent chapters (VI & VII).

1921-1950: At the inception of the modern Jordanian State in 1921, industrial output contributed an insignificant part of aggregate economic activity. The development of the materials-producing sector were constrained by limited raw materials, shortages of skilled labour, capital scarcity, and the high cost of infrastructure facilities. The few existing industries consisted largely of small-scale processing of agricultural products, especially flour milling. Most industries relied on work done at home or in small workshops, and even these activities were relatively rare. The economy thus thrived on basic farming. The country's close ties with Palestine stimulated its agricultural production,[4] and enhanced its employment opportunities, as some Transjordanians found seasonal employment in Palestine, especially on public construction projects.

Since both the physical and social infrastructure were lacking in this period, the service sector was far less developed than now. However, due to political instability,[5] there was disproportionately generous spending on the military, financed from abroad (Dar Al-Handasah, 1982g: 13-14; Mazur, 1979: 7-8 & 10; El-Akel, 1985: 18). No national accounts are available for this period, and estimates of growth cannot, therefore, be made.

1950-1967: The World Bank mission (IBRD, 1956: 10) that visited Jordan in 1955 estimated GDP growth in current prices to be 10% p.a. for the period 1952-54 (inflation was not expected to have exceeded 2% p.a.). This rate of growth is quite remarkable, given the problems Jordan faced with labour absorption, after the influx of 350,000 Palestinians into the country (which then included the 'West Bank'). According to Sayigh (1978: 191), about one third of

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[4]Jordan seems to have run a surplus on its balance of trade with Palestine, consisting mostly of agricultural products (Mazur, 1979: 7).

[5]Instability in this period was caused mainly by the constant Bedouin raids on settled areas. Later in the period, tensions came mainly from Arab-Israeli politics, with its consequent internal tensions in Jordan - between Jordanians and Palestinians (ibid: 8).

the total labour force was unemployed in the early fifties, and there was in addition a high level of disguised unemployment.[6]

To a large extent, problems of excess capacity were overcome in the following period (1955-60) by a construction boom spurred by the arrival of the Palestinian refugees. From that point, a construction-led expansion, following a large influx of population, seems to have become something of a trend in Jordan. Behind this phenomenon lie the relatively strong backward linkages construction has to many other manufacturing and service sectors. Construction booms, therefore, are usually concomitant with rapid expansion in many labour intensive manufacturing industries (wood, paints, metals, cement, etc.). Over the 1955-60 period, construction grew at 19.9% p.a., and was the leading sector as far as growth is concerned. Manufacturing grew at 9.4% p.a., with the impetus coming mainly from private sector ventures into cement, petroleum refining, cigarettes, vegetable oil and other small-scale industries (Five Year Plan 1976-80: 6). The state's economic activities were concentrated on the provision and development of infrastructure: road construction, building facilities at the Port of Aqaba,[7] and expanding facilities for basic services like education, health, etc. (ibid: 5), which explains the rapid growth in electricity, transport and communication and services. Agriculture's growth was slowest at 5% p.a. (Table IV.1-2)

Thus, whilst the direct annexation of the 'West Bank' did not change the structure of the Jordanian economy (as both Transjordan and the 'West Bank' were predominantly agricultural),[8] the addition to the quantity and quality of

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[6]In addition to the 350,000 refugees of the occupied part of Palestine, for whom there were no immediate jobs in Jordan, a good proportion of the 'West Bank' residents - at least 120,000 - lost their livelihood which was some way or another linked to the occupied part of Palestine (ibid: 9).

[7]After the occupation of most of Palestine, Jordan was forced to reorient its trade routes and communication lines, which used to move westward to the ports of Palestine, to north-south directions (ibid: 10).

[8]The proportion of commercial as opposed to subsistence farming was greater in the 'West Bank' than in Jordan. Also, the 'West Bank' was initially better equipped with manufacturing industry and trading establishments in general than Jordan. Yet, "the two economies were rather more complementary with that part of Palestine which was lost to Israel, than with each other" (ibid: 9. See also Sayigh, 1978: 187).

Jordan's labour resource,[9] as well as to its capital stock,[10] led to rapid sectoral shifts. Over 1954-61 the share of agriculture in aggregate output declined from 32.4% to 23.7%; that of industry (mining, manufacturing and construction) rose from 7.9% to 11.8%; and of services from 59.4% to 60.1% (Table VI.1-1).

These sectoral shifts are in keeping with the 'universal' trends of development, reflecting a GDP elasticity of less than one for agriculture, and more than one for industry (all expressed in *per capita* terms). This in turn reflects a change in demand patterns as income per capita rises (Engel law). Yet the share of manufacturing at this stage of Jordan's development was relatively small (6.7%). Mazur explains this apparent 'disequilibrium' in terms, firstly, of the political instability of the period, which must have discouraged investment in this sector; and, secondly, the inadequacy of the transport system in the aftermath of the severing of transport links with Palestine. "In trying to address the latter issue, the government tied up human and capital resources which could have been used in industrial promotion" (Mazur, 1979: 75-76 & 79).

This imbalance was somewhat redressed in the subsequent period 1961-1966, which was one of relative political stability. The emphasis of the government shifted from developing an infrastructure base towards a more comprehensive development approach, with emphasis on the expansion of the productive capacity of the economy. This took the form of completion of on-going projects, such as the East Ghor Main Canal (EGMC) which is of monumental importance to agriculture in Jordan, and the expansion of phosphate production and the exploitation for export purposes of other mineral resources, which was helped by the substantial expansion of infrastructure that had been provided in the previous period (Five Year Plan 1976-80: 9). The private sector continued its activity in developing industry, helped in this not only by the encouragement and sometimes active participation of the government, but also

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[9]With the annexation, "Jordan added significantly to its educated merchant, civil service, and professional groups ..... these provided a fairly high level of sophisticated leadership in government and private economic activity" (Mazur, 1979: 11. See also Sayigh, 1978: 187 & 190; and IBRD, 1956: 41).

[10]Sayigh (1978: 187) estimates that Palestinians brought with them 20 million Palestinian pounds (P£). The P£ was legal tender in Transjordan and was equal to one pound sterling. He contends that this amount was probably larger than the total money supply in Jordan at that time.

by the then political security (Ibid: 7). Consequently, the value added in mining and manufacturing increased at 17,8% p.a., which is more than double the rate at which aggregate output grew (8.2% p.a.), and was one of the fastest growing sectors in this period (Table IV.1-2). The sector's contribution to overall growth (the ratio of increase in its value added to increase in aggregate value added) was thus very significant at 19%, and its share in the total value added at the end of the period rose to 9.7%. In the meantime, the share of agriculture declined to 18%; of construction increased substantially to 6.6%; and of private and public services increased slightly to 61.3%.

1967-1972: To a large extent, the growth momentum gathered in the 1961-66 period was lost with the eruption of the 1967 war and the consequent loss of the 'West Bank'.[11] The economic loss to Jordan was estimated by Anani (1987: 127) at 40% of farming income; 80% of tourism income; and 20% of industrial income. Furthermore, an inflow of 300,000 people from the 'Occupied Territories' (the 'West Bank' and Gaza) into Jordan increased the latter's population by about a quarter in one year (Mazur, 1979: 81). Inevitably, the economy suffered from a sharp recession in activity immediately following the war, and the most severely affected were the commodity producing sectors.

Arab aid to Jordan became very significant in this period,[12] which resuscitated the economy, and by 1969 industry had largely recovered from the post-war slump. Unemployment was also reduced by absorption in the construction sector since, once again, a new housing boom was spurred by the influx of refugees. This period of recovery was short-lived as the internal political conflict of 1970/71 disrupted all economic activities again and produced a severe, but temporary, setback in the economy. In addition to the physical losses, industrial and agricultural activities were discontinued for about two months. Some sectors, such as manufacturing and agriculture, began to recover

[11]Immediately following the occupation of the 'West Bank', Israel imposed steep tariffs on 'West Bank' imports from Jordan, while completely abolishing barriers to trade in manufactures between her and the 'West Bank'. Thus Jordan lost all of the 'West Bank' as a commodity and factors market - notwithstanding the 300,000 refugees who fled the West Bank to the East Bank - (Mazur, 1979: 213).

[12]JD 40 million per year from Saudi Arabia, Kuwait, and Libya were pledged in the Khartoum Arab summit of September 1967. In addition a one-off JD 14 million was given as a relief fund.

in 1971, while other sectors, particularly construction, had a lagged recovery which only really began in 1972. By 1972, however, all sectors were expanding, and the government resumed its development efforts (Central Bank of Jordan, 1967 to 1973, *Annual Report*).

As is to be expected, the share of the productive sectors (agriculture, mining and manufacturing) declined, while that of services increased over this period. In 1972 the real value added for many manufacturing industries was lower than its level at 1966.[13] This is reflected in an all time low contribution made by the commodity producing sector to the economy, which dropped from 31.4% in 1966 to 29.1% in 1972. Another feature of this period, from the beginning of 1972, was double digit inflation as measured by the Amman consumer price index, with the most rapid rise occurring in the food sector. By comparison, throughout the 1950s and 1960s the rate of inflation had remained relatively low at about 2% (Central Bank of Jordan, 1989, *Yearly Statistical Series 1964-88*, Table 49).

1973-1982: The oil boom in the Gulf states began to spill over into Jordan, *via* Arab aid and workers remittances. By 1974/75 booming conditions were well established in the Jordanian economy, with unemployment virtually non-existent. Of equal importance to foreign exchange flows was the increase in demand for Jordanian exports originating from neighbouring oil producing countries, which significantly expanded Jordan's commodity markets and allowed its manufacturing to benefit from economies of scale. The period was thus one of rapid industrialisation. While aggregate output grew at 11.9% p.a., manufacturing growth was 16.7% p.a., which increased its share by more than 5% over one decade. Construction's growth was even more outstanding (18.2% p.a.) followed by electricity and water (17.2% p.a.). Taking all industrial sectors together, industrialisation reached its zenith at the end of this period, when the share of industry as a whole (mining, manufacturing, and construction) reached 31.8%. On the other hand, agriculture's relatively slow growth at 4.4% p.a., indicated the sector's continuing long term decline.

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[13]The decline was particularly noted in products that depended on the local market (cement, petroleum refining, liquid batteries and tanning), while those that could be marketed abroad suffered less (e.g., phosphate, tobacco) (Central Bank of Jordan, 1967, *Annual Report*).

The hallmark of this period is high inflation, experienced especially from 1973-79, which encompasses the two oil price hikes. The most rapid inflation rates were observed in non-traded sectors such as construction and services, while tradeable sectors had their prices moderated by the rapid increase in imports.

1983-1988: The economic slowdown in the Gulf[14] that started in 1981/82 had been fully transmitted to Jordan by 1983, *via* declining foreign aid receipts, reduced remittances, and shrinking markets for Jordanian commodities. The boom was now reversing itself. The sectors that showed least resilience to changing economic conditions were construction followed by manufacturing, both of which experienced a rapid decline in the immediate post-boom period; while agriculture, quite surprisingly, experienced rapid rates of growth, and managed to increase its share in output quite significantly. Unemployment, especially amongst the professional groups and highly skilled labour, became visible as the Gulf economies no longer absorbed their labour. All these deteriorating economic conditions were reflected in the all time low GDP growth (3% p.a.).

The mid-eighties were a period characterised by economic mismanagement in Jordan. The slowdown of the economy and the decline in external aid notwithstanding, Jordan increased its non-concessionary borrowing quite rapidly. In 1988 Jordan faced a serious debt problem when its debt servicing fell due, and its total debt stock reached $7.418 billion with a ratio to GNP of 119%.[15] Foreign reserves, on the other hand, had been drawn upon heavily in the preceding years, precisely because Arab aid had diminished. Almost inevitably, in late October 1988 Jordan adopted the IMF/World Bank Structural Adjustment Programme, the main features of which were contractionary fiscal policies and a major currency devaluation (by 50%); which led to high rates of inflation, unemployment, and civil unrest.

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[14]Brought about mainly by the decline in oil prices, together with the protracted Iran-Iraq war. With Arab Gulf states financially supporting Iraq, the war placed severe constraints on their resources.

[15]Other relevant ratios are: total debt service to export earnings, 29.8%; and external debt stock to export earnings, 194.9% (World Debt Tables, 1990-91).

1989-date: The programme was interrupted in 1990/91 by the Gulf war. Jordan was a major casualty in the conflict, as it became home to a massive number of refugees from Kuwait; although, at the same time, because of its neutral stance *vis-à-vis* Iraq, Jordan was penalised by both Arab and foreign states, who curtailed grant aid. Constraints were also put on the marketing of Jordanian commodities in the Gulf, and on employment opportunities for Jordanian labour in these markets, which reduced remittances significantly. Reverse migration, admittedly on a small scale, also began. Serious macroeconomic imbalances occurred, not least because of the government budget and balance of payments deficits. Nevertheless, in 1992 the gross domestic product increased by 10% in real terms, reflecting the economy's built-in resilience to exogenous shocks. It is still a matter of conjecture what were the sources of this growth, but it is plausible to think that 'returnees' from Kuwait had funds to invest not only in construction, but also in industrial production, which witnessed the fastest sectoral growth in that year.

IV.2 Factor Inputs, Output Growth, and Productivity

Table IV.2-1 recapitulates aggregate growth rates over selected periods (all data is in 1975 prices). The periods with the highest growth rates are notably 1960-66, representing an era of political stability; and 1973-82, the boom period. Post boom growth was much slower than that following the 1967 war, reflecting poor adjustment to the reversal of boom conditions.

For the economy as a whole, the rapid growth of the boom period 1973-82 was almost entirely due to the rapid growth in factor inputs, while technical change seems to have been insignificant in this period. In the following two sections, factor inputs will be examined in greater detail, as they underpin the assumptions on which the Dutch disease model is built. The analysis will proceed from the year 1968, since this is the first year for which data do not include the 'West Bank'.

Table IV.2-1
Compounded Growth Rates of Real GDP, 1954-92

1954-1960	10.01
1960-1966	8.16
1967-1972	4.06
1973-1982	11.89
1983-1988	3.01
1989-1992	7.95

Source: Central Bank of Jordan, (1989), *Yearly Statistical Series 1964-88*; & *Monthly Bulletin*, various issues.
Notes: For details of estimation see Appendix AIV.1.

IV.2.1 Labour

IV.2.1.1 Characteristics of the Labour Market

The main characteristics of the Jordanian labour market are: 1) high population growth rate, 2) high level of enrolment in educational institutions, and 3) low female participation rate.

The two comprehensive population censuses that took place in 1961 and 1979 indicate that the average annual population growth rate in the inter-census period was 4.8% p.a.. This rapid increase is attributed both to a high natural growth rate (3.8% p.a.), and to the influx of refugees in 1967, which added over one percentage point to the growth rate observed previously. From 1968 to 1990 population growth resumed its natural rate, but the influx from Kuwait in 1990 pushed the growth rate to 5.3% in 1991. These high growth rates resulted in 50% of the population in Jordan being below the working age of 15 years.

School and college enrolment has increased dramatically since the mid-seventies, not least because of work opportunities in the Gulf. In 1982, 40% of the total population and 56% of the 15-24 year-old group were enrolled in educational institutions. Primary school enrolment continues to grow at the same pace as population: 4% annually. At middle and secondary school the rates are higher, at 7% and 9%, respectively; and at post secondary levels, the rate of growth is even higher: in 1979/80 enrolment increased by 36%. This extended the time lag for joining the labour force, and raised the educational profile of the labour market entrants. It also meant that the Jordanian population is amongst the best educated in the Arab world with a literacy level of 65.4% in 1979 and 81%

in 1991, which was a major determinant in the numbers that migrated to the Gulf during the boom. An ECWA (the United Nations Economic Commission for Western Asia) comparison of nine Arab countries in the late seventies showed Jordan to have the highest literacy rate, while other countries had significantly lower figures (Yemen Arab Republic 14%, Saudi Arabia - a major importer of Jordanian labour - 32%, and Iraq 40%).

Female participation in the labour force amounted to 7.7% in 1979, 9.7% in 1983, and 10.6% in 1987. This rate is low by world standards, as well as when compared with other Arab countries who were at a similar stage of social and economic development in the late eighties, such as Syria (13.9%), Iraq (19.1%), and Tunisia (23.6%). It is generally believed, however, that female participation in agriculture is much higher than the national average, where women are mainly active as family workers. The majority of working women in Jordan are young, aged between 20 and 24, unmarried, and well qualified (in the early nineties, 59% of male employees had not attained more than a secondary qualification, while the figure for females was only 25%.)

A high population growth rate, combined with high school enrolment, and modest female participation resulted in a low activity rate, or, conversely, a high dependency level. It was mentioned earlier that 50% of the Jordanian population is below 15 years old, thus making half the population economically inactive. Amongst those aged above 15 years, the activity rate for the age group 15-19 does not exceed 30%, resulting from the relatively high levels of attendance at educational establishments. Together with a female participation rate of less than 11%, these factors put the overall activity rate[16]in Jordan on average at 20%, and the dependency ratio in the order of 1:5, one of the highest in the world. Comparisons made by ILO and ECWA in 1975 showed that among all Arab countries, only Saudi Arabia had a lower activity rate than Jordan (El-Akel, 1985: 60; World Bank, 1989, Annex E: 79-82; World Bank 1986b: 3; Takriti and Quwar, 1992: 77; Economic and Social Plan, 1993-1997: 25 & 52; Dar Al-Handasah, 1982i: 8-32).

[16]The proportion of the population who are either working or seeking employment.

In addition to these basic characteristics, new characteristics emerged during the boom period. These were high volatility; rapid turnover; and visible segmentation. Volatility resulted mainly from Jordan's policy of open borders, which led to large-scale labour movement in both directions. Out-migration to the Gulf accelerated dramatically after the first oil boom in 1973, and by 1980 had reached 43% of the total Jordanian labour force. In-migration rose from a negligible percentage of the labour force in 1975, to 10% in 1979, and 32% in 1984 (the subject is discussed in more detail in the next chapter). Regional conflicts have also contributed to the volatility of the labour market *via* population influxes into Jordan.[17]

The massive labour migration to the Gulf, consequent upon the oil boom, had by 1975 created serious labour shortages in the Jordanian economy, which led to rapid labour turnover (e.g., 107% p.a. in the hotel industry). Employees were constantly changing jobs either within Jordan or to travel abroad. "These high levels of turnover were an appropriate way of responding to the economic conditions of the time, and served to minimise the deleterious impact of labour emigration, by internal promotion and replacement of departed workers" (World Bank, 1989, Annex E: 82). Since 1983 labour turnover has plummeted as the labour market has begun to show some slack, especially for Jordanian workers. The Civil Service Commission rate of turnover fell from 4% in 1981 to 2% in 1986 (ibid).

Segmentation of the labour market in Jordan is a more recent phenomenon, which started with the influx of foreign labour, and became pronounced with the economic slowdown and the ensuing increase in unemployment. An important aspect of labour market segmentation is the existence of unemployment among Jordanians alongside the employment of non-national migrant workers. Other important aspects are differential remuneration, conditions of employment, occupations and skill levels applying to the two groups of workers. And finally, as a consequence of migration, there has been a

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[17]"The Iran-Iraq war disrupted economic life for the estimated two million erstwhile Egyptian farmers in Iraq, and brought a stream of migration into Jordan culminating in 1982 with 130,000 net Egyptian arrivals in Jordan" (World Bank, 1989, Annex E: 88). More recently, the Gulf war in 1990 brought an influx of approximately 400,000 Palestinian "returnees" from Kuwait into Jordan (Economic and Social Plan, 1993-97: 9).

growth in importance of rentier income, especially from land speculation, which diminished competition between non-nationals and nationals for available jobs (ibid). Some of these aspects will be discussed in more detail in the following chapter (section IV.3).

IV.2.1.2 The Labour Supply[18]

For the period preceding 1968 there are only guesstimates regarding growth in employment in Jordan. The World Bank mission visiting Jordan in 1955 estimated the total population at 1,475,000, of whom 370,000 were economically active. Unemployment was put at 16.5%. In addition, the mission estimated there were 10.8% only partially employed (IBRD, 1956: 10 & 441-44). The 1961 census reported an unemployment rate of 7%. Although both figures may have large error margins, the trend of declining unemployment is plausible, given that GDP growth for the period 1954-60 was rapid at about 8.7% p.a.. If we accept these figures, then employment as calculated by Mazur (1979: 30 & 35) would have grown at 5% p.a., led by a labour-intensive construction sector. The period 1961-66 witnessed a slower rate of labour absorption of 4% p.a., which was still high enough to reduce unemployment further to 4-5% in 1966 (ibid: 31). With the influx of refugees in 1967, both the growth of the population and unemployment rose. Unemployment was estimated in the late 1960s and on the eve of the first oil boom to range between 10-14%.

Table IV.2.1.2-1 depicts labour supply and unemployment during the boom and after. Both the oil boom in the Gulf and the oil-induced domestic boom moved the Jordanian economy into tight labour market conditions, with

[18]The main source of information on Jordanian employment is the Department of Statistics. According to this source, the labour force is defined as all those aged 15 years or more, who are economically active. Economic activity excludes students, home owners, the disabled, and pensioners who are not seeking employment. Employment is defined as the performance of some work for wage or salary, in cash or in kind, or own account work for profit or family gain, in cash or in kind. Unemployment refers to all those economically active, who are seeking employment; have worked before; but are not currently employed (Department of Statistics, Employment Survey 1982/83 and 1992; Royal Scientific Society, 1989: 8).

Table IV.2.1.2-1
Population, Labour Supply, and Unemployment in Jordan, 1968-1987

						Annual Percent Growth			
	1968	*1973*	*1976*	*1981*	*1987*	*1968-1972*	*1973-1975*	*1976-1981*	*1982-1987*
Population (000)	1409	1675	1889	2307	2897	3.5	4.1	4.1	3.9
Labour supply (000)	279.4	332.8	367.2	435.4	555.7	3.6	3.3	3.5	4.1
Actually employed	251.7	296	361.3	418.4	509.3	3.3	6.9	3.0	3.3
Participation rate 1/ (%)	19.8	19.9	19.4	18.9	19.2	0.0	-0.7	-0.6	0.3
Unemployment (%)	9.9	11.1	1.6	3.9	8.3	2.2	-47.4	19.4	13.5

Source: Calculated from Royal Scientific Society (1989), 'The Data Base for the Jordanian Labour Market', vol. III.
1/ Labour supply over total population.

Table IV.2.1.2-2
Growth and Structure of Employment in Jordan by Sector, 1968-87

	Annual Percent Growth					Percentage Share (%)				Total Number in '000s			
	1968-1973	*1973-1975*	*1975-1979*	*1979-1983*	*1983-1987*	*1968*	*1973*	*1979*	*1987*	*1968*	*1973*	*1979*	*1987*
Agriculture	-2.4	0.4	-2.6	-7.7	3.5	22.3	16.8	11.5	7.4	56.2	49.8	45.1	37.7
Mining & Manufacturing	2.6	5.5	2.4	7.3	4.7	9.7	9.3	8.6	10.5	24.3	27.6	33.7	53.5
Electricity & Water	5.2	8.0	3.4	14.3	20.0	0.6	0.6	0.6	1.7	1.4	1.8	2.4	8.5
Construction	3.8	12.1	8.8	0.9	0.3	9.5	9.7	13.0	10.5	23.9	28.8	50.8	53.4
Trade	5.0	7.9	4.7	3.3	2.2	8.9	9.7	10.2	9.8	22.4	28.6	40	49.7
Communication & Transport	9.5	5.3	2.4	8.2	5.3	5.8	7.8	7.2	9.2	14.6	23	28	47.1
Finance & Insurance Services	5.3	9.2	5.4	11.6	7.2	1.7	1.9	2.1	3.4	4.4	5.7	8.4	17.2
Social & Administrative Services	4.6	8.3	4.5	4.1	3.1	41.5	44.2	46.7	47.6	104.4	130.7	182.7	242.2
Total	3.3		3.7	3.3	3.4	100.0	100.0	100.0	100.0	251.6	296.0	391.1	509.3
Total non-Agricultural	4.7	8.1	4.7	4.5	3.4								

Source: Ibid.

unemployment falling as low as 1.6% in 1976. The rapid labour immigration of the late seventies relieved these tight conditions, raising unemployment to 3.9% in 1981. 1982 marks the beginning of Jordan's economic slowdown, which continued until 1991. Unemployment increased to 8% in 1986, and 18% in 1991, but decreased to 14% in 1992 (Lanzendorfer, 1985: 38; Aretsvic, 1976: 24; Royal Scientific Society, 1989: 41; World Bank, 1989: Table 5: 90; and Central Bank of Jordan, 1992, *Annual Report*).

Table IV.2.1.2-2 shows the size, growth, and sectoral distribution of employment in Jordan over the period 1968-1987. Employment increased at an annual rate of 6.9% p.a. during 1973-1975; compared with about 3.5% p.a. during all other periods. The rapid increase in employment in the early years of the boom, in addition to labour migration, were responsible for reducing unemployment from 14% in 1972 to 1.6% in 1976. During the boom sub-period 1973-79, construction was the lead sector in employment growth in terms of its overall impact, i.e. its share in overall employment as well as its growth rate. This is in large part attributable to the boom in housing as well as the Five Year National Plan's ambitious infrastructure development programme. Despite the rapid growth in employment in industry (including water and electricity), it still accounted for less than 10% of total employment by 1979. In contrast, over 45% of the employed labour force was absorbed by public administration and defence, in the same year. This reflects the disproportionately large share of services in total production in Jordan, which is discussed in section (IV.3) below. Employment in agriculture declined in the late seventies, as domestic and external demand for Jordanian labour increased rapidly and resulted in higher wages in non-agricultural sectors.

The years 1979-83 witnessed a change in the structure of employment growth. Characteristic of this sub-period was the high rate of employment in mining and manufacturing, particularly in labour-intensive industries such as clothing, food products, and wood and furniture. A number of large projects, like fertilisers, oil refinery and potash, also created considerable employment as they came on stream. The sub-period also reflected the turnaround in domestic and regional economic activity as the boom years of 1979-81 turned into a recession in 1982. This is evidenced by the near stagnation of employment in construction following a period of very rapid growth. On the other hand, the ambitious expansion of public capital expenditures resulted in continued rapid

increases in government employment, which raised its share by 1% between 1979 and 1987.

IV.2.2 Investment

IV.2.2.1 Investment Financing

The financial sector in Jordan consists of the following four main types of institution: i) commercial banks, ii) specialised credit institutions, iii) financial companies (merchant banks), and iv) non-bank financial institutions (the post office savings fund, the pension fund, and the social security corporation). The first three types of institutions are involved in loan financing, whereas the latter are involved mainly in providing equity shares. In addition, there are several insurance companies, money changers, and leasing companies that constitute potential participants in the financing of economic activities through equity shares. A small but quite active stock exchange has also existed in Jordan since 1978[19] (World Bank, 1988: 35).

Of these institutions, commercial banks are the largest source of loan finance in Jordan. The rôle of commercial banks was enhanced significantly with the advent of remittances. As Table IV.2.2.1-1 shows, the value of commercial banks' assets, deposits, and credit rose at least sixteen-fold over the boom decade 1972-82. Credit rose from JD 50.5 million in 1972 to JD 887.2 in 1982, and further to JD 2,218.3 million in 1992. The high inflation rate in the seventies reduced the real significance of all money values, as the JD was worth only 333 fils by 1982, compared with 1972 (1 JD = 1,000 fils). The second part of Table IV.2.2.1-1 shows the growth in commercial banking after deflation by the general cost-of-living index (adjusted to make 1972=100). The deflated figures give increases for the ten year boom period of about 550% for the three variables considered, namely assets, deposits, and credit.

[19]For a detailed description of financial arrangements and institutions in Jordan see Dar Al-Handasah, 1982f.

Table IV.2.2.1-1
Growth of Commercial Banking, end of year data (000 JD)

				Ratios	
	1972	*1982*	*1992*	*1978/1972*	*1992/1982*
Total Assets	95.5	1,553.5	6,615.7	16.3	4.3
Total Deposits	72.9	1,169.5	4,749.1	16.0	4.1
Total Credit	50.5	887.2	2,218.3	17.8	2.5
o/w Industrial	4.4	98.5	269.3	22.4	2.7
Growth at 1972 Prices					
				Ratios	
	1972	*1982*	*1992*	*1972/1982*	*1992/1982*
Total Assets	95.5	521.3	1,127.0	5.5	2.2
Total Deposits	72.9	392.4	809.0	5.4	2.1
Total Credit	50.5	297.7	378.2	5.6	1.3

Source: Central Bank of Jordan, 1989, *Yearly statistical Series 1964-89*; and *Monthly Statistical Bulletin*, various issues.

The fastest rate of increase of commercial credit during the boom period was in agriculture, whose share in total credit increased from 1.3% in 1972 to 2.8% in 1982. Credit to industry grew almost as quickly, its share of total credit increasing from 8.7% to 12.1% over the same years. For much of the boom period, growth in credit for industry (mining and manufacturing) exceeded growth in activity in that sector (as measured by the growth in total value added). This may be due to the Central Bank of Jordan's (CBJ henceforth) authoritative encouragement of commercial banks to increase their loan allocations to "productive" activities, such as agriculture and industry, and away from commercial activities. In 1973 banks were "asked" to switch lending from commercial sectors to productive sectors and National Plan projects. Later in the same year banks were "instructed" to differentiate interest charges to favour development projects over non-essential imports (Dar Al-Handasah, 1982f: 50). In late 1974, CBJ imposed a ceiling on the expansion of commercial bank lending, with exemptions for agriculture, industry and public projects (Mazur, 1979: 233). The CBJ's attempts to redistribute credit in favour of productive sectors and away from all other sectors through monetary policies is thus apparent.

The CBJ took other measures to increase credit availability to the industrial sector. These measures included rediscounting syndicated loans at low interest rates; statutory purchase of equity by banks; and limits on funds that could be held abroad (World Bank, 1989: 35).

IV.2.2.2 The Accumulation Process

Throughout the seventies and until 1981, interest rates were fixed by law which stipulated that commercial banks could charge 9% (plus a 2% fee) on investment loans, while interest on savings accounts was 6.5%. The Industrial Development Bank (a Specialised Credit Institution) charged 8-9% for lending to "developed areas", and 7% to "underdeveloped areas" and "export-oriented" projects. These rates persisted throughout the seventies against inflation rates averaging 10.5%, and sometimes reaching as high as 14%. Hence the real rate of return on savings was negative throughout the period, and the cost of borrowing was negative in most years, as indicated in Table IV.2.2.2-1 below.

Table IV.2.2.2-1
The Cost of Capital in Jordan, 1970-1992 (%)

	Nominal Lending Rate	*Inflation Rate (average)*	*Average Real Lending Rate*
1970-1982	9.00	10.50	(1.50)
1983-1986	8.00-8.75	2.30	6.00
1986-1987	7.25-8.00	0.20	7.50
1988	9.00	6.60	2.40
1989	10.00	25.80	(15.80)
1990-date	10.00-14.00	6.00	6.00

Source: Central Bank of Jordan, *Monthly Statistical Bulletin*, various issues

From 1981, the Central Bank of Jordan was given the power to adjust interest rates, and from the second quarter of 1983 the lending rate on loans by commercial banks was slightly lowered to 8-8.75% (plus a 1.7% fee), and further to 7.25-8% in 1986. Inflation having dropped to 2.3% p.a. in 1983-86 and further to 0.2% p.a. in 1986-87, positive real interest rates arose. Lending

rates increased to 9% in late 1988, and further to 10% in 1989. Since then they have been floating, and have ranged between 10-14% over 1990-92.

With abundant foreign exchange, and negative real interest on investment loans, gross fixed capital formation (GFCF) increased significantly during the two oil booms, as compared with other periods (Table IV.2.2.2-2). The 1973-82 average is higher than the average for non-oil producing countries (24.1%), as well as that of oil-producing countries (26.2%), for the same period. The subsequent period average, although much lower, was still higher than both groups (data comparisons from IMF, *IFS*, 1990). The reason behind the higher than usual GFCF ratio is Jordan's large receipts of foreign aid, unrequited transfers, and remittances, which, in relation to GDP, are themselves high (see following chapter).

Table IV.2.2.2-2
Ratio of Gross Fixed Capital Formation to GDP: 1952-90 (period average)

1952-62	*1963-66*	*1973-75*	*1976-82*	*1983-90*
14.7	17.2	31.2	42.7	20.3

Source: For 1952-1966 Bdour (1990): 73. For 1973-92 Central Bank of Jordan (1989), *Yearly statistical Series 1964-89*; *Monthly Statistical Bulletin*, various issues.

As far as the Dutch disease model is concerned, it is the distribution of investment that is of relevance rather than the absolute level. During a boom, relative profitability in the economy should favour non-traded sectors and work against traded sectors, which in the Jordanian model consist of agriculture and manufacturing. The differential distribution of pre- and post-boom investment should thus be a good indicator of the effect of relative price movements on profitability, and will be examined thoroughly in what follows.

The distribution of investment cannot be discussed in isolation from development planning in Jordan or from government intentions *vis-à-vis* the structure of the economy. Government actions, for example its own investment pattern, can significantly influence the pattern of demand growth in the economy. Also, and given the normal interplay between demand and supply

factors, supply responses can be expected to change, thus seriously influencing the observed patterns of sectoral shift.

Starting in 1973, the government of Jordan adopted serious development planning when it launched the 1973-75 national plan.[20] In this period, there was heavy concentration of planned government investment, as well as that of the private sector, in the non-commodity producing sectors (services, construction, and transport), which will be loosely referred to here as non-traded sectors.[21] This is reflected in Table IV.2.2.2-3: the share of agriculture and irrigation, mining and manufacturing, and energy and electricity sectors in ex ante investment for 1973-75 amounted to only one-third, while the remaining two-thirds went mainly to transportation and construction. The two sectors differed even more markedly in terms of ex post investment, with the traded sector accounting for only 30% of total investment.

Similar conclusions can be reached from Table IV.2.2.2-4 which gives gross fixed capital formation (GFCF) values and shares for different periods. Over 1973-75 the average GFCF in building and construction for the three years was 67%, that for transport equipment was 11% and for other machinery 21%. However, this is merely a continuation of an already established pattern. The share of building and construction in GFCF in the preceding periods ran as follows: 1954-61, 58%; 1962-66, 66%; 1967-72, 66%. The explanation of large expenditures on building and construction in the concerned period thus may not be found in the boom conditions, but rather in more enduring factors, some of which may include the high risk involved in other types of investment, given

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[20]Development planning in Jordan started as early as 1953, but was not taken seriously then. The fifties and sixties plans were mainly designed to attract aid. In the seventies and eighties, on the other hand, when aid to Jordan became substantial, the intent of planning was to regulate its use.

[21]This division between the traded and non-traded sectors is rather arbitrary, but is useful in a Dutch disease analysis. For example, "trade" is a largely non-tradeable item, as it incorporates activities such as those of financial institutions. Yet this activity is crucial to the promotion of exports, and any growth in exports would induce investment in financial services. Transportation can be considered both traded and non-traded, not only because it directly supports the traded sector, but also because transit fees are an important item in Jordan's foreign exchange receipts (mainly from Saudi Arabia for the transport of oil through the Tapline, and from Iraq for commodities shipped *via* Aqaba). Finally, Jordan has always exported military services - personnel training, etc. - to some of the Gulf states.

Table IV.2.2.2-3
The Distribution of Investment by Sector 1973-1975 (000 000 JD)

	Investment Ex Ante				Investment Ex Post	
	Public	Private	Total			
			Value	% age	Value	% age
Commodity Producing Sector	35.1	28. 5	63. 6	35.5%	68.0	29.7%
Agriculture	8.9	4.1	13.0	7.3		
Water & Irrigation	14.6	-	14.6	8.2	23.0	10.0
Mining & Manufacturing	5.8	20.3	26.1	14.6		
Energy & Electricity	5.7	4.1	9. 8	5.5	45.0	19.7
Non-Commodity producing Sectors	64.3	51.1	115.4	64.5	161.0	70.3
Transport	27.8	8.1	35.8	20.0	57.0	24. 9
Communication & Trade	6.7	0.8	7.5	4.2	7.0	3.1
Tourism	2.1	5.1	7.2	4.0	6.0	2.6
Social Services	24.1	5.8	29.8	3.9	41.0	17.9
Education	7. 7	3.2	10.9	6.1		
Health	0.9	0.6	1.5	0.8		
Social & labour	1.4	0.1	1.5	0.8		
Municipal & rural affairs	14.1		14.8	8.3		
Religious		1.2	1.2	0. 7		
Housing & government buildings	3.4	31.5	34. 9	19.5	50.0	21.8
Other Services	0.3		0.3	0.2		
Total Investment	99.4	79.6	179.0	100.0	229.0	100.0

Source: *Three-year Development Plan 1973-1975*: 36; *Five Year Development Plan 1976-1980*: 19.

Table IV.2.2.2-4
Gross Fixed Capital Formation by Type of Expenditure, 1954-1975 (% of total)

	1954-61	*1962-66*	*1967-72*	*1973-75*
Dwelling & building	33.0%	31.0%	27.0%	21.4%
Public construction	25.0%	35.0%	39.0%	43.2%
Other construction				2.4%
Total building & construction	58.0%	66.0%	66.0%	67.0%
Transport equipment	24.0%	18.0%	24.0%	11.6%
Other machinery	18.0%	16.0%	10.0%	21.4%
Grand total	100.0%	100.0%	100.0%	100%

Source: *Five Year Development Plan 1975-1980:* 18.

Jordan's political instability. Also, as Jordan is largely aid dependent, with aid normally attached to investment in sectors that are not directly productive, such as schooling, health, community services, roads, bridges, railways, etc., a high ratio of aid to GDP would mean a larger proportion of GFCF in construction and building than would normally be expected.

In the following period 1976-1980 (Table IV.2.2.2-5), there was a perceptible shift in the sectoral distribution of both ex ante and ex post investment, with more emphasis on the traded sector than in the previous period. Priority was given to mining and manufacturing, but agriculture and irrigation also received more attention than previously. The share of the traded sector in total ex ante investment was now 53.4%, instead of 35% for the previous period. Ex post investment in mining and manufacturing, although it did not meet its targeted level of 29.9% of total investment, was still impressively high at 25.9%.[22] The same is true of agriculture and irrigation, whose share in ex post investment stood at 10.3% of total investment (rather than the planned 17.9%).[23] Sixty percent of that investment came from the government, much of which was directed into irrigation. As a percentage of GDP this figure represents 2.3%,[24] which compares favourably with Nigeria (1%); closely with Mexico (2%); and unfavourably with Iran (3%) and Indonesia (5%) during the boom period (Majd, 1991: 401). Private sector investment in agriculture and irrigation in this period was concentrated in imported technology (green houses, drip irrigation, etc.), as foreign exchange became more available to the private ventures, *via* remittances.

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[22]Public investment in mining and manufacturing did, however, exceed its target by a large margin (with an actual over planned ratio of 206), but this was mainly because of cost overruns in major projects (World Bank, 1983a, Table 10: 20).

[23]The figures for planned investment in irrigation may be slightly misleading. The major irrigation project 'Al-Maqarin' dam was only included in national plans as a statement on Jordan's riparian rights with Syria and Israel, and was never actually implemented. The total current cost of this project was JD 25 million. To exclude it, therefore, means the share of irrigation in total investment has to be scaled down by 3.3%, making planned investment in agriculture and irrigation 14.6%, instead of 17.9%.

[24]This figure is slightly exaggerated as the "water and irrigation" item is inclusive of water supply projects not necessarily used in irrigation.

Table IV.2.2.2-5
Distribution Of Investment By Sector, 1976-1980 (000 000 JD)

	Investment Ex Ante		Investment Ex Post			
			Public	Private	Total	
	Value	% age			Value	% age
Total commodity producing sector	409.3	53.5 %	188.1	353.5	541.6	44.3%
Agriculture	40.0	5.2	4.7	47.0	51.7	4.2
Water & irrigation	97.4	12.7	73.8	-	73.8	6.0
Mining & manufacturing	229.1	29.9	15.3	301.5	316.8	25.9
Energy & electricity	42.8	5.6	94.3	5.0	99.3	8.1
Total Non-commodity producing sector	355.7	46.5	312.0	368.4	680.4	55.7
Transport	119.9	15.7	175.6	77.8	253. 0	20.7
Communication & trade	26.8	3.5	39.5	-	39.5	3.2
Tourism	24.4	3.2	4.9	28.6	33.5	2.7
Social Services	88.9	11.6	83.6	10.9	94.5	7.7
Education	34.6	4.5	40.0	4.9	44.9	3.67
Health	9.0	1.2	3.0	3.0	6.0	0.5
Social & labour	1.0	0.1	1.2	-	1.2	0.10
Municipal & rural affairs	5.5	0.7	39.4	-	39.4	3.2
Religious	38.8	5.1 %	-	3.0	3.0	0.3
Housing & government building	86.0	11.2 %	7.5	250.2	257.7	21.1
Other Services	9.7	1.3 %	0.9	0.9	1.8	0.2
Total Investment	765.0	100.0 %	500.1	721.9	1222.0	100.0

Source: *Five Year Development Plan 1975-80*: 3; and World Bank, 1983a: 105.

In the non-traded sector, investment in transport, including infrastructure and equipment was 20.7%, with the bulk of the public programme being in roads and airports (World Bank, 1983a: 21). This type of investment significantly enhanced production efficiency in Jordan, as the productive sector had until then been subject to transport and freight constraints. Housing and building achieved a high 21.1%, which was accounted for almost entirely by the private sector. Yet this share was still 0.7% less than that achieved in the previous plan period (although in absolute terms it was more than five times greater). It is worth noting at this point that investment in construction has spin-off effects on the productive

sector, because of its strong backward linkages to the labour-intensive building industries, such as paints, tiles and mosaics, insulation material, etc., which all thrived during the boom period. The real decline in the share of the non-traded sectors in total investment in this period was almost entirely at the expense of the social services, such as health, social welfare, labour and vocational training, as well as in the area of rural and municipal affairs. In these sectors investment was low, both ex ante and ex post, as it did not exceed 7.5%. Achievement in these projects was hindered by institutional bottlenecks, relating to the ability of the government to implement projects effectively (World Bank, 1983a 21).

In the third five-year plan period, 1981-84, the share of the commodity producing sector declined slightly from 44.3% in the previous plan to 40%. The difference is almost entirely accounted for by the increase in private sector investment in construction.

The exposition thus far has shown the great influence the government has had in channelling investment into the different sectors, most notably along traded-non-traded lines. In both planning periods, achievements were largely in line with the emphasis the government put on sectors: on infrastructure in the first period (1973-75) and on the productive sector in the second (1976-80). A similar shift in investment patterns occurred between the periods 1955-60 and 1961-66. In the former period the government aimed to reinforce infrastructure after the loss of Palestine, while in the second period it stimulated investment in production, mainly in the agricultural sector (e.g. the East Ghor Main Canal project, e.g.).

The government's ability to influence investment behaviour stems mainly from its status as a major investor. This status partially arises from the fact that all foreign aid is channelled through its agencies (this is similar to the case where oil rents accrue largely to governments, as in Saudi Arabia, Iran, Nigeria, Indonesia, etc.); and partially because government external borrowing is high in Jordan. Over the period 1973-75, the share of state investment in total investment was 55%. The upsurge of remittances after 1974 made large quantities of investible funds available to the private sector, increasing the latter's share in total ex post investment to 60% in subsequent plans periods, still leaving a high 40% share for public investment.

The increase in private sector participation in investment after 1975 was across the board, though was concentrated in industry. In the second plan period 1976-80, 41% of private sector investment went into mining and manufacturing, compared with 34% in construction, and 6.5% in agriculture (Table IV.2.2.2-5). It should be noted that while investment in agriculture was in proportion to the sector's share in aggregate output, investment in mining and manufacturing was disproportionately larger. Most of the private investment in the latter sector went into small and medium industries, while government investment was concentrated in large capital-intensive industries (potash, fertilisers, extension of the oil refinery and the cement plant). In agriculture, private sector investment was concentrated in on-farm irrigation and modern production techniques (greenhouses, mulch, and fertilisation). It appears that private investment in these sectors (agriculture and mining and manufacturing) was encouraged by earlier state investment in infrastructure, which reduced the cost of, and increased the return to, private investment in productive sectors. In agriculture, for example, private investment was stimulated by the high returns in irrigated farming of high value export crops after the government's heavy investment in irrigation facilities, partly in the previous plan period, but mostly in the sixties. Likewise, government investment in the port of Aqaba and in feeder roads in the late seventies significantly reduced the cost of transporting intermediate and final industrial goods, and increased productivity and thus profitability in this sector.

The foregoing shows that investment during the boom period was more balanced than would have been envisaged by the Dutch disease theory, since investment in the productive sectors, agriculture and manufacturing, was forthcoming especially after 1975. It follows that throughout the boom period the return to capital, assumed to be the specific factor in manufacturing and agriculture, was at least as high as that in non-traded sectors.

Data on return to capital are available for the early eighties from the records of the Amman Stock Exchange (1983: 410 & 728). Comparisons between 14 general service companies, 22 insurance companies, 19 banks, and 44 manufacturing companies in 1982/83 give the following returns on investment (net income after tax over total assets): services 6.1% , insurance 6.2%, banks 3.7%, and manufacturing 7.1% (Guide to shareholding companies in Jordan, vol. 3). This sample is biased as it includes only shareholding companies and no

privately held companies. But the results should be accepted as indicative of the fact that investment in manufacturing was still more profitable than in services, and not the other way around. Data for 1990 revealed even more disparity between the return on investment in the different sectors: services 2.6%, insurance 4.8%, banks and financial companies 0.88%, and manufacturing 8.6%; however, this is less surprising under non-boom conditions.

IV.2.3 Productivity Growth and Technical Change

As we have seen, Jordan's labour supply grew at about 3.5% p.a. over the period 1968-87, despite the continuous out-migration. This was due to a high population growth rate; and, to a much lesser extent, in-migration from the late seventies. Employment growth rates were about half a percentage point lower than those of labour supply, except during the boom years when the growth was 4% p.a. Capital accumulation was much faster than employment growth, especially during the boom period when the compounded rate of growth of total fixed capital was 17.2% p.a. (at 1975 prices).[25] As Pack (1971: 29) puts it, "Factor growth does not necessarily lead to increasing output per capita, nor to increasing output per unit of combined input. Growth in this latter sense may be taken as one measure of the level of development of an economy and its capacity for fruitfully utilising increasing inputs, especially foreign inflows".

Measures of productivity could be either partial or total. Whilst the former is not entirely satisfactory conceptually, because it does not take account of changes in other than the factor considered, the latter is not entirely satisfactory empirically, because of data and measurement problems. For Jordan, data are a major constraint. Therefore, both measures will be used to increase

[25]Capital stock data do not exist for Jordan. I made an estimate using a 1:1 ratio of capital stock to GDP in the base year 1967. This ratio was selected in the light of other countries' experiences as calculated by Maddison (1991: 67), and is similar to Japan's ratio in 1913 (Japan's per capita income in that year was $ 1,114, and Jordan's per capita income in the base year 1967 was $ 1,186 - both in 1985 prices). GFCF data from the national accounts (in current prices) was then used to estimate capital stock for the whole period under study. To deflate current prices, a composite price index for capital was constructed using unit value imports for equipment and machinery; and wholesale prices for construction material (from Central Bank of Jordan, *Monthly Bulletin,* various issues). The weights used are 75% for equipment and 25% for construction (based on industrial census data).

the confidence with which conclusions are made regarding productivity gains in the economy.

The most critical period for the analysis of productivity is the boom period, when resources were absorbed especially rapidly: labour resources in the period 1973-75, and capital resources in the period 1976-82. Thus neither partial nor total productivity values are predictable during this period. It is conceivable, for example - in fact, it is highly probable - that the rapid absorption of resources, especially capital, led to organisational and management problems. Also, in the Jordanian context, about 40% of total investment was undertaken by the government. Since this was a period of rapid out-migration to the Gulf, serious institutional bottlenecks, in dispensing the funds and acquiring the managerial and engineering skills required for project implementation, occurred. A typical problem that faced the Ministries of Planning and of Public Works during this period was major time delays and cost overruns in project implementation. Another factor that might have undermined productivity was the quality of labour absorbed in the economy, since the out-migrating labour was mostly highly skilled, while the in-migrating labour possessed much lower skills, and was mostly unmodernised (agricultural labour and petty trading - see following chapter section V.3.1 on labour migration). In the industrial sector, problems of choosing the right technology and its absorption arose because of the rapid deepening of capital during 1979-82, while industrial managers did not have the expertise to make the right choices (see Dar Al-Handasah, 1982a on industrial technology transfer). These shortcomings almost certainly pushed productivity down in Jordan. Under ideal situations (e.g. where institutional bottlenecks do not exit) by contrast, a high growth rate of primary inputs can lead to productivity gains, either directly if the new investment and labour is of better quality, or indirectly from the rapid increase in output (Verdroon's law).

In measuring partial productivities, for labour the real value added per worker is used. The results shown in Table IV.2.3-2 indicate that throughout the boom period growth in labour productivity was high, while in all other periods it was either negligible (in the immediate post boom period), or negative.

Table IV.2.3-1
Growth of Labour Productivity (Value added per worker at 1975 prices)

1969-72	1973-82	1983-91
-1.59	8.25	-3.39

Sources: For value added in current prices Central Bank of Jordan (1989), *Yearly statistical Series 1964-89*; and *Monthly Bulletin*, various issues. For deflation Appendix AIV.1. For labour Royal Scientific Society (1989).

Assessment of capital productivity is more problematic, not least because of the difficulty of defining and measuring capital. Furthermore, because of the intertemporal nature of investment, periodisation of the variables involved adds to the precariousness of the measure. The measure is least satisfactory in the Jordanian context, because a high proportion of government investment went into a few large capital intensive projects with long gestation periods (seaports, highways, fertiliser plants, etc.). The measure used is the incremental capital output ratio (ICOR), or the incremental growth in output attributed to a certain amount of investment.[26] The results (Table IV.2.3-1), which should be treated with caution, seem to indicate that capital absorption may not have been efficient during the boom, with an ICOR value of 3.1. It is especially the period of rapid capital intensification, 1979-82, that has a high ICOR. More generally, if the ICOR measure is to be given any credit, Jordan does not seem to be an efficient user of capital.

Table IV.2.3-2
Incremental Capital Output Ratio (ICOR)

1969-72	*1973-79*	*1979-82*	*1973-82*	*1983-91*
13.2	1.9	11.0	3.1	19.2

Source: Calculated from Central Bank of Jordan (1989), *Yearly statistical Series 1964-89*; and *Monthly Bulletin*, various issues. See footnote 26 for methodology.

[26] The concept of ICOR is based on the Harrod-Domar model of growth that accounts only for capital as an input. Therefore, $\Delta Y = v.\Delta K$; where Y is gross domestic product, K is the total stock of capital net of depreciation; and v is $\Delta Y/\Delta K$ or the efficiency of capital (the inverse of ICOR). Then $\Delta Y/Y = v.(\Delta K/Y)$. Or $ICOR = (\Delta K/Y)/(\Delta Y/Y)$. Thus ICOR is a quotient the numerator of which is the ratio of investment to GDP, and the denominator is the rate of change in GDP over the period considered. In the present calculation the denominator period was lagged by one year from the numerator's period.

For total factor productivity growth (TFPG) calculations, a geometric productivity measure is used, assuming in the background a homogenous production function, with constant returns to scale. Factor shares[27] are used as weights, on the assumption that factor elasticities are represented by factor shares.[28] The results are shown in Table IV.2.3-3.

The negative value for the period 1969-73 is understandable, in light of the political upheaval that led to production disruptions. TFP growth was also negative in the post boom period as inputs grew at moderate rates, while output failed to grow. During the boom, growth in output can be accounted for largely by factor inputs, while TFP growth at 0.8% p.a. accounted for only 4.4% of total growth. Thus productivity gains were insubstantial during the boom period despite Jordan's access to imported technology. This result is particularly surprising since there was idle capacity in the economy prior to the boom. An increase in capacity utilization in this period almost certainly took place, as evidenced from the rapid decline in unemployment, and the slow increase in capital build up in the immediate aftermath of the boom. The failure of productivity to grow under these circumstances seems to indicate that there were organisational difficulties in absorbing the rapid build up of inputs, and that problems of technology choice, transfer and absorption may have been experienced. Another explanation for the low value of the residual may be that over-investment might have taken place in the latter period of the boom, in anticipation, perhaps, of the continuation of the boom's buoyant demand. If this is true, then there would have been excess capacity in the economy towards the tail end of the boom. These TFP growth results are in line with the calculated

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[27] Labour share is taken as the wage share in total value added, and capital share is the residual of value added over wages (calculated from Department of Statistics, *National Accounts,* various issues).

[28]This is not an entirely fair assumption for labour, for although the labour market is characterised by minimal state interference and weak trade unions, unemployment in the pre-boom (1969-72) and post-boom (1983-91) periods was high in Jordan. For capital the assumption is even less fair, especially during the boom period (1973-82) the minimum rate of interest on loans was set by the state at a level that made the real cost of capital negative. The assumption is nevertheless maintained to facilitate the analysis.

ICOR, whose high value over 1973-82 is indicative of inefficient utilization of capital.

Table IV.2.3-3
Factor Input and Output Growth for Jordanian Economy, 1969-1991

	Output	Labour	Capital	Residual
1969-72	-1.8%	2.8%	7.7%	-7.0%
1973-82	11.4%	4.0%	17.2%	0.5%
1983-91	0.0%	2.6%	5.5%	-4.1%

Source: Output and capital are calculated from Central Bank of Jordan (1989), *Yearly Statistical Series 196 89*; and *Monthly Statistical Bulletin*, various issues. Factor shares from Department of Statistics, *National Accounts*. Labour from Royal Scientific Society (1989); and Central Bank of Jordan, *Monthly Statistical Bulletin*, various issues.
Note: Capital is estimated by assuming a 1:1 ratio of capital stock to GDP in 1967, the base year. GFCF is then added yearly to obtain the capital stock.

IV.3 Sectoral Shifts and The Dutch Disease

IV.3.1 The Sectoral Interplay

The intersectoral analysis will be started from 1954, the first year for which national accounts data exist. The initial relative importance of the various sectors conditioned the ensuing growth process. In particular, the service sector's exceptionally large share in aggregate output (about 60%) did not leave much room for the expansion of the industrial sector. In fact the share of services increased further to 70% on the eve of the first oil boom. In parallel, the sector's share of employment rose from 55% in 1955 to 63% in 1975. These shares are very high by international standards. Thus, despite the substantial amounts of capital devoted to manufacturing in the seventies, the manufacturing sector contribution remained modest, contributing only 15% to total domestic output. By comparison, Chenery's (1960, Figure 1: 636) analysis of the process of industrialisation predicts a manufacturing share of about 30% at the stage of $500 per capita income (in 1953 prices), which is approximately the level Jordan attained in the early eighties.

Many factors underlie the unusually high contribution of services. The most important factor is perhaps the extremely narrow resource base in Jordan (very scarce water and land for agriculture, and a very narrow range of

industrial raw materials for manufacturing. The scarcity of water also meant only limited hydroelectric potential and high cost of power for manufacturing). The supply response of the traded sectors were thus 'naturally' constrained.

There were also economic constraints further limiting the industrialisation potential in Jordan. The small size of the domestic market deprived Jordanian industries of economies of scale, and discouraged investment since low profitability was expected. Only when the government was forthcoming in granting monopoly rights, and/or when exports became a possibility did investment in manufacturing rise significantly. The limited potential for industrialisation kept Jordan's per capita income low and accumulation proceeded at a slow pace throughout the fifties, sixties and until the early seventies. Thus industrial activities could not have compensated for the declining share of agriculture, as normally happens in industrialising countries. Juxtaposed with Jordan's poor natural resources and dearth of capital was a large pool of skilled human resources, which further encouraged the bias towards services. These combined factors meant that the 'growth' elasticity of services was high, and of traded commodities low.

With services being highly non-tradeable, the bias in home production towards services invited a higher than usual level of import penetration, which in turn induced a higher supply of complementary and auxiliary services.[29] A high import penetration was also helped by the historically high level of foreign aid combined with the receipt of factor income from abroad, especially workers' remittances. Foreign aid to Jordan was historically of the 'untied' type, which meant it could be used directly for consumption. A large proportion of this aid went directly to government consumption, for 'budget support' purposes, and was recorded under "current aid", as opposed to the project tied aid, named "capital aid". Per capita income was thus much higher than the country's

[29]In this connection, there are other hypotheses put forward. One is that a high import surplus is normally matched with a high service sector to restore the balance between goods (traded sector) and services (non-traded sector) in the economy. A second hypothesis is that the increase in the total resources available in the economy from a high import surplus would increase services just as a higher income level would. A third hypothesis is that the increase in income, through demand elasticities and changes in supply responses, would change relative prices in the economy to the advantage of services: their share in the economy would thus rise. For a discussion of these hypotheses see Mazur (1979: 70-71), on Jordan, and Pack (1971: 162-3), on Israel.

resources allowed, which enabled a higher level of imported consumption and services.

Finally, a relatively sizeable public administration, and high expenditure on defence in Jordan directly influenced the size of the services sector. According to the Ministry of Planning, the government sector employed 45% of the total labour force in the early seventies, 73% of which were in services (Three Year National Plan 1973-1975: 11; Fariz, 1976: 35-36 & 38). The civilian public administration seems to have been concentrated in education and health. It was shown, under the supply of labour section, that educational attainment in Jordan is quite high. This is due in part to the population structure, with 50% under 15 years of age, and partly to the desire of the Jordanian population to attain high levels of education. The level of health services are less explicable, although a plausible cause may be the need to offer these services to the influxes of refugees. This was in a large part initiated by international organisations such as UNRWA, but was only sustainable when the local government took over. Another reason may be simply that high health standards[30] were set by the national authorities, and with Jordan's high population growth this inevitably meant a large civil service administering this activity.

IV.3.2 The Dutch Disease Counterfactual

In this section the counterfactual to the Dutch disease is established. The necessity and difficulty of this task have been noted in chapter two, and both are related to the continuous shifts in the structure of production: because of de-industrialization in developed economies, and industrialisation in developing economies. The task is particularly difficult for Jordan for three main reasons. *First*, Jordan 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. *Second*, the political upheaval in the region of the world

[30]Jordan's mortality and morbidity rates are the lowest in the Arab world (World Bank, *World Development*, various issues).

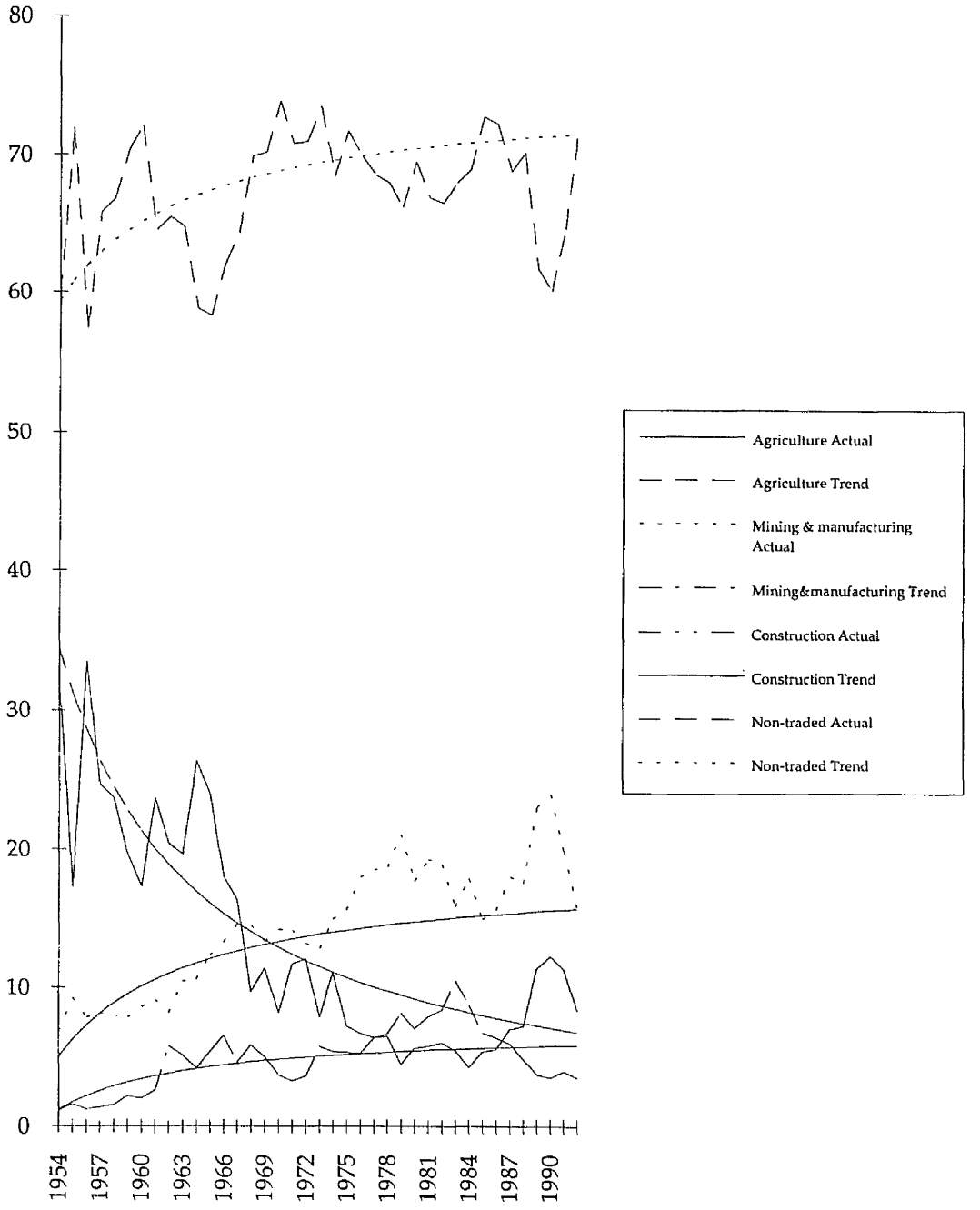
where Jordan is located has always manifested itself most strongly on the Jordanian society and economy, by repeatedly subjecting it to exogenous shocks and introducing serious breaks in its historical pattern of development. *Third,* and perhaps most important, data prior to 1967 relate to both the Jordanian economy as well as the 'West Bank'. Although the degree of homogeneity between the two economies is high, it is not entirely accurate to compare pre-1967 with post-1967.

These difficulties notwithstanding, the counterfactual will be established in two stages. First, the historical trends of sectoral growth and shares in total output for the period preceding the boom years, i.e. 1952-73 are established (an exponential growth rate is assumed). Second, these historical patterns are projected on the boom and post-boom period, thus establishing the counterfactual. The result is then compared with the actual pattern of sectoral development to say something about the economy's response to the boom conditions, insofar as relative price changes have 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.3.2-1 shows the results. For the traded goods sector, agriculture's share during the boom period was lower than 'expected' (the trend line), and mining and manufacturing share was significantly higher than 'expected'. Results for the non-traded goods sector are equally mixed, with construction performing better, and other non-traded goods worse, than expected. Not too much importance should be attached to the actual magnitude of deviation but rather to their order of magnitude, because of the qualifications made to establishing the counterfactual discussed above. All that needs be noted is that sectoral shifts are not entirely in accordance with the predictions of the Dutch disease. The theory predicts a decline in the output and employment of the traded sectors, which in the Jordanian is comprised of the mining and manufacturing and agriculture, and an increase in the share of the non-traded goods sector, which is largely made up of services.

After this general background, in the following chapters I shall bring the study of economic history of Jordan into more focus by considering the impact of

Figure IV.3.1-1
Sectoral Shares in Aggregate Output: Actual & Counterfactual, 1954-1992



the seventies oil-induced shocks on the economy's structure. To that end, I shall demonstrate in the next chapter that, as a starting point, the Dutch disease model is an appropriate theoretical construct for the analysis of economic performance in Jordan.

CHAPTER V

The Dutch Disease and De-industrialisation in Jordan: Some Indications

Introduction

I have argued that the Dutch disease model may not be entirely adequate for the study of booming industrialising economies like Jordan. On the one hand, the Dutch disease model offers valuable insights as to how the spending effect and the resource movement may change the structure of prices. On the other hand, how this change in relative prices and, more generally, the booming conditions may influence the structure of production cannot be assessed accurately by using the Dutch disease model. The reasons for this shortcoming are related to the static general equilibrium nature of the model, and will become clearer as this study proceeds. First of all however, a case does need to be established for the appropriateness of testing the Dutch disease model against the Jordanian experience in the first place, since Jordan does not produce the natural resource - oil - that was responsible for its booming conditions in the seventies. Instead, the boom was the result of sudden and large foreign exchange inflows, themselves induced by the two oil price socks in the Gulf.

I shall make my case, first, by demonstrating that these inflows constituted a favourable exogenous shock to the Jordanian economy (section V.1). Comparisons with other industrialising economies, who themselves are oil producers and who have been discussed in the Dutch disease literature, are made in the same section to strengthen further the case for the appropriateness of the model. Second, by showing that the boom's effects were fully transmitted to the economy *via* the spending effect (section V.2) and the resource movement (V.3); and that change in the structure of prices was as would have been predicted by the model (section V.4). In section V.5 I will examine whether or not the process of adjustment to the boom implied a deterioration in the performance of exports.

V.1 Oil Prices And The Boom In Jordan: A Case For The Dutch Disease

While Jordan is not an oil exporter,[1] it does have strong ties with the major Arab oil producers: Saudi Arabia, Kuwait, the United Arab Emirates, Iraq and Libya. These ties are political in origin, and have always brought into Jordan a stream of 'Arab aid', especially after the loss of the 'West Bank' in 1967. In addition, as a labour-surplus country Jordan has always exported manpower to these oil-rich but labour-short countries. With the advent of oil booms, the

[1]Jordan does extract some oil from El-Reesheh in the Eastern part of the country, but the volumes extracted do not permit a commercially viable export-oriented oil industry.

wealth of Arab oil exporters increased substantially, and so did their level of economic activity. Consequently, the previously established patterns in the Jordanian economy of aid inflow and labour outflow intensified.

The strong correlation between oil prices and received Arab aid is readily demonstrable: between 1973 and 1975, Arab aid to Jordan doubled; in 1978, Arab aid to Jordan was half that of the previous year, reflecting the oil recession; in 1979 with further oil price increases, the value of Arab aid trebled; since 1982 with the fall in oil prices Arab aid has fluctuated with a downward trend.[2]

Table V.1-1
Annual Growth Rates of Remittances and Transfer Payments[1/], 1967-1991

	1967-72	*1973-76*	*1977-79*	*1980-81*	*1982-91*
Remittances	3%	108%	6%	52%	-3%
Transfer payments	0%	28%	38%	8%	1%

Source: Central Bank of Jordan, *Monthly Bulletin*, various issues.
1/ Data on Arab aid are available up to 1982 only, transfer payments will be used instead to indicate the effect of oil prices on increasing the country's foreign exchange earnings. The share of Arab aid in transfer payments in the early seventies was 50%, and rose to 90% in the late seventies. Growth in transfer payments is therefore almost entirely due to Arab aid.

The increase in oil prices was also associated with a massive movement of Jordanian labour to the Gulf. The number of Jordanians working abroad in 1961 - mostly in Saudi Arabia and Kuwait - was 64,000 or 23% of the total Jordanian labour force. This number had risen by 1975 to 264,700, which comprised 43% of the Jordanian labour force. A dramatic increase in remittances ensued,[3] implying a strong, but lagged, correlation between oil prices and remittances.[4] Over the period 1964-1973 remittances ranged between JD 4.1 million and JD 7.4 million; in 1974 they doubled; in 1975 they increased by 121%, and again by 143% in 1976,

[2]The correlation coefficient between oil prices and Arab aid over the period 1968 to 1984 is 0.94.

[3]For a discussion of the impact of labour emigration and remittances on the Jordanian economy (the labour market, domestic consumption, imports and the monetary system) see Fariz (1976), chapter five: 176-217.

[4]This applies to the period that covers the two oil booms. Subsequently, as a large proportion of the Jordanian labour force was in permanent or semi-permanent employment, the correlation became much weaker. The correlation coefficient between oil prices and remittances, lagged by two years, was 0.97 for the period 1968 to 1982, and dropped to 0.47 for the period 1983 to 1992.

reaching JD 129.6 million. With the slowdown in oil prices in the late 1970s remittances growth decelerated, then leapt forward again in 1980 and 1981, following the second oil boom. The peak was reached in 1984 when remittances amounted to JD 475 million.[5] As a source of foreign exchange, remittances accounted for about one-third in the late seventies, up from only about 7% on the eve of the first oil boom.

Table V.1-2 shows the absolute and relative value of grants and remittances (as ratios to GDP, exports and imports). It can be seen that the ratio of grants and remittances to GDP has always been significant in the Jordanian economy, but increased noticeably in 1974 and again in 1979, when it peaked at 73%. Subsequently, the ratio declined continuously and in 1990 it constituted 33% of GDP, a rate that is comparable with the pre-boom period. As a ratio to exports and imports, grants and remittances averaged 317% and 71%, respectively, over the period 1970-1981. There is no apparent upward trend in these ratios during the boom years although grants and remittances' growth was substantial, indicating that both exports and imports experienced significant growth rates over this period.

Table V.1-3 depicts the effect of these foreign exchange inflows on the balance of payments. The current account balance is dominated by merchandise and transfer payment balances; the latter consisting of workers' remittances and unrequited transfers. The increase in workers' remittances and Arab aid after the first oil boom brought the current account into surplus over the period 1972-76. Jordan's stock of foreign assets was growing. Subsequently, both the upsurge in imports from 1977 and the decline in unrequited government transfers in 1978 (when oil prices declined) turned the current account surplus into a deficit. Over the period 1979-1980 the current account position improved as transfer payments increased with the second oil boom, but this only had a short-term effect; and from 1981 onwards - with the exception of 1989 - the current account was in deficit

[5]Statistics on remittances should be treated with caution. Officially published data on remittances include only the sums remitted through the banking system. Official sources on the other hand exclude foreign currency brought back into the country either by individuals or through money changers, and these remittances are thought to be substantial. They also exclude remittances in kind which Jordanian expatriates often bring home as personal import items, such as cars, which may be re-sold freely in Jordan. These items may add an estimated 60% to the value of officially declared remittances. On the other hand, not all of the remitted money remains in Jordan: an unknown proportion of remittances passing through the Jordanian banking system is destined for the Israeli-occupied 'West Bank' where the Jordanian Dinar is legal tender (Seccombe & Wilson, 1982: 28 & 31). From the above it is clear that any adjustment to the officially published data on remittances would be haphazard and will not, therefore, be attempted.

Table V.1-2
Trends in Growth of Grants and Remittances, 1970-1992

	Value (million JD)			Ratio of Grants & Remittances to (Percentage)		
	Grants	Remittances	Grants & Remittances	GDP	Exports	Imports
1970	40.7	5.5	46.2	26.5	379.5	70.5
1971	36.6	5.0	41.6	22.3	363.5	54.6
1972	68.3	7.4	75.7	36.5	445.0	79.8
1973	64.6	14.7	79.3	36.3	328.4	73.6
1974	86.7	24.1	110.9	44.8	222.9	71.2
1975	139.8	53.3	193.1	61.9	394.9	82.9
1976	126.6	129.6	256.2	60.8	372.8	75.6
1977	165.8	154.8	320.6	62.3	390.7	70.8
1978	106.5	180.4	286.9	45.4	315.6	62.5
1979	314.4	236.7	551.1	73.2	455.8	93.7
1980	398.8	236.7	635.4	64.6	370.6	88.9
1981	430.8	340.9	771.7	66.3	318.1	73.7
1982	373.3	381.9	755.2	57.2	285.5	66.2
1983	294.9	402.9	697.8	49.0	331.4	63.3
1984	278.8	475.0	753.8	50.3	259.3	70.5
1985	315.0	402.0	717.0	44.6	230.6	66.9
1986	238.0	414.5	652.5	37.0	254.9	77.0
1987	199.3	317.7	517.0	28.2	163.8	56.7
1988	232.2	335.7	567.9	29.9	174.9	55.5
1989	371.1	358.3	729.4	35.3	136.6	59.3
1990	409.4	331.8	741.2	32.6	121.1	42.9
1991	337.1	306.3	643.4	26.6	107.5	37.6
1992	279.0	573.1	852.1	30.6	134.4	38.5

Source Calculated from Central Bank of Jordan (1989),'Yearly Statistical Series 1964-88'; 'Monthly Bulletin', various issues.

Table V.1-3
Summary of Jordan's Balance of Payments (on cash basis), 1967-1992
(000 000 JD)

	Trade Balance (1)	Services Balance 1/ (2)	Net Workers Remittances (3a)	Net Unrequited Transfers (3b)	Total Transfer Payments (3)	Current Account Balance (4)	Capital Account Balance (5)	Overall Balance (6)
1967	(42.9)	8.6	6.6	53.9	60.5	26.2	2.0	28.1
1968	(43.0)	(5.4)	4.1	54.5	58.6	10.1	5.0	15.1
1969	(52.8)	(17.8)	6.9	47.4	54.3	(16.2)	5.3	(10.9)
1970	(53.4)	1.2	5.5	40.7	46.2	(5.9)	0.3	(5.7)
1971	(64.8)	1.9	5.0	36.6	41.6	(21.3)	6.7	(14.5)
1972	(77.9)	3.5	7.4	68.3	75.7	1.3	6.3	7.6
1973	(83.7)	8.1	14.8	64.6	79.4	3.8	6.5	10.3
1974	(105.9)	(2.0)	24.1	86.7	110.9	2.9	10.9	13.8
1975	(184.1)	12.5	53.3	139.8	193.1	21.5	44.1	65.6
1976	(270.0)	31.2	129.6	126.6	256.2	17.3	(14.7)	2.7
1977	(371.1)	63.0	139.8	165.8	305.6	(2.5)	50.2	47.7
1978	(368.0)	36.3	139.4	106.5	245.9	(85.8)	90.9	5.1
1979	(467.4)	(5.5)	156.4	314.4	470.9	(2.1)	58.3	56.2
1980	(543.3)	65.5	190.7	398.8	589.4	111.6	32.0	143.7
1981	(803.7)	70.4	288.9	430.8	719.7	(13.7)	69.0	55.4
1982	(876.6)	65.6	319.5	373.3	692.8	(118.3)	113.4	(4.9)
1983	(891.4)	125.0	330.1	294.9	625.0	(141.4)	156.8	15.4
1984	(778.5)	18.1	377.5	278.8	656.3	(104.1)	64.4	(39.8)
1985	(761.6)	36.7	310.0	315.0	625.0	(99.9)	137.6	37.7
1986	(591.8)	9.8	328.1	238.0	566.1	(16.0)	51.0	35.0
1987	(596.9)	23.9	255.3	199.3	454.6	(118.4)	75.9	(42.4)
1988	(638.5)	22.2	278.5	232.2	510.7	(105.5)	32.8	(72.7)
1989	(585.3)	122.1	306.3	371.7	678.0	214.8	113.3	328.1
1990	(1,008.6)	166.0	285.0	409.4	694.4	(148.2)	353.9	205.7
1991	(994.1)	123.3	264.7	337.1	601.8	(269.0)	733.2	464.2
1992	(1,461.7)	147.5	514.6	279.0	793.6	(520.6)	482.7	(37.9)

Source: Central Bank of Jordan, Monthly Bulletin, vairous issues
1/ Includes factor income (investment income and oil transfer dues).

again. In the boom period 1973-81, transfer payments covered 92% of the trade deficit; in the period 1983-92, 75%.

The expansion of foreign exchange reserves in the economy (from JD 80 billion in 1972 to JD 353.9 billion in 1981) was not accompanied by any significant increase in investment abroad. The economy was thus not sterilised of the foreign exchange effect, entailing full adjustment to the boom. In fact, the economy's monetisation increased even further during the boom, with the government significantly increasing its borrowing from abroad (see following section).

To reveal the potential impact of foreign exchange earnings on the Jordanian economy more clearly, comparisons with other developing economies cited as examples of Dutch disease cases will be made. The results are given in Table V.1-4.

Table V.1-4
Comparisons of Booming Sector Foreign Exchange Earnings, in 1979

	Ratio of Foreign Exchange Receipts[1/] to:	
	GDP	Total Exports [2/]
Jordan	73.0	80.0
Nigeria	24.8	95.1
Indonesia	21.8	65.4
Iran	27.8	89.4

Source: Central Bank of Jordan (1989), *Yearly Statistical Series, 1964-1988* for Jordan; World Bank, *World Tables* for Indonesia, Nigeria, and Iran.

1/ Grants and remittances for Jordan, and oil export revenues for the other economies.

2/ For comparative reasons, grants and remittances in Jordan have been treated as a source of export earnings, and have thus been added to real exports in the denominator.

The above exposition shows that Jordan was potentially under booming conditions in the seventies and very early eighties, as evidenced by the following two observations: i) a sudden and significant increase in its foreign exchange earnings as the price of oil rose in 1973/74 and again in 1979; and ii) a massive resource movement to the Gulf, which itself became an important source of foreign exchange flow into Jordan. It seems appropriate therefore to model the Jordanian economy with the aid of the Dutch disease theory since the necessary conditions are met, despite the fact that Jordan is not an oil exporter. One can imagine the oil producing sector (the source of the boom) to be loosely linked to the Jordanian economy; it transmits foreign exchange to the rest of the economy, and draws on its labour resource - the mobile factor in the Dutch disease model for Jordan. This

sector, however, is an enclave in all other respects; its output is not a function of any resource in the economy other than labour.

The ultimate criterion as to whether or not the Dutch disease model is applicable to Jordan is the impact effect foreign exchange flows have had on the structure of prices, which will be examined in section V.4. In the following sections (V.2 & V.3), the two mechanisms that transmitted the boom effects to the economy will be studied. These are, first, the spending effect and, second, the resource movement.

V.2 The Spending Effect

V.2.1 Public Spending

As Arab aid to Jordan was channelled through the government, the latter's spending was a crucial determinant of the process of adjustment to the new economic conditions. Jordan's experience in this respect is similar to that of other countries - e.g. Iran, Indonesia, Nigeria, and Saudi Arabia - to whose government large proportions of the windfall foreign exchange gains have accrued, either through direct ownership of oil and gas resources or from royalties, taxes, etc.

Faced with higher immediate and anticipated income after 1973, the government chose to increase both current and future consumption by accumulating. Generally, the choice between consumption and investment depends on the social rate of time preference; the relative rate of return on physical assets; and expectations regarding receipts of foreign exchange. In the Jordanian case, there is evidence that the government wished to spread income evenly between the present and the future, as evidenced from the high rate of investment during the boom (averaging 35% of GDP during 1973-83).

It is less clear, however, what rate of return on investment was used in government calculations. According to Anani (1987) return on public investment was barely 2% while the average cost of borrowing was more that 7%. If this is true, government investment must have had considerable externalities, otherwise public investment decisions would have been irrational. It would be quite formidable, and beyond the scope of this study, to internalise all externalities related to government investment and recalculate its rate of return. Suffice it to say that, on the one hand, there is ample evidence that some public projects had significant externalities, such as primary and secondary roads, the expansion of the port of Aqaba, the irrigation schemes in the Jordan Valley, etc., which benefited

the productive sectors directly by increasing their efficiency and lowering their production costs; and, on the other hand, government projects which were largely capital-intensive almost invariably overran their budget and time schedules, thus increasing investment costs and lowering the social rate of return. Moreover, rent-seeking and corruption are known to have been rife during the period of very high public spending (i.e. 1974/75-82/83), further reducing the economic efficiency of public investment.

Regarding expectations of foreign exchange earnings, it can be argued, based on its rate of public consumption, investment, and borrowing, that the Jordanian government expected the oil boom in the Gulf to be perpetual.

Pinto (1987) argues that government spending during a boom is biased towards construction services; capital-intensive investments in protected sectors, which are essentially non-tradeable; and wages and salaries. In what follows, these assertions will be tested against Jordanian data.

Table V.2-1
Trends in Government Expenditure (Ratio to GDP)

	Current	Capital	Total
Average 1967-68	35.4	16.4	51.8
Average 1969-73	34.4	14.2	48.6
Average 1974-79	40.1	23.0	63.1
Average 1980-92	33.2	13.2	46.4
Average 1967-92	35.2	15.9	50.5

Source: Calculated from Central Bank of Jordan, Monthly Bulletin, various issues.

Table V.2-1 above shows that government spending as a ratio to GDP has always been very high in Jordan, with an average of 50.5% for 1967-92. There are distinct periods, however, when this ratio has been higher than usual: 1967-68 (51.8%) and, more notably, 1974-79 (63.1%). Both these periods witnessed an upsurge in Arab aid, in the former period to help Jordan with its post-1967 war reconstruction, and in the latter simply because the Gulf states were flush with oil money. From 1975 to 1979 - the second national plan period - government spending grew annually at 25.9%, which outstripped growth in GDP of 23.8% (both in current prices). In real terms, this growth represents 15% p.a., which is

faster than the already very high rate for Iran during the first oil boom period (12.2% p.a.) (Jazayeri, 1988: 44)

As to the proportion of capital and current in total government spending, although current spending continued to be larger than capital spending, the latter's share was perceptibly higher during the boom compared with other periods: 1967-73, 30%; 1974-81, 39%; and 1982-92, 26%. This indicates that the rate of growth in government capital outlays was faster than the growth in its current outlays (27.1% and 22.7% p.a., respectively, over 1975-79) (see Table V.2-2). These trends were reversed in the post-boom period: capital expenditure experienced a sluggish growth of only 1% p.a. over 1980-90, with a decline in most years; while current expenditure, and because of its nature, continued to grow at 12.8% under conditions of economic slowdown.

Table V.2-2
Government Budget Expenditure: 1972-79 (in current prices)

	Annual Growth Rates		In percentage of GDP	
	1972-73	*1975-79*	*1973*	*1979*
Total Expenditure	25.0	25.9	54.7	76.1
Current Expenditure	21.3	22.7	36.0	47.1
Defence	7.0	24.1	19.2	17.5
Civil Service	n.a.	18.6	15.0	16.6
Wages	12.5	14.9	23.4	17.3
Transfers	n.a.	38.3	1.8	9.4
Capital Expenditure	32.9	27.1	18.7	29.1
GNP	15.9	24.8	109.6	125.9
GDP	10.3	23.8	100.0	100.0

Source: World Bank (1980), *Country Economic Memorandum on Jordan*: 12.

Table V.2-2 above gives some insights into the growth and distribution of government current spending. The most remarkable changes between 1973 and 1979 were: i) a decline in the share of military spending in GDP from 19.2% (53% of current spending) to 17.3% (35.7% of current spending); ii) an increase in the share of transfer payments from 1.8 to 9.4% of GDP; iii) a significant decline in the share of wages by 6% over 1973-79; and iv) a slight increase in the share of civil service (i.e. public administration, excluding the military) payments.

The decrease in military spending is explained by the political stability Jordan enjoyed in the oil era. The increase in transfer payments is mainly due to a rise in subsidies made to food and energy, from a negligible share prior to the boom to 5.1% of GDP in 1979. This is in line with the practice in most other booming LDCs. To combat inflation and make "essential commodities at reasonable prices, sufficient quantities, and acceptable quality" available to the low income groups, the Jordanian Ministry of Supply was created in 1974 (Central Bank of Jordan, 1975, *Annual Report*). The Ministry's approach to controlling inflation was to monopolise imports of major food items, especially wheat flour, sugar, rice, and meat, and resell them to the public at subsidised rates. Energy subsidies became significant only after the second oil price rise. Both food and energy subsidies peaked in absolute value in 1982 at JD 56.2 million, which amounted to 12.2% of current spending and 4.2% of GDP. Subsequently, energy subsidies were stopped in 1985; and food subsidies declined considerably, until the economic crisis of 1989 when they were increased substantially to reach 7% of current spending (2.7% of GDP) in 1991.

The decline in the share of wages is explained largely by the labour movement into the booming sector (the Gulf states), which drew labour from all sectors of the economy, including the public sector. Furthermore, since the government put no effort to bring its remuneration in line with the rest of the economy, the rapid increase in wages in the boom period was an inducement for workers to join private sector employment.

As regards capital expenditure, the general trend in sectoral distribution of investment was discussed at length in chapter IV. It was shown that during the plan period 1976-80 a perceptible shift in investment distribution in favour of the commodity producing sectors took place as relative to the previous period 1973-75, and that this trend continued during the third plan period 1981-85. Table V.2-3 recapitulates the argument, from the public investment point of view. The share of the commodity producing sectors, largely traded goods with the exception of energy and electricity, increased from 29.4% in 1973-75 to 35.3% in 1976-80, and declined to 30.6% in 1981-84. Investment in transport has been consistently high at about one third of total public investment in all plan periods. The same can also be said of communication, although spending on this item did increase in the third plan period, 1981-84. The most remarkable change in the non-traded sectors' outlays is perhaps the dramatic decline in the share of social services (education,

health, etc.) from 37.8% in the first plan period (1973-75) to 15.4% in the third plan period (1981-84).

Table V.2-3
Sectoral Distribution of Public Investment, 1973-75, 1976-80 & 1981-84
(Value in million JD, share percentage in total)

	1973-1975		*1976-1980*		*1981-84*	
	Value	Share	Value	Share	Value	Share
Commodity Producing Sector	30.0	29.4	188.1	35.3	320.1	30.6
Agriculture	5.0	5.6	4.7	0.9	33.2	3.2
Water & Irrigation	13.0	14.4	73.8	13.9	139.1	13.3
Mining & Manufacturing	15.3	2.9	40.9	3.9		
Energy & Electricity[1/]	12.0	13.4	94.3	17.7	106.9	10.2
Non-commodity producing sector	72.0	70.6	344.5	64.7	725.0	69.4
Transport	30.0	33.3	175.6	33.0	354.9	34.0
Communication & Trade	7.0	7.8	39.5	7.4	116.4	11.1
Tourism	1.0	1.1	4.9	0.9	8.2	0.8
Social Services	34.0	37.8	124.5	23.4	160.9	15.4
Housing	74.8	7.2				
Other		9.8	0.9			
Total Investment		102.0	100.0	532.6	100.0	1,045.1

Source: *Five Year Development Plan, 1976-80*: 19 & 38; World Bank (1983a), *Special Economic Report: Jordan Review of Five Year Plan, 1981-1985: 105; and (1980), Country Economic Memorandum: 38*
1/Including mining and manufacturing for 1981-84.

The expenditure behaviour of the Jordanian government thus contrasts with that of other booming economies' governments, where the increase in internal funds invariably lead to an expansion of spending on wages, social benefits, and social services. Chapter IV has shown that this obtained in the majority of booming economies reviewed, including Holland (Ellman, 1981); Trinidad and Tobago (Gelb, 1986); Iran (Jazayeri, 1988); and Nigeria (Struthers, 1990). The Jordanian experience, rather, was not only that the government desired to aid in particular the commodity producing sectors, but also the boom period was one of relative political stability, where none of the demographic shifts experienced in the pre-boom occurred, thus easing the pressure on health, education, and other social services. Furthermore, with the government unable to compete with wages paid in the private sector, and certainly not with those paid in the Gulf, public administration activities did not expand.

Generally speaking, public investment was concentrated in capital-intensive projects, especially in the period 1976 to 1980. In this latter period five mining and manufacturing projects accounted for 78% of total investment in the sector. These were: the chemical fertiliser industry (JD 61 million), expansion of petroleum refining (JD 39 million), potash extraction (JD 25 million), expansion of phosphate production (JD 24 million), the South cement factory (JD 21.3 million), and extension of Fuheis cement (JD 8 million) (Five Year Plan 1976-80: 189).

Implementation of these projects in turn necessitated large-scale capital-intensive investment in social overheads. For example, the transport of phosphate and potash to the port of Aqaba, which handles 90% of total exports of these commodities, made investment necessary in major roads (Ma'an-Wadi Yutum and Yutum-South Aqaba for phosphate, and Safi-Aqaba road for potash); extension of railways (between El-Hasa phosphate mines and the port of Aqaba); and the expansion of Aqaba port facilities (phosphate stores, cargo berths, floating cranes, etc.) (Five Year Plan 1976-80: 181-9; 236-49; & 250-9).

Such investment had significant positive externalities that mainly benefited small-scale producers in agriculture and manufacturing, especially those who exported. In the immediate aftermath of the boom, serious bottlenecks were created at Jordan's only sea port, Aqaba, as the port facilities were inadequate for the rapidly increasing tonnage handled. Heavy investment undertaken by the government in expanding the port facilities relieved this constraint significantly, and by the end of the seventies the port's capacity had increased five-fold (Dar Al-Handasah, 1982h: 28). Further expansion took place in the early eighties, with the financial, technical and institutional support of Iraq,[6] who was the major beneficiary of this expansion because of its transit traffic through Aqaba during the war with Iran.[7] Iraq also extended financial support to Jordan in the late seventies and early eighties, in the form of soft loans, for the construction of feeder roads.[8] The result was to increase Jordanian producers' competitiveness by reducing the

[6]In 1980, Iraq advanced a JD 7 million loan for the expansion of the Port facilities. JD 4 million was for the development of the free zone; JD 2 million for the development of the storage yard; and JD 1 million for the purchase of equipment for goods handling (Ministry of Industry and Trade, 1985: 156).

[7]Out of 3.8 million tons handling capacity of the Aqaba port, 1.5 million tons was dedicated to Iraq for its transit goods (Dar Al-Handasah, 1982h: 28).

[8]A JD 15 million loan, with 2.5% interest and a 12-years repayment period including two years' grace, was advanced to Jordan for the purpose of financing roads connecting Aqaba with other towns along the commercial route to Iraq (Ministry of Industry and Trade, 1985: 172, 192, 157, & 220).

cost of imported intermediate inputs, as well as the price of final output in their main export markets - i.e. the Gulf states.

On the other hand, the rapid implementation of government projects was faced with serious institutional constraints thereby reducing the economic efficiency of public investment. The most important of these constraints was, perhaps, the mobilisation of managerial, technical and professional skills, which were continually being drained out of the public sector into the private sector within Jordan, and out of the Jordanian economy altogether into the booming economies of the Gulf (Five Year Plan 1967-80: 48). Another factor that may have reduced the social benefits from government projects was the rent-seeking and corruption associated with rapid disbursement of large amounts of funds.

Table V.2-4
Finance of Government Budget, period totals (million JD)

	Domestic Revenues[1/]	Domestic Expenditure	Financing Requirements	External Financing Requirements			Internal Financing Requirements[2/]	Ratios	
				Grants	Loans	Total			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(4)/(3)	(5)/(3)
1967-73	240.5	621.8	381.3	279.9	43.7	323.7	57.8	73.4	11.5
1974-80	1,287.2	3,039.2	1,752.0	1,055.4	383.0	1,438.4	313.4	60.2	21.9
1981-91	7,012.0	10,894.6	3,882.6	2,173.0	1,395.2	3,568.3	314.2	56.0	35.9

Source: Central Bank of Jordan (1989), *Yearly Statistical Series: 1964-1988*; and *Monthly Bulletin*, various issues.
1/ Includes repayment of loans to the government.
2/ Includes accounting errors and omissions.

Together, capital and current government spending exceeded the current additions to income from Arab aid (Table V.2-4). The government's budget deficit thus expanded (Table V.2-5). This situation obtained because Jordan's credit-worthiness increased with the inflow of foreign exchange to both the government and the private sector, which allowed an increase in the rate of borrowing from international markets.

Table V.2-5
Trends in Government Budget Position [1/] (Ratio of Balance to GDP)
(Period average)

	1967-72	*1973-82*	*1983-88*	*1988-93*
Deficit before assistance	-30%	-34%	-22%	-8%
Deficit after assistance	-7%	-13%	-14%	1%

Source: Central Bank of Jordan, *Monthly Bulletin*, various issues.
1/ The above figures pertain to the central government, and do not include parastatal organisations. If those were included, Anani (1990: 32) estimates the increase in total expenditure at 50%.

A 13% ratio of budget deficit after financing to GDP represents a far less disciplined fiscal behaviour than has obtained in most other booming LDCs with which comparisons are made. Even in Nigeria, known for its profligate government spending during the boom, the government deficit did not exceed 11% of GDP. Comparisons with Indonesia are far less favourable as the budget deficit to GDP ratio was less than 5% (and indeed, for two years during the boom there was a budget surplus) (Pinto, 1987).

To sum up, comparisons with other developing countries whose experiences have been discussed in a Dutch disease context, namely Nigeria, Indonesia, and Iran, show that the sudden increase in foreign exchange earnings in Jordan had a potentially stronger impact on its economy than on the other economies. Also by comparison, the Jordanian government's response to the sudden change in economic conditions was far less disciplined than in the other economies considered, in terms both of the size of the budget deficit and increased borrowing from abroad, which meant that the economy had to undergo more adjustment than was necessitated by the boom conditions alone. The higher-than-usual government spending during the boom in Jordan was caused mainly by, on the capital expenditure side, the government's high degree of involvement in investment projects, and its own choice of large capital-intensive development projects; and, on the current expenditure side, the subsidies granted to major food items and oil products. No bias towards construction, other services, and protected traded sectors was found during the boom. On the contrary, compared with the pre-boom period, government spending was biased towards industry (mining, manufacturing, electricity, and energy). Pinto's finding on Nigeria and Jazayeri's on Iran, where spending was highly biased towards the non-traded sector, are thus not borne out by Jordanian data. Rather, Jordan's experience resembles very much that of

Indonesia, which saw in higher foreign exchange earnings an opportunity to increase the efficiency of the productive sectors, especially agriculture.

V.2.2 Private Spending

An increase in private spending during the boom was to be expected from a rise in remittances, which increased disposable income. A survey carried out by Seccombe and Wilson (1982: 45-47) to study remittances behaviour of households in seven villages in the highland areas of Irbid governorate in the early eighties led the authors to the conclusion that "the main impact of emigration is largely confined to improving the living standards, through consumer spending and new housing of emigrant households, rather than leading to any re-structuring of production potential. The experience of the villages appears to mirror that of the economy as a whole" (46). More specifically the survey gave the following results: 68% of the households recorded that the major use of remittances was for daily expenditure; 45% of the households were engaged in building a new house a further 13% were using remittances to purchase land for building, and 8.3% to add rooms or facilities to existing property. Overall, almost two-thirds of migrant workers were involved in investment in improved housing. Another survey for the capital, Amman, gave similar results. The researchers concluded that "the strong bias towards investment in housing, which is consistent across all educational and occupational groups, reflects a lack of alternatives: a point of view supported by the lack of variation in remittance expenditure pattern by migrants with different socio-economic and demographic characteristics" (ibid).

These results are similar to findings on remittances behaviour in other labour exporting countries, namely Pakistan, the Philippines, Sri Lanka and Thailand. In these countries, a large proportion of remittances went into increased consumption, mainly food items, clothing and consumer durables (60% in Pakistan, 85% in the Philippines, 55% in Sri Lanka and 42% in Thailand). Furthermore, the bulk of investment was in housing - either renovation, repairs or construction (50% in Pakistan, 50% in the Philippines, 40.6% in Sri Lanka, 45% in Bangladesh and 57% in Thailand) (Amjad, 1989: 15-16).

However, macro-level data on Jordan do not entirely bear out Wilson and Seccombe's argument. Private expenditure on construction during the boom years was indeed very high in Jordan, amounting to 20% of total private investment during the second National Plan period 1976-80 (Table IV.2.2.2-6 in the previous chapter). But even this high percentage was exceeded by private investment in

mining and manufacturing which amounted to 40.8% of total private investment over the same period. It is a gross inaccuracy, therefore, to say that remittances were not instrumental in restructuring production potential in Jordan. Furthermore, investment in construction is not entirely unproductive, since the sector has relatively strong backward linkages to building industries (paints, tiles and mosaics, insulation material, etc.) which thrived in the period 1976-80, the height of the boom in Jordan.

Another important area of private sector ventures during the boom was agriculture, which accounted for 6.4% of total private investment during the same period, namely 1976-80. Considering that agricultural output constituted only 9% of aggregate output at that time, this level of private sector involvement in agriculture, typically a government domain, is quite considerable. The private sector also contributed to investment in transport including infrastructure and equipment, which again, as a social overhead, is normally undertaken by the government.

In conclusion, private spending during the boom period was much more balanced than would have been envisaged by the Dutch disease theory, since investment in productive activities (largely tradeable) was forthcoming; this indicates that such activities were still relatively profitable under booming conditions, which is contrary to the theory's predictions. Chapters VI & VII will discuss the causes behind this investment behaviour. What is worth noting at this point is the leading rôle government investment has played in inducing private investment in productive sectors. At the beginning of the boom, 1973-75, public investment in irrigation accounted for 5.6% of total public capital spending (Table V.2-3). In the following period private investment in agriculture was considerable at 6.4% of total private capital spending. Similarly, heavy public investment in mining and manufacturing which invariably took the form of joint ventures with the private sector (e.g. petroleum refining, potash, fertilisers, cement, etc.) by necessity meant a high level of private investment in these sectors during the second plan period 1976-80, which covers most of the boom years.

V.3 The Resource Movement

In discussing the Jordanian labour market, a word of caution is in order regarding data availability and quality. Labour migration statistics are especially weak, since neither Jordan nor the receiving countries systematically collect data on the

volume, composition and characteristics of migrating labour. Moreover, the receiving states, with the exception of Kuwait, do not distinguish in published statistics between Jordanians and Palestinians, making it difficult to unambiguously identify Jordanian manpower abroad. Analysing the Jordanian labour market from a historical perspective is thus handicapped. For example, time series data, including those on which this section is based, involve a high level of extrapolation, interpolation and other statistical manipulations, and must therefore be considered as merely indicative.

On the other hand, certain characteristics of the labour market in Jordan are very strongly manifest, which adds an element of confidence to conclusions made in their regard, despite the weakness of the data. A good example to cite in this context is the massive labour out-migration, and the rapid rise in wages after the first oil boom. However, such aspects as labour market segmentation are, although apparent enough, more difficult to analyse in terms of magnitude, cause, and effect, in the absence of an adequate data base.

V.3.1 The Tradeability of Labour in Jordan

During 1973-83 two large international, and one domestic, labour migration movements took place in the Jordanian economy. The early 1970s saw the intensification of Jordanian labour emigration to neighbouring Arab oil producing countries. This resource movement was of such magnitude that, by the end of the seventies, over 40% of all actively employed Jordanians worked outside their home country. Inevitably, extreme labour shortages were created within Jordan. This large emigration was compensated to some extent, starting from the late 1970s, by a sizeable inflow of foreign workers into Jordan, particularly Egyptians. By 1985, about 12% of the total population and 28.5% of the domestic labour force comprised foreigners.

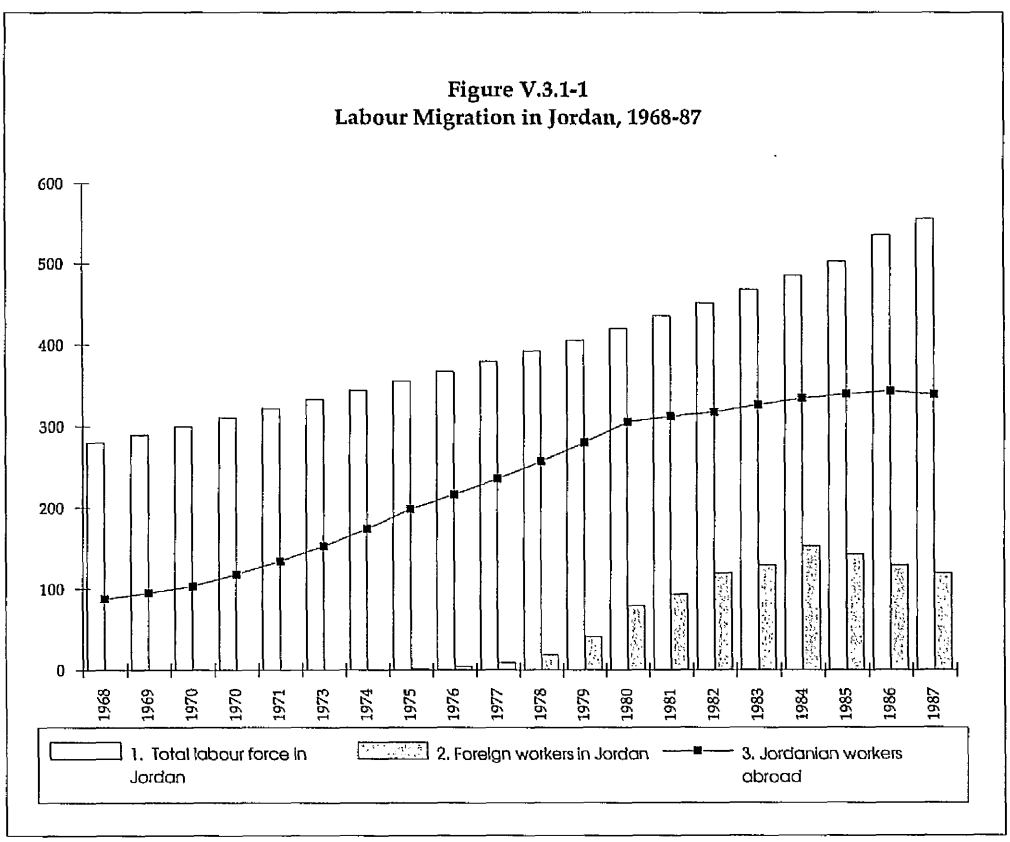
These international labour movements into and out of Jordan, depicted in Table V.3.1-1 and Figure V.3.1-1, made Jordanian labour highly tradeable. However, if it is argued that tradeable factors' prices must be entirely determined in international markets, labour cannot be considered as truly tradeable in Jordan. The imperfection of information regarding labour markets is partly responsible for this outcome, as are institutional, regulatory and social considerations. Nevertheless, it is equally inaccurate to treat labour as a non-tradeable factor of production, because its international mobility has the effect of reducing the

Table V.3.1-1
Trends in Labour Migration in Jordan, 1968-87

	1968	1973	1981	1984	1987	Annual Growth Rates 1968-73	1973-81	1981-87
1. Total labour force in Jordan (000)	279.4	332.8	435.4	484.7	555.7	3.56	3.42	4.15
2. Foreign workers in Jordan (000)	0.0	0.4	93.4	153.6	120.0	0.00	99.25	4.27
3. Jordanian workers abroad (000)	87.5	152.9	312.3	334.0	339.0	11.81	9.34	1.38
4. Total Jordanian labour supply 1/ (000)	366.9	485.3	654.3	665.1	774.7	5.75	3.80	2.86
5. Percentage of Jordanian workers abroad 2/	23.8%	31.5%	47.7%	50.2%	43.8%			
6. Percentage of foreign workers in Jordan	0.0%	0.1%	21.5%	31.7%	21.6%			

Source: Calculated form Royal Scientific Society (1989), 'The Data Base For The Jordanian Labour Market', vol III.
1/ (1) - (2) +(3)
2/ (3) / (4)

Figure V.3.1-1
Labour Migration in Jordan, 1968-87



insulation of domestically determined wages. Thus wages are brought more in line with internationally prevailing wages than would otherwise have been the case.

The boom period also witnessed a significant rural-urban migration. The large inflows of rural population into cities, especially the Greater Amman area, coincided with the rapid build up of government civil and military services in the capital area, and the boom in the construction sector. This rural movement deprived the agricultural sector of manpower, and was partly responsible for the foreign labour inflows into Jordan, the majority of which was absorbed by construction and agriculture (World Bank, 1989: 4).

V.3.1.1 Out Migration

Out-migration has always existed in the Jordanian economy, albeit at moderate rates in the 1950s and 1960s, as Jordan was one of the first countries to export labour to the Gulf. When the first oil boom took place, the major Arab oil exporting countries (Saudi Arabia, Kuwait, United Arab Emirates, Qatar, Bahrain and Libya) adopted ambitious economic plans which required manpower they did not possess.[9] They selectively imported manpower, which was already employed in the sending countries, and which possessed skill and experience. Jordan, among many other countries, supplied the Gulf states with professional, technical, skilled and experienced manpower. In 1977 the 'Technical Committee on Manpower Migration' of the National Planning Council in Jordan cited the following evidence of the continued emigration of educationally qualified Jordanian manpower:

(i) In 1976: 34% of doctors; 24% of pharmacists; 66% of engineers; and 48% of agricultural engineers registered in Jordan were employed outside the country.

(ii) In 1976: 750 teachers were suspended by the Ministry of Education after absenting themselves without leave, the majority appearing to have emigrated to oil producing neighbouring states.

(iii) Over the years 1975-77, the Jordanian army was obliged to recruit women for administrative tasks in response to manpower shortages (Dar Al-Handasah, 1982i: 45).

[9]In addition to their small indigenous populations, those countries suffer from low crude participation rate in economic activities and low literacy rates (El-Akel, 1985: 100).

Out-migration thus mainly deprived the Jordanian economy of highly skilled and well-trained labour[10] taken from different sectors and industries in the economy. In the second wave of out-migration, after the 1979 oil price rise, semi-skilled labourers were also seeking higher paid jobs in the Gulf[11] (El-Akel, 1985: 97 & 105; World Bank 1989, Annex E: 83).

The main reason for this resource movement is the wage differential between Jordan and the Gulf countries (see Labour Cost in section V.3.2 below). Another reason may have been the historically high rate of unemployment in Jordan.

V.3.1.2 In-migration

The Jordanian labour market was by the mid-to-late seventies characterised by imbalances and excessive demand for labour, as a result of massive out-migration. To close the gap between the supply of and demand for labour the Jordanian government facilitated in-migration of foreign labour. An attractive wage structure, and a strong currency induced increasing numbers of Arab non-oil country nationals, mostly Syrians and Egyptians, to seek employment in Jordan. In 1975 foreign labour inowfl increased by more than four-fold over 1974; and between 1975-79 the annual rate of growth of foreign labour averaged 200%; it diminished subsequently; and started declining from 1985. Thus the most intense period of labour immigration coincided with the height of the boom in Jordan.

The number of foreign workers and their share in the Jordanian labour force were shown in Table V.3.1-1 and Figure V.3.1-1 above. This share increased from 0.1% in 1973 to 31% in 1984, but declined to 23.6% in 1987. Over 1974-84 about 70% of the labour supply in Jordan was contributed by in-migration. Thus, out of the 3.5% p.a. growth in labour supply in that period, 2.4% was provided from abroad.

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[10]A study done by ESCWA (the United Nations Economic and Social Committee for Western Asia) has shown that western nationals are the most educated amongst all immigrant workers in the Gulf. These are followed by Palestinians and Jordanians who are mainly employed in professional, technical, administrative, managerial and related occupations requiring advanced skills and high educational standards (El-Akel, 1985: 103)

[11]The basic difference between the two types of migrant workers is that the professional workers had long-term contracts (and were accompanied by family), while the skilled and semi-skilled were on short term contracts (and were single men). Also, many of the former type migrated under the umbrella of bilateral agreements, and were seconded for a given period, normally five years. On their return, they assumed their public sector employment; whereas the latter group, the skilled workers, are not officially sponsored, except those under an agreement with Saudi Arabia.

Table V.3.1.2-1 gives the sectoral distribution of foreign labour in Jordan. The leading sector in employing foreign labour was construction up until 1982, which accounts for the rapid growth of employment in this sector over 1973-79 (see Table IV.2.1.2-2 in previous chapter). In 1983 agriculture took the lead, when it employed 43,478 out of the 130,000 foreign workers (34%) mostly of Egyptian origin, while construction employed 40,661 workers (30%). The high elasticity of foreign labour supply to agriculture has prevented any significant depressing effect on the volume of agricultural output that might have been generated by out-migration, as will be shown in chapter (VI). In 1983, on the other hand, mining and manufacturing employed only 7.3% of all foreign workers, nearly three-quarters of which were concentrated in 'Non-metallic Mineral Products' (World Bank, 1989).

Table V.3.1.2-1
Sectoral Distribution of Foreign Labour In Jordan, 1968-1987

	Number				Percentage in total			
	1973	*1979*	*1984*	*1987*	*1973*	*1979*	*1984*	*1987*
Agriculture	33	3,615	46,280	41,189	8.8	8.8	30.1	34.3
Mining & manufacturing	25	2,735	11,949	9,676	6.6	6.7	7.8	8.1
Electricity & water	2	168	1,475	1,200	0.5	0.4	1.0	1.0
Construction	158	17,336	48,449	37,200	42.0	42.2	31.5	31.0
Trade	36	3,965	13,331	10,057	9.6	9.7	8.7	8.4
Communication & transport	6	616	7,198	6,600	1.6	1.5	4.7	5.5
Finance & business	4	415	2,705	2,400	1.1	1.0	1.8	2.0
Social & administrative services	112	12,192	22,204	11,678	29.8	29.7	14.5	9.7
Total	376	41,042	153,591	120,000	100.0	100.0	100.0	100.0

Source: Royal Scientific Society (1989), *The Data Base of the Jordanian Labour Market*, vol. III.

In terms of the share of foreign labour in sectoral employment, the highest percentage also seems to be in agriculture.[12] According to El-Akel's survey (1985: 111) conducted in 1982/83, the percentages of foreign manpower in the different economic sectors in Jordan was as follows: agriculture 79.8%, construction 56%, hotels, small businesses and sub-contracting 43.4%, trade and storage 30.6%, and manufacturing 11.1%. The Department of Statistics Employment Survey (1985) for establishments employing five persons or more gave the following percentages of foreign manpower: mining 6%, manufacturing 20%, construction 31%, and overall 11%. However, as the survey excludes agriculture, the overall percentage must have a significant downward bias. A downward bias is also expected in all sectors since the survey does not include small establishments that employ less than five persons, where the proportion of foreign labour is expected to be high.[13]

The concentration of foreign labour in agriculture and construction, both of which are labour-intensive, is an indication of the low level of skills amongst foreign labour in Jordan. Tables V.3.1.2-2 & 3 compare the educational and skill levels of foreign labour in Jordan with those of out-migrating labour. More than 60% of foreign workers in Jordan have educational qualifications below secondary school, compared with only 23% for out-migrating labour. Only 6.3% of foreign workers in Jordan have university degrees, compared with 25% for out-migrating labour. As regards skill levels, the following comparisons are illuminating: the ratio of white collar workers (administrators & specialised workers) and technicians to total out-migrating labour increased from 15.7% in 1973 to 29.4% in 1986. The same ratio for foreign labour working in Jordan declined from 23.7% to 5.2%, for the same years; and rose for Jordanian labour employed in Jordan from 9.7% to 14.7% only, despite the rapid increase in education enrolment.

Thus it would appear that Jordan was not receiving foreign labour with skills that would fill the particular gap created by its out-migrating labour. In other words, in-migration could not have worked towards equilibrating the labour market imbalances in Jordan during the boom, since there was no match between 'required' and 'acquired' skills. On the contrary, it seems more plausible that in-migrating labour competed with skills that were already abundant in the economy,

[12]For anecdotal evidence, see Khouri (1983: 3).

[13]Records of the Amman Chamber of Industry (1991, Table 13: 41-2) show the percentage of foreign to total labour employed in firms registered with the Chamber and employing 50 persons or more to be only 2.7%. It appears, therefore, that at least in manufacturing foreign labour is concentrated in small industries, probably due to its lack of skills.

Table V.3.1.2-2

Distribution by Function of Jordanian Workers and of Foreign Workers in Jordan.

1. Distribution by function of Jordanian workers in Jordan

	1968		1973		1976		1981		1986	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
Specialized and technicians	15.1	6.0	24.9	8.4	38.0	10.5	55.8	13.3	66.9	13.6
Administrators	2.5	1.0	3.7	1.3	5.3	1.5	6.6	1.6	6.6	1.3
Secretarial	14.0	5.6	17.6	5.9	22.6	6.3	25.3	6.0	27.9	5.7
Retail	18.2	7.2	22.1	7.5	28.0	7.7	35.5	8.5	47.5	9.6
Services	15.7	6.2	18.3	6.2	22.5	6.2	26.6	6.4	31.0	6.3
Agriculture	55.3	22.0	46.8	15.8	47.6	13.2	39.1	9.3	31.2	6.3
Production and unspecified	130.8	52.0	162.6	54.9	197.3	54.6	229.4	54.8	281.4	57.1
Total	251.6	100.0	296.0	100.0	361.3	100.0	418.3	100.0	492.5	100.0

2. Distribution by function of Jordanian workers abroad

	1968		1973		1976		1981		1986	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
Specialized and technicians	10.5	12.0	21.0	13.7	34.3	15.8	70.2	22.5	88.5	25.8
Administrators	1.8	2.1	3.1	2.0	4.3	2.0	7.3	2.3	12.5	3.6
Clerical	4.5	5.1	8.5	5.6	12.5	5.8	18.4	5.9	20.0	5.8
Retail	6.1	7.0	9.4	6.1	9.8	4.5	8.6	2.8	16.0	4.7
Services	4.4	5.0	6.5	4.3	7.4	3.4	6.4	2.0	13.0	3.8
Agriculture	0.7	0.8	1.4	0.9	2.0	0.9	5.1	1.6	12.9	3.8
Production and unspecified	59.6	68.1	103.0	67.4	147.0	67.6	196.2	62.8	180.4	52.5
Total	87.57	100.0	152.9	100.0	217.3	100.0	312.2	100.0	343.3	100.0

3. Distribution by function of foreign workers in Jordan

	1973		1976		1981		1986	
	No.	%	No.	%	No.	%	No.	%
Specialized and technicians	79	21.0	793	16.6	5,557	5.9	5,850	4.5
Administrators	10	2.7	115	2.4	1,028	1.1	909	0.7
Secretarial	13	3.5	166	3.5	2,195	2.4	2,340	1.8
Retail	40	10.6	421	8.8	4,343	4.6	7,800	6.0
Services	58	15.4	702	14.7	11,909	12.8	22,230	17.1
Agriculture	52	13.8	627	13.1	19,997	21.4	43,472	33.4
Production and unspecified	124	33.0	1,967	41.1	48,373	51.8	47,399	36.5
Total	376	100.0	4,791	100.0	93,402	100.0	130,000	100

Source: Royal Scientific Society, 1989, 'The Data Base for the Jordanian Labour Market', vol. III.

Table V.3.1.2-3

Distribution by Education of Jordanian Workers and of Foreign Workers in Jordan.

1. Distribution by Education of Jordanian Workers in Jordan

	1968		1973		1976		1981		1986	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
Less than secondary	204.0	81.1	232.5	78.5	279.6	77.4	291.7	69.7	272.3	55.3
Secondary	23.3	9.3	29.9	10.1	37.5	10.4	62.2	14.9	131.2	26.6
Intermediate Diploma	8.8	3.5	14.3	4.8	20.5	5.7	32.1	7.7	41.7	8.5
Bachelor	14.2	5.6	17.3	5.8	21.0	5.8	28.6	6.8	43.1	8.8
Higher Education	1.3	0.5	2.0	0.7	2.7	0.7	3.8	0.9	4.2	0.9
Total	251.6	100.0	296	100.0	361.3	100.0	418.4	100.0	492.5	100.0

2. Distribution by education of Jordanian workers abroad

	1968		1973		1976		1981		1986	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
Less than secondary	29.9	34.2	49.5	32.4	64.0	29.6	82.0	26.3	89.5	26.1
Secondary	51.7	59.1	86.1	56.3	120.6	55.8	168.0	53.8	171.0	49.8
Intermediate Diploma	1.9	2.2	5.0	3.3	8.9	4.1	19.7	6.3	30.9	9.0
Bachelor	2.6	3.0	9.3	6.1	17.9	8.3	34.6	11.1	43.5	12.7
Higher Education	1.4	1.6	3.0	2.0	4.9	2.3	8.0	2.6	8.4	2.4
Total	87.5	100.0	152.9	100.0	216.3	100.0	312.3	100.0	343.3	100.0

3. Distribution by education of foreign workers in Jordan

	1973		1976		1981		1986	
	No.	%	No.	%	No.	%	No.	%
Less than secondary	229	60.9	3,080	64.3	64,354	62.1	79,716	61.3
Secondary	59	15.7	737	15.4	14,963	14.4	26,689	20.5
Intermediate Diploma	52	13.8	537	11.2	7,463	7.2	15,406	11.9
Bachelor	31	8.2	376	7.8	5,473	5.3	6,473	5.0
Higher Education	5	1.3	60	1.3	11,419	11.0	1,716	1.3
Total	376	100.0	4,790	100.0	103,672	100.0	130,000	100.0

Source: Royal Scientific Society, ibid.

for example services, thus increasing unemployment in those sectors employing such skills. This is evident from the continuous rise of overall unemployment from 1.6% in 1976 to 8% in 1984, the height of the labour in-migration.

It follows from the above that the high overall unemployment level in the mid-eighties may have hidden excess demand for labour in certain segments of the Jordanian labour market. The continuing in-migration of foreign labour, despite the existence of unemployment in the segments receiving foreign labour, can only be explained by the differential wage system between indigenous and foreign labour working in Jordan, as well as differential working conditions accepted by the two groups (see section V.3.2 below). This particular aspect of labour market segmentation was the direct outcome of the government 'open border' policy, coupled with weak labour legislation and almost non-existent trade unions. In the early years of the recession, 1982-85, there was no overt competition between Jordanians and non-Jordanians, especially since rentier income from the boom propped up the income of many Jordanians. As the recession deepened, however, and the unemployment of Jordanians grew, competition between nationals and non-nationals increased and created pressure on the government to take action. Such action, however, was not forthcoming,[14] and consequently labour market segmentation, in the form of a differential wage system and differing work conditions, had become quite visible by the mid- to late-eighties.

IV.3.2 Labour Cost

Average weekly pay in Jordan in 1979 was estimated to be only about 38% of that in Saudi Arabia (which is broadly equivalent to the pay in Kuwait). The difference was particularly pronounced for managers and administrators, where Jordanians at home were paid only 20% of their counterparts in Saudi Arabia. Professionals and technicians received about 37% of their counterparts' salaries in Saudi Arabia (World Bank, 1989: 15). This was the main reason for the intensification of out-migration after the first oil boom, and the ensuing rapid rise in wages in Jordan.

[14]Apart from limited intervention, such as requiring work permits where they were not required previously, or increasing the fees for acquiring permits. The most important measure that could have been taken, namely abandoning the policy of open borders, was not considered for political reasons.

Within Jordan wage differentials between nationals and foreign workers had always existed. A survey undertaken by the Royal Scientific Society (RSS) in the early eighties showed that about 60% of foreign workers enjoyed wages equal to or lower than Jordanians. The informally quoted wage rate for an Egyptian farm worker in November 1987 was JD 2 per day, with some rudimentary benefits as well. Evidence from the contracting industry suggests that Jordanians earn much more than these sums at even modest skill levels, and at a basic level JD 3 per day (World Bank, 1989, Annex E: 89).[15] Similarly, a survey by Seccombe (1981: 94) on foreign labour in the Jordan Valley, a predominantly agricultural area, showed that a Jordanian working in the Valley in the late seventies would earn something between JD 80-100 a month, while a non-Jordanian doing the same job would earn JD 50-55 a month. However, by comparison with wages in either Egypt or Syria, these rates are very attractive when converted into local currencies. Non-nationals in service occupations and petty trading are believed to earn very little per hour, but to work long anti-social hours: "this group certainly occupy a niche in the market which is particularly unattractive to Jordanians on account of the conditions of employment" (World Bank, 1989, Annex E: 89).

As regards wage movement during the boom period, the most comprehensive study was undertaken by El-Akel (1985). The study's analysis of wage differentials and wage movements is based on functional and educational, rather that sectoral, categorisation; and along public sector *vs.* private sector lines. This study shows that over the period 1975-1983 the average (weighted) median wage in constant 1975 prices rose at a minimum of 0.6% and a maximum of 14.3% for females; and at a minimum of 1.0% and a maximum of 10.1% p.a. for males.[16] As regards wage differentials among skill groups, the general trend was one of narrowing down between highly qualified and qualified professionals on the one hand, and technicians and skilled workers on the other.[17] The differential

[15]These rates apply for those in employment only, while unemployment in contracting is highly likely (ibid).

[16]El-Akel (1985) found other strong indications of labour market segmentation in Jordan. The improvement in real wages was not equal for employees with identical specialisations, qualifications, and skill levels; it differed within the same establishment, sector, and between sectors.

[17]For the medical and engineering professions this was explained by the high salaries they had received since the 1960s, when the brain drain for this group started. As labour shortages became significant in the mid 1970s, other groups and skills had their salaries adjusted, and the former group's position thus deteriorated in relative terms. However, in absolute terms both engineers and doctors were still the best paid in the country.

between the latter group and unskilled workers however widened as the immigration of unskilled workers eased the pressure on their wages.[18] This means that the technician and skilled workers group was to benefit most from wage rises in this period, in both private and public sectors. The wage differential between the private and public sectors declined in some sectors (notably banking and insurance), and increased in others, especially for technicians, skilled and unskilled workers. Unskilled workers' wages in the informal sector - mainly construction, subcontracting and small businesses - improved relative to both the public and private sectors (El-Akel, 1985: 250-285).[19]

Table V.3.2-1
Annual Growth Rates of Real Wages in Manufacturing Industries

	Jordan	Egypt
1973-79	2.3%	6.1%
1979-85	1.3%	4.1%

Source: Wages in current prices are calculated from ILO, *Yearbook of Labour Statistics*, various issues. Wholesale price deflators from IMF, *IFS*, various issues.

Note: These figures do not tally with the figures presented in Table V.1.2-2 because different deflators are used.

It is clear from Table V.3.2-1 that in-migration has tempered wage rises in Jordan but maintained them at a relatively high rate in Egypt, the main source of foreign labour in Jordan (about 70% of foreign labour in Jordan is from Egypt), during a regional recession period (early-to-mid eighties).

Table V.3.2.1-2 below shows how the wage rise during the boom influenced Jordan's wage competitiveness. The wage level in manufacturing industries in Jordan in the early eighties was equal to the level of the upper middle-income countries South Korea and Singapore; much higher than that of Egypt and India;

[18]This is true despite the fact that unskilled workers witnessed a rapid increase in their wage level during the period 1977-1983.

[19]Between 1975 and 1983, real wages of unskilled workers in the urban informal sector rose at 9.1% p.a. Real wages for the same group in the private and public sectors increased at 5.2% and 4.5% p.a. respectively (El-Akel, 1985, Tables 9.7 & 9.9: 270 & 282).

and much lower than Cyprus and Kuwait. Thus despite the potential negative effect of the resource movement - labour out-migration - on the wage level in Jordan, labour in-migration seems to have alleviated the problem to the point where Jordan's manufacturing wages were still relatively competitive.

Table V.3.2-2
Average Hourly Earnings[1/] in Manufacturing (US$)

Kuwait	3.35
Cyprus	2.25
Singapore	1.22
Jordan	1.20
S. Korea	1.17
Egypt	0.40
India	0.30

Source: ILO (1984), *Yearbook of Labour Statistics*, Table 17.
1/ Includes family allowance and wage in kind

However, an assessment of cost competitiveness requires the measurement of wage cost per unit of production; that is, in addition to the absolute level of wages, labour productivity has to be considered. *Ceteris paribus*, higher labour productivity represents lower wage cost per unit output. Data of this kind are not available for cross country comparisons, but measurements of unit cost of labour over time were made for Jordan.

The unit cost of labour, l, can be expressed as a ratio of the wage bill, w, and the quantity produced, q, as follows:

$$l = \frac{w}{q} \tag{1}$$

The wage bill is the product of the wage rate per hour, s, and the total number of hours worked, h, in the period under review ($w = s.h$); and the quantity produced, q, may be expressed as the product of man-hour productivity, a, and the total number of hours worked ($q = a.h$). This can be expressed as:

$$l = \frac{s.h}{a.h} = \frac{s}{a} \tag{2}$$

The rate of change in unit cost of labour may then be written as:

$$\Delta l = \Delta s - \Delta a \tag{3}$$

Table V.3.2-3
Annual Growth Rates of Real Wages, Labour Productivity, and Unit Wage Costs, 1968-87

	Real wage per worker			Labour productivity [1/]			Unit wage cost [2/]		
	1968-1973	*1973-1983*	*1983-1987*	*1968-1973*	*1973-1983*	*1983-1987*	*1968-1973*	*1973-1983*	*1983-1987*
Agriculture	-6.24	13.33	4.22	-0.88	9.94	8.03	-5.36	3.40	-3.82
Mining & manufacturing	0.04	8.03	-0.58	-4.04	8.41	3.60	4.08	-0.39	-4.18
Electricity & water	-4.93	11.98	-11.84	5.62	3.45	1.69	-10.55	8.53	-13.53
Construction	-1.47	4.65	2.49	-0.37	-0.95	-6.17	-1.10	5.60	8.65
Trade	-2.92	6.49	3.72	-2.34	6.65	1.83	-0.58	-0.16	1.88
Communication & transport	-5.70	5.61	-1.44	-7.22	8.88	4.82	1.53	-3.27	-6.27
Finance & business	-2.71	7.68	0.01	-5.02	-0.66	-2.69	2.32	8.34	2.70
Social & administrative services	-5.55	0.82	2.17	-1.94	5.62	3.28	-3.61	-4.80	-1.11
Total	-3.26	4.82	1.52	-2.37	6.88	1.57	-0.89	-2.06	-0.05

Source: For wages and labour, Royal Scientific Society (1989), *The Data Base of the Jordanian Labour Market*, vol. III. For value added, Central Bank of Jordan (1989), *Yearly Statistical Series 1964-1988*; and (1992) *Monthly Bulletin*, December. For deflators, Appendix AIV.1.

1/ Value added at constant 1975 prices per worker.

2/ Rate of change in real wage per worker minus rate of change in labour productivity - equation (3).

Table V.3.2-3 gives the results of these measurements. It can be seen that the rate at which labour productivity grew exceeded that at which wages rose for most sectors in the economy, especially during the boom period, with a resulting decline in unit labour cost for the economy as a whole. In agriculture, however, despite substantial gains in productivity the rapid rise in wages still yielded a positive rate of change of labour unit cost.[20] In mining and manufacturing both the real wage rise and labour productivity were substantial during the boom period 1973 to 1983 (over 8% p.a.) thus annulling each others' effect. The freeze on government salaries resulted in very slowly rising wages, and per unit wage costs that declined

[20]Data on labour in agriculture are highly unreliable in Jordan because of the high proportion of foreign labour in the sector and its seasonal nature. Any conclusions in this regard will be reserved for chapter VI where a more rigorous analysis of unit costs in this sector is given.

most rapidly over this period. The reverse is true of water and electricity where wages rose most rapidly during 1973 to 1983, while labour productivity growth was relatively modest.

It was shown in section V.3.1.2 that the proportion of foreign labour was lowest in mining followed by manufacturing, and highest in agriculture followed by construction. Thus, there does not appear to be any pattern relating growth in unit wage cost and the proportion of foreign labour in the sectors considered. The rapid rise of unit wage cost in construction may indicate the low level of skills the sector attracted during the boom, which is believed to have downgraded the technology employed in production by adopting capital-saving techniques.[21]

In view of the above observations, we may conclude that in-migration has not restored what is called in Corden's model the "true real wage", or W*,[22] to the pre-boom level.[23] We may not conclude, on the other hand, that Jordan's traded goods lost competitiveness, since there were significant gains in terms of labour productivity which reduced unit wage cost in most sectors during the boom.

Comparative levels of unit wage costs for Jordan and its major trade competitors cannot be made, due to problems of data availability. This has prevented a real testing of the squeeze on Jordanian exports. However, some insights were gained from interviews I conducted with industrialists during my firm-level survey that constitutes an integral part of this research. The majority of industrialists revealed that Jordanian exports were unable to compete with exports from Far Eastern developing countries, especially China and South Korea during the boom period. Turkey also posed difficulties for Jordanian exports in that period. On the other hand, competition with Middle Eastern countries like Syria

[21]With the influx of low cost foreign labour into Jordan, technologies employed in the service and construction industry adjusted to this change in factor prices: roads were cleaned by hand by cheap immigrant workers; building techniques relied on cheap foreign labour; small establishments relied on cheap labour enabling them to remain open for long hours, etc. (World Bank, 1989, Annex E: 92).

[22] This is nominal wage measured in terms of a consumption basket of T (traded) and N (non-traded) goods.

[23]The dampening effect of in-migration on wage rises stems not only from relieving excess demand conditions, but also from the existence of wage differentials between nationals and non-nationals in Jordan.

and Egypt was lean, as it is generally believed that labour productivity in these countries compares unfavourably with Jordan.[24]

V.4 Relative Prices and The Real Exchange Rate

The most commonly used measure of relative price change in Dutch disease literature is the real effective exchange rate (REER). The REER is a 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.4-1 shows both trade and import weighted REER for Jordan over the period 1970-1992. The year 1972 is taken as the base year, since the Jordanian Dinar was devalued by 7.89% to realign it with the US dollar, which was devalued by the same amount in that year.[25]

Most of the appreciation during the boom period took place between 1972 and 1978, as the import weighted REER had appreciated by 13%, and the trade weighted REER appreciated by 17%. Apart from minor fluctuations, the REER remained stable from 1978 to the end of the boom in 1983. It started depreciating slowly from the early eighties until 1988, when a major devaluation took place, and the JD in 1990 was worth 50% its 1986 value. By comparison, the import weighted REER of Nigeria's Naira appreciated by 48%, and that of Indonesia's Rupiah by 24% over the boom period 1973-82 (Pinto, 1987, Table 3: 427). Judging from these two countries' experiences, appreciation in Jordan appears to have been moderate. The main reason for this moderation is that many of Jordan's trading partners are oil-exporters: Saudi Arabia, Kuwait, and Iraq, who themselves suffered from high inflation in the wake of the first oil boom. In addition, the control of domestic prices of major food items which started in 1974 must have played an important rôle in moderating domestic inflation, which is precisely the purpose of such a practice.

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[24]A Royal Scientific Society study (1989, Table 6-1-4: 227) shows that labour productivity in Jordan is at least two and half times that of Egypt. Moreover, while labour productivity in Jordan declined by 3.9% p.a. over 1980-83, it declined by 20.3% p.a. in Egypt over the same period.

[25]Over 50% of Jordan's foreign reserves were in US dollar denomination in the early seventies. When the US. devalued its currency Jordan followed suit and the JD remained unchanged *vis-à-vis* the dollar (Central Bank of Jordan, 1974, *Annual Report*: 69).

Table V.4-1

Real Effective Exchange Rate (JD per 100 US$)

	Import weighted	REER Index 1972=100	Trade weighted	REER Index 1972=100
1970	29.93	79%	21.33	67%
1971	31.94	85	22.76	71
1972	37.71	100	32.07	100
1973	38.27	101	32.85	102
1974	36.82	98	31.24	97
1975	34.04	90	28.46	89
1976	32.31	86	26.80	84
1977	32.99	87	27.39	85
1978	32.54	86	26.72	83
1979	33.50	89	27.47	86
1980	34.92	93	28.92	90
1981	33.25	88	27.27	85
1982	32.66	87	26.76	83
1983	32.38	86	26.58	83
1984	34.13	91	28.80	90
1985	34.39	91	28.77	90
1986	34.14	91	28.38	89
1987	35.40	94	29.54	92
1988	53.72	142	48.11	150
1989	65.41	173	60.13	188
1990	68.92	183	62.77	196
1991	61.52	163	55.99	175
1992	58.33	155	51.63	161
Appreciation				
1972-1978		*13%*		*17%*
1979-1982		*0%*		*0%*
1983-1992		*-79%*		*-93%*

Source: Calculated from IMF, *IFS*, various issues. See Appendix AV.1 for details

The REER, developed in an international economics context, may not be a true measure of relative price changes in the economy for the same reasons that make the law of one price not operable at all times. Moreover, the index, even assuming the law of one price prevails, incorporates both traded and non-traded goods in the measure for domestic inflation which, as Warr (1992) has rightly argued, make the REER understate the degree of inflation in the domestic economy.

Other proxies 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 measure is more appropriate. In the Jordanian case, the high import penetration (79% of GDP in 1980) means that imports cover a wider range of goods than do exports, which are concentrated in a few goods (phosphate exports were 30% of total exports in 1980). The implication of this concentration is that export revenues will be subject to fluctuations which are extraneous to our Dutch disease model, making imports a better measure of traded goods' prices. For non-traded goods the easiest measure to use, in terms of availability, is the cost of living index (COL). This measure, however, is flawed as it incorporates traded as well as non-traded goods. The ability to construct a cost of living index for non-traded goods only depends on the availability of disaggregated data relating to domestic prices. If no such data are available, housing indices can be used so long as they do not include traded items like fuels, otherwise rents alone can replace them as a proxy for non-traded goods prices. The disadvantage of the latter measure lies in its narrowness, which renders it unrepresentative of movement in the price of all domestic non-traded goods. For Jordan the level of dissagregation of price data allowed me to construct a non-traded goods price index (COL_N) composed of four items: rents (56%), housing services (19.1%), medical care (6%), and education (18.9%). The weights used are in accordance with the disaggregated COL data available from the Central Bank of Jordan (Central Bank of Jordan, 1984a). I constructed a similar measure for rural areas (COL_R) to help in finding the effect of the boom on farmers' real income (calculated from Central Bank of Jordan, 1984a).

Table V.4-2 shows indices of some aggregate price series. The first five series shown are for traded goods' prices, and the remaining are for non-traded goods. In Table V.4-3 these data are converted to relative price form, by using the appropriate indices, and setting 1975 at 100 (see also Figure V.4-1). The indices for import and export prices have declined significantly relative to the consumer price index over 1975-82. The decline is more pronounced when the COL_N is used, rather than the general COL. Prices of agriculture and manufacturing, in terms of non-traded goods, have also declined, as did the ratio of agricultural prices to COL_R, entailing an erosion of farmers' real income. It is worth noting that the 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.4-2
Aggregate Price Indices for Jordan, 1976-82 (1975=100)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Import prices 1/	100	89	91	88	94	117	143	145	133	139	136	102	106	112	163	219	219	207
Export prices 1/	100	90	90	87	87	104	119	130	118	129	125	108	100	117	182	217	242	233
Agricultural (FPI) 3/	100	157	174	193	213	246	231	241	276	285	268	256	251	276	395	401	461	438
Manufacturing (WPI) 3/	100	106	115	121	136	163	188	203	209	210	220	222	228	237	276	314	352	352
COLg 4/	100	112	128	137	156	173	193	207	211	219	225	225	225	240	301	350	379	394
COLh 5/	100	106	120	133	170	176	182	193	210	230	240	237	239	245	261	280	294	309
COLn 6/	100	109	125	138	164	174	191	211	213	251	249	252	255	265	295	313	330	347
COLr 7/	100	110	125	134	156	173	188	201	212	220	227	227	225	240	298	346	374	389

Source: Calculated from Central Bank of Jordan, 1989, Yearly Statistical Series 1964-88; 1983, 'Price Index for Agricultural Production in Jordan'; 1984, 'Cost of Living Index for Jordan, 1968-83'; and Monthly Bulletin, various issues.

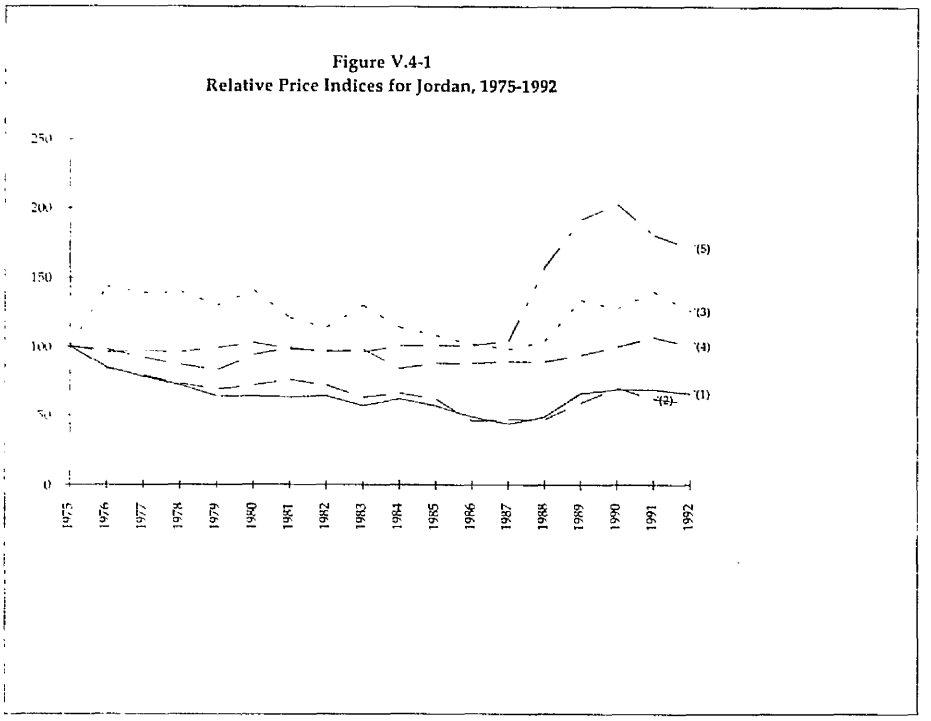
1 Index of unit price of import (export). The series is converted to 1975 base year, instead of 1985 in CBJ.
2 Farm gate price index for agriculture (for food production only, excluding animal production)
3 Wholesale price index for manufacturing
4 General cost of living index for the whole kingdom.
5 Housing item in the COL, excluding fuels and utilities which are imported
6 Cost of living index for non-traded goods. The index includes rents (50%); housing services; (19.1%); medical care (5%); & education (18.9).
7 Same structure as COLg with weights for rural areas.

Table V.4-3
Selected Aggregate Relative Price Indices in Jordan, 1976-82 (1975=100)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
(1) Export /Manufacturing WPI	100	85	78	72	64	64	63	64	57	62	57	49	44	49	66	69	69	66
(2) Import /Manufacturing WPI	100	84	79	73	69	72	76	72	63	66	62	46	47	47	59	70	62	59
(3) Agriculture FPI / COLr	100	144	139	140	130	141	121	114	130	114	108	102	98	104	134	128	140	126
(4) Manufacturing WPIm / COLn	100	98	92	87	83	94	99	96	98	84	88	88	89	89	94	100	107	101
(5) REER 1/	100	96	97	96	99	103	98	97	96	101	101	101	104	158	192	203	181	172
(6) Export / COLg	100	81	70	63	56	60	62	63	56	59	56	48	45	49	60	62	64	59
(7) Imports / COLh	100	84	75	66	56	66	78	75	63	61	56	43	44	46	62	78	75	67

Source: Calculated from V.4-2
1/ Real effective exchange rate

Figure V.4-1
Relative Price Indices for Jordan, 1975-1992



Legend: Line numbers in figure match those in Table V.4-3

V.5 The Effect of Foreign Exchange Inflows on The Tradeables Balance

Chapter IV gave ample evidence that on the eve of the first oil boom, the Jordanian economy had substantial under-utilised resources (Section IV.1-2, Table IV.1-2 & Table IV.2.1.2-1). The sudden receipt of large sums of foreign exchange revenues presented two opportunities to the Jordanian economy: an improvement in the balance of payments, which relieved the foreign exchange constraint, and an increase in real national income. These two factors together allowed the economy to operate at a higher level of activity. Given that, and given the government's choice of 'growth strategy' with a focus on increasing the share of productive sectors in aggregate output (agriculture and manufacturing, both of which are import intensive), a significant pressure was exerted on the commercial balance.

Table V.5-1 shows the manifold effect of the rise in overall economic activity during the boom period, 1974-82, on the balance of commodity trade. The deterioration in the food balance reflects the limited supply response of this sector due to its narrow resource base. The beverage and tobacco trade position, on the other hand, improved because of substantial growth in tobacco exports to the Gulf. A similar result obtained for basic material balance due to the fortuitous upsurge in the exports of Jordan's main export item, phosphate, in 1974.[26] The five-fold increase in the importance of the fuel balance to GDP was to be expected, given that Jordan is a non-oil producer. Finally, the manufactures trade position experienced the most remarkable change, and therefore merits further attention.

The increase in overall economic activity increased the demand for manufactures, some of which was satisfied by foreign suppliers; as a result, there was an increase in manufactured imports. Prior to the boom, import controls restrained the propensity to import manufactures, but after the boom, and given the increase in foreign exchange availability, the government embarked on a policy of trade liberalisation and the replacement of import quotas by tariffs in 1976 (see section VII.2). The boom thus increased the propensity to import manufactures.[27] The increase in propensity to import may also have arisen from bottlenecks in the economy due to the high level of economic activity following a period of unusually

[26]Responsible for this outcome was the four-fold increase in world phosphate prices, and the doubling of Jordan's output, in response to the price increase.

[27]Change in average propensity to import (total value of imports over GNP) over time was as follows: 36% (1964-73), 63% (1974-82) and 58% (1983-92) (Calculated from Central Bank of Jordan, *Monthly Bulletin,* various issues).

Table V.5-1
Trends in Jordan Commodity Trade, 1967-1992
(net exports as a % of GDP at current prices)

	Food 1/	Beverages & Tobacco	Basic Material	Fuel	Manufactures	Total
1967	-7.8	-0.3	1.0	-2.6	-31.1	-38.3
1968	-7.4	-0.5	1.6	-2.3	-26.3	-32.6
1969	-7.6	-0.4	0.7	-2.3	-26.9	-34.2
1970	-9.0	-0.1	0.1	-2.4	-27.2	-36.3
1971	-9.9	-0.5	0.0	-2.9	-30.2	-40.6
1972	-12.3	-0.4	0.5	-2.5	-32.8	-45.0
1973	-13.8	-0.1	0.7	-2.1	-36.5	-49.7
Average 1967-1973	***-9.7***	***-0.3***	***0.6***	***-2.4***	***-30.2***	***-39.5***
1974	-13.7	0.0	6.5	-2.1	-40.8	-48.0
1975	-12.9	-0.1	4.7	-8.1	-55.2	-63.6
1976	-17.2	-0.2	2.6	-9.6	-61.6	-76.4
1977	-12.6	-0.4	1.8	-9.8	-78.1	-89.3
1978	-12.9	-0.6	1.4	-8.5	-59.6	-71.6
1979	-13.0	-0.2	1.4	-11.1	-63.9	-75.6
1980	-10.7	0.0	3.7	-13.6	-59.7	-66.6
1981	-13.0	0.1	2.6	-17.5	-74.1	-84.3
1982	-13.1	0.1	2.3	-20.5	-70.9	-81.7
1983	-11.6	-0.4	1.7	-17.1	-65.5	-75.8
Average 1974-1983	***-13.2***	***-0.1***	***3.0***	***-11.2***	***-62.7***	***-73.0***
1984	-10.8	-0.3	4.3	-16.2	-54.7	-61.4
1985	-9.5	-0.2	4.7	-16.1	-53.8	-58.8
1986	-7.0	-0.3	3.9	-6.6	-31.7	-35.1
1987	-6.7	-0.3	3.4	-8.5	-32.7	-36.2
1988	-7.5	-0.3	5.7	-8.3	-34.5	-36.6
1989	-7.2	-0.3	8.9	-11.3	-34.7	-33.3
1990	-15.1	-0.2	8.4	-13.7	-41.5	-48.5
1991	-13.7	-0.1	7.0	-10.1	-41.4	-48.2
1992	-11.6	-0.2	6.2	-10.8	-51.2	-56.8
Average 1984-1992	***-9.9***	***-0.2***	***5.9***	***-11.3***	***-41.8***	***-46.1***

Source: Calculated form Central Bank of Jordan (1989), 'Yearly Statistical Series (1964-1988)'; 'Monthly Bulletin', various issues.
1/ Includes processed food.

Table V.5-2
Annual Growth Rates in Commodity Trade, 1967-73; 1974-82; & 1983-92

	1967-1973	*1974-1982*	*1983-1992*
Food			
Exports	-2.3	17.9	9.7
Imports	14.0	19.7	11.6
Beverage & Tobacco			
Exports	-0.1	29.2	7.3
Imports	-0.9	24.1	4.4
Basic			
Exports	-0.9	17.7	17.7
Imports	3.0	24.1	6.7
Fuel			
Exports	n.a.	n.a.	n.a.
Imports	7.0	49.8	5.0
Manufactures			
Exports	23.9	35.0	18.6
Imports	12.1	28.8	7.7
Total			
Exports	2.8	23.4	16.7
Imports	12.1	26.8	8.4

Source: Calculated from Central Bank of Jordan, ibid.

low investment, and too rapid an acceleration in the rate of growth of demand (see Singh, 1981: 146).

The deterioration in the commodity trade balance masks substantial expansion in commodity exports. Given the regional nature of the boom there was a rapid increase in demand in the Gulf states for imports from Jordan, which increased Jordan's propensity to export.[28] Table V.5-2 shows that the annual growth rate in manufactured exports during the boom period, 1974-82, was substantial and far exceeded that for imports. A deterioration in the manufacturing trade balance occurred, nevertheless, because the initial trade gap for this item was substantial (imports were a staggering 1,900% of exports in 1973).

Thus, while imports may have indicated that the boom squeezed domestic production of tradeables *via* relative price changes, the rapid expansion in exports negates this fact, as it indicates that Jordanian producers were able to maintain, if not increase, competitiveness in their traditional export markets. This observation has serious implications for any Dutch disease analysis. It reflects how a sudden change in foreign exchange revenues influences the structure of the economy depends on more than just relative price changes, with the additional factors falling under both macro- and micro-economic effects. At this point I shall only present the relevant hypotheses: they will be discussed in more detail, including empirical analysis, in the following two chapters.

At the macro-level, changes in foreign exchange availability relieved a foreign exchange constraint with two major outcomes. First, the availability of foreign exchange in turn made available imported raw, intermediate and capital inputs to production, which were likely to embody better technologies than those used under conditions of foreign exchange constraints. Second, the improved balance of payments position as mentioned above allowed an expansion of overall economic activity, thus increasing income and employment. If the economy had started from an idle capacity situation, expansion in economic activity allowed increasing capacity utilization and benefits from economies of scale where they existed, thus increasing productivity and eventually the competitiveness of exports.

At the micro-level, the increase in national income increased demand for all commodities. The pattern of demand growth depends on the level of development the country is at, and for early-stage development countries (such as Jordan in the

[28]Change in average propensity to export (total value of exports over GNP) over time was as follows: 5% (1964-73), 16% (1974-82) and 17% (1983-92) (ibid).

early seventies) the expansion in demand for manufactured output may be substantial. The change in the pattern of demand will therefore have a significant impact on the structure of production, and resources will move into those sectors where the increase in demand is most rapid. It is highly likely that the growth of output in any sector, say manufacturing, itself leads to increasing productivity and competitiveness (Verdoorn's law). Such gains would have been compounded if expansion in domestic demand occurred at the same time as increased demand for exports, which represents Jordan's case. Section IV.3.1 revealed, with the aid of trend analysis, that manufacturing's share in aggregate output was significantly above the historical trend line. The rapid growth in manufacturing output over the boom period may have been the *cause* of the rapid expansion in exports (through productivity gains) or the *outcome* of the rapid increase in exports. Whatever the direction of causation, the observed growth of output and exports of manufactures runs counter to Dutch disease predictions.

To conclude, the increase in oil prices in 1973/74 and 1979 created booming conditions in Jordan as the country's foreign exchange earnings expanded very rapidly with each shock. The boom effects were transmitted to the economy *via* both the spending effect and the resource movement, while immigration 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 (in favour of the latter and against the former), albeit more moderately than experienced by other developing economies under similar economic conditions. However, commodity producing sectors (agriculture and manufacturing) managed to increase their exports substantially during the boom period, in response to the rapid rise in demand originating in the Gulf states.

The following two chapters will examine how the adverse impact effect of relative price movement on the production of tradeables was overcome (agriculture VI & manufacturing VII).

CHAPTER VI

The Squeeze on Tradeables: The Performance of Agriculture

Introduction

The previous chapter has established that the two oil price shocks of the seventies created booming conditions in Jordan, *via* workers' remittances and Arab aid inflows; the 'spending effect' and a massive 'resource movement' were well observed; and the real exchange rate appreciated by 17% in less than a decade. Yet, in contrast to what the Dutch disease model would have predicted (a decline in traded goods output and exports) Jordan's agricultural output grew by 4.4% p.a. and agricultural exports by 22.5% p.a. in real terms over the boom period 1973-1982. This chapter discusses why this discrepancy between the theory and empirical observations occurred.

The question is of particular interest, given the many factors that constrain the sector's supply response. For, in addition to a narrow physical resource base, the historical developments of Jordan rendered an agrarian structure that, in general, is not conducive to the generation of large profits in the majority of its farms. Other institutional factors, such as credit availability, research and extension services, and organisational issues have exacerbated, rather than relieved, the constraints on agricultural production.

The main finding of this chapter is that, despite the existence of a scenario within the Dutch disease theory that could give a satisfactory explanation of Jordan's agricultural performance, namely the 'paradox model', there is strong evidence that the real reason lies elsewhere, namely in the technological advance achieved by the sector during the boom, which enhanced the supply response of the sector and provided the conditions necessary for production at higher profit rates.

The chapter is divided into five sections. The first section is a theoretical discussion of the suitability of the Dutch disease model for the study of agriculture in less developed economies. The second section outlines the agricultural sector's general performance indicators (change in trends of production and trade). The third section is a quantitative analysis of the sector's factor input and output growth. Changes in relative prices, production cost and farm enterprise profitability are discussed in the fourth section. The fifth section concludes.

VI.1 The Dutch Disease Model for Developing Countries: A Theoretical Discussion

The applicability of the Dutch Disease theory to less developed economies has already been discussed in a considerable body of literature (see for example Pinto (1987), Scherr (1989), Jazayeri (1988), Karshenas (1990), Struthers (1990), and Majd (1991). The theory was developed within a general equilibrium framework, to explain intersectoral shifts in an industrialised economy under booming conditions. The emphasis of the model, when used for developed economies, has been on manufactures as the lagging sector. This in itself cannot be criticised, but ambiguities arise when the same model is used for less developed economies.

It must be stated at the outset that Corden (1984) has addressed some of these ambiguities with success. The 'enclave' nature of the booming sector is not peculiar to less developed economies, and its existence does not alter the analysis: it only means that the spending effect will prevail. The lagging sector need not produce only exportables, but may also produce importables, so long as they are perfect substitutes for imports; otherwise, if there are prohibitive tariffs and/or quantitative restrictions, their prices will be determined domestically rather than internationally;[1] and they will become effectively nontradeables. Finally, the lagging sector is not only composed of manufactures, but also of agricultural goods. This last point, however, is not without its problems.

To what extent is the behaviour of agricultural producers comparable to that of manufacturers? Historical, political and social variables often influence the structure and supply response of agricultural producers in ways that differ from industrial producers. The subject is currently the focus of energetic debate in the economic development literature, so we need not dwell on it. Suffice it to say that evidence from less developed countries suggests there may be different reactions to a profit squeeze in farms than in industrial firms, for reasons to do with the method of employing factors, factor intensities, and factor mobility. Furthermore, responses within the farm sector may be more variable than within industrial firms, precisely because socio-economic variables differ more widely amongst them. This becomes important when the analysis is done within the extended model framework, and where decomposition of the lagging sector is the issue under discussion (see section II.3.3). Thus, systematic evaluation of the micro-economic

[1] See Jazayeri (1988: 2-4) for a discussion on the limits between which a commodity is exportable, importable or non-traded.

mechanisms by which the boom effects are transmitted to the agricultural economy is important (Scherr, 1989, Majd, 1991). For example, in Mexico, Ecuador and Iran, production of peasant farmers expanded, while that of commercial producers contracted (Majd, 1991), in conformity with the theory. Corden (1984) has dealt with a similar case theoretically. Taking as a starting point the work of Snape (1977) and Cassing and Warr (1982), he showed that variations in the performance of industries within the lagging sector are possible: "it is perfectly possible that some of the non-boom tradeable industries actually expand, even though the sector as a whole contracts" (Corden, 1984: 363). Corden's explanation for this outcome is wholly based on factor intensities and the Rybzcynski (1955) effect. Those industries that are relatively better endowed with capital than with labour will be able to expand; while labour-intensive industries will contract as a result of labour moving out of the lagging sector and into the booming sector - the resource movement - and the subsequent reorganisation of capital and labour within the lagging sector.[2] The Rybzcynski (ibid) theorem can be extended further to allow for the whole tradeable sector to expand, if it was relatively more capital-intensive than services, and if both capital and labour were mobile between the two sectors; but provided the overall stock of capital and labour in the economy does not change - the "paradox model" (Corden, 1984: 363).

The Rybzcynski-based explanations of decline in agricultural activities, whether they relate to commercial farming or to the sector as a whole, are not entirely satisfactory, for three main reasons. *First*, as argued in chapter III it is not clear whether the relative decline of agriculture in developing economies is symptomatic of the Dutch disease, or just the 'normal' level of decline for a developing country, to be compensated for by the expansion of industry. In other words, since it is difficult to establish the counterfactual of the Dutch disease for agricultural performance in developing economies, it is equally difficult to assert that the performance of this sector is a contraction only in a Dutch disease sense, or one that is due to more enduring effects. *Second,* Corden's case assumes that the sector, or indeed the economy as a whole, has a fixed stock of capital, which is an unlikely condition for developing economies under booming conditions, especially if they were quantity-constrained in capital markets prior to the boom. *Third*, and more importantly, perhaps, is that the reason for the ability of peasant agriculture to

[2]Struthers (1990) seems to have missed this point. He questions the applicability of the model for LDCs since there exist different industries employing capital and labour in different intensities within the same sector.

resist the squeeze on profits may not be a matter only of the intensity with which it employs factors but, rather, with the method of their employment. It is highly likely that peasant farms are more labour-intensive than commercial farms. But if they were in fact more capital-intensive, then the immobility of their capital may have prevented them from reallocating their resources elsewhere. A more convincing reason for peasant farms' continued production under boom conditions is their ability to employ family labour, and to engage in non-farm employment while, at the same time, continuing to apply their labour on farms. One can argue further that peasant farmers may accept more squeeze on profits than commercial farmers before they move into other types of production.

The implication of that argument is that socio-economic factors *do* matter. So do institutional factors, as Jazayeri (1988) and Karshenas (1990) have shown for Iran, insofar as land tenure, credit markets, etc. can influence the supply response of farmers under boom conditions. Government policies are also influential, especially trade and price policies, but also the quantity and quality of public investment in the sector. This was demonstrated by Scherr (1989) in her comparison of the performance of Nigeria, Mexico, and Indonesia, and by Gelb (1986) in his comparison of seven capital-importing, oil-exporting countries (Indonesia, Iran, Nigeria, Algeria, Ecuador, Venezuela, Trinidad and Tobago).

There are other analytical problems of the Dutch disease theory as it relates to agriculture in less developed economies. The resource movement must be distinguished from urban-rural migration, which is analytically different in causation, but produces similar results. Since the phenomenon of labour leaving agriculture to join urban employment does not of itself permit unequivocal attribution of cause, the testability of the Dutch disease theory is weakened.

Another difficult distinction is between the 'spending effect' of the boom and the natural urban bias of government spending. Whereas the increase in government spending may have only been enabled by the boom, its urban bias may be a continuation of an historically established trend. Such bias will not only squeeze agriculture but also manufacturing, as some of the government spending is bound to spill over into industrial purchases which, with imports made cheaper by the boom, may wipe out a range of import substitutes. The analysis becomes more intricate if urban bias entails increased spending, not only on construction and services but also on industry; or indeed, if the government decides to protect both agriculture and industry by increasing its investment in these sectors. The Dutch disease model does not allow for a change in its outcome, a squeeze on tradeables, under these

circumstances: it merely sees the adjustment forced on a smaller section of the traded goods sector, namely those industries that are unprotected. However, this analysis is only possible if we assume, as the model does, that technical coefficients of production are fixed. Thus government spending is only important insofar as it impacts on the non-traded sector and eventually changes relative prices. Once the assumption of fixed technical coefficients is relaxed, however, we can easily see how government spending on the traded sectors, if it embodies technological changes, can change the outcome from that of the model.

We may find structuralist models to be of more use in this context. Such models anticipate that the extra income from the boom gained in foreign currency would relieve two main constraints facing the economy: the foreign exchange and savings constraints. This may explain the existence of a 'latent growth sector' in Nigeria (I shall argue later that a similar phenomenon was observed in Jordan) which benefited from cheap imports as a result of currency appreciation during the boom period. More important, the relative abundance of foreign exchange implies the availability of modern imported technologies to local producers. Technological advances normally work themselves out in the economy through increased productivity, which in turn reduces unit costs and increases profitability[3] (see Karshenas, 1990). A good catalyst for this process, as Ishikawa's (1972) model for Eastern Asia shows, is government investment in what he calls 'basic technology' (e.g. flood control and water distribution for agriculture). Therefore, abstracting *from* both the government sector and technological change may yield erroneous results regarding the performance of the traded sectors during and after the boom. And, in countries where the government captures a significant part of the oil rent, a theory of adjustment to booms becomes "primarily an abstraction *of* observed government behaviour following massive windfall gains" (Gelb, 1981).

The ultimate determinant of the squeeze on tradeables is firm profitability. What the Dutch disease model does not allow for, being a static general equilibrium model, is analysis of the cost function facing individual producers, and its change over time, not only because of changes in producers' prices, but also because of technical change. Thus the Dutch disease model should be augmented by both microanalysis and dynamic analysis.

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[3]This is especially true for technology embodied in material and capital such as HYV, irrigation, fertilisers, etc. It may also be true for disembodied technology, transferred through better training and management (which may be considered as technology embodied in human capital).

Aggregate analysis of the boom shows the rise in cost of labour and other non-traded inputs as squeezing profits in the traded goods sector. But since firms are heterogeneous in their use of inputs, rate of return on investment, etc. it is unlikely that a whole sector would lose its competitiveness. It is constructive, therefore, to investigate the distribution of unit costs across firms, and see what happens during the boom. A good analytic tool here is the Heckscher diagram, used in his study of Swedish economic problems caused by foreign competition in 1918. Heckscher has shown that with non-malleable capital such diagrams are fairly stable from one year to another, and indicate the firms about to be squeezed out by cost increases or product price decreases (Forsund, 1981). If capital is malleable, and if technical changes do take place, such diagrams will become less stable and more complex. The problem that faces any analyst in this respect is that nothing short of a highly disaggregated input-output matrix for the sector as a whole and for the main industries within it would answer the question, 'How do changes in prices, costs and technology during the boom change a firm's profitability?'.

VI.2 The Performance of Agriculture: 1973-1982

VI.2.1 Growth Trends

In chapter four it was established that from 1921 and until the early 1950s the Jordanian economy was predominantly agricultural. Subsequently, it started changing into an economy that produced other commodities and services, and agriculture's share in GDP continuously declined, reaching 12% in the early seventies. During the boom (1973-82) agriculture's share in aggregate output declined further, standing at 6.8% in the early eighties, and in the post-boom period it increased to reach 10% in the early nineties. Historical trends in the sector's growth and share in output and employment are shown in Table VI.2.1-1 below:

Table VI.2.1-1
Agriculture's Growth and Contribution to GDP and Employment: 1955-92

	Real Annual Growth Rates		Agriculture's Share in 1/	
	Agriculture	GDP	Employment	GDP
1954-60	5.04%	10.01%	-	24.1
1961-66	6.32%	8.16%	22.3	22.8
1967-72	-0.28%	4.06%	16.8	13.5
1973-82	4.39%	11.89%	10.0	7.9
1983-91	10.00%	-0.12%	7.4	8.8

Sources: Growth and share in GDP calculated from Appendix AIV.1. Employment calculated from Royal Scientific Society, 1989, *The Data Base of the Jordanian Labour Market*, vol. III.
1/ Period average.

It was shown in section IV.3.1, with the aid of trend analysis, that the sector's share during the boom period was below its historic trend line, which may appear to indicate that agriculture in Jordan suffered from Dutch disease symptoms, in relative terms (since the sector's output did not decline in absolute terms). Yet three considerations militate against this conclusion. *First,* the counterfactual is merely an intellectual exercise, and no conclusions based on it can be absolute. *Second*, given the limited supply response of the sector, a 4.4% p.a. growth over 1973-82 is significant, implying an increase of 148% in the sector's output. This growth rate, moreover, compares favourably with most booming developing countries during the same period: Nigeria (1.7%), Mexico (3.2%), Ecuador (3.4%), Venezuela (3.9%), Indonesia (4.3%), Iran (4.6%), and Algeria (4.8%) (Majd, 1991).[4] *Third*, and far more importantly from a Dutch disease point of view, the sector's exports growth was phenomenal (at 22% p.a. in real terms) over the period 1973 to 1982. Since the Dutch disease model concerns above all the performance of tradeables, it would seem that the behaviour of agriculture in Jordan during the boom period does not accord with the theory's predictions.

[4]Compared with the rest of the world during the seventies, Jordan has done even better. According to the World Bank, the average annual rate of growth of agricultural output for low-income, middle-income, and developed countries was 2.3%, 3%, and 1.8%, respectively during the decade 1970-1980 (World Bank, 1983, *World Development*).

VI.2.2 Domestic Consumption, Production and Exports

Under boom conditions income increases rapidly and, with it, the spending on non-traded and traded goods including food. Because of currency appreciation imports become cheap relative to domestically produced items, and the demand for imports thus increases. However, because of the low income and price elasticities of the demand for food compared to manufactures, this relationship may not be very pronounced.

The impact of the increase in per capita income on the demand for food in Jordan is shown in Table AVI.1-2 in Appendix AVI.1. The most significant changes were observed for cereals, meat, and eggs, whose consumption per head doubled, while per capita consumption of sugar more than trebled. Jordan does not produce sugar, and has a low elasticity of supply for cereals, meat, and eggs. The ratio of imports to domestic consumption during the boom period averaged 100% for sugar, and 85% for cereals (see Table AVI.1-3 in Appendix AVI.1). This means that a significant portion of the increased income was spent on food imports. By contrast, the income elasticity of demand for fruit and vegetables, which have a high elasticity of supply, seems low.[5] Over the period 1973-1981 production of all vegetables increased at 11% p.a., while consumption increased at 4.5%. The surplus was marketed internationally, which increased the ratio of agricultural exports to GDP from 2.4% in 1973, to 3.3% in 1981.

Jordan is a traditional supplier of winter fruit and vegetables in regional markets in Iraq, Syria, Lebanon, and Saudi Arabia. On the other hand, it imports all other types of agricultural commodities, in substantial quantities for wheat and flour. This was and has persisted to be the case before and after the boom, with two qualifications. *First*, the self-sufficiency factor (the ratio of domestic production to consumption) decreased for cereals; and increased for vegetables and fruit. *Second*, exports of fruit and vegetables increased significantly during the boom. The change in exports and imports is reflected in Table VI.2.2-1 below.

[5]The estimated income elasticities of demand for vegetables in Jordan ranges between 0.2 and 0.4 while price elasticities fall between 0.31 and 0.74 (Tech International, Table III.1: 65).

Table VI.2.2-1
Indices of Food and Live Animal Imports and Exports (1985=100)

	Exports			Imports		
	1970-72	*1980-82*	*change*	*1970-72*	*1980-82*	*change*
Price	48.9	98.7	48.8	43.3	110.0	66.7
Volume	15.4	64.7	49.3	32.8	79.7	46.9

Source: Calculated from Central Bank of Jordan 1989, tables 30-33.

Further desegregation of trade in agriculture is given in Tables AVI.1-4 to AVI.1-6 in Appendix AVI.1. In this part of the paper, analysis will be narrowly confined to the main exports, fruit and vegetables, and an import-substituting commodity, wheat.

The trade deficit in cereals, the main component of which is wheat, more than trebled over 1973-1981, reflecting both an increase in domestic demand and a decline in production. On the other hand, Jordan improved its vegetables trade position significantly, by increasing its exports. From being a net importer of vegetables in 1973 with a trade deficit of JD 0.08 million, Jordan became a net exporter in 1981, with a trade surplus of JD 12.5 million. This was the single most important change in the performance of the food trade position in the period studied. The stimulus came mainly from tomato exports, which increased seven-fold, and also from eggplants and onions, whose exports increased four- and five-fold, respectively. Jordan also increased its exports of fruit and citrus more than six-fold, but remains a net importer of this item.

There are both supply-side and demand-side factors responsible for this performance. Because of the oil boom, demand in regional markets was buoyant, and food export prices continued to rise.[6] On the supply side, investments in flood control and large irrigation schemes by the government during the sixties, which continued in the seventies and early eighties, yielded high returns during the boom period; especially since the private sector responded strongly to government investment, by investing in high technology plasticulture with improved irrigation

[6]Because Jordan is a regional supplier of fruit and vegetables rather than an international one, the assumption of small country is not valid in the short run, and demand for these commodities leads to an improvement in its terms of trade. In the long run, however, this is not sustainable, and the assumption of small country will prevail.

and agrochemical inputs (Section IV.2.2.2, Table IV.2.2.2-5, & Section V.2.1, Table V.2.1-3). Output growth was very rapid, particularly that of certain vegetables such as tomatoes (more than two-fold), squash (four-fold) and cucumber (six-fold), which used up more than 50% of the total irrigated land area in Jordan. Tomatoes alone covered about 30% of irrigated land, whilst squash and cucumber took about 8% each.

The picture on the demand side changed after the boom, although supply conditions remained unchanged. Beginning in the eighties, structural changes in regional trade patterns began to alter Jordan's favourable position as the primary supplier of these commodities. That is, demand in the Gulf began to be met by other non-Jordanian sources, including domestic producers in the respective importing countries; while, at the same time, demand in the Gulf was less buoyant than in the seventies. These factors combined to suppress regional demand for Jordanian exports at a time when its own agricultural productivity was still expanding through technological transformation. By the mid-eighties, the gap between domestic supply and demand had widened enough to level off farm-gate and wholesale prices for vegetables, which actually declined in real terms (Table V.4-3).

Numerous factors caused these structural changes in the demand for Jordan's produce, among which appear to be quality, change of taste in the Gulf, and administrative problems (Huneidi & Qudah, 1991: 19-22). The source just cited refuted the argument that the upward exchange rate adjustment of the Jordan Dinar against other regional currencies, and the high relative cost of Jordanian agricultural labour with respect to regional labour costs rendered Jordanian produce more expensive to import than those of its main rivals in the region, namely Egypt and Turkey. Even in 1988, just before the major currency devaluation, the ratio of import prices of Jordanian vegetables to those of her rivals in Gulf markets were as follows:

	Tomatoes	Cucumbers & Courgettes
Egypt	0.64	-
Turkey	0.90	0.65

The importance of the foregoing analysis is two-fold. *First*, it emphasises the importance of demand, in addition to relative price changes, in determining

farmers' income. This in turn highlights a limitation of theories that consider supply-side factors only such as the Dutch disease when demand conditions are far from stable. *Second*, it shows that, despite increases in real wages and currency appreciation, the production cost of vegetables in Jordan was still competitive in regional markets. This result obtained because, although wages increased rapidly during the boom in all sectors in Jordan, unit wage costs declined in most sectors, and increased very slowly in agriculture (3.4% p.a.) because of significant gains in labour productivity (Table IV.3.2.1-3). The last point cannot be over emphasised in relation to Dutch disease analysis. The wage differential, between Holland and its major trade partner Germany, was the definition that Corden (1983: 441) used for currency appreciation, implying that it was the main mechanism through which the squeeze on Dutch exports was effected. Thus we must conclude that the reasons for the expansion of vegetable production and exports in Jordan are not to be found in a Dutch disease analysis, which does not allow for productivity changes, as technical coefficients are assumed constant. The subject will be further explored in section VI.4.

This ends the discussion of the performance of agriculture during the boom period. In the rest of the chapter I shall investigate the factors underlying this performance. The following section analyses factor input and its relation to output growth during the boom.

VI.3 Factor Inputs and Output Growth

VI.3.1 Arable Land

The first relevant question regarding inputs to agricultural production is that of the arable land frontier. There are no historically recorded data on the expansion of arable land in Jordan before the seventies. However, it appears that land reclamation through major investments in the Jordan Valley did take place during the sixties, while available data for the seventies suggest not only that the land frontier has stagnated, but that it has actually declined.

While the total agricultural area in Jordan was 390,400 hectare in 1974, it was only 364,200 hectare in 1983. The difference - 26,200 hectare - seems to have been lost to the uncontrolled urban expansion of the seventies, which pushed real estate prices to historical levels. The increase in land prices in Jordan is a stark example of how relative prices under booming conditions change, in favour of non-traded goods. There is no documentation of the increase in land prices in Jordan, but anecdotal evidence suggests an order of magnitude of between 100 and 1000%,

depending on location, with the higher percentage pertaining to central areas inside and adjacent to the capital Amman, including agricultural land.

Land speculation was a direct outcome of the rise in remittances and Arab aid after 1973. The combined effect of the two flows was to increase spending on building and construction which in turn led to a rapid increase in the demand for land,[7] thus inviting land speculation. The latter peaked in 1975, when "land became virtually equivalent to any other liquid asset" (Fariz, 1976: 303).[8] How this eventually impacted on investment in agriculture is hard to assess. It can be argued, nevertheless, that land speculation has increased total production costs, since land is an important input, and diverted resources away from agriculture, since "good agricultural land was left fallow because of the lure of real-estate speculation"[9] (Five Year Plan 1986-90).

Despite the contraction in total cultivated land area, the period under study witnessed an expansion in the total irrigated area, and a change in the method of irrigation from open channels to drip and sprinkle irrigation, especially in the Jordan Valley. The use of fertilisers, pesticides, and herbicides as well as improved seeds also increased during the boom. Expenditure on fertilisers increased from an annual average of JD 0.86 million in the period 1967-1969, to JD 3.95 million in the period 1976-1979; and on pesticides from JD 0.44 million to JD 2.58 million for the same periods (all at constant 1975 prices) (Department of Statistics, *Agricultural Survey*, various issues).

These inputs and techniques are land-augmenting. They allow double cropping; increase the yield per hectare cultivated; and permit farmers to change the cropping pattern away from cereals cultivation, in which Jordan has no comparative advantage, towards more lucrative enterprises like fruit and vegetables. These issues will be discussed in further details in section VI.4 below.

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[7]Fariz has shown that credit extended to building and construction increased from 8.5% of total credit in 1966, to 21.7% in 1975 (Fariz, 1976: 303).

[8]Fariz (ibid) saw land as "A market enjoying all the characteristics of a feasible financial market - namely breadth, width, and liquidity".

[9]Another side effect to land speculation is the creation of a dominant wealthy group - the speculators - with a high propensity to consume. This further increased inflationary pressure in the economy, *via* the spending effect, one important element of which is building and construction. However, as Fariz (1976: 207 & 304) believes this group's consumption to be influenced by the "demonstration effect", where a large portion of demand is met from imports, we would expect a mitigating effect on inflation.

VI.3.2 Labour Supply

Between 1961 and 1982, the labour force in agriculture declined from about one-third to less than one-tenth of total employment in Jordan. This decline took place while the total labour force in Jordan grew at 3.5% p.a., implying rural-urban migration, as well as international out-migration, both of which are considered in our model as a domestic resource movement. As a countervailing force, labour immigration increased from the end of the seventies to the mid-eighties. The numbers of foreign workers employed in agriculture rose from a negligible 400 in 1973 to 43,478 in 1983 (see section V.3.1.2).

Labour shortages seem to have had different consequences for rain-fed and irrigated agriculture. In irrigated areas, most farmers tended to rely more on foreign labour (Aydin, 1990: 201), so the majority of foreign labour went to the irrigated sub-sector. A survey by Steitieh and Musa in 1980 showed that more than 90% of permanent workers employed in the production of fruit and vegetables in the Jordan Valley were Egyptian guest workers (Ibid). "It is only through this replacement migration that the agricultural sector in Jordan maintained the increase in its production" (Birks and Sinclair, quoted in Lanzendorfer, 1985: 39).

This conclusion seems to be born out by Seccombe (1981: 80-81) whose analysis of migrant workers in the Jordan Valley shows that, despite the decline in the number of Jordanians employed in agriculture in the Valley, there has been an increase in total agricultural employment, as a result of immigration of non-Jordanians. The corollary of the above is that the rain-fed 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 this sub-sector was more serious than aggregated employment figures suggest. We conclude, then, that the resource movement was very serious for the rain-fed sub-sector, while it was largely, or perhaps even completely,[10] mitigated by labour immigration in the irrigated sub-sector. This seems to be due to the low productivity of rain-fed agriculture, which meant that the increase in wages and other costs had no counterbalancing forces to offset it.

Section VI.2.1 demonstrated that output from the whole sector expanded during the boom, that is, 'pro-agriculturalisation' rather than 'de-agriculturalization' took place. This result is interesting, because labour immigration on its own would

[10]Depending on what would have been the rate of growth of labour in the sub-sector without the boom.

not have enabled this outcome to occur, according to the extended model of the Dutch disease. Corden (1984) has shown that so long as there is any spending effect in the economy, which would be augmented by immigrant workers' spending, real appreciation and higher wages will not be completely countered by labour immigration, and some de-industrialization is inevitable. Immigration, in other words, would only increase output in the lagging sector relative to pre-immigration conditions, but would not restore it to normal pre-boom conditions, and definitely would not increase it, i.e. overshooting is not possible (see section II.3.1).

VI.3.3 Capital

There are, broadly speaking, two categories of farms in Jordan, differentiated from each other by the amount of capital investment devoted to production. Irrigated vegetables are examples of the relatively high capital input crops, while rain-fed field crops require only relatively low capital input. Since field crops are grown mainly in the highlands, while vegetables are grown in the Jordan Valley, most agricultural investment took place in the Valley, thus giving agricultural production a permanent dual structure. On average - for the boom period as a whole - the area cultivated in the Jordan Valley accounts for 10% of the total area cultivated in Jordan, but produces about 60% of the total agricultural value (World Bank, 1990).

Large-scale investment[11] undertaken in the irrigated sub-sector took the form of flood control and major off-farm irrigation schemes, the details of which are given in Appendix VI.2. These projects were financed by the government, considering they are social overhead.[12] On the other hand, small-scale investment, mainly in on-farm irrigation and plasticulture, was entirely financed by the private sector, having admittedly been encouraged by public investment.

The importance of Government investment in agriculture stems from the fact that it may mitigate the 'spending effect', insofar as the expression refers to the impact of additional spending on non-traded goods. If government investment embodies technological change, the supply responses of the sector will be altered,

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[11]Arbitrarily defined as any investment larger than JD 0.5 million per annum, which takes into consideration Jordan's small GDP (JD 303 million in 1975).

[12]The milestone in public investment in irrigation was the construction of the East Ghor Main Canal (EGMC) in the northern part of the Valley in the early sixties, which was extended in the mid-seventies and again in the mid-eighties. The project irrigated about 10,000 hectare, or roughly 15% of the total Valley area.

through the effect of investment on 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 ignores technological changes. To the extent that government investment induces private investment, taking only government investment into account understates the degree to which the 'spending effect' is mitigated by investment. (This is especially true if private investment involves a multiplier effect). Accordingly, both sources of investment in agriculture should be considered.

The discussion of capital accumulation (section IV.2.2.2) showed investment in agriculture and irrigation in the period 1976-80 to have been 10% of total investment. Investment in irrigation alone accounted for 60% of this total, amounting to 6% of investment in all sectors of the economy, and was entirely financed by the Government (Table IV.2.2.2-5).[13] A concomitant feature with public investment in irrigation has been the fast introduction and absorption of advanced technologies, especially in irrigation and agriculture under plastic, as well as a continuous upgrading of irrigation, fertilisation and disease control techniques by the private sector (Five Year Plan 1986-90: 532).[14]

Over 1976-1980 private sector investment in agriculture accounted for 6.5% of total private investment, or 3.9% of total investment, both private and public. The significance of these figures for private investment in agriculture stems from the low share of agriculture in GDP during the period of study, which averaged 9%, compared with 71% for all services including construction (which received 55.5% of total investment, 54% of which was private; part of this investment may have also benefited agriculture). Furthermore, this level of private sector involvement in the sector is unprecedented. From about JD 5 million over 1973-1975, private investment in agriculture rose to JD 47 million over 1976-1980, and further to JD 140 million during 1981-85. These absolute figures represent 21.7%, 40%, and 78% of total investment in the sector (Five Year Plan 1986-90: 532).

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[13]Majd (1991) cites the following percentages for government expenditure on "agricultural development" during the oil boom: Nigeria 1%, Mexico 2%, and Iran 3% of GDP. It is not clear whether this includes expenditure on irrigation or not. If it does, then Jordan compares very favourably with those countries; if not, she compares unfavourably to all but Nigeria.

[14]Plasticulture was started by the Valley farmers in the mid-seventies, and by 1981 there were 1,500 hectare, or 6% of total irrigated area under either plastic houses, plastic tunnels or mulch (Abu Howayej, 1985: 89).

Private investment decisions were responses mainly to government investment in basic technology - flood control and irrigation.[15] This can be inferred from the fact that private investment was directed mainly towards (1) on-farm irrigation systems, (2) increasing inputs per unit of cultivated land, and (3) adopting palsticulture. The first type of investment is only possible when main irrigation schemes are in place, while the second and third are encouraged by the reduction in risk associated with rain-fed farming. Furthermore, investment in basic irrigation schemes permits the use of other embodied technologies such as fertilisers, pesticides, and improved seeds, through their complementarity relationships. There are no data on irrigated crops and area for the whole of Jordan, but there are data on the Jordan Valley alone, which can be used to show the degree of spread of irrigation in Jordan. A 1961 study conducted by the Jordanian Department of Statistics (DOS) showed a total of 15,271 hectare to be irrigated in the Valley - either partially or totally (Khouri, 1983: 91).[16] The main technology used was surface irrigation. By 1975, the irrigated area had increased to 18,659 hectare, and by 1979 to 24,286 hectare, of which 9,397 hectare (39%) were under pressurised irrigation. By the mid-eighties total irrigated area had reached 30,590 hectare, of which 44% was under pressurised irrigation (24% drip irrigation, and 20% sprinkle irrigation) (Department of Statistics, 1983, *Agricultural Census*). Accordingly, the irrigated area in the Jordan Valley increased by 163% over 1975-1985. This made possible an increase in cropping intensity from 106% to 120%, for the same period (Khouri, 1983: 20).

As for the highlands, available data show irrigated areas there in the late eighties to be 24,812 hectare,[17,18] up from 11,741 hectare in 1975,[19] or an increase

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[15]It is relevant to mention that government investment in irrigation was supplemented by investment in rural infrastructure and in industries serving agricultural production needs, such as fertilisers, veterinary medicines, agricultural and drip irrigation equipment and plastic houses. A number of food processing facilities were also established (Five-Year Plan 1986-90: 532-533).

[16]The total area farmed in 1961 was 20,794 hectare (ibid).

[17] 20,781 hectare of which were irrigated by the use of tubewells, while the rest utilised springs and wadis (World Bank, 1990, Table 6.16: 109).

[18]According to these figures the sum of the irrigated area in both the highland and the Jordan Valley in the mid-to-late eighties was 51,000 hectare, which exceeds the 44,000 hectare officially declared as the total irrigable area in Jordan (see Khouri, 1983: 104). This reflects the inaccuracy of official statistics on agriculture and, more importantly, these statistics reflect the exhaustion of irrigable land in Jordan.

of 112%[20] (World Bank, 1990, Table 6.16: 109). If these figures are accurate, then the irrigated area in Jordan as a percentage of total cultivated area rose from 7.8% to 15%.[21] By the mid-eighties irrigable land in Jordan was more or less exhausted, and the only possible increase in irrigation was through vertical expansion; that is by increasing the efficiency of irrigation through modernising technology, for example by converting surface irrigation to pressurised irrigation, which the government embarked upon intensively from the mid-to-late 1980s.

The question arises now as to what extent the investment in flood control and irrigation contributed to the increase in agricultural output per hectare of cultivated land in Jordan. A related question concerns how this investment in irrigation stimulated other improvements in cultural practices, further increasing land productivity. To answer the first question I shall compare the increase in irrigated area under vegetables with the change in output per hectare.[22] Table VI.3.3-1 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. These results are similar to Ishikawa's (1972, Chart 2-3: 74) findings for East Asia. Comparisons with rain-fed vegetables reveals a stark difference in output per cultivated hectare between irrigated and rain-fed vegetables, leaving no doubt about the superiority of irrigated agriculture in terms of productivity in Jordan.[23]

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[19]This figure is derived as follows: the 1975 agricultural census shows 30,700 hectare to have been irrigated in the whole of Jordan (Lanzendorfer, 1985, footnote 10: 78). Thus the irrigated area in the highlands in 1975 must be the difference between this figure and that for the Jordan Valley (18,659 hectare) or 11,741 hectare.

[20]To the extent that an increase in irrigated agriculture is expected to raise demand for labour, the remaining non-irrigated area must have suffered disproportionately from the decline in labour in the highlands.

[21]Note, however, that part of the increase in this ratio is due to the decrease of total cultivated area by 26,000 hectare.

[22]Ishikawa (1972) has argued against the existence of a correlation between investment in irrigation, proxied by proportion of irrigated to total cropped land, and land productivity, proxied by the total cereal output per unit of cultivated land, for the Near East region. The above measures are not only crude but the proxy used is illegitimate, at least for Jordan which showed the lowest response to irrigation in Ishikawa's analysis. As late as 1983, only 1% of total cereal area in Jordan was irrigated, while the majority of irrigated area was under vegetables and fruit. Thus, it is the yield of the latter that should be measured against the increase in irrigation.

[23]This relationship between irrigation and productivity is particularly pronounced in Jordan because of its semi-arid climate.

Table VI.3.3-1
Irrigation and Land Productivity for Vegetable Production, 1973/74-1983/84

	Summer irrigated area (ha)	Ratio of irrigated to total area (%)	Productivity (ton/ha) Irrigated	Rain-fed
1973/74	7.74	20.5	14.72	6.65
1974/75	9.30	23.0	18.60	4.74
1975/76	9.92	20.7	16.70	4.61
1976/77	9.26	26.8	14.91	5.08
1977/78	9.48	24.2	16.97	4.01
1978/79	11.65	35.5	14.40	1.28
1979/80	15.22	32.4	14.24	4.99
1980/81	15.45	34.0	23.84	4.72
1981/82	20.78	44.3	24.30	4.18
1982/83	24.75	37.7	22.47	5.13
1983/84	25.95	39.0	23.02	4.99

Source: Calculated from World Bank, 1990, Statistical Appendix.

The effect of irrigation on land productivity goes beyond the straight forward matter of increasing water availability and its supply reliability. With the advent of irrigation the adoption of modern techniques becomes possible, not only for technical but also for financial reasons: the increase in productivity increases profitability, which enables investment in more technologies, as advance capital becomes available. Moreover, irrigation can make possible the introduction of

another crop, thus increasing cropping intensity. These factors combine to enable production at different input-output combinations, and at higher productivity.[24]

In the Japanese context Ishikawa (1972: 90) has argued, with the help of empirical analysis, for the existence of successive levels of productivity increase, paralleling the increasing role irrigation plays: first in stabilising harvest fluctuations; next in making possible the introduction of a second crop; and then by enabling the introduction of improved farming techniques and inputs, such as fertilisers and seeds. The Jordanian case does not fit this conceptualisation, but similarities do exist between Jordan's experience and that of Korea and Taiwan, where the introduction of improved seed varieties and increased application of fertiliser and other improved farming techniques occurred almost simultaneously with the improvement in irrigation. This was mainly because of the integrated development approach adopted by the Jordanian government for the Jordan Valley, where expansion in irrigation and drainage, dissemination of improved seeds, and spread in the use of fertilisers and manure were all energetically attempted by the Jordan Valley Authority in the seventies.

VI.3.4 Agricultural Output

Despite the decline in land and labour, and the stagnation in machinery,[25] the increase in capital, with its ensuing increase in productivity gave agriculture enough drive to increase its production from JD 57.8 million in 1975, to JD 80.6 million in 1981 (and further to JD 105.4 million in 1983) in constant 1983 prices. This represents a growth of 5.7% p.a. over 1975-1981, although individual commodity performance was highly variable, and some commodities did not perform well at

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[24] The effect of the introduction of new inputs on productivity is available for cross-sectional data from the work of Qasem and Taqieddin (1986). The researchers have shown per hectare yield of vegetables to change under different types and levels of inputs as follows:

Method of Production	Productivity (ton/hectare)			
	Tomato	Cucumber	Squash	Eggplant
Plastic house / high input	1.6	1.0	-	-
Plastic house / normal input	1.2	0.7	-	-
Plastic tunnel / drip or mulch	0.6	-	0.3	0.4
Open field / drip or mulch	0.6	-	-	-
Traditional open field	0.1	-	0.1	0.1

Source: Qasem (1986), Tables 7.6 & 7.7: 95-96.

[25] See notes 29 and 30 below.

all. The total volume of output of major crops is given in Table VI.3.4-1 for the period 1973-1981. Over this period, vegetable output increased by 80%, that of fruit by 30%, while field crops output declined by 20%. The growth of cucumber production at 456% is worth noting, since most cucumber is grown under plastic in the Jordan Valley. The increase in tomato production, at 91.5%, is equally important in view of the fact that it is the main export commodity.

Table VI.3.4-1
Change in Crop Production in Jordan, 1973-1981

	Average production (000 MT)			Change in Production (1973-1981)		Share in Total Value
	1973-75	*1976-78*	*1979-81*	*(000 MT)*	*Percent*	*(1981)*
Field crops	149.07	65.34	118.91	-30.16	-20.23	6%
wheat	100.71	41.39	75.93	-24.78	-24.60	
Vegetables	426.50	424.40	767.33	340.83	79.91	65%
tomato	160.60	184.03	307.60	147.00	91.53	
eggplant	64.20	55.63	86.87	22.67	35.31	
cucumber	15.43	29.60	85.81	70.38	456.03	
squash	15.14	15.50	44.20	29.06	191.88	
Fruit trees[1/]	96.23	107.871	127.17	30.97	32.18	29%
grapes	36.50	37.87	45.17	8.70	91.53	
citrus	59.73	70.00	82.00	22.27	35.31	

Source: Calculated from World Bank, 1990, Statistical Appendix
1/ No total is available for this group in terms of volume (MT), figures in this row pertain to grapes and citrus only. However, the share in total value (value in last column) pertains to the group as a whole.

VI.4 Changes in Prices, Costs, and Profitability

The Dutch disease model depicts a decline in the return to the specific factor in the lagging sector, which is interpreted as a fall in profitability. This is because the rise

in the wage rate (relative to producers' prices) itself brought about by the resource movement effect, squeezes profitability in the sector in absolute terms.[26] If profitability also falls in relative terms, resources will in the medium run move out of the sector, and into the non-traded sector.

How changes in input prices affect resource allocation, however, depends not only on the relative changes in input and output prices in a static manner, but also on change in the technical coefficients of inputs, which ultimately disturb the old input-output relations. That is, a dynamic analysis is necessary to understand the relationship between changes in prices, costs, and profitability.

Assuming a linear cost function for the farm sector - both for simplicity and because empirical evidence supports it (see Labini, 1957, and Staehle, 1942 on general cost functions) - producers' profit, G, can be expressed in terms of revenue, R, and total cost, C, as follows:

$$G = R - C \tag{1}$$

Total cost in turn is composed of constant cost, a, plus variable cost, which itself is composed of labour cost, L, and material cost, M, while revenues are the product of producers' price, p, and the quantity sold, q:

$$G = p.q - (A + L + M) \tag{2}$$

To reflect supply side changes, unit costs are taken. Expressing above variables in lower case to represent per unit values:

$$g = p - (a + l + m) \tag{3}$$

That is change in profit per unit output (profit margin) depends on change in labour and material cost, and on producers' prices.

I shall first examine how changes in the prices of material inputs and labour cost affected change in variable cost, taking changes in input-output coefficients into consideration. Next, I shall look at changes in producers' prices and relate them to unit cost changes to arrive at an indicator of profit margins. To simplify the

[26]The same may not be true in relative terms, that is relative to profits obtainable in the non-traded goods sector. The ultimate result depends on factor intensities in terms of value shares. If the share of labour in the value of the lagging sector output is smaller than that in the non-traded goods sector, then a given rise in the wage rate reduces its profitability by less than it reduces it in the non-traded sector (Corden and Neary, 1982).

analysis, wheat will be taken as representative of field crops production, tomato of vegetables, and citrus of fruit.

Tables AVI.3-1 to AVI.3-3 in Appendix VI.3 show the cost structure for representative irrigated farm enterprises in the Jordan Valley in 1975 and 1982. Tables AVI.3-4 and AVI.3-5 in the same Appendix show the technical coefficients of production for these two years. The tables suggest, based on cost shares, that fruit and vegetables are more labour-intensive than wheat, although *all* enterprises were more capital-intensive in 1981 than in 1975, because of the resource movement. Material inputs for fruit and vegetables increased significantly over the period, due to the adoption of modernised techniques; and they were more significant in the production of fruit and vegetables than in the production of wheat. Before we take the analysis any further, we need to look at changes in the prices of these inputs, to see how they may have influenced changes in the cost of production.

Prices paid by farmers for material inputs in Jordan are generally market determined for most crop production inputs.[27] This include fertilisers and agro-chemicals as well as investment items such as plastic houses and drip irrigation equipment. All agricultural inputs are sold by private firms who import directly from international companies. The Jordan Cooperative Organisation (JCO) provides some inputs to dryland farmers at subsidised prices, but apparently this support is very limited, given the extent of Jordan's rain-fed sub-sector. Rates for machinery hire from cooperatives are at cost-recovery (World Bank, 1990: 42). Government support for agricultural inputs includes exemption from import tariffs and duties for all inputs, and subsidised provision of irrigation water in the Jordan Valley (one m^3 of water costs only JD 3/1000).[28] The change in prices paid by farmers for these inputs is shown in Table VI.4-1.

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[27]During implementation, some specific projects like fruit tree planting and terrace building receive direct government aid (Hurani & Duwairi: 1986: 61).

[28]To put this figure in perspective, operation and maintenance costs for irrigation in the valley was estimated by the World Bank in the mid-eighties at JD 15/1000 per m^3 of water, and supply cost at JD 50/1000 per m^3 (World Bank, 1986a: 33). Water charges to farmers in the valley were doubled in 1988 to JD 6/1000 per m^3. In the highlands, farmers dig wells and supply themselves with water and, therefore, water costs are entirely borne by them. Cost to the latter group of extracting one m^3 of water was estimated at JD 56/1000 in the mid-eighties (ibid).

Table VI.4-1
Index of Prices Paid by Farmers, 1975-1981 (1975=100)

	Land	Machinery	Fertilisers	Seed	Pesticides	Material	Wages
1975	100	100	100	100	100	100	100
1976	112	107	73	110	104	99	20
1977	125	112	59	111	80	90	144
1978	140	118	50	140	67	99	173
1979	157	120	74	128	88	105	207
1980	176	272	109	166	107	137	249
1981	197	272	116	186	116	151	299
Annual Growth	12.0%	18.2%	6.7%	11.7%	4.3%	7.8%	20.0%

Source: FAO, *Yearbook*, various issues.
Notes: Wages are assumed to increase at 20% p.a. (based on El-Akel, 1985, results); land prices are assumed near the COL index, but slightly higher; materials index is composed of 50% fertilisers, 25% pesticides, 25% seeds.

The overall increase in the prices of all these inputs is quite modest especially for pesticides (4.3%) and fertilisers (6.7%), while seed prices grew at 11.7%. The general price level in the economy increased at 10.9% over the same period, meaning that the cost of fertilisers and pesticides fell in real terms, while the cost of seeds did not change. More importantly, according to FAO, prices received by farmers for crops increased at 11%[29] over 1975-81. Taking 1975 as the base year, the purchasing power of farmers *vis-à-vis* pesticides, therefore, increased at about 7% p.a., and *vis-à-vis* fertilisers at about 4% p.a., while it remained unchanged for seeds. The same, however, does not apply to machinery which, despite being imported, experienced a price increase of 24% p.a., much faster than the rate of output price increase. This may explain the near stagnation in adopting machinery in agriculture in the seventies.[30] [31]

[29]According to Central Bank of Jordan figures, wholesale prices for all food items increased by 7% over 1975-81 (calculated from Central Bank of Jordan, 1989, Table 50).

[30]The reason for the rapid increase in the price of machinery during the oil-induced boom may lie in the fact that their production is fuel-intensive.

The high share of land (58%) in the total cost of production of wheat, compared with that of fruit and vegetables (17% and 19%, respectively, see Tables AVI.3-4 and AVI.3-5 in Appendix VI.3) means that the change in relative prices must have squeezed wheat much more than the other two crop-types. The same is true of machinery (6% for wheat, 0.9% for tomato, and 0.6% for citrus). The low level of land input per unit output for fruit and vegetables, relative to field-crops, mitigated very considerably the effect of wage increases.

The other term in equation (3) is prices received by farmers. Producers' prices were affected both directly, through specific policies, and indirectly, through macro-economic policies. There is no explicitly stated government policy for the sector in general, nor for prices in particular. The latter change continuously and sometimes erratically, and it is thus not analytically useful to follow them in detail. My discussion will therefore continue to be highly stylised, concentrating on the major exported commodities, fruit and vegetables, and the import-competing commodity, wheat.

In general, Jordan's macroeconomic policies have been designed to protect domestic producers from cheap imports, while pricing policies had the objective of supporting incomes by ensuring an adequate net return, and stimulating production to improve self-sufficiency. The focus of the pricing policy has been on field crops, the bulk of which are imported (World Bank, 1990).

Both agricultural production and income are, de facto, subsidised by the exemption of agricultural income and land from tax. The sector was, however, taxed indirectly through currency appreciation. Appreciation reduces farmers profit margins because it lowers the value of exports in domestic currency, while it raises the price of non-traded domestic inputs such as labour and land, relative to the traded output. Alternatively, if the output is not exported, it is still taxed by appreciation which makes competing imports cheaper. Over the 1972-1978 real currency appreciation, as measured by REER, amounted to 17%.

More directly, wheat was taxed from 1974-1976 when the controlled price offered to local producers was below international market prices. The percentage ratio of the domestic producer price of wheat to the imported c.i.f. price - Nominal

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[31]On the question of mechanization, Lazendorfer (1985) claims that agriculture in Jordan was fully mechanised by the mid-seventies. This may be another plausible explanation for the stagnation of mechanization.

Protection Coefficient (NP) - was 61% in 1974, increasing to 79% in 1976.[32] During the same period, exports of wheat were controlled, and the government had a monopoly over wheat imports. Gotsch has argued that this policy distorted the relationship between input and output prices, and curtailed the incentive to wheat farmers to adopt improved technology (Mazur, 1979: 164). However, in the subsequent period this policy was reversed with heavy subsidies on domestic production of wheat. The NP was 130% in 1977, and escalated to 270% in 1986 (FAO, 1989, *Yearbook*, Table 3: 21).

The government supported producers' prices for other commodities: barley, chickpeas, lentils, potatoes, onions, and tomatoes. The support price objective varied with the crop. For tomatoes the floor price was paid during periods of production glut (which started occurring in 1982/83) to produce a minimum return to growers.[33] Floor prices for onions and potatoes were provided as a means to stimulate production of these two commodities for which Jordan had a comparative advantage: it was only the farmers' lack of familiarity with their production that had necessitated imports. Incentive prices were also paid, temporarily, to stimulate the adoption of appropriate production technology. This policy succeeded in increasing Jordan's exports of onions. Exports of fruit and vegetables were also supported through trade policies. Import duties were imposed on imported fresh vegetables (23%) and fruit (18-23%), as well as quantitative restrictions. These tariff barriers kept domestic prices for those commodities generally high, which more than compensated for the appreciation of the exchange rate during the oil era, which would otherwise have worked as a subsidy to imports. No such duties were imposed on imports of cereals and lentils, which are import-competing commodities. On the contrary, wheat and wheat flour imports were heavily subsidised by the government, through the Ministry of Supply while, as mentioned above, domestic producers were protected though support prices.

These policies combined with demand trends during the boom were reflected in an increase in wholesale prices of: 6.9% p.a. for wheat, 15% p.a. for fruit, and 17.7% for vegetables, over 1975-81.

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[32]Since NP is calculated using official exchange rates, overvaluation understated the disincentive to farmers. FAO's calculations of the exchange rate corrected NP showed it to be not significantly different from the uncorrected one, because FAO's calculations erroneously show the Jordanian currency overvaluation to be negligible (about 1%).

[33]Surplus production is processed at substantial losses in a government owned canning operation.

Synthesising the change in input and output prices, and taking dynamic changes of the input-output relationships into consideration, a composite index of a profitability (price/cost ratio) has been constructed (Table VI.4-2).

Table VI.4-2
Composite Index of Price/Cost ratio

	Cereals	Vegetables	Fruit
1975	100%	100%	100%
1976	153%	174%	146%
1977	144%	181%	159%
1978	170%	226%	181%
1979	153%	185%	168%
1980	109%	189%	148%
1981	97%	156%	139%

Source: Calculated from tables in Appendix VI.3.

The favourable price/cost ratios for vegetables and fruit can be explained, firstly, in terms of increased output prices resulting from buoyant demand, and, secondly, in terms of the reduction in costs associated with increased labour productivity.

Table VI.4-3
Trends in the Yield of Crops Grown in Jordan (ton/hectare)

	1973	1980	1986
Wheat	1.01	2.04	1.53
Tomatoes	7.52	16.93	26.24
Cucumber	4.81	16.23	26.61
Eggplant	7.52	19.39	18.69
Oranges	12.33	13.30	21.37
Lemon	6.31	9.16	16.13
Banana	4.39	31.18	14.91

Source: The Jordan Valley Dynamic Transformation: 1973-1986, tables II.18, II.19, & II.20: 49, 50 & 52.

That demand was buoyant during the boom has already been mentioned in Section VI.2.2. Data on yield per hectare of individual crops for the period 1973-1986 are given in Table VI.4-3. Both fruit and vegetables yields, expressed in tons per hectare, increased much faster than for field crop yields. How this affected labour productivity depends on changes in employment in each enterprise. When employment declines, the increase in land productivity is expected to be magnified when expressed in terms of labour productivity. The reverse is of course true. Analysis of the resource movement suggests that, in general, employment declined in rain-fed farming, and increased slightly in irrigated farming in the Jordan Valley. But even allowing for this factor, it is unlikely that productivity results would have changed significantly, since capital was increased considerably in the fruit and vegetables enterprises, while labour increased only slightly. This argument is difficult to support with historical data, since a breakdown of labour productivity by enterprise is not available. Other routes to the same result are possible. Cross-sectional data for vegetable production using different techniques show that a move from traditional farming to modern high input farming brought about substantial gains. As shown in Table VI.4-4 below for tomatoes, a move from traditional open-field cultivation to cultivation under plastic and using high input production techniques reduced unit production cost by 24%, and increased profit margin per unit output by a factor of three, and per hectare by a factor of forty-eight. Since this move away from traditional to modern farming techniques has been the historical trend for fruit and vegetables, but not for cereals, we would expect the effect of increasing land productivity on reducing per unit production cost to be highly salient in the first two enterprises, and not in the latter.

Table VI.4-4
Profitability for Vegetables Grown Under Different Techniques of Production

	Yield (ton/ha)	Price (JD/ton)	Gross Revenue (JD/ha)	Total Cost (JD/ha)	Net Profit (JD/ha)
Tomatoes					
Plastic houses/high input	160	119	19,040	12,850	6,190
Plastic Tunnels/Drip or mulch	60	119	7,140	3,580	3,560
Traditional /Open field	10	119	1,190	1,060	130
Cucumber under plastic					
High input	100	228	22,800	12,340	10,460
Normal input	70	228	15,960	9,450	6,510
Squash					
Drip/mulch	30	163	4,890	2,120	2,770
Open field	10	163	1,630	1,260	370
Eggplant					
Drip/mulch	40	113	4,520	2,770	1,750
Open field	14	113	1,582	1,290	292
Potatoes					
with manure	30	120	3,600	2,570	1,030
without manure	10	120	1,200	1,540	(340)

Source: Qasem, 1986: 95.

VI.5 Conclusions

The study of agriculture's performance during the boom period in Jordan gives results that contradict the expected outcome of the Dutch disease 'core model', since agricultural output increased in absolute terms, and agricultural exports grew exponentially. We conclude that the Dutch disease was not manifest in the agricultural sector of Jordan..

There are two arguments by which this outcome may be compatible with the Dutch disease 'extended model', both of which are based on Rybczynski's theorem. The first is the 'paradox model': if both capital and labour are mobile across agriculture and the non-traded sector, and if agriculture is relatively better endowed with capital, 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, on account of its relative labour-intensity. The spending effect will have a counter-balancing effect, but on balance pro-agriculturalization is possible. Agriculture *is* more capital-intensive than service activities, especially construction. The paradox model may, in theory, therefore be accepted as an explanation of the performance of the sector as a whole.

The second argument is connected with the concept of 'decomposition of the lagging sector'. If agriculture is composed of industries that employ factors with differing intensities, then the movement of labour out of the sector leads to a reorganisation of capital and labour in favour of the capital-intensive industries whose output expands. Taking the technical coefficients for agricultural production in 1975, fruit and vegetables were relatively more labour-intensive than wheat, yet the output of the former two enterprises expanded significantly while that of wheat contracted. This contradicts the extended model of the Dutch disease, and Rybczynski's theorem on which it is built.

Critical analysis of production in the sector shows technical coefficients to be changing during the boom, because new techniques of production embodying technological change were adopted. Evidence obtained from such analysis suggests strongly that technological advances increased productivity and therefore profitability in the production of vegetables and fruit. It is highly plausible that this is mainly responsible for the continued increase in supply; while the expansion of external demand originating in the Gulf assured that no excess supply conditions were 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' hypothesis.

CHAPTER VII

The Squeeze on Tradeables: The Performance of Manufacturing

Introduction

The growth of output and exports of manufacturing in Jordan over the boom period was considerable; that is, in terms of Corden and Neary's model (1982), 'pro-industrialisation' rather than 'de-industrialization' took place. It was argued in Chapter III that some expansion of manufacturing during the boom must be allowed for in developing economies, because of the industrialisation process. However, trend analysis in Chapter IV, which established the counterfactual to the Dutch disease, showed manufacturing output to have been much higher during the boom, and much lower after the boom, than would have been 'expected' from the projected historical trend line. It would appear, therefore, that performance of manufacturing in Jordan was counter to the predictions of the Dutch disease model, even when assessed in relative terms. This chapter substantiates this assertion.

The previous chapter established that 'pro-agriculturalisation' was due mainly to technological progress embodied in irrigation and other technology, which was made possible by heavy government investment in major irrigation schemes prior to the boom. In manufacturing, it will be shown that 'pro-industrialisation' was made possible, not only by technological progress embodied in imported plant and equipment, but also by the rapid expansion of demand for manufacturing output originating both domestically and in the Gulf states. The increase in demand for manufactures made possible the use of hitherto idle capacity; the adoption of more sophisticated production techniques; and allowed for dynamic economies of scale to come into play. All of these new conditions increased production efficiency, which more than offset the adverse effect of relative price changes. This chapter will show that the divergence of the results for Jordan from those that would have been predicted by the Dutch disease model lies in productivity growth, and will investigate the source of this productivity growth.

The chapter is divided into three main parts. Part I offers: i) a theoretical discussion of why the Dutch disease model is not the most suitable theoretical framework for the study of manufacturing performance in industrialising booming economies (section VII.1); ii) an overview of market conditions and the policy and institutional framework governing manufacturing activities in Jordan (section VII.2); and iii) an examination of manufacturing performance and the sources of demand growth in the sector, in terms of domestic demand, export expansion and import substitution (section VII.3). Part II provides a quantitative account of the sector's growth in terms of: i) factor input (section VII.4.1); ii) total factor productivity (section VII.4.2); and iii) discusses the sources of productivity growth

(section VII.4.3). Part III sets out to: i) establish a methodology for the construction of profitability indices, taking into account trends in relative prices of inputs and outputs and in productivity growth (section VII.5.1); ii) present estimates of profitability in 12 manufacturing firms in Jordan (section VII.5.2); and iii) concludes with remarks on the implication of productivity growth for the Dutch disease theory (section VII.6).

PART I

VII.1 Industrialisation and the Dutch Disease: A Theoretical Discussion

Pro-industrialisation is not completely ruled out by the Dutch disease model. Under strict assumptions of a fixed national stock of primary factors, and of differing factor intensities in the three main sectors, 'pro-industrialisation' becomes a possibility.[1] If the lagging sector (manufacturing) is relatively more capital-intensive than the non-traded sector (services), while the total stock of capital and labour in the economy is fixed, the economy behaves in a Heckscher-Ohlin fashion. The resource movement, which draws labour out of both sectors into the booming sector thus making the resource structure facing both sectors more capital-intensive, entails a decline in the output of the relatively labour-intensive sector and an expansion of the relatively capital-intensive sector - the Rybczynski (1955) theorem. The spending effect, which increases the price of services relative to that of manufacturing, counters this trend, but 'pro-industrialisation' remains a possibility. A similar process may take place within the manufacturing sector, if different industries employ factors in different proportions: the relatively capital-intensive industries expand, even if the sector as a whole contracts.

There are two problems with this explanation as applied to the sector as a whole: one is practical and the other theoretical. On the practical side, it is quite difficult, if not impossible, to ascertain the relative capital intensity at a sectoral level, given the patchiness and sometimes total absence of data on capital stock in developing economies. On the theoretical side, the concept of capital intensity for a sector as a whole may not be meaningful: the manufacturing sector may include the highly labour-intensive industries of clothing, footwear and leather tanning, side-by-side with the highly capital-intensive industries of pharmaceuticals and petroleum refining. Similarly, the non-traded sector may include petty trading and telecommunications. These differentials in capital-intensity within sectors, on the other hand, allow the application of the Heckscher-Ohlin model and the Rybczynski theorem at an intra-industry level. As will be shown later for Jordan, the relatively capital-intensive industries tended to fare better than the relatively labour-intensive industries under boom conditions. However, differing factor-intensities constitute only a partial explanation of why 'pro-industrialisation', rather than 'de-

[1]This is a necessary repetition from the previous chapter on which a different argument for manufacturing is built.

industrialization', took place in many developing economies, including Jordan, during the seventies oil boom. More important is the chain of interlinked supply-demand effects, normal to the process of industrialisation, which were augmented from the mid-seventies to the early eighties by the boom conditions.

Under booming conditions, aggregate demand rises rapidly, thus leading to an acceleration of the process of industrialisation, which is underpinned by the rise in *per capita* income and the greater-than-unity elasticity of demand for manufactures. This process is further helped by the fact that under booming conditions capital is abundant, which makes rapid capital accumulation possible. In turn, if the generally observable phenomenon of relatively higher productivity levels in manufacturing (i.e. as compared with the rest of the economy) is present, industrialisation itself will lead to increases in the rates at which aggregate demand grows: the process of industrialisation will become self-sustaining.

Increases in the level and rate of growth of productivity in manufacturing are more likely to happen under booming conditions than otherwise, because of the buoyant demand conditions which enlarge the extent of the market. The two most important means by which demand may influence the growth of productivity are increased capacity utilization and economies of scale.

The rapid rise in incomes ensures that demand for final output is sufficient to keep capacity installed in the economy fully utilised, whereas a pre-boom developing economy with low *per capita* income is, by contrast, more likely to be operating under excess supply conditions. A developing economy that has just entered a booming phase, then, may increase its output by moving towards the full capacity utilization state without any loss of competitiveness, even in those sectors against which relative prices have moved, since while output is expanding, unit costs of production are declining because of increased production efficiency. This increase in productivity could more than compensate for the decline in tradeables' prices relative to non-tradeables, arising from the spending effect. Furthermore, abstracting from the spending effect, the existence of unemployed labour prior to the boom would also dampen the effect of the resource movement, since the booming sector would be absorbing what is otherwise an idle resource. The assumption of the Dutch disease theory of full employment of resources at all times, i.e. including the pre-boom phase, does not easily accommodate this outcome, although Corden has discussed it (1984).

Economies of scale are expected to impart substantial gains in efficiency in developing economies that start from low *per capita* income and therefore small

markets, through greater specialisation. The size of these gains depends greatly upon the distribution of increased expenditures among products as *per capita* expenditures rise; and shifting consumption patterns have a great deal to do with observed differences in growth rates (Denison, 1967: 9). *Ceteris paribus*, the smaller the existing market the larger, presumably, are the gains from economies of scale as markets expand. The importance of these changes will diminish if the expansion of markets is not accompanied by changes in managerial and technical knowledge (ibid).

Economies of scale need not be looked at in a static manner only. Adam Smith, Alfred Marshall, and Allyn Young have all stressed the interplay of static and dynamic factors causing returns to increase in response to an increase in the scale of industrial activities. These scale economies include aspects like learning by doing, embodied technology, new entrepreneurs, etc., which are derived not only from the expansion of any single industry, but also from a general industrial expansion, which should be seen, as Young put it, "as an interrelated whole" (Young, 1928; see also Kaldor, 1966: 13-15; and Matthews, 1982: 275). The statistical basis of the hypothesis is the so-called Verdoorn Law, or the observed correlation between the rate of growth of productivity and the rate of growth of production. Because of its neo-classical nature, the Dutch disease theory cannot easily accommodate increasing returns into the prevailing framework of perfect competition and marginal productivity factor pricing.

The effect of a larger market may be to increase efficiency in yet another way, namely by allowing the application of techniques that could not have been adopted until *per capita* incomes were sufficient to provide a market justifying the cost of their use. This was the case in many European economies that were able to adopt American technology only after their *per capita* incomes had, to some extent, caught up with that of the US. The possibility of this outcome was enhanced when capital became abundant, since American technology had developed in an environment where capital was more abundant than in Europe. The rapid increase in capital availability in Europe in the post-war period facilitated the transference of technology and reduced the amount of adaptation required. This process was not the result of any technological lag between the US. and Europe; rather, it flowed from the increase in *per capita* income, combined with a disproportionate allocation of purchasing power to products where existing techniques for larger scale output could be adopted with an above average decline in unit costs (Denison, 1967: 237).

The importance of demand goes beyond income elasticities and the level of *per capita* income to include total demand for consumption goods. The sudden increase in domestic purchasing power may allow the economy to cross a 'consumption threshold' whereby the income available for consumption goods, especially manufactures, is magnified. This in turn has two major outcomes. First, it leads to a rapid increase in total profits which will most probably induce more investment in the sector, as internal financing in firms becomes a possibility. Second, the demand pull may be so large that some of it is bound to spill over into domestic production, which enjoys natural protection against imports. It is worth noting that domestic products do not always have to be perfect substitutes for imports, if consumer tastes allow it. To put it another way, in many developing economies where incomes are much lower than in industrial economies, consumers are content with lower quality domestic products, so long as they are cheaper than imports. That is, the elasticity of substitution between domestically produced and imported products is lower than what is implied in the Dutch disease theory - where perfect substitution is assumed. In this case, the law of one price does not hold, and domestically produced tradeables may be able to compete well in their own markets.

Finally, the demand pull effect on output of tradeables will be magnified if the boom is regional rather than domestic. In such a case the demand from nearby countries for domestic exports will compound the effect of domestic demand; while, at the same time, if the whole region is booming the adverse relative price effects will be dampened, since differential inflation will be less pronounced than otherwise. A multi-country, rather than a single-country, model may be more efficient in predicting the outcome of tradeable goods' performance in this case.[2]

The supply response of manufacturing may be influenced by factors other than demand, but which are nevertheless related to the boom conditions. The two most important of these factors are abundance of foreign exchange and change in relative prices. Both these factors would be consistent with the importation of new technology, in the form of plant, equipment and even managerial skills, which might impart technological progress and thus increase productivity through shifting production possibility frontiers. The two factors are also consistent with the

[2]A hint of how these models may be constructed can be glimpsed from Forsyth and Kay (1981). Their very simple model was developed for the UK. Germany, and Saudi Arabia, although for a different purpose than our present one.

importation of improved intermediate inputs to production, thus increasing productivity through enhancing production efficiency.[3]

Government policy and action can greatly influence the performance of manufacturing, both directly and indirectly. In most developing countries governments do not remain neutral to the process of industrialisation but try to direct its pace through an explicitly adopted 'development strategy', which in a large number of developing economies take the form of 'unbalanced' growth, i.e. with the emphasis on increasing the share of industry. Indirectly, government consumption and investment behaviour, which determines the vector of final demand, will through the usual inter-industry links influence the structure and performance of manufacturing. This latter aspect is especially important when the foreign exchange earnings of the boom accrue to the government (see sections IV.2.2.2 & V.2.1).

Government trade policies are also important. It is to be expected that when foreign exchange is abundant, governments are likely to embark on trade liberalisation. This policy may have two opposing effects. On the one hand, it will increase competition from imports and thus further exacerbate the inter-sectoral effects of relative price changes; but, on the other hand, the very fact of increased competition may have the positive effect of increasing efficiency in manufacturing production.

Industrial and pricing policies are also relevant. In a large number of developing economies the seventies oil price rise brought about the adoption of price controls, at least for fuel oil, to protect consumers and industrial production. In booming economies with generally high domestic inflation price controls extend to manufactured commodities, thus exacerbating price movement against tradeables. On the other hand, if investment in manufacture is directly supported by the government, with, for example, exemption from income and profit tax, tariffs and duties, this would alleviate the relative price effect.

To sum up the argument, the limitations of applying the Dutch disease model to the study of manufacturing performance in industrialising economies arises from three main shortcomings: first, its assumption of fixed technical

[3]It has been suggested by Keesing (1979) that a high price of foreign exchange will generally speaking correspond to a faster growth rate, although the means by which this is achieved, namely the increase in production efficiency, is not discussed.

coefficients of production;[4] second, and linked to the first aspect, its neglect of demand effects - apart from the allowance for elasticities of demand to work themselves out in the model - which may significantly influence supply conditions (by increasing productivity which alters technical coefficients of production); and third, its failure to take account of government action.

There is not, as our knowledge of economic modelling stands, one model that can on its own adequately study the short-to-medium effect of favourable exogenous shocks on the production structure of industrialising economies. Yet all the above aspects must be carefully considered in any such study. This is why the analysis of manufacturing performance under boom conditions cannot be encompassed in one overarching argument, such as the one advanced by the Dutch disease theory. In fact the reverse is true: this chapter shows that an analysis which encompasses all the above points is multi-faceted to such an extent that, at times, sustaining an integrated analysis is difficult.

VII.2 The Manufacturing Sector in Jordan: An Overview

The manufacturing sector in Jordan faces two major disadvantages. The first is a small domestic market, both in breadth and depth, which necessitates a strong export performance to achieve economies of scale in production. The second is the absence of domestically available raw materials on which to base production. These two factors combined have the effect of increasing production costs and lowering profitability. During the boom, Jordanian manufacturing suffered further from the familiar adverse intersectoral effects of, on the one hand, rising prices for labour and other non-traded inputs, and, on the other hand, declining output prices, relative to services. This was further exacerbated by trade liberalisation, which the government had embarked upon because of the improved external balance position.

On the other hand, manufacturing production in Jordan enjoys a number of advantages. First, Jordan's proximity to the large and prosperous markets of the oil-exporting countries in the Middle East and the Gulf gives them a significant transport cost advantage. Second, strong cultural ties with these countries benefit Jordanian producers in these markets, not least because of the homogeneity of

[4]More accurately, the Dutch disease model does allow for change in technical coefficients through the elasticity of substitution between labour and capital in the model, but not through technological progress. It is precisely this latter aspect of change in technical coefficients that leads to a reduction in unit costs, when the assumption of zero change in its value is dropped (see chapter VIII for an elaboration).

tastes. Third, reasonably well-developed financial institutions and instruments are available to channel financial resources to industries. During the boom three further effects - two supply-side and one-demand side - helped to increase manufacturing profitability. First, government investment in physical infrastructure such as roads, reliable electricity and telephone services, and industrial estates in the seventies (and eighties) facilitated increases in industrial productivity and reductions in production costs (section V.2.1). Second, the inflow of large sums of foreign exchange relaxed the foreign exchange constraint, which gave Jordanian manufacturers an advantage over their major regional competitors, Egypt and Syria, by ensuring better access to imported inputs and technology. On the demand side, the rapid rise in incomes (GNP *per capita* rose at 8% p.a. in real terms over 1974-82), given the greater-than-unity income elasticity of demand for manufacturing in developing economies, relaxed the small market constraint on efficient size of plant, and allowed economies of scale to work. This process was enhanced by the rapid rise in demand for Jordanian manufactured exports originating in Gulf states, where incomes were rising much faster than Jordan's. Idle capacity in the economy (unemployment stood at 14% in 1972) was rapidly utilised, and by 1976 the economy seems to have reached full capacity utilization (unemployment stood at 1.6% in 1976). These factors combined to lower production costs by increasing productivity.

On balance, the boom's favourable effects, namely the relief of the foreign exchange gap, gains in productivity from better infrastructure, and the effect of demand pull on unit production costs, appear to have succeeded in completely reversing the adverse intersectoral effects of the boom, as evidenced by the impressive growth of manufacturing output and exports during 1974-1982.

Before the analysis starts, a word on government action is in order, since limited space has prevented a detailed exposition of the policy and institutional framework that governed the growth of the manufacturing sector in Jordan.

Generally speaking, the Jordanian government's stated position *vis-à-vis* the economy is one of *laissez-faire*. Nevertheless, as in almost all developing economies, a certain level of intervention in the market economy has always existed, which inevitably encroached on manufacturing activities. For example, in addition to direct government ownership in manufacturing which amounted to 18.4% in 1984, the government has indirect ownership through equity participation by autonomous public institutions and mixed enterprises, whose capital is partly owned by the government. Furthermore, the government often appoints representatives on boards of directors in companies in which it owns equity, and

solicits loans for these companies. Finally, the government's close relationship with the private sector in manufacturing often compels it to bail out loss-making firms (World Bank, 1983c, Annex A, Table A-1: 79; 1986a, Table 4.2: 40; & 1988: 6).

Policies explicitly stated to enhance the contribution of industry in national income include investment encouragement, investment licensing, and control of external trade. As regards investment encouragement in the sector, the government has always relied on the 'Encouragement of Investment Law', which grants tariff exemption for imported fixed assets, and income and social security tax breaks for industrial, and other, projects if they meet certain criteria, most important among which is the fulfilment of national plan objectives. An assessment of these exemptions has shown their effect on investment to be only marginal (see Dar Al-Handasah, 1982e for detailed analysis). More important has been the effect of investment licensing and the granting of monopoly rights, which were pursued vigorously in the sixties and early seventies. Tobacco, leather tanning, petroleum refining, and cement have been enjoying monopoly rights and a ban on competing imports since the fifties. Monopoly rights were given on the grounds that these industries enjoy economies of scale of which they would be deprived in the presence of competition, given Jordan's small market. Prior to the boom, investment licensing was often withheld from applicants for many prospective manufacturing industries on the same grounds. However, regulating the market through investment licensing came to halt in the wake of the first oil boom since the rapid expansion of domestic demand enlarged the extent of the market, but monopoly rights remain even to date. Where these monopoly rights are granted the government reserves the right to dictate output prices, which are invariably lower than free trade import prices. In addition, prices for six other manufactured commodities were under control during the boom period when inflation rates were historically high (grain milling, baking, pharmaceuticals, soft beverages, batteries and detergents). In aggregate, the influence of price controls on profitability is not significant.

The single most effective policy in influencing profitability in manufacturing in Jordan is trade regulation. Prior to the first oil boom import substitution was pursued explicitly, and the effective rate of protection (ERP) was about 72%; this was significant enough to turn many otherwise unprofitable enterprises into profit-making ones by increasing their value added.[5] In addition, quantitative restrictions

[5]For comparisons with other developing economies during that period, which show Jordan's ERP to be mid-range, see Bdour (1990) Table 6.4: 148; Amerah (1982), Table 4.7: 169.

and outright import bans were also common. From 1974, restrictive trade policies were abandoned in favour of tariffs, which were reduced across the board to bring the ERP down to 42% by 1979 which, although still significant, helped only a small section of manufacturing as a whole.[6] This trade liberalisation was, to a certain extent, reversed in 1983[7] under intense pressure from the private sector for more protection, as the regional recession deepened (Alawin, 1978; Dar Al-Handasah, 1982c; World Bank, 1988).

Finally, trade agreements, both bilateral and multilateral, were one of the trade policy tools through which the government furthered its industrial strategy. Some of these agreements were quite effective, notably with the Arab oil-exporting countries, but most were not. It is especially with Saudi Arabia and Iraq that trade agreements, which treat Jordanian imports preferentially, helped Jordanian manufactured exports (Ministry of Industry and Trade, 1985). Although these agreements were mostly entered into in the fifties and sixties, and their status did not change considerably during the boom, the rapid expansion of demand in the Gulf states, resulting from the inflow of oil revenues, must have enhanced the opportunities for Jordanian exporters to benefit from these agreements.

The important point to make from the foregoing is that during the boom period manufacturing activities were conducted under relatively liberal industrial and trade policies, compared with the pre- and post-boom periods, since the only form of manufactures protection during the boom was nominal tariffs which, by historical standards, was low.[8] In other words, government action was not a significant explanatory factor of manufacturing performance under booming conditions in the case of Jordan, because of the reasons mentioned above.

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[6]See Dar Al-Handasah (1982c), Table 25: 84; Amerah (1982), Table 5.10: 271.

[7] For 1983 rates, see World Bank (1988) Table 2.4: 22.

[8]It is plausible that under conditions of buoyant demand a lower ERP would have had a similar effect on profitability to higher ERP under conditions of suppressed demand, and may still, therefore, be considered as a determining factor of growth of output and exports. In Jordan's case no apparent correlation exists between these variables for manufactures. The correlation coefficient between ERP and exports growth was 0.08 for 1974-82 and -0.2 for 1983-91; between ERP and output growth 0.31 and 0.02 for the same periods (ERP for 1979 from Bdour, 1990, Table 6.3: 148; ERP for 1983 from World Bank, 1988, Table 2.4: 22; export and output growth from Tables VII.3.1-2 and VII..3.1-3.

VII.3 The Performance of Manufacturing Under Booming Conditions

VII.3.1 Growth Trends

It was demonstrated in Chapter IV that from the early fifties until the early eighties the Jordanian economy went through continuous industrialisation (section IV.1). The share of agriculture in total employment and output declined, and was compensated for by the growth in industry (mining, manufacturing, utilities and construction). By 1982 manufacturing was contributing 13.1% to aggregate output. Employment in manufacturing increased much more slowly during the boom than did output, and in most years lagged behind the growth of employment in mining, the utilities sector and construction, but it surpassed employment in agriculture where it actually declined. The manufacturing sector had thus unambiguously experienced 'pro-industrialisation' during the boom period, rather than 'de-industrialization'.

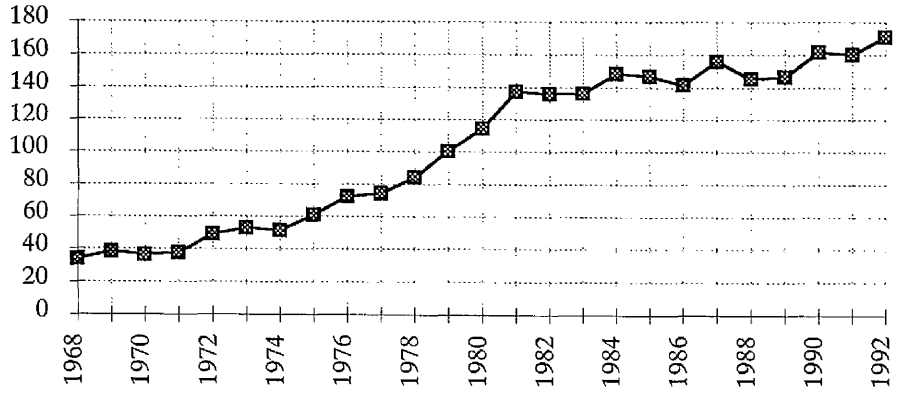
The index of manufactures' production (by quantity, weight or volume) grew at 15.9% p.a. over 1974-81, compared with 9.8% p.a. over 1968-74. From 1982, growth of manufacturing output decelerated, and in many years between 1983-92 it suffered a real decline, reflecting poor adjustment to the post-boom conditions. The index of manufactures' production thus grew sluggishly at 3.3% p.a. over 1983-91. Table VII.3.1-1 and Figure VII.3.1-1 summarise these general trends in manufactures performance.

Table VII.3.1-1
Manufacturing Growth and Contribution to Employment and GDP: 1954-92

	Real Annual Growth Rates[1/]		Manufacturing Share in[2/]	
	Manufacturing	GDP	Employment	Output
1954-1960	9.38	10.10	-	5.7
1961-1966	17.85	8.16	-	7.3
1967-1972	2.18	4.06	9.0[3/]	10.1
1973-1982	16.66	11.89	6.9	13.3
1983-1992	0.77	-0.12	8.1	11.6

Source: Appendix AIV.1 for growth and share in output; Department of Statistics, *Industrial Census; Industrial Survey*, various issues, for employment.
1/At constant 1975 prices.
2/ Period average.
3/ Including mining.

Figure VII.3.1-1
Index of Manufacturing Production: 1968-92
(physical quantities)



Source: Calculated from Central Bank of Jordan, *Monthly Bulletin, various issues.*
Notes: The index is a weighted average of production indices for 18 manufacturing industries, based on weights for individual industries as given in above reference. This is different from Central Bank of Jordan's index of industrial production which includes mining industries.

The expansion in manufacturing was experienced over a wide range of industries, as can be seen from Table VII.3.1-2 below. The industries with outstanding performance during the boom, in terms of growth rates and contribution to growth (the addition of total value added attributed to the industry concerned), were: non-metallic minerals, tobacco, chemicals, non-electric machinery (although the latter started production in 1979, its contribution was equal to that of chemicals at 14%). On the other hand, wearing apparel, leather, basic metal, electrical machinery, and transport equipment, all of which are labour-intensive in Jordan, experienced serious declines.

In the immediate post-boom period 1983-1986 growth patterns for many industries were reversed: most industries that had experienced rapid growth during the boom performed poorly after it (tobacco, paper, and petroleum) or even declined (beverage, footwear, chemicals, and non-electric machinery); while some industries that suffered during the boom had exhibited impressive performance immediately following the boom (food, textiles, wearing apparel, basic metal, and electric machinery). The sector as a whole managed to grow at 4.3% p.a. over 1983-86. In the following period (1987-1991) the majority of industries experienced a real decline, and the value added for the sector declined at 3.3% p.a.. The

Table VII.3.1-2
Growth & Contribution to Growth of Value Added in Manufacturing Industries, 1969-1992

(at constant 1979 prices)

	Annual Percentage Growth Rates				Contribution to Growth 1/		
	1969-73	*1974-82*	*1983-86*	*1987-91*	*1969-73*	*1974-82*	*1983-91*
All Manufactures (300)	**9.8%**	**15.8%**	**4.3%**	**-3.7%**	**100%**	**100%**	**100%**
Food products (311-312)	8.2	0.6	15.1	3.7	17.6	0.5	22.4
Beverages (313)	7.2	25.0	-2.7	0.6	1.0	3.5	4.0
Tobacco (314)	2.9	38.6	0.8	-0.5	3.7	15.4	4.5
Textiles (321)	11.4	-0.4	15.4	15.9	8.3	-1.6	13.7
Wearing apparel (322)	11.4	-2.6	9.3	4.3	5.0	1.3	3.7
Leather products (323)	79.2	-20.9	1.4	2.6	10.7	-0.8	2.0
Footwear (324)	79.2	21.4	-18.0	-11.3	3.0	2.6	-4.7
Wood products & furniture (331-332)	79.2	24.5	10.6	-14.5	13.6	3.6	-4.0
Paper & products (341)	2.5	39.7	0.4	-0.4	0.3	5.5	9.9
Printing & publishing (342)	2.5	18.2	13.6	-6.8	0.5	2.3	2.2
Chemical & products (351)	20.5	32.4	-9.0	11.8	5.3	14.2	51.5
Petroleum refining (353)	11.2	9.9	0.0	-28.8	13.9	4.6	3.7
Rubber products (355)	9.8	23.9	11.5	-2.3	0.0	0.3	1.0
Plastic products (356)	9.8	-11.2	0.0	3.3	3.7	3.5	3.4
Non-metallic mineral products (369)	11.2	27.6	4.5	-10.8	9.2	35.1	-34.6
Basic metal products (371-372)	3.4	-6.5	15.3	-5.1	3.4	-3.5	9.4
Fabricated metal (381)				-4.1			28.1
Machinery, except electrical (382)		20.3	-44.9	26.6		14.3	-27.7
Machinery, electric (383)	3.4	-7.1	20.6	40.7	0.5	-0.6	12.3
Transport equipment (384)	3.4	-22.0	-10.6	-36.3	0.4	-0.3	-0.9

Source: Department of Statistics (DOS), 'Industrial Census'; 'Industrial Survey'; and 'Statistical Yearbook, various issues.
Central Bank of Jordan (CBJ), Monthly Bulletin, various issues.

Notes: Value added from DOS is available from 1974 onward. The 1969-1973 values are extrapolated backward with the help of 'Industrial Production Index' from CBJ. All values from above sources are given in current prices. For deflation an index of wholesale prices was constructed from CBJ, 'Monthly Bulletin', various issues, see Table AVII.4- (1.a) in Appendix AVII.4.

1/ Addition to total value added attributed to the industry, or (Vi2-Vi1)/(V2-V1) , where Vi is value added in industry i, V is total value added, and 1& 2 are the end years for the respective period.

foregoing suggests that manufacturing performance during the boom was the outcome of distinct economic conditions, which were apparently reversed in the post boom period.

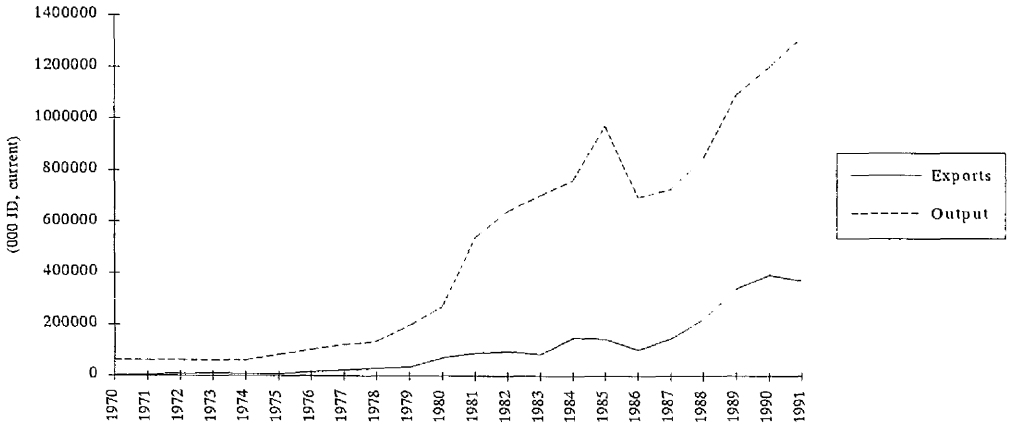
Jordan's manufacturing experience during the boom and post boom periods is closer to that of Indonesia than to Nigeria or Iran. Indonesia's manufacturing performed well during the boom, albeit under relatively high ERP (66%), and sluggishly in the post-boom period, but did not decline. In Nigeria, the manufacturing sector expanded at 13.4% p.a. over 1973-82, while it declined very rapidly over 1982-84. Struthers (1990) explains this in terms of availability of cheap imports in the first period and their scarcity in the second period. In Iran, the manufacturing sector grew at 5.9% p.a. in real terms immediately after the first boom, and started declining from 1977 onward (Jazayeri, 1988, Table A.9: 173). A combination of Dutch disease effects, in terms of rising costs and declining relative prices (of tradeables to non-tradeables), led to that outcome. In addition, government action augmented the sectoral influence of the boom (ibid).

It is important to note that, performance in the post-boom period notwithstanding, all of these industrialising economies experienced 'pro-industrialisation' during the boom period rather than 'de-industrialization', which runs counter to both what the Dutch disease model envisages, and the experiences of industrial booming economies (UK., Holland, and Norway, for example. See Barker and Brailovsky, 1981). It is plausible, therefore, that whether 'pro-industrialisation' or 'de-industrialization' takes place under booming conditions depends, either directly or indirectly, on *per capita* income levels and the degree of industrialisation at the start of the boom (see chapter III, section III.4).

VII.3.2 Exports Expansion

The expansion of manufacturing output was accompanied by an expansion in exports, as can be seen in Figure VII.3.2-1. In 1967, the value of manufactured exports amounted to JD 0.5 million (5.5% of total exports), increasing to JD 7.1 million in 1974 (18% of total exports), and further to JD 86.4 million (51% of total exports) in 1982 (Table VII.3.2-1); the annual rate of growth of manufactured exports was thus 43% over the boom period 1974-82. In real terms this amounts to 30.6% p.a., compared with 23.9% p.a. in the pre-boom period of 1970-73, and 5.0% p.a. in the post-boom period 1983-91 (Table VII.3.2-2).

Figure VII.3.2-1
Jordan Manufacturing Output and Exports, 1970-1991



Source: Department of Statistics, *External Trade Statistics; Industrial Survey;* and *Industrial Censuses,* various issues.

The expansion of exports was on a broader base than the expansion of output, since with the exception of petroleum refining all manufactures experienced export growth between 1974-82, for most quite substantially. Thus there is no necessary correlation between output growth and export expansion; a notable example being food products, whose exports expanded at 30% p.a. while its value added barely grew at all. Other such examples include textiles, clothing, basic metal, indicating that Jordanian exports may have become more competitive in export markets than domestically, perhaps because of bilateral trade agreements.

The largest contributor to export expansion was food products, which alone contributed 27.3% to total value of manufactured exports, followed by chemicals, whose contribution amounted to 21.3%. Metal products, plastic products and non-metallic minerals also contributed substantially to export expansion, and so, but to a lesser extent, did wood and tobacco. Like manufactured output, manufactured exports experienced serious fluctuations in the post-boom period, especially from 1983-86; but continued their upward trend nevertheless. The most noticeable fluctuations were in construction industries (non-metallic minerals, and wood products), beverage, tobacco, clothing and rubber products.

Table VII.3.2-1
Jordan's Exports of Manufactures; Value and Ratio to Domestic Output, 1970-1991

BTN	ISIC		Value (000 JD, current prices)				Proportion of Domestic Output			
			1970	*1974*	*1982*	*1991*	*1970*	*1974*	*1982*	*1991*
11-21	311-312	Food products	960	1,735	12,351	14,878	0.09	0.12	0.24	0.10
22	313	Beverages	11	36	1,538	3,268	0.01	0.02	0.10	0.09
24	314	Tobacco	520	832	4,912	4,138	0.56	0.24	0.15	0.06
50-59	321	Textiles	145	1,107	2,596	13,664	0.18	0.28	0.26	0.37
42-43	322	Leather products	4	13	2,748	338	0.01	0.01	2.05	0.03
60-62	323	Clothing	90	448	1,132	8,578	0.05	0.18	0.14	0.46
64-67	324	Footwear	38	85	751	2,617	0.08	0.14	0.14	0.46
44-46	331-332	Wood products	7	12	5,345	1,246	0.00	0.01	0.39	0.04
47-48	341	Paper & products	241	436	2,982	8,134	0.27	0.43	0.17	0.17
49	342	Printing & publishing	10	6	405	146	0.01	0.01	0.06	0.01
28-38	351	Chemical products	302	1,178	22,923	162,385	0.18	0.31	0.45	0.65
27	353	Petroleum refining	11	232	29	22	0.00	0.02	0.00	0.00
40	355	Rubber products	2	31	25	50	0.01	0.06	0.03	0.02
39	356	Plastic products	30	161	6,870	17,339	0.04	0.15	0.53	0.36
68-71	369	Non-metallic mineral products	31	73	8,421	8,013	0.01	0.01	0.09	0.06
73-81	371-372	Metals & products	15	144	9,971	15,675	0.00	0.02	0.37	0.18
82-83	381	Metal manufactures	1	7	120	480			0.06	0.08
84	382	Machinery, non-electric	1	45	2,038	5,091	0.59	0.43	0.33	0.09
85	383	Electric machinery	304	542	449	1,677	0.00	0.00	0.60	0.39
86-89	384	Transport equipment	0	0	782	676				
Total Manufactured Exports			**2,737**	**7,121**	**86,388**	**268,414**	0.04	0.12	0.13	0.20
Total National Exports			**9,320**	**39,438**	**185,581**	**598,627**				
Ratio of Manufactured to total Exports			0.29	0.18	0.51	0.62				

Source: Department of Statistics, 1970-1991, 'External Trade Statistics' for exports; Industrial Survey and Industrial Censuses, various issues for output.

Table VII.3.2-2
Jordan's Export of Manufactures (constant 1979 prices)

BTN	ISIC		Annual Percentage Growth Rates (exponential)				Contribution to Growth 1/			
			1970-73	*1974-82*	*1983-86*	*1987-91*	*1970-73*	*1974-82*	*1983-86*	*1987-91*
11-21	311-312	Food products	19.2	31.5	(9.2)	21.9	33.1	27.3	(217.2)	5.7
22	313	Beverages	(42.8)	25.6	(33.5)	117.4	(0.3)	2.1	(3.2)	3.0
24	314	Tobacco	27.4	25.2	(39.9)	(15.8)	12.5	5.2	(40.4)	(2.3)
50-59	321	Textiles	44.6	13.9	(14.2)	11.4	6.3	2.2	(30.9)	9.2
42-43	322	Leather products	164.7	75.6	(9.1)	10.7	5.9	2.7	(0.4)	0.1
60-62	323	Clothing	(8.4)	17.8	(22.7)	23.6	(0.6)	0.4	(15.6)	3.2
64-67	324	Footwear	(3.7)	3.9	(6.3)	27.1	(0.3)	0.1	0.3	1.9
44-46	331-332	Wood products	(6.4)	114.1	(25.1)	14.7	0.0	5.7	(21.0)	1.7
47-48	341	Paper & products	0.1	10.3	24.5	(8.9)	0.1	1.6	16.1	(2.1)
49	342	Printing & publishing	(14.2)	54.2	31.5	(22.3)	(0.4)	1.1	5.0	(0.8)
28-38	351	Chemical products	9.0	43.6	26.2	7.0	1.7	21.3	449.1	50.9
27	353	Petroleum refining	59.4	(49.2)	11.9	(51.0)	11.6	(1.3)	0.2	(0.1)
40	355	Rubber products	120.2	2.0	(25.9)	53.6	0.4	0.0	(0.1)	0.1
39	356	Plastic products	(16.3)	35.7	(0.3)	(8.2)	(0.2)	9.3	10.7	(9.7)
68-71	369	Non-metallic mineral products	(24.6)	74.3	(34.0)	44.5	(1.7)	8.9	(48.3)	20.1
73-81	371-372	Metals & products	85.8	52.2	(2.1)	3.5	3.3	10.7	(0.3)	0.8
82-83	381	Metal manufactures	115.6	39.5	42.8	4.7	0.2	0.1	1.6	0.0
84	382	Machinery, non-electric	385.6	52.7	(10.5)	70.7	6.0	2.1	(3.2)	13.5
85	383	Electric machinery	(13.7)	11.0	63.9	47.6	(2.8)	(0.3)	5.4	3.4
86-89	384	Transport equipment			(34.3)	27.6			(7.8)	1.3
	300	**Total manufacturing**	**23.9**	**30.6**	**3.2**	**8.7**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Department of Statistics (DOS), 1970-1992, 'External Trade Statistics'; Central Bank of Jordan (CBJ), Monthly Bulletin, various issues.

Note Current price exports from above sources are deflated by unit export value series constructed from DOS and CBJ. See note 20 for methodology.

1/ Addition to total value of exports attributed to the industry, or (Xi2-Xi1)/(X2-X1), where Xi is value of exports in industry i, X is value of total exports, and 1 & 2 are end years in the period considered

The expansion of manufacturing exports at twice the speed at which their domestic value added grew during the boom led to a rapid change in the status of exports, from that of a minor activity accounting for only 4% of manufactures' output in 1970 to that of a significant aspect of the national economy accounting for 15% of manufacturing output in 1982 (this was further increased to 28% in 1991).

From the mid seventies to 1978, manufactured exports received their main impetus from the booming oil-exporting Arab countries, especially Saudi Arabia (which imported nearly one-half of the total), while from the late seventies to the early eighties the most dynamic factor was the steep increase in exports to Iraq, which accounted for 46% of Jordan's total manufacturing exports as compared with only 9% in 1977 (World Bank, 1983b: 4). On average, Saudi Arabia, Iraq and Syria accounted for nearly 80% of Jordan's manufacturing exports during the boom period in Jordan (Department of Statistics, *External Trade Statistics,* various issues).

The sudden increase in Iraqi demand for Jordanian exports[9] was more a result of its war with Iran than the oil boom itself (Iraq's use of Jordan as a transit route for its trade was rewarded by increasing imports from Jordan). Nevertheless, the impetus this demand gave to Jordanian exports had a profound impact on the structure of industrial production, and in fact many enterprises were created in the late seventies and early eighties, either as joint ventures between the Jordanian and Iraqi governments or on private initiative, for the sole purpose of serving the Iraqi market. Iraq's financial difficulties after 1982, combined with the end of the oil boom which had financed a large part of Iraq's war machine, led to a real decline in Jordanian exports in 1984. The coming on stream of additional capacity in a large number of industrial firms (e.g. paints, aluminium profiles, glass) coincided with the collapse of these markets, resulting in low profitability and widespread capacity under-utilization (World Bank, 1988: 10).

The special ties Jordan had with Iraq during the second oil boom notwithstanding, the performance of Jordanian exports reflects increased competitiveness. This remains the case despite the fact that Jordan has a locational advantage, and had entered into trade agreements giving Jordanian manufactures preferential treatment in these two and other Arab countries. Since these agreements had been signed in the fifties and sixties and did not change in nature during the

[9]From JD 3.4 million in 1978 Jordanian exports to Iraq rose to JD 12.7 million in 1979, of which JD 11 million (78%) were manufactures (Department of Statistics, *External Trade statistics*, various issues).

boom period, they cannot be considered a variable determining export performance, although they undoubtedly boosted Jordan's position in these markets.

VII.3.3 Import Substitution

To more accurately reflect the impact of the boom on Jordan's trading position, import substitution must also be considered. Import substitution can be measured as a change in the ratio of imports to total available supplies *à la* Chenery (1960), i.e.

$$IS_{1-2} = \frac{M_2}{S_2} - \frac{M_1}{S_1}$$

where M and S stand for imports and total supply respectively, and total supply in turn equals domestic production Q plus imports M: $S = (Q + M)$. Subscripts 1 and 2 denote successive time periods.[10]

The results of import substitution calculations can be traced in Table VII.3.3-1, which shows that the reverse of import substitution took place, i.e. there was increased import penetration, by 13% between 1974-82 (or 1.6% p.a.), although some industries (beverages, tobacco, rubber products, paper products, and non-electric machinery) succeeded in substituting imports. The increased import penetration for the sector as a whole is hardly surprising given the liberalisation of trade that had taken place in the mid-seventies, the currency appreciation by 17%

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[10] A measure of import substitution that accounts for spill-over effects upon the rest of the economy from imports would be based on input-output tables as follows: define **M, Q** and **S** as above, let **A** be the relevant input-output matrix for the period and **I** be the identity matrix, so that:

$$[\mathbf{I}-\mathbf{A}]\mathbf{Q}+\mathbf{M}=\mathbf{S}$$

$$\mathbf{Q}+[\mathbf{I}-\mathbf{A}]^{-1}\mathbf{M}=[\mathbf{I}-\mathbf{A}]^{-1}\mathbf{S}$$

calling $[\mathbf{I}-\mathbf{A}]^{-1}\mathbf{M}$ the new vector of redefined imports $\mathbf{M}^*$ and $[\mathbf{I}-\mathbf{A}]^{-1}\mathbf{S}$ the new vector of total supply $\mathbf{S}^*$, import substitution of good i is then computed as:

$$\mathbf{IS}_i^* = \frac{\mathbf{M}_i^*}{\mathbf{S}_i^*} - \frac{\mathbf{M}_{i-1}^*}{\mathbf{S}_{i-1}^*}$$

Input-output tables for Jordan are available for 1967 (from Department of Statistics, 1967), 1979 (from Dar Al-Handasah, 1982b) and for 1987 (Ministry of Planning, 1992). However, the treatment of imports in each of these tables is different, insofar as they are considered as perfect substitutes for domestic output or uncompetitive. Furthermore, the 1979 tables are given in purchaser's prices, rather than producers' prices, which further reduces their comparability with the other tables. This has prevented the use of the above described methodology in calculating import substitution.

Table VII.3.3-1
Annual Growth Rates of Import Substitution in Manufacturing Industries, 1974-1991 1/

	1970-73	*1974-82*	*1983-91*
Food products	-1.61	2.74	-1.68
Beverages	9.73	-2.38	-8.80
Tobacco	-3.62	-8.07	-6.12
Textiles	1.07	2.27	0.35
Wearing apparel	1.69	2.43	0.12
Leather products	-11.62	39.16	-10.47
Footwear	-21.21	0.87	7.58
Furniture, and wood products	5.14	4.12	-2.40
Paper and products	-3.73	-1.72	0.23
Printing and publishing	12.22	2.19	-2.88
Industrial chemicals	0.76	2.05	-11.71
Petroleum refining	-1.43	6.70	-0.23
Rubber products	0.68	-0.34	-0.23
Plastic products	-9.46	6.70	0.90
Non-metallic minerals	-0.90	1.24	-1.93
Basic metal products	-1.67	4.18	-1.79
Machinery, non-electrical	3.30	-0.52	1.27
Machinery, electrical	1.03	0.29	-1.70
Transport equipment	10.55	0.40	-0.05
Total Manufacturing	**0.04**	**1.57**	**1.23**

Source: Department of Statistics, 'External Trade Statistics', various issues, for imports & exports; 'Industrial Survey'; 'Industrial Census', various issues, for output.

1/ A negative sign indicates that import substitution has taken place. See text for methodology.

Table VII.3.3-2
Jordan Net Trade Balance of Manufactured Products, 1974-1991

	1974-84	*1984-91*
Food products	-19,694	-67,621
Beverages	-1,270	2,273
Tobacco	-2,166	-1,820
Textiles	-17,611	-36,867
Wearing apparel	-8,460	-8,834
Leather products	-1,284	762
Footwear	-4,100	4,291
Furniture, and wood products	-7,126	-22,846
Paper and products	-9,810	-25,928
Printing and publishing	-6,310	433
Industrial chemicals	23,190	74,778
Petroleum refining	-208,450	-33,746
Rubber products	-10,370	-13,140
Plastic products	-12,897	-25,071
Non-metallic mineral product	-56,007	36,802
Basic metal products	-61,699	-31,963
Machinery, non-electrical	3,245	-89,772
Machinery, electrical	-45,129	10,509
Transport equipment	-75,605	-58,361
Other manufactures	-37,559	1,692
Total Manufactured Exports	**-564,290**	**-290,173**

Source: Department of Statistics, External 'Trade Statistics', various issues.

between 1972-78, and the abundance of foreign exchange which made imports more readily available in the economy. In view of the fact that no import substitution took place in the pre-boom period, despite the relatively high protection offered to industrial production during that period, the boom's low rate of import penetration may be considered an achievement. If this proposition is accepted, it follows that domestic producers maintained, if not increased, competitiveness under adverse booming conditions.

A close examination of the manufactured trade balance (Table VII.3.3-2) shows that the most significant increase in deficit over 1974-82 occurred in capital goods (non-metallic minerals, metal products, transport equipment and electric machinery) which accounted for 66% of the manufactures trade deficit, against 43% in the pre-boom period. This is to be expected because Jordan was going through a rapid process of industrialisation, while her technological abilities in producing capital goods were still limited. The weak and rudimentary inter-industry linkages that ruled out the production of capital goods were the result of Jordan's dependence on a small number of export markets, coupled with a narrow range of domestic product lines, mainly concentrated in engineering and construction material. Structural weaknesses in manufacturing became more apparent from 1983 onward, when Gulf markets began to be adversely affected by the rapid decline in oil prices.

Thus far it has been shown that domestic output and exports of manufacturing grew substantially during the boom period in Jordan, while import substitution declined relatively slowly. In part II a quantitative account of the sector's growth in terms of factor input and total factor productivity is given, followed by an investigation of the sources of productivity growth.

PART II

VII.4 Factor Input and Total Factor Productivity

VII.4.1 Factor Input

Labour

Our examination of the Jordanian labour market in sections IV.2.1 and V.3.1 has shown its most salient features to be: (1) a substantial resource movement - labour out-migration - immediately following the first oil boom, especially of highly skilled labour; (2) a rapid labour absorption in all sectors during the period 1973-75 (6.9%) which, combined with labour out-migration, lead to a rapid decline in unemployment from 14% in 1972 to 1.6% in 1976; and (3) an inflow of foreign labour, mostly unskilled, from the late seventies. The boom has thus had two opposing effects on labour input; on the one hand the increase in economic activity increased labour input quantitatively, notwithstanding labour out-migration since the economy started from excess supply of labour conditions and, on the other hand, the boom and the consequent labour migration led to a slower growth in the quality of labour than would have been expected given the rapid increase in education. This is evidenced from the more rapid increase in the percentage of highly educated and highly skilled labour among the out-migrating labour than among Jordanian labour working within Jordan; while the same percentage for in-migrating labour declined (Tables V.3.1.2-2 and IV.3.1.2-3). It is believed that the industrial sector suffered most from the latter effect (Al-Akel, 1985). However data available on labour supply in Jordan do not allow adjustments for quality.

Labour input to manufacturing is shown in Figure VII.4.1-1 and growth rates between benchmark years in Table VII.4.1-1.[11] The most rapid absorption of labour occurred during the oil boom period 1974-82 at 11.3% p.a., which is accounted for by a large number of small labour-intensive industries (food, clothing, wood and furniture, rubber products, etc.), and a small number

[11]The figures for growth of labour in manufacturing in the above referred to Table (from Department of Statistics - DOS - *Industrial Survey; Industrial Census*, various issues) are not entirely in agreement with Table (IV.2.1.2-2) which uses a different data base (Royal Scientific Society - RSS - 1989). For manufacturing, it is highly likely that DOS is a more reliable source that RSS - RSS was used as a source in chapters IV & V for comprehensivenesss since it covers the whole economy, and no adjustment for labour in manufacturing was attempted then as it would have lead to internal inconsistency in the data base.

Table VII.4.1-1
Growth of labour In Manufacturing Industries
(Annual percentage growth rates, by number)

	1969-1973	1974-1982	1983-1991
Food products	-2.5%	12.8%	9.9%
Beverages	10.0	7.6	-5.5
Tobacco	-1.7	3.1	7.3
Textiles	-4.5	-2.6	4.2
Wearing apparel	3.9	11.4	2.4
Leather products	-3.7	-1.4	2.1
Footwear	2.5	3.3	5.3
Furniture & Wood	6.8	7.2	1.7
Paper and products	3.7	10.2	7.0
Printing & publishing	-2.7	8.0	3.1
Industrial chemicals	15.7	22.4	5.2
Petroleum refining	6.7	6.7	2.8
Rubber products	9.1	11.2	107.4
Plastic products		9.3	8.8
Non-metallic minerals	7.7	11.5	3.7
Basic metal products	7.5	9.2	-0.5
Machinery	-0.8	38.3	-26.9
Transport equipment	20.1	9.7	40.0
All Manufacturing	**3.3**	**11.3**	**6.6**

Source: Department of Statistics, 'Industrial Census'; 'Industrial Survey', various issues

Figure VII.4.1-1
Labour in Manufacturing Industries in Jordan, 1967-1991

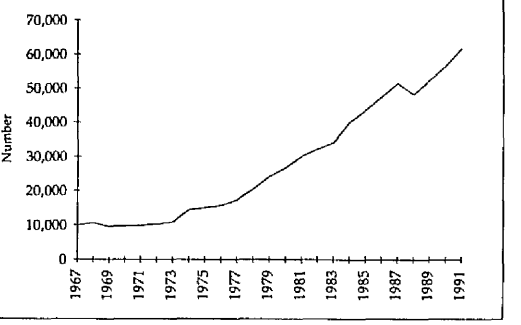


Table VII.4.1-2
Growth of Fixed Capital in Manufacturing Industries
(Annual percentage growth rates, at constant 1984 prices)

	1969-1973	*1974-1982*	*1983-1991*
Food products	36.3%	10.9%	16.2%
Beverages	17.3	13.4	-0.9
Tobacco	10.8	5.8	-10.6
Textiles	3.9	10.5	2.5
Wearing apparel	43.2	15.7	8.0
Leather products	4.0	7.8	10.6
Footwear	2.1	30.9	3.8
Furniture & Wood	5.7	15.7	-3.1
Paper and products	2.2	25.7	7.3
Printing & publishing	19.6	9.5	9.9
Industrial chemicals	-2.4	33.2	-8.8
Petroleum refining	36.7	19.1	5.8
Rubber products	18.9	7.2	23.0
Plastic products	0.0	13.6	3.4
Non-metallic minerals	3.6	11.2	9.7
Basic metal products	8.7	14.5	-4.7
Machinery	16.2	58.7	-9.0
Transport equipment	12.7	19.1	19.6
All Manufacturing	**9.3**	**17.4**	**4.2**
excluding NRIs 1/	**10.5**	**15.9**	**5.5**

Source: Ibid
1/ Chemicals, petroleum refining and non-metallic minerals

Table VII.4.1-2
Fixed Capital Stock in Manufacturing Industries in Jordan, 1967-1991

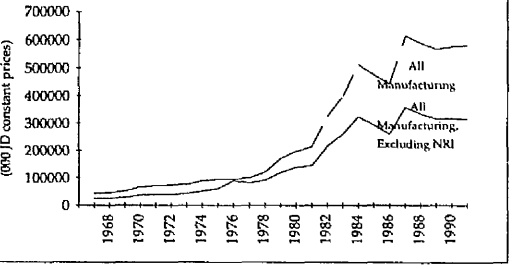
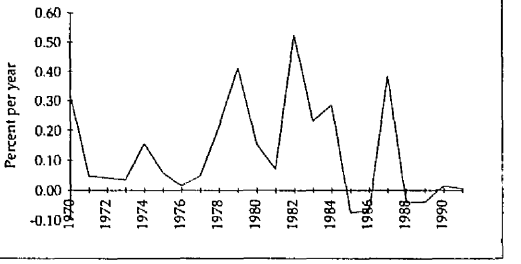


Figure VII.4.1-3
Growth of Fixed Capital in Manufacturing Industries in Jordan, 1970-1991



of very large capital-intensive projects (non-metallic minerals, and fertilisers - under industrial chemicals).

Capital

The concept of capital stock (K) here used is total fixed assets at constant prices, net of depreciation (to give greater relative weight to investment of more recent date).[12] Annual data relating to accumulation of capital as defined are charted in Figure VII.4.1-2, and the corresponding annual growth rates in Figure VII.4.1-3. Growth rates between benchmark years are given in Table VII.4.1-2. A comparison of the boom period with earlier and following periods yields two outstanding conclusions: (1) the growth rate of the fixed capital stock in the boom period was markedly higher than in other periods, and (2), within the boom period, there was a pronounced acceleration from 1979 which spilled over the post-boom period as it continued up to 1984. The high rate of investment in manufacturing has to be viewed against the background of the pre-boom period, when investment was low (due to political instability). Nevertheless, taking the entire period 1968-91, the growth rate of capital during 1979-84 remains higher than any other period, suggesting it was not a catching-up phenomenon since it has no historical parallel.

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[12]Capital stock in manufacturing was obtained from the Department of Statistics (DOS). The value of capital stock for 1974-91 is published in *Industrial Survey; Industrial Census;* and *Statistical Yearbook,* various issues. For 1968-73 capital stock was obtained from unpublished records of DOS. In all these sources capital stock is given in current prices. Deflating capital to constant prices proved difficult as DOS evaluates total fixed assets as beginning of the year assets plus net additions to capital (purchased assets, plus assets of own account, plus improvements minus sold assets) during the year with depreciation netted out. The difficulty stems from estimating beginning of the year value of an asset as book value at purchase time, rather than take down time. Converting this book value to a meaningful measure of capital stock is what usually gives rise to erroneous estimates of physical capital in general, since total stock of capital is composed of assets of different vintages. To overcome the problem, I took the year 1979 as a base year as it is a middle point in the span of time for which capital stock is considered (1968-1991) and also because it is a census year. Total fixed assets for 1979 were then considered to reflect capital stock in current prices for that year, I then deflated net fixed capital formation to 1979 prices and added and subtracted it forward and backward to obtain an estimate for the capital stock for the remaining years. The method follows directly from DOS's procedure in estimating capital stock as can be seen from the following formula:

$$K_n = K_0 + \frac{(1-d)_n}{(1+f)}$$

where K is capital stock, 0 and n represent base year and current year respectively, I is investment, d is depreciation and f is inflation rate.

Rather, it is the conditions of the boom that are responsible for the rapid capital accumulation. Most important perhaps is the negative cost of borrowing, as the Central Bank of Jordan fixed interest on investment loans at 9%, while inflation averaged 10.5% over 1970-82 yielding a negative real lending rate of -1.5%; compared with +6.0% over 1983-87 (Table IV.2.2.2-1). The second factor responsible for the rapid capital build-up is the large inflow of funds from the Gulf for the private sector (remittances) and the public sector (Arab Aid). Both sources made investible funds readily available in the economy which previously suffered from an investment gap. Furthermore, since these funds were in foreign currency, the boom also relieved a foreign exchange gap thus enabling the import of capital goods that Jordan does not produce. Finally, the accumulation of foreign exchange increased Jordan's creditworthiness, which allowed the escalation of an already high level of foreign borrowing, making investible funds even more available. The latter factor is important in explaining investment behaviour in Jordan since all the borrowing was made by the government which did not necessarily follow market signals in making investment decisions. For example, whilst signs of demand slackening were visible as early as 1981/82 heavy investment continued in late 1984. The influence of government investment behaviour on capital accumulation can be seen from the high concentration of gross fixed capital formation in natural resource based industries (NRI), which are largely government financed; three NRI industries (chemicals, non-metallic minerals, and petroleum refining) accounted for 72% of total gross fixed capital formation in manufacturing over the period 1974-84 (see Figure VII.4.1-2). Petroleum refining is a monopoly in which the government holds shares, and both chemicals and non-metallic minerals are dominated by one capital-intensive, government-owned enterprise, viz. fertilisers for chemicals and cement for non-metallic minerals.

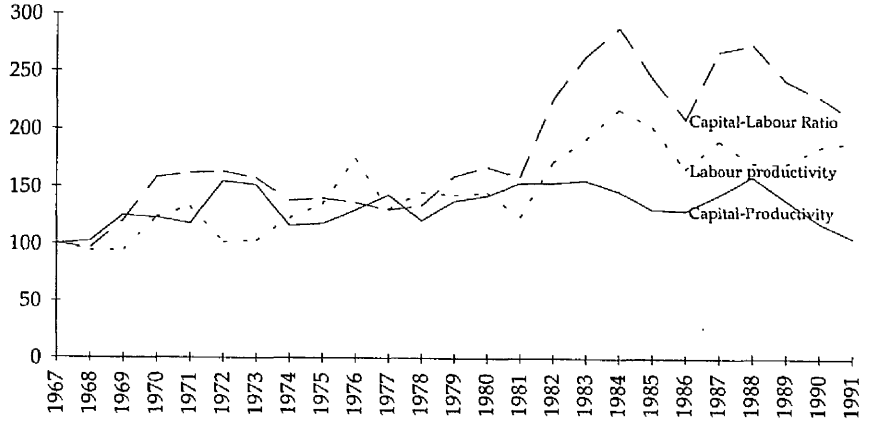
The measures of physical capital discussed above relate to capital stock, and not capital in use, unlike the measure of labour input.[13] There are no continuous statistical series on the degree of utilization comparable to the unemployment percentage for labour. Therefore total factor productivity (TFP) as I calculate it should be interpreted to account for changes in capital utilization, since the latter is not included in total factor input (TFI).

[13]For a discussion of the utilization of capital and a differentiation between economic and physical utilization see Matthews *et al.*, 1982: 151-9.

VII.4.2 Total Factor Productivity

The advantage of TFP over partial productivity measurement, which lies in its comprehensiveness, has already been mentioned in chapter IV when the economy's performance was assessed. For manufacturing, the case is equally strong: growth in capital exceeded that of labour by 6% p.a. over the boom period which would have necessarily meant a rapid growth in labour productivity (since output was expanding at least as fast as labour); yet, that growth partly reflects a rising capital-labour ratio rather than productivity increases (Figure VII.4.2-1). Furthermore, the exceptionally high rate at which capital grew might have undermined capital productivity because of organisational problems, and because of difficulties in choosing technology (see Al-Handasah, 1982a). This was further exacerbated by the serious shortages of skills from out-migration, mainly engineers, but also managers and skilled manual labour. With in-migration consisting mainly of unskilled and semi-skilled labour, less skills were available to deal with more sophisticated machines.[14] Thus a true measure of productivity should reflect both labour and capital productivity, which is captured by TFP, or output per unit of input.

Figure VII.4.2-1
Labour Productivity, Capital Productivity and Capital-Labour Ratio in Manufacturing Industries



Source: Department of Statistics, *Industrial Survey* and *Industrial Censuses*, various issues.

[14] It is argued sometimes that mechanization requires less skills than manual work. Although this may be true of some processes, in the majority of Jordanian industries, scarcity of managers and of skilled manual labour was a serious constraint on the effectiveness of technology transfer in the boom period (see Al-Handasah 1982a for a detailed discussion based on a 74-firm survey).

"A fully comprehensive measure of TFI would include inputs of all scarce resources, direct and indirect (i.e. embracing all externalities and unintended by-products, insofar as they affected measured output). The rate of growth of TFI, so defined, would be little if at all lower than the rate of growth of output" (Matthews, *et al.* 1982: 200). Any positive value for growth in TFP must then be held to be due to either errors of measurement, or to increases in output due to the borrowing of innovations that were ultimately traceable to inputs of scarce resources in other countries than the country in question. Since a statistical estimation of TFI in its fullest sense is not a practical proposition, more restricted measures of TFI have to be used, and the lines of demarcation between TFI and TFP are bound to be to some extent arbitrary (ibid: 201). The most elaborate use of TFP concept, as presented above, is Denison's (1967), who was able to account for 23 sources of American growth over 1950-1962, including change in age-sex composition of labour, education, hours worked, advances of knowledge, economies of scale, cyclical effect of demand, and improved allocation of resources. Other economists like Jorgenson and Griliches have adjusted not only for labour but also capital inputs for efficiency changes and thus have further narrowed the residual (Kendrick 1977: 18).

Kendrick (ibid), on the other hand, has taken a different position. Instead of adjusting inputs for quality or efficiency to narrow 'the measure of our ignorance', he measures inputs unadjusted so that the residual brackets the entire change in productive efficiency. He then tries to quantify all the variables that explain productivity change. I will adopt Kendrick's approach for two reasons. One is convenience, since no data on input quality or the efficiency of their use are available. Second, and more to the point, given that my objective is not to quantify TFP as such, but rather to show the effect of the boom conditions on changes in its value, I would like to capture all boom-related changes, especially those of production efficiency, in the residual. I will then try to decompose this residual to show the different components of productivity change and, when possible, their order of magnitude.

In estimating TFP in manufacturing industries in Jordan, I first attempted an econometric approach but problems of choosing the mathematical form of the production function soon arose, and the econometric fitting of production functions exhibited marked instability in the face of minor modifications in data, specification, and observation period. I decided to stay as unspecific as possible in respect of the form of production function and just calculate TFP using the

growth account technique à la Matthews *et al.* (1982), which corresponds to that used by Solow (1971), adapted for changes in discrete time instead of instantaneous rates of change. This is expressed in the following formula which decomposes output growth into the growth TFI and the growth of TFP:

$$\hat{p} = \hat{q} - \hat{f} \quad (1)$$

$$\hat{q} = \alpha.\hat{l} + (1-\alpha).\hat{k} \quad (2)$$

where the circumflexes denote the average annual rate of change between two benchmark years, p is TFP, f is TFI, q is output, l is labour, k is capital, and α is a weighting term, taken as equal to the average share of labour in income for the period considered.

Matthews' *et al.* (ibid) justification for this growth account approach is based on macro-economic and other grounds, since 'the growth accounting method involves saying "let us see what remains unexplained if we assume that in the base year the factors of production, as defined, are paid the value of their marginal product", rather than asking "what remains unexplained if we assume that the production function at any time is $q = (0.25\ k^{-0.7} + 0.75\ l^{0.75})^{-1.4}$?" (202). Moreover, Matthews *et al.* argue, in making comparisons between periods using the growth accounting method, that it can readily be seen whether differences in TFP growth are the result of differences in output growth, or in the growth of one or more of the inputs, or in first year factor shares. This would not be true of a more complicated system (ibid). Nevertheless, the growth account method still assumes certain properties for the production function: constant returns to scale; homogeneous labour and capital; growth in TFI *and* TFP mutually independent; marginal productivity pricing; and no discontinuities (ibid: 203; Krueger and Tuncer, 1980 Nishimizu and Page, 1982). The appropriateness of these assumptions is discussed in a considerable body of literature, and I need not repeat the discussions here. Griliches (1971) has criticised the growth account method on the grounds that the underlying production function is not a stable function, since there are large unexplained shifts in it; this should be interpreted, according to Griliches, as measurement errors, rather than technological change. (Interestingly, Griliches' suggested alternative econometric approach accounts for differences between inputs and output entirely in terms of changes in quality of inputs and economies of scale). However, as Pack (1988) has observed, despite the imperfections in the measurement of TFP growth, sustained learning at an industry-wide level should be reflected in the growth of measured TFP (Ahluwalia, 1991: 35). The absence of an alternative framework for analysing the

issues of growth and productivity makes it necessary for us to analyse the trend in TFP, while recognising the limitations imposed by the methodological framework (ibid).

I have estimated TFP at both two-digit manufacturing level using officially published data, and at firm level using data I gathered for ten firms in the process of conducting a survey that forms an integral part of this study. The two sets of TFP measurements are presented in Tables VII.4.2-1 and VII.4.2-2. Details of the methodology and measurement are given in Appendix AVII.1.

In my calculations of TFI in two-digit manufacturing industries I did not include raw materials because of data unavailability. However, at the firm level material was included as an input, since the differing conditions of foreign exchange abundance and currency value during the boom period compared with the pre- and post-boom periods are expected to influence the availability and quality of imported material input, and consequently productivity (especially after the devaluation by 50% of the Jordanian Dinar in 1988). Of course, the inclusion of raw material in TFI meant that the measured output was gross of raw material.

At the firm level, in seven firms out of ten TFP was positive for the 1974-82 period, and in six it was both positive and significant.[15] In Jordan Dairies and Arab Pharmaceuticals the negative value was due to very rapid capital build-up. Thus despite the exceptionally high growth rates of output (17% p.a. in Dairies and 14% p.a. in Pharmaceuticals), the abnormally high growth rate of capital especially in the former (44% p.a.) but also in the latter (22% p.a.) gave negative TFP.

In the post-boom period most firms that experienced positive TFP during the boom continued to exhibit positive and significant TFP, with the exception of Fabricated Aluminium and Society Publishing. Jordan Dairies continued to have negative TFP indicating inefficient use of resources, while Arab Pharmaceuticals' negative TFP during the boom turned positive and significant in the post-boom period.

At the two-digit level the sector as a whole experienced 0.5% p.a. growth in TFP over the boom period 1974-82, compared with a decline of 0.7% p.a. in

[15]The pre-boom period was one of major political upheaval, and its results will therefore not be discussed.

Table VII.4.2-1
Total Factor Productivity Growth in Ten Jordanian Manufacturing Firms, 1970-1992

(Annual percentage growth rates)

		1970-1973					*1974-1982*					*1983-1992*				
		Output	Factor Input			TFP	Output	Factor Input			TFP	Output	Factor Input			TFP
ISIC			Capital	Labour	Material			Capital	Labour	Material			Capital	Labour	Material	
(3112)	Jordan Dairies	35.9	(1.8)	21.1	26.3	20.1	17.0	44.3	14.7	16.8	(11.2)	0.0	(16.8)	2.6	9.9	(0.6)
(3211)	Woollen Textiles	23.7	2.4	0.0	41.6	2.6	5.9	1.9	2.5	1.8	4.0	12.5	(10.4)	2.4	18.5	5.0
(3211)	Qwaasmi Textiles	(7.7)	3.2	10.0	13.0	0.0	0.5	8.0	4.6	2.0	(2.8)	(5.3)	(1.6)	0.4	13.3	0.0
(3240)	BATA Footwear	2.5	(24.3)	6.8	23.9	(2.1)	12.2	(1.1)	(3.8)	14.3	4.5	(5.1)	(19.0)	(1.8)	(19.7)	11.9
(3420)	Society Publishing	(6.0)	(13.2)	8.6	24.0	(18.5)	6.1	(0.6)	5.4	4.0	3.2	(4.4)	(4.7)	2.0	(0.5)	(3.7)
(3420)	Al-Tawfiq Publishing	0.4	217.6	49.0	(3.5)	(15.9)	13.5	(2.5)	7.6	16.0	8.2	(5.6)	(15.6)	1.9	0.3	2.8
(3522)	Arab Pharmaceuticals	12.0	(5.1)	10.2	19.3	6.0	14.0	21.6	6.7	17.6	(4.9)	4.8	(9.0)	7.6	7.5	4.5
(3523)	Al-Najah Soap	(2.2)	(13.5)	7.6	(1.6)	0.0	(0.5)	(3.9)	8.4	(1.0)	0.1	(0.5)	(1.8)	(2.6)	(4.4)	3.3
(3812)	Ayoubi Metal Furniture	38.7	(24.5)	0.0	0.8	23.4	(1.0)	(1.2)	(4.7)	(3.9)	1.9	20.3	(19.0)	5.6	8.9	23.7
(3813)	Fabricated Aluminium	(6.6)	(11.3)	0.0	34.6	(34.5)	15.1	(8.2)	6.4	14.9	2.3	(5.0)	(9.4)	5.6	(5.4)	(0.5)

Source: Own firm-level survey for outputs and inputs. Department of Statistics, 'External Trade Statistics'; Central Bank of Jordan, 'Monthly Bulletin', various issues for price deflation.

Note: See Annex AVII.1 for methodology

Table VII.4.2-2
Total Factor Productivity Growth for Two-Digit Manufacturing Industries in Jordan, 1969-1991

(Annual percentage growth rates)

		1969-1973			*1974-1982*			*1983-1991*		
ISIC		TFI	Output	TFP	TFI	Output	TFP	TFI	Output	TFP
311-312	Food products	31.5	8.6	(22.9)	10.11	0.6	(9.5)	13.77	7.42	(6.4)
313	Beverages	15.8	7.2	(8.6)	11.52	25.0	13.5	-1.33	3.70	5.0
314	Tobacco	6.0	2.9	(3.1)	5.48	38.6	33.2	-2.87	-0.23	2.6
321	Textiles	1.9	11.4	9.4	6.12	(0.4)	(6.5)	3.31	8.89	5.6
322	Wearing apparel	36.7	11.4	(25.3)	13.36	(2.6)	(15.9)	6.20	2.21	(4.0)
323	Leather produces	3.6	21.2	17.6	5.31	(20.9)	(26.2)	7.39	7.82	0.4
324	Footwear	2.2	21.2	19.0	21.56	21.4	(0.2)	3.63	-8.27	(11.9)
331-332	Furniture, and wood products	5.9	21.2	15.3	12.85	24.5	11.6	-0.75	-3.88	(3.1)
341	Paper and products	2.9	2.5	(0.4)	18.48	39.7	21.2	7.78	8.72	0.9
342	Printing and publishing	12.6	2.5	(10.0)	8.02	18.2	10.2	7.09	-1.90	(9.0)
351-352	Industrial chemical	(0.6)	20.5	21.1	27.98	32.4	4.5	-2.40	11.53	13.9
353-354	Petroleum refining	18.6	11.2	(7.4)	13.76	9.9	(3.9)	4.92	2.71	(2.2)
355	Rubber products	0.0	9.8	9.8	9.72	23.9	14.2	53.65	53.92	0.3
356	Plastic products				11.00	18.0	7.0	5.00	2.00	(3.0)
369	Non-metallic mineral products	4.5	11.2	6.7	11.49	27.6	16.1	7.71	-4.26	(12.0)
371-372-381	Basic metal products	8.5	3.4	(5.1)	13.22	(6.5)	(19.7)	-3.21	14.09	17.3
382-383	Machinery	10.8	3.4	(7.3)	50.98	52.3	1.4	-16.33	-5.04	11.3
384	Transport equipment	14.1	3.4	(10.7)	15.02	(13.5)	(28.5)	0.00	-13.32	(13.3)
300	All Manufacturing	9.5	8.8	(0.7)	15.37	15.9	0.5	5.68	2.30	(3.4)

Source: Department of Statistics, ' Industrial Survey'; 'Industrial Census'; & 'External Trade Statistics, various issues, for outputs and inputs. Central Bank of Jordan, 'Monthly Bulletin', various issues, for price deflation.

Note: See Annex AVII.1 for methodology

the pre-boom period and of 3.4% p.a. in the post-boom period. In the boom period, almost all industries that experienced a very high growth rate of output also experienced a substantial growth in TFP: beverage 13.5% p.a., tobacco 33.2% p.a., wood and furniture 11.6% p.a., paper 21.2% p.a., printing and publishing 10.2% p.a., rubber products 14.2% p.a., and non-metallic minerals 16.1% p.a.. These values may seem unreasonably high, but, obviously, output growth in all these industries was even higher. Furthermore, remembering that capacity utilization is unaccounted for in TFI, and that idle capacity in the pre-boom period was substantial (see next section), TFP is expected to be very high to reflect increases in capacity utilization. Conversely, those industries whose output declined during the boom (clothing, leather, basic metal and transport equipment) or almost stagnated (food products and textiles) experienced a rapid decline in TFP. There are few exceptions to this rule of association between output growth and productivity growth, notable amongst them are footwear whose output grew at 21.4% p.a. but TFP declined at 0.2% p.a.; and petroleum refining whose output grew at 9.9% p.a. and TFP declined at 3.9% p.a.. It is also worth noting the performance of machinery and chemicals whose TFP growth (1.4% p.a. and 4.5% p.a., respectively) was not commensurate with growth in output (52.3% p.a. and 32.4% p.a., respectively (it is interesting to compare the result for the chemicals industry with that of Arab Pharmaceuticals firm, whose TFP declined because of the excess of capital input at 44% p.a. over output growth at 14% p.a. It is worth noting that Arab Pharmaceuticals controls a large share of the pharmaceuticals market, which itself, until 1982 when fertiliser production commenced, dominated industrial output).

Our conclusion thus far is that productivity increases in those industries that experienced rapid growth in output during the boom were substantial, which may explain their ability to resist a squeeze on profits stemming from adverse relative price movement and wage rises. This will be further investigated in section VII.5 which addresses relative price movement and profitability. The question addressed in the following section is whether productivity growth was related to the boom conditions, or whether it was more autonomous.

VII.4.3 Sources of Productivity Growth

Many hypotheses have been advanced in the literature on the possible sources of TFP growth, including output growth, trade liberalisation, relieving the

foreign exchange constraint, and economies of scale. These hypotheses are not mutually exclusive; they may all be true, and the postulated effects need not be independent of one another.

To investigate which of these hypotheses is relevant to manufacturing in Jordan, I ran a simple correlation analysis on sixteen variables; this included, in addition to TFP growth: growth in output (to test Verdoorn's law), growth in factor inputs (to test for economies of scale), and the proportion of output exported and export expansion (to test the trade liberalisation hypothesis). In addition, I included relative prices (of tradeables to non-tradeables), wage levels and wage rises, the import content of total cost, and factor intensities, to test the Dutch disease hypothesis of possible links between these variables and output growth. The results are given in Appendix AVII.2 with a discussion of the correlations' most salient features. Although it is not possible to discriminate finely among these hypotheses using such simple correlations, or indeed to determine the direction of causation, they should indicate areas meriting further investigation.

The most remarkable aspect of Table AVII.2-2 in Appendix AVII.2, which gives within-period correlation between 18 manufacturing industries for the boom, pre- and post-boom periods, is the existence of strong correlation between growth in productivity (both labour productivity and TFP) and output; and the lack of correlation between productivity growth and any other aspect investigated. The same is true for growth in output, which does not seem to be influenced by wage levels, wage rises, capital intensities and the import content of total cost, all of which have been suggested, explicitly or implicitly, by the Dutch disease hypothesis as explanatory of tradeables' performance.

This finding supports the existence of dynamic economies of scale associated with output expansion, or, in other words, that Verdoorn's law is operable. The law states that there is a positive and linear relationship between productivity growth p and output growth q (a view that is strongly supported by Kaldor 1966; 1975). Mathematically, this can be expressed as:

$$p = \alpha + \beta.q$$

where α and β are constants, and $\beta > 0$. Estimating β by OLS regression of p and q for pooled data (for 18 industries and across three periods as given in

Table VII.4.2-2 above) gave the following results:

$$p = -5.58 + 0.819\,q$$

$$(2.58) \quad (0.075) \qquad\qquad R^2 = 0.645$$

With $R^2 = 0.645$ and the t value = 10.9, a significant relationship between output and productivity can be said to exist, which further supports Verdoorn's law in the context of Jordanian manufacturing.[16]

Which way the causation runs, from output to productivity or the other way round, is a subject of intense debate in the literature (see the exchange between Rowthorn and Kaldor in *Economic Journal* 1975; Matthews *et al.*, 1982: 276). It is difficult to accept Kaldor's proposition that growth in output can be exogenous, except when there are peculiar features to the period in question (Rowthorn, 1975). Such features certainly existed for Jordan over 1974-82, namely the boom conditions, which were exogenous to the Jordanian economy. Nevertheless, that productivity growth in turn did not influence output growth is hardly a tenable position. Productivity increases raise output not only through their effect on relative prices and demand, but also through making exports more competitive; through increasing profits, *ceteris paribus*, and causing firms to invest more; and, through stimulating domestic demand for industrial goods, by making them relatively cheaper (ibid). Under these circumstances, the effect of dynamic economies of scale cannot be identified from a single-equation model, and what is required is a simultaneous model (ibid), "though whether one could be constructed satisfactorily for comparisons over a long period of time is problematical" (Matthews *et al.*: 982).

The strong correlation between output growth and productivity change in Jordan is more readily understandable when we examine the level of domestic demand and the constraints it placed on the utilization of productive capacity, and on the efficiency of production in general in the pre- and post-boom periods. On the eve of the first oil boom the population of Jordan was 1.83 million people, and current GNP *per capita* (at market prices) was only JD 132.0 ($ 395.9); it had risen to JD 708.12 ($ 2,124.3) by 1983, which amounted to an

[16]Lest these results are spurious because of errors in measuring TFP, β was estimated again using labour productivity, for which more reliable data exist. The results were as follows: β = 0.632, R^2 = 0.6446 and t value = 7.79; the fit is reduced but R^2 and t are still sufficiently good to convey something significant between output growth and productivity growth.

annual increase of 7.4% in real terms; but only to JD 789.7 ($ 1,128.1)[17] by 1992, which amounted to an annual decline of 5.4% in real terms. The constraint on growth caused by small market conditions is well recognised in economic development literature, and leads many economists to advocate export expansion as a growth strategy since it relieves this particular constraint on production and allows for economies of scale. This condition was present in the Jordanian economy from 1974, as the boom presented the opportunity for manufacturers to expand beyond national boundaries when incomes in neighbouring oil-exporting countries rose at much higher rates than in Jordan. The similarity of tastes, language and customs between Jordan and the Arab Gulf states, combined with bilateral trade agreements with these states giving Jordanian exporters preferential treatment, significantly reduced barriers to product markets in Jordan imposed by borders; this explains the export growth of 30.6% p.a. in real terms, and the consequent rapid enlargement of product markets. The potential effect of cyclical changes in demand on productivity growth should thus be apparent, since the rates of utilization of fixed plant and overhead labour as output rises or falls significantly influence productivity, by changing production efficiency.

That resources were under-utilised in the pre-boom and post-boom periods in the Jordanian economy is supported by unemployment figures (the unemployment rate was 14% in 1972, 1.6% in 1976, 6% in 1986 and 17% in 1992). In manufacturing, the 1970 *Industrial Survey* (Department of Statistics, 1971) revealed idle capacity of fixed plant and machinery to be of substantial proportions in most industries, with an unweighted average (for 32 industrial groups) of 55%. This was mainly due to the loss of the 'West Bank' in 1967, which shrank commodity markets for Jordanian products by an order of magnitude of 50%. But even in 1974, the first boom year, unused capacity in most industries, as given by the *Industrial Census* (Department of Statistics, 1974), was still of significant proportions (e.g. leather tanning 66%, plastic products 57%, rubber products 40%, paints 61%). In the post-boom era, an examination by the Royal Scientific Society of industrial capacity utilization in 1985 concluded that only about 50% of total installed capacity in the sector was actually being used (World Bank, 1988). This large magnitude of capacity under-utilization is explained by the rapid capital build-up after the second oil boom (at 24.3% p.a. between 1979 and 1982), on the assumption, apparently, that

[17]Notice that this is a decline in nominal dollar terms, because of the 50% devaluation in 1988.

demand will remain buoyant. Thus, the decline in oil prices in the early eighties, which led to a reversal of the boom in a sudden manner, in turn led to a collapse of commodity markets for Jordanian manufactures both domestically and abroad.

The intervening years between 1974 and 1985 cover the boom period for which no data on capacity utilization is available (see Appendix AVII.3 for an estimation). One fragment of evidence, however, allows me to suggest, tentatively, that the level of demand imparted varying degrees of capital utilization during the boom compared with pre- and post- boom. The measure I adopted relies on the phenomenon that the slower the demand the more overhead per unit output is incurred by enterprises. Therefore, the ratio of fixed to total cost should roughly indicate the degree to which available capacity is being utilised. I used data at the firm level from my own survey, since aggregation of cost at the industry level would most probably mask such a relationship.

Table VII.4.3-1
Ratio of Fixed to Total Cost in 12 Manufacturing Firms in Jordan
(unweighted arithmetic mean for)

1970-73	*1974-82*	*1983-91*
25%	21%	35%

Source: Own firm-level survey

As shown in Table VII.4.3-1 above, the ratio for the boom period was slightly lower than that of the pre-boom, but significantly lower than that of the post-boom. This is consistent with the observation that although plant capacity under-utilization in the pre-boom and post-boom periods were 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 10.4% for the pre-boom and 3.5% for the post-boom), and output fluctuations were far less pronounced in the former period than in the latter (coefficients of variation for average annual rates of growth were 1.33 and 2.54, respectively); labour overhead (e.g. financial management) is thus expected to be lower in the pre-boom than in the post-boom period.

I attempted to adjust for capacity utilization at the sector level, to show the order of magnitude of the contribution to TFP made by cyclical effects. In Appendix AVII.3 rates of capacity utilization for all the years between 1967 and 1992 were estimated, the values obtained used to adjust for capital input, and TFP recalculated. The results are shown in Table VII.4.3-2.

Table VII.4.3-2
Total Factor Productivity Growth
(exponential annual growth rates)

	1969-73	*1974-82*	*1983-91*
(1) Without adjustment for capacity in use	-0.7%	0.5%	-3.4%
(2) With adjustment for capacity in use	0.4%	0.9%	1.0%
(3) Difference, (2) - (1)	1.1%	0.4%	4.4%

Source: TFP growth from Table VII.4.2-2. Adjustment for capacity from Appendix AVII.3.

As is to be expected, the smallest difference between capacity-adjusted and capacity-unadjusted TFP growth occurred in the boom period, and the largest in the post-boom period. This is because the boom represents a period when resources approached full utilization.[18] The 1% p.a. growth in TFP during 1983-91, after capacity is adjusted for, is an indicator of the sector's potential productivity growth under conditions of buoyant demand.

These counterfactual values for TFP growth clearly show the significant effect on output growth of cyclical changes associated with the boom conditions. The utilization of hitherto idle capacity during the boom period increased output per unit input, or, conversely, reduced input per unit of output - real costs.

Abstracting from business cycles, part of the rise in TFP during the boom as compared with the pre-boom period is still not accounted for (line 2 in Table

[18]To be sure, only the period 1975-78 represented more or less full resource absorption. As can be seen from Appendix AVI.3, resource slack began its upward trend in Jordan from 1979, when unemployment exceeded 3%.

VII.4.3-2).[19] One of the plausible explanations for this rise is economies of scale. A study by Alawin (1978) of the manufacturing sector in 1974 conducted at the firm level has shown that many firms' actual plant size fell short of efficient size of plant. In that period, government industrial policy was oriented to controlling market structure through restrictive investment licensing: where market size was thought to be a constraint, investment licensing was withheld on the pretext of 'market saturation'. In a few cases where market size was a binding constraint that investment was not forthcoming, monopoly rights were granted (petroleum refining, cement, leather tanning and vegetable oil), and competing imports were banned. Although monopolies remain today, investment licensing as a regulatory measure was stopped soon after the boom began.

Given this evidence, economies of scale may have made a contribution to increasing output per unit input, through greater specialisation and dealing with larger units (longer products runs, larger transactions, etc.). The measurement of economies of scale effects is quite difficult, and I have not come across a satisfactory methodology of isolating the effects of economies of scale on growth that could be used for Jordan - barring extensive research into the engineering and the economics of production processes in single plants, as done by Pratten (1971) for British manufacturing. Econometric estimates of Cobb-Douglas and CES production functions were adopted by Griliches and Rringstad (1971) for Norwegian industries, to find that on the average these industries enjoyed economies of scale of the order of 6-7%. For Jordan, available data did not lend itself to econometric analysis, with the main problem originating from capital input.[20] Finally, Denison's (1962) roundabout approach to measuring the effect of scale economies on growth relied on the effect of increases in *per capita* consumption (the source of enlarging markets) on the composition of consumption *via* income elasticities of demand, and eventually on relative prices. By measuring consumption in Europe using US. relative

[19]In addition, of course, to errors of measurement, which may be due to: misspecification of variables - inputs - influencing output; errors in the measurement of their quantity; failure to account for changes in their quality; and using wrong weights in estimating their contribution.

[20]This may be due to the fact that the Government contributed substantially to capital input in the sector, especially between 1979 and 1984; while its investment was not in synchroneity with demand conditions (see "capital" under section VI.4.1 above). Another reason may be, as revealed by my own firm survey, that dump pricing - to drive competitors out of market - and profit mark-up are widely practised in Jordan, which would invalidate some of the assumptions underlying production functions, in regard to product and factor pricing.

prices (since US. prices should reflect the effect of larger markets on unit costs and therefore prices), and comparing the result with that obtained from using European prices, he was able to measure economies of scale associated with income elasticities and their contribution to growth in national output (in other studies, e.g. 1976 of the Japanese growth, Denison simply *assumes* the contribution to growth by economies of scale). This approach could not be used for Jordan, not least because of unavailability of *per capita* consumption data.

More important, perhaps, than static economies of scale is the effect of a larger market on the application of techniques that could not have been adopted until *per capita* incomes were sufficient to provide a market justifying the cost of their use, as happened in many European economies in the post-war period when they adopted American technology. Similarly in Jordan, many 'known techniques' could not be adopted prior to the boom because of the small market, as well as the dearth of capital. As incomes rose very rapidly and capital was abundantly available in the economy, many techniques well known in industrial countries as well as in those countries that were ahead of Jordan in terms of development stage, where transferred to Jordan. As expected, since most of these techniques were developed in countries with much more available capital than Jordan, this process inevitably meant a rapid change in capital-labour ratios in favour of capital (this was enhanced by the relative price change, when capital became relatively cheaper and labour relatively more expensive during the boom compared with the pre-boom period).[21]

In addition to growth in income and output, booming conditions may allow other factors to increase TFP, namely: foreign exchange abundance and the strong value of domestic currency. Both these factors are consistent with rapid advances in technological and managerial knowledge, including business

[21]One example elucidates the point. JUWICO (Jordan Universal Wood Industries Co.) manufactures wooden furniture, concentrating on kitchen outfits. Prior to the boom, JUWICO used to manufacture simple kitchen cabinets which were not capital-intensive. With the advent of the boom, the rapid rise of incomes and the change of tastes made American-style kitchens quite fashionable in Jordan (despite the fact they are very expensive). JUWICO seized the opportunity of satisfying this demand and embarked on the large-scale capital-intensive enterprise of manufacturing complete American-style kitchens, with technology imported from the US. but very much adapted to Jordanian tastes, especially in terms of materials used. In addition, JUWICO was able to meet very large orders from the Gulf and Iraq for the same product. JUWICO, like most manufacturers of wood furniture in Jordan, were one of the most rapidly expanding industries during the boom period, and one that suffered tremendously in the post-boom period, when incomes in real terms declined (This exposition is the result of an extended interview I conducted with the production manager of JUWICO).

organisation, and permit more production with the same inputs. This is especially true under conditions of rising demand, since it is easier to innovate when adding to capacity than when replacing capacity (Kendrick, 1977).

Technological advance should be distinguished from increases in the efficiency with which known technology is applied to production (discussed above), although the two are not neatly separable either in theory or in practice (Nishimizu and Page 1982).[22] Technological progress is the change in the best practice production frontier. All other types of productivity change, for example learning by doing, diffusion of new technological knowledge, as well as short run adjustment to shocks, external to enterprises, which change techniques of production from average to best-practice, result in increasing technical efficiency. There is growing evidence that the productivity gain due to 'technological mastery' may be substantial in developing countries and may outweigh gains from technological progress as Nishimizu and Page (ibid) have shown Yugoslavia's experience to be over 1965-78. Nevertheless, under conditions of abundant foreign exchange, technological progress is also expected to impart positive TFP growth; with capital input growing at 17.4% p.a. in real terms during the boom, it is expected that substantial technology transfer took place in Jordanian manufacturing. Al-Handasah's (1982a) inquiry shows that such a transfer mainly took the form of purchases of imported equipment and plant machinery, but managerial assistance was also, on occasions, imported. Time and space has prevented an investigation of the question of separating TFP into technical progress and technical efficiency, which is usually done by frontier estimates, either parametrically or nonparametrically, by using operation research methods (see Journal of Econometrics, special issue 1992, Production Frontier Estimates).

Finally, the trend towards a rising TFP - when cyclical changes are adjusted for - reflects the secular forces underlying productivity advance. This would include intangible investment designed to improve the quality and efficiency of tangible human and non human factors, such as investment in education, labour training, health care, etc., which becomes embodied in the work force and capital goods (Kendrick, 1977). This view has experienced a comeback in more recent literature that examines the effect on growth of externalities associated with investment in human and capital resources; the

[22]See the source cited for a methodological approach to separating technological progress from technical efficiency in the measurement of TFP.

emphasis is on the accumulation of knowledge which becomes endogenous to the growth process as an intangible capital good, while, at the same time, exhibiting increasing returns to scale (Romer, 1986; see also Lucas, 1993, who emphasises the role of human embodied knowledge accumulation).

The foregoing suggests that rising demand and 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, neither of which can be accommodated in the Dutch disease model; the former - change in technical efficiency - because of the model's assumption of full employment of resources at all times, and the latter - technological progress - because of its assumption of fixed coefficients of production. Yet it is precisely these kinds of change that explain the performance of manufacturing under booming conditions, through their effect on unit costs and eventually on profitability; a subject that will be investigated in the following section.

VII.5 Relative Prices, Cost Pressure and Profitability

The Dutch disease model depicts the effect of relative price changes on the production structure *via* changes in profitability. In the tradeable goods sector, rises in wages and other non-traded inputs relative to producers' prices squeeze profitability in that sector - in absolute terms. Furthermore, if the tradeable goods sector is labour-intensive - in terms of value share - relative to the non-tradeable goods sector, the rise in wages reduces its profitability by more than it reduces that in services; in the medium term, therefore, resources will move out of tradeables to non-tradeables, and a decline in tradeables output results (this is especially true if the resource movement dominates the spending effect).

Given the above, it is customary for the Dutch disease literature to test the degree of the squeeze on tradeables by a general index of relative prices of tradeables to non-tradeables. Corden (1983: 441) has made the faster rate of increase in wages in Holland than in Germany, its main trading partner, pivotal to his argument of de-industrialization in Holland. This differential rise in production cost, Corden argues, squeezed profits in Dutch manufacturing, since output prices were internationally determined and therefore did not change in Holland relative to Germany. More generally, the real effective exchange rate REER, which was discussed in section V.4, has consistently been used in traditional Dutch disease literature as an indicator of competitiveness.

However, this and other similar indices of tradeables' to non-tradeables' prices are crude measures of competitiveness, and indeed of profitability, and for booming industrialising economies can be quite misleading, as will be shown in Jordan's case. The inadequacy of these measures stems from three main causes. *First*, they do not accurately consider the structure of production cost in the denominator, as they either deflate output price by one variable only, namely wages, as Corden does, or the deflator may be a general index of domestic prices, as the case is for REER. *Second*, underlying these measures is the implicit assumption of fixed technical coefficients of production, thus disregarding growth in productivity which may arise either from increased technical efficiency, or from technological progress, or indeed from externalities associated with investment either directly in the sector or in its supporting infrastructure. *Third*, these measures are proxies for profit margins and give no

information on total profits, which may be rising even when profit margins are falling, if demand is expanding rapidly.

Better indicators of profitability may be devised by investigating the relationship between profits, output and input prices, and productivity, as shown in the following equation, already introduced in the previous chapter:

$$g = p - \left(x + \frac{s}{a} + m \right)$$

Change in unit profits g is directly proportional to change in output prices, p, and labour productivity, a, and inversely proportional to change in fixed costs, x, per hour wages, s 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 section.

VII.5.1 Relative Price Movement for Manufactures in Jordan

I shall first consider changes in manufacturing output prices relative to output prices in non-tradeable sectors, to show that manufactures did suffer from adverse terms of trade *vis-à-vis* those sectors during the boom period. Then I shall investigate the movement of manufacturing output prices relative to prices of inputs that go into their production, taking into consideration productivity growth, related to both labour and material. This will be done on a two-digit manufacturing level, 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 industries, i.e. to see why some industries expanded output and exports while others contracted. The reasons for this differential performance may be (inasmuch as such indices allow us insight) the experiencing of different relative prices, productivity growth, or both.

As regards output prices it was shown in section V.4 that, in the aggregate, export and import prices declined relative to non-traded prices over the boom period, as would be expected by the Dutch disease model. This is shown again in Figure VII.5.1-1 which gives indices of import, export and wholesale prices for Jordan manufactures over 1967-91; and Figure VII.5.1-2 which turns these indices into ratios. From the mid-seventies growth of manufactures import and export prices has generally lagged behind that of domestic wholesale prices (all indices exclude petroleum prices), with the result

Figure VII.5.1-1
Price Indexes for Manufactures in Jordan
(1967-91)

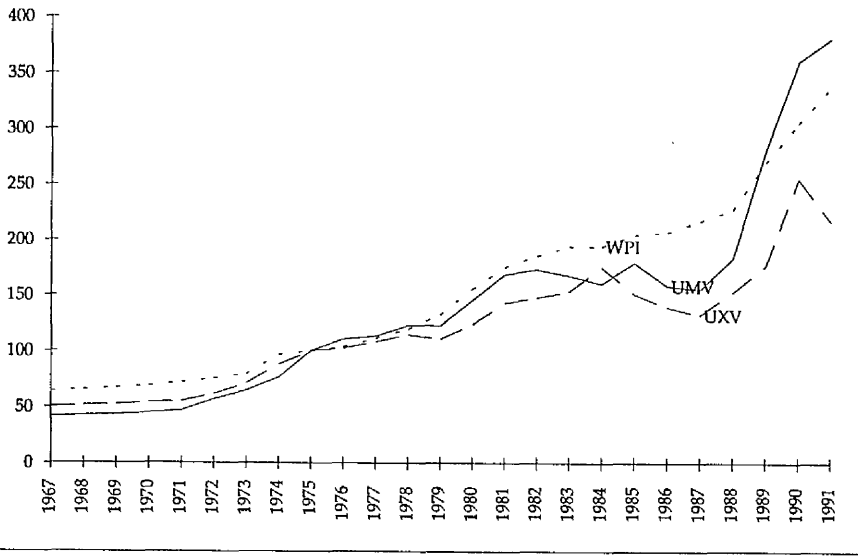
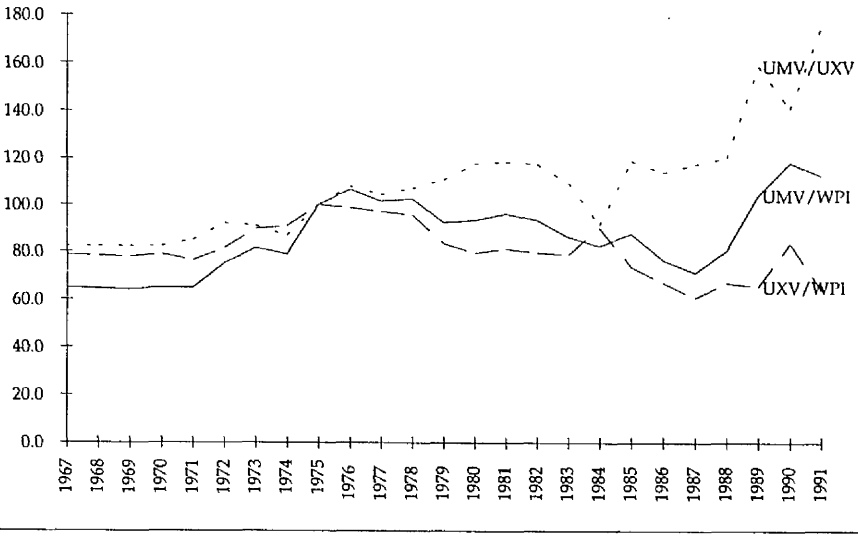


Figure VII.5.1-2
Relative Price Movements for Manufactures in Jordan
(1967-1991)



Legend

UXV	Unit Export Value
UMV	Unit Import Value
WPI	Wholesale Price Index

that by the mid-eighties the ratios of imports and exports to domestic prices had declined by about 20%. The ratios continued their downward trend until the major devaluation of 1988, when the import ratio was 70%, and that of exports was only 60%, their 1975 levels. Thus the serious competition from imports that domestic producers faced continued well beyond the boom period, as the government did not correct for currency overvaluation until 1988. The recovery of export prices after the 1988 devaluation was less pronounced than that of imports.

At a more disaggregated level, Tables VII.5.1-1 and VII.5.1-2 show the ratio of unit value of exports and imports to domestic wholesale prices for 20 manufactures groups and for the sector as a whole over 1967-1991.[23] Whilst the overall indices declined over the boom period, the same is not true for many industries within the sector. For example, paper products export price index rose over 1974-82, and printing and beverage indices rose over the first oil boom 1974-79. For imports as well, leather, paper, printing and publishing, chemicals and non-metallic minerals indices showed an upward, rather than a downward, trend (in some of these cases output prices were controlled by the government: leather, and cement).

The task of constructing indices for input prices that take account of the structure of production costs for individual industries is more difficult. The need to construct such indices at all is apparent from Figure VII.5.1-3, which shows the distribution of total cost over labour, material and other costs for certain years that cover the pre-boom, boom and post-boom periods.

On the average, the share of labour in total production cost is 16%, and that of material is 72%. The remaining 12% is composed of various other cost

[23]Unit values of exports and imports (value over volume) are given in Central Bank of Jordan (CBJ), *Monthly Bulletin*, for five manufactures groups that do not coincide with the two-digit International Standards of Industrial Classification (ISIC) adopted in this study. This necessitated the laborious process of calculating unit values of exports and imports for 87 manufactures groups (BTN 11 to 98) over 22 years (1970-91) from Department of Statistics (DOS), 1970-1991, *External Trade Statistics*; the 1967-1969 values were then obtained through backward extrapolation. The 87 BTN groups were aggregated into 20 ISIC groups using value shares in the current year as weights. For the sector as a whole 1979 value shares in total exports (imports) were used as weights in finding an overall index of unit values. For certain years volumes of trade are not given in DOS, in which case unit values were interpolated from adjacent data. For petroleum and few other industries, volumes were not given at all, in which case unit values were taken from CBJ directly when available; otherwise unit values for the closest industry were adopted (e.g. basic metal for fabricated metal).

Table VII.5.1-1

Ratio of Unit Export Value to Domestic Wholesale Price Index for Manufacturing Industries, 1967-1991

	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
Food products (311)	96.7	86.0	76.5	69.4	74.5	74.4	77.6	91.5	100.0	200.2	163.0	106.6	123 0	125 2	81.0	61.7	61 6	143.9	74.1	144 4	179.8	201.2	123 8	158 6	174 7
Beverages (313)	97.4	97.4	97.3	99.2	99.3	103.8	96.9	84.3	100.0	115.7	104.5	136.0	125.4	103.5	104.8	71.6	71.0	69 5	56.7	62 8	42.5	43.9	73 2	83.2	63 7
Tobacco (314)	107.8	107.8	107.8	109.9	109.9	114.9	107.3	93.3	100.0	94 9	89.1	111.6	110.2	98.9	90.3	86.2	122.8	65 2	65.9	82 8	48.2	50.1	80 5	96.1	81 1
Textiles (321)	70.5	70.5	70.5	71.8	69.7	69.8	84.0	101.2	100.0	132.0	113.0	127.2	104.0	87.0	121.5	89.2	38 2	77.4	182.3	103.1	122.5	112.7	93.8	88 1	51 5
Wearing apparel (322)	70.5	70.5	70.5	71.8	69 7	69.8	84.0	101.2	100.0	100.5	90 0	95.2	92.3	84.3	90.3	131.3	58.4	112 0	124 3	105.6	74 8	77 2	69.6	55.6	60.2
Leather products (323)	65.4	65.4	65.4	66 6	64.6	64.8	77.9	93.9	100.0	94 8	81.0	87 4	84.6	82.2	112.3	105.0	97.6	139 5	116 5	68.4	72.2	92.0	84.8	95 2	121.5
Footwear (324)	65 4	65.4	65.4	66.6	64.6	64.8	77.9	93.9	100.0	62.7	45.8	75 8	88.5	101.6	173.0	206 5	188.5	242 3	219.6	175 7	166.1	106.1	95 9	94.6	67 5
Wood & furniture (331-332)	64.3	64.2	64.2	65.5	63.5	63.6	76.5	92.2	100.0	69.6	90.9	78.0	65.3	55.0	52.3	68.8	74 9	80.8	82.3	78.9	72.0	65.4	43.5	47.0	12 2
Paper & products (341)	62.7	62.6	62.6	63.8	61 9	62.0	74.6	89.9	100.0	120.1	145.6	164.7	156.5	241.9	281.1	286.0	279.1	255.0	238.3	273.4	242.4	299.2	233.7	309.8	260.5
Printing & publishing (342)	62.7	62.6	62.6	63.8	61.9	62.0	74.6	89.9	100.0	248.0	190.0	722 1	793.6	486.5	413.0	500 9	595 1	735.4	405.5	458.5	364.3	332.3	188.2	305.1	371.4
Industrial chemical (351)	69 5	69.5	69.5	70.8	63.0	71 6	73.4	86.7	100.0	85.6	77.0	82 4	59.1	71.1	69.3	83.1	72.4	93.3	75.4	59.0	57.9	58.7	63.0	66.7	73.6
Petroleum refineries (353)	68.1	68.1	68.1	69.4	66 6	73.3	67.7	34.4	100.0	109.4	124.9	140 4	378.2	344.3	321.4	357 4	407.5	476.0	512.1	577 7	643.2	512.1	292.7	324 8	197 4
Rubber products (355)	84.9	84.8	84.8	86.5	83 8	84.1	101.1	121.8	100.0	78.7	70.5	60.6	71 0	92.2	90.0	103.5	493.2	280.7	245 4	233.4	87.0	64.9	205.7	358 9	65.9
Plastic products (356)	64 9	64.9	64 9	66.2	64.2	64.3	77.3	93.2	100.0	109.5	102.7	72.6	91.3	93.1	103.4	97 4	105 3	116.3	124.2	92.6	70.4	86.3	118.1	110 1	89 7
Non-metallic minerals (369)	64 9	64.9	64.9	66.2	64.2	64.3	77 3	93.2	100.0	68.9	87.1	69.6	57.1	58.5	64.0	79.2	82 4	89.2	89 7	81.9	71.0	69.6	67 8	76 6	17 7
Basic Metals (371)	69 4	69.4	69.4	70 7	72 7	92.7	98.7	93.0	100.0	125.8	110.8	122.1	81.6	100.6	124.5	102.7	88.0	75 2	84.1	122.6	110.8	120.1	72 4	219 6	99 2
Metal manufactures (372)	60 4	60.3	60.3	61.5	63.3	80.6	85.9	80.9	100.0	92.1	99.6	130.0	127.0	123.7	130.9	208.5	292.8	660.6	189 9	242.2	408 8	559.8	302 3	331 6	219 7
Machinery (382-383)	60.4	60.3	60.3	61 5	63 3	80.6	85.9	80.9	100.0	68.9	87.1	69.6	57.1	58.5	64.0	79.2	82 4	89.2	89.7	81.9	71.0	69.6	73 0	88 9	22.2
Transport equipment (384)	65.2	65.2	65.2	66.5	68 4	87 1	92.8	87.4	100.0	63.7	83.3	71.5	63.8	71.6	74.7	86.9	80.0	82.0	80 0	66.5	57.9	52.9	37 3	40 7	10 3
Other manufacturing	66.3	66 3	66.3	67.6	65.5	65.7	79.0	95.1	100.0	73.1	76.7	68.4	68.2	66.1	86.6	83.2	65.0	89.3	84.3	68.7	54 0	67.5	81 2	76.6	82 5
All Manufacturing (300)	**78.7**	**78.3**	**77.9**	**79.0**	**76.5**	**81.6**	**89.7**	**90.9**	**100.0**	**98.8**	**97.2**	**95.8**	**83.6**	**79.5**	**81.4**	**79.6**	**78.9**	**90.2**	**73.8**	**67.3**	**60.9**	**67.1**	**65.6**	**83.6**	**64.3**

Source: Tables AVII.4- (1.a) to (1.d) in Appendix AVII.4

Table VII.5.1-2

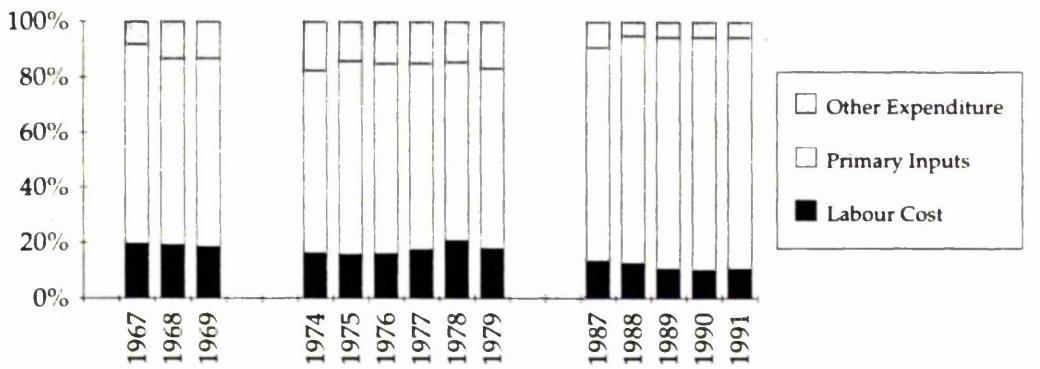
Ratio of Unit Import Value to Domestic Wholesale Price Index for Manufacturing Industries, 1967-1991

	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
Food products (311)	96.7	86.0	76.5	69 4	74.5	74.4	77.6	91.5	100.0	77.9	80.3	83.3	69.3	69.4	84.5	83.0	98 7	101.0	92.2	90.7	38.2	105.6	152.9	144 9	93.2
Beverages (313)	97.4	97.4	97.3	99.2	99.3	103.8	96.9	84.3	100.0	115.7	104.5	136.0	125.4	103.5	104.8	71.6	71.0	69 5	56.7	62.8	42.5	43.9	63.7	81 5	98 5
Tobacco (314)	107.8	107.8	107 8	109.9	109.9	114.9	107.3	93.3	100.0	107.7	95.4	92 2	72.7	72.3	82.1	80.1	95.7	68 8	106.4	70.7	60.6	62.5	89.4	100 6	121 2
Textiles (321)	70.5	70.5	70.5	71.8	69.7	69.8	84.0	101.2	100.0	86.4	89.3	85 3	87 7	91.4	97.5	97.7	92.8	100 6	107.7	99.7	76.6	85.5	92.7	87 1	92 8
Wearing apparel (322)	70.5	70 5	70.5	71.8	69 7	69.8	84.0	101.2	100.0	84 1	78.7	72 4	75 2	87.6	80.7	81 4	82.4	88 5	89 5	88.1	84.0	88 1	96 6	98 2	100 0
Leather products (323)	65 4	65.4	65 4	66.6	64 6	64.8	77 9	93.9	100.0	110.1	163.8	117.0	125 4	135 4	175.1	127 5	150 7	127 9	123 5	72.5	107.7	107 0	155.0	161 1	209 6
Footwear (324)	65.4	65 4	65 4	66 6	64 6	64.8	77 9	93.9	100.0	55 9	49.9	52 8	69 0	59 4	62.2	67 6	67 9	64.0	76.2	70 0	74 3	83.5	112 9	104 6	96 4
Wood & furniture (331-332)	64.3	64.2	64.2	65 5	63.5	63.6	76.5	92.2	100.0	92.3	86.2	77 7	78 0	71.6	64.4	67.2	73 4	78 3	78.2	74.0	72 9	71.5	61 4	58 9	60 5
Paper & products (341)	62 7	62.6	62.6	63 8	61.9	62.0	74.6	89.9	100.0	95 6	114.6	77 9	93 5	110.7	114.2	128.0	117 4	84 5	101.4	103.9	99.8	115.9	98 6	101 9	110 4
Printing & publishing (342)	62.7	62.6	62.6	63.8	61.9	62.0	74.6	89.9	100.0	102.4	114.0	113.8	87.5	131 5	165.4	207 3	165 2	419 1	126 7	164 2	175.0	202.5	162 4	228 3	255 3
Industrial chemical (351)	69 5	69.5	69 5	70.8	63.0	71.6	73.4	86.7	100.0	132 5	106.5	133 3	119.6	121 1	122.4	143 5	132 9	92 7	124.6	106 0	102.0	112.8	157 8	166 4	123 5
Petroleum refineries (353)	68.1	68.1	68.1	69.4	66 6	73.3	67.7	34.4	100.0	135.9	119.4	150 7	108 6	69 0	50.2	53 9	46 7	32 3	42 7	40 0	39 7	47 3	81 0	93 4	71 5
Rubber products (355)	84.9	84.8	84 8	86.5	83.8	84.1	101 1	121.8	100.0	81 1	79 0	58.5	61 1	60 4	84 2	106 5	76 3	94 3	96.8	97.2	87 5	89 2	102 2	113 1	95 8
Plastic products (356)	64 9	64.9	64 9	66 2	64 2	64 3	77 3	93 2	100.0	96.0	92 9	65 1	74.0	103 4	83 8	84 7	81 1	71 4	72 8	65 1	63 2	83.6	90 6	87 8	73 8
Non-metallic minerals (369)	64 9	64 9	64 9	66.2	64.2	64 3	77 3	93.2	100.0	308 9	164 3	220 0	255 9	285 3	295.3	290 1	303.2	324 5	319 4	288.5	269 6	285.7	359.4	360 0	328 6
Basic Metals (371)	69.4	69.4	69 4	70.7	72.7	92.7	98.7	93.0	100.0	87.1	84.0	95 8	72 1	98.4	95 7	101.8	96 2	90 4	92.5	78 0	38 4	66 3	106.4	108 4	49 5
Metal manufactures (372)	60.4	60.3	60 3	61 5	63 3	80.6	85.9	80.9	100.0	92 5	81.6	79 1	77 1	87 1	93 4	92.8	179 3	179 7	103 2	79 0	75 4	73 4	105 5	140 2	121 4
Machinery (382-383)	60.4	60.3	60 3	61 5	63 3	80.6	85 9	80.9	100.0	93 8	85 3	73 2	66.3	73 1	97 4	93 2	78 8	86 5	86.9	71 0	66.5	72.7	85 9	132 9	132 5
Transport equipment (384)	65.2	65.2	65 2	66 5	68 4	87.1	92.8	87.4	100 0	86 8	81 6	75 2	74 1	89 5	113 8	102 3	76 5	79 5	77 5	57 7	54.2	55.2	43.9	60 8	61 3
Other manufacturing	66.3	66 3	66.3	67 6	65 5	65.7	79 0	95.1	100.0	113.8	153 9	203 1	199 7	163 0	171 8	180 4	179 0	193 5	185 8	144 9	164.5	148 9	183 8	194 1	213 5
All Manufacturing (300)	**64.8**	**64.5**	**64.1**	**65.0**	**65.0**	**75.3**	**81.6**	**78.9**	**100.0**	**106.6**	**101.6**	**102.5**	**92.4**	**93.4**	**96.3**	**93.5**	**86.4**	**82.5**	**82.6**	**70.7**	**62.8**	**75.4**	**96.6**	**112.9**	**100.3**

Source: Ibid

items, including transport (2%) and electricity (2%). Material inputs have a high import content in Jordan due to it's limited natural resources, with the exception of the cement industry. The share of directly imported to total material input to manufactures production was 67% in 1979, a representative production year. In addition, it is believed that a large portion of the remaining 33% of material purchased locally is actually imported, either wholly or in part.

Figure VII.5.1-3
Structure of Production Cost in Manufacturing Industries in Jordan



Source: Department of Statistics, *Industrial Survey; Industrial Census*, various issues.

Thus, production costs in Jordan are far more sensitive to changes in import prices than to wages. It is likely, therefore, that the conditions of the boom alleviated the costs squeeze by reducing material input prices through currency appreciation, i.e. by increasing manufacturers' purchasing power *vis-à-vis* imported inputs, and the need to account for material input in profitability indices is thus apparent.

In constructing a composite index of input prices for individual industries, I allocated total costs to three main inputs: (1) labour, (2) imported material and (3) locally purchased material, and took the weights of each input for individual industries from the 1979 Industrial Census; which gives a Laspeyres index with the following structure:

$$P_{i_t} = \frac{\left\{\sum_{n=0}^{20} \alpha_{j_{1979}} p_{j_t}\right\}}{\left\{\sum_{n=0}^{20} \alpha_{j_{1979}} p_{j_0}\right\}}$$

where P_{i_t} is the composite input price index for industry i at time t; $\alpha_{j_{1979}}$ is the cost share of input j in year *1979*;[24] p_j is the price of input j; and o and t are the first year and current year in the series, respectively.

The main difficulty in constructing input price indices arises from lack of knowledge of the type of material input that enters into any industrial production process, which may be obvious for some products (e.g. clothing uses textiles as inputs), but the same may not be true for others (e.g. beverages uses inputs from chemicals, food and agriculture; leather products uses material input from clothing, food and chemicals, and so forth). For this purpose the 1979 input-output tables (Dar Al-Handasah, 1982b) were consulted (See Tables AVII.4- (2.a), (2.b) & (2.c) in Appendix AVII.4).

As to movement in input prices p_j, the following indices were constructed: for labour, an index of the wage rate, or total wage bill over number of workers in each industry; for imported material input, an index of unit value of imports; and for domestically purchased material input a wholesale price index (see Tables AVII.4- (1.d), (1.b) & (1.a), respectively, in Appendix AVII.4).

From all the above the composite index of input prices for single industries was constructed (see Table AVII.4-3 in Appendix VII.4), and relating this index to those of output prices (unit value of exports; see Table AVII.4- (1.c) in Appendix VII.4) gives a first approximation of changes in profitability. The final results are shown in Table VII.5.1-3. For the sector as a whole, the price index of profitability declined by 25% over 1975-1982, it recovered slightly over 1983-84, but continued its decline thereafter, with a noticeable dip in 1989, following the 1988 devaluation, as import prices rose substantially. However, for some industries within the sector, the index had an upward trend over the boom period: paper, printing and publishing, and chemicals, all of which achieved rapid rates of growth in exports during the boom. In all of these

[24] A true Laspeyres index would weight prices by quantities in the base year. Had this been done, the results would differ only slightly in magnitude, but not direction.

Table VII.5.1-3

Price Index of Profitability In Manufacturing Industries 1/, 1967-1991

	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
Food products (311)	93.9	89.6	91.8	81.8	91.6	97.3	103.7	105.5	100.0	182.8	150.9	93.1	139.8	135.2	79.7	60.2	57.3	134.5	69.2	131.1	193.5	159.5	84.7	120.9	169.3
Beverages (313)	173.0	164.9	163.1	124.5	125.9	127.6	115.9	96.6	100.0	101.5	78.2	96.1	89.7	76.8	73.3	72.9	69.7	73.0	67.7	81.5	57.3	49.5	75.0	87.4	78.7
Tobacco (314)	225.1	223.4	188.3	191.4	176.5	173.0	142.9	107.0	100.0	105.3	89.3	110.5	118.7	102.2	79.4	77.8	131.5	69.9	86.8	113.0	126.8	73.2	95.6	102.3	97.4
Textiles (321)	95.7	92.6	83.4	73.0	72.7	73.7	83.3	105.6	100.0	150.8	128.0	144.5	95.3	67.1	107.6	75.5	32.0	60.2	129.9	73.5	100.2	95.3	85.0	83.0	48.4
Wearing apparel (322)	71.5	71.7	71.3	74.9	73.5	70.0	83.6	99.7	100.0	91.6	82.6	69.9	76.7	71.2	90.5	87.4	87.9	139.5	124.2	76.5	83.4	90.8	81.5	103.4	119.7
Leather products (323)	95.2	96.1	91.4	83.3	81.2	79.8	89.1	102.7	100.0	106.2	97.4	99.9	92.0	78.0	82.4	114.1	54.0	96.0	101.5	77.0	67.4	65.8	63.7	52.9	56.4
Footwear (324)	54.8	56.8	61.9	68.2	67.2	68.4	82.6	119.3	100.0	56.7	48.8	64.9	67.5	71.8	111.2	143.9	148.5	196.8	174.6	146.1	146.5	81.2	76.9	90.2	59.2
Wood & furniture (331-332)	76.8	77.9	77.8	80.9	78.7	79.0	91.6	111.1	100.0	69.0	93.8	79.1	69.9	61.5	60.4	73.9	75.4	78.5	79.6	83.7	77.6	75.9	57.4	65.1	16.6
Paper & products (341)	23.8	25.8	27.8	32.1	32.9	35.4	51.6	85.3	100.0	117.6	174.7	169.7	213.4	404.0	577.5	582.5	530.8	424.5	466.1	536.9	476.1	707.2	688.4	930.9	802.6
Printing & publishing (342)	24.2	25.7	27.4	35.0	35.8	38.1	53.5	85.5	100.0	265.1	233.7	823.4	1,040.8	802.0	720.0	857.3	1,013.1	1,243.5	776.6	831.2	675.7	699.0	488.0	811.3	1,058.1
Industrial chemical (351)	27.0	28.1	29.1	30.7	26.6	36.3	40.0	73.0	100.0	114.0	95.0	120.3	88.4	115.1	140.5	175.5	153.3	155.0	156.4	117.7	115.5	137.1	242.3	277.4	259.5
Petroleum refining (353)	42.2	42.6	43.4	44.7	43.0	47.3	46.0	61.1	100.0	84.7	102.0	83.2	272.6	408.3	475.9	483.4	578.2	824.7	797.4	911.3	989.2	717.3	322.6	341.3	231.0
Rubber products (355)	87.6	87.4	87.4	88.7	90.1	87.9	104.0	113.8	100.0	89.0	85.8	84.2	124.4	168.2	150.4	127.3	790.8	470.7	309.6	307.6	125.5	91.5	225.0	388.6	93.3
Plastic products (356)	105.8	105.8	105.8	106.0	114.1	102.0	120.0	113.7	100.0	86.5	97.2	56.9	75.2	86.8	88.6	69.5	67.7	90.6	77.5	61.4	53.0	63.3	66.9	64.0	75.9
Non-metallic minerals (369)	104.3	98.4	88.6	87.9	86.5	82.9	99.9	70.9	100.0	80.7	115.3	93.3	58.3	51.7	50.6	61.0	58.3	70.6	66.1	60.5	60.6	60.2	66.0	77.7	20.1
Metal and products (371-372)	98.1	96.5	92.0	93.1	93.9	97.6	99.7	99.7	100.0	131.9	120.3	117.5	109.6	103.3	130.3	102.3	92.1	83.2	90.0	153.1	238.6	170.1	68.2	204.0	183.0
Machinery (382-383)	78.9	70.7	67.0	59.5	61.4	78.4	84.3	82.6	100.0	71.2	91.4	73.7	71.9	70.6	71.3	88.8	94.6	103.7	102.7	80.4	71.2	74.0	77.2	88.4	22.5
Transport equipment (384)	43.4	40.5	40.3	61.2	64.4	66.2	75.4	76.8	100.0	71.8	109.0	91.1	109.2	115.9	82.7	136.1	126.9	129.3	123.1	106.6	91.1	89.0	65.1	70.8	18.4
All manufacturing	99.2	97.7	94.3	91.8	89.7	89.9	96.3	106.3	100.0	93.3	93.7	89.1	81.4	76.9	75.9	75.5	77.1	92.9	73.5	73.1	69.8	70.7	63.1	76.8	61.1

Source: Table AVII 4-4 in Appendix AVII.4.

1/ Ratio of Price Index of Exports to Composite Price Index of Production Inputs. See text for methodology.

Table VII.5.1-4

Index of Ratio of Unit Value of Exports to Wage Rates

	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
Food products (311)	60.5	51.7	68.7	38.9	46.9	53.1	56.0	75.8	100.0	215.0	181.9	105.8	117.9	110.3	66.7	51.9	52.6	128.1	57.8	107.2	148.4	135.3	91.7	149.2	191.7
Beverages (313)	176.7	153.4	152.0	75.1	78.2	85.1	81.3	79.7	100.0	113.5	64.0	77.0	56.0	47.9	47.3	44.8	43.0	41.9	40.8	47.8	28.1	27.0	51.8	74.3	56.1
Tobacco (314)	167.7	161.5	80.5	85.0	96.0	102.5	87.5	81.5	100.0	93.4	76.8	88.1	60.3	55.4	42.0	33.9	69.7	42.0	52.4	64.8	44.7	46.9	68.8	83.8	64.6
Textiles (321)	97.3	85.7	61.1	43.1	43.0	44.3	58.1	126.0	100.0	153.8	138.5	140.2	62.0	36.4	77.0	50.3	19.6	36.7	76.2	39.8	49.4	53.8	58.8	55.9	35.7
Wearing apparel (322)	60.8	61.6	60.3	68.7	68.6	57.9	74.1	96.3	100.0	106.7	75.1	65.4	83.7	57.1	59.4	73.0	33.6	73.5	85.9	69.9	60.7	57.0	71.7	69.2	63.7
Leather products (323)	95.6	102.8	83.2	58.9	57.6	58.7	68.8	100.0	100.0	91.8	87.3	70.1	51.6	48.8	57.4	58.2	73.7	86.3	73.4	33.5	44.5	52.4	71.3	114.2	96.4
Footwear (324)	35.3	38.1	46.6	58.5	58.8	62.2	78.2	218.5	100.0	51.1	46.5	57.4	45.6	42.9	62.6	81.9	89.3	113.6	96.6	82.8	92.9	49.8	58.6	82.2	48.4
Wood & furniture (331-332)	81.9	88.5	88.0	104.6	98.2	105.2	132.9	274.2	100.0	65.1	91.8	66.2	67.3	57.0	54.4	58.2	59.2	57.4	55.0	71.8	67.8	85.5	81.5	120.6	29.6
Paper & products (341)	107.6	87.1	76.0	59.1	59.0	61.4	75.6	100.1	100.0	103.5	111.6	116.8	71.2	84.7	66.6	61.1	57.4	58.8	47.3	48.1	45.0	50.1	75.6	119.0	101.4
Printing & publishing (342)	122.8	112.8	101.9	58.6	59.2	63.2	78.6	102.9	100.0	174.7	134.3	472.7	469.5	204.8	163.7	179.9	182.9	211.4	104.9	116.0	94.0	84.2	97.0	184.5	200.7
Industrial chemical (351)	84.8	83.3	87.2	103.8	103.2	118.1	165.2	90.5	100.0	66.2	57.1	68.3	27.0	32.1	17.1	29.0	19.9	26.8	22.2	19.2	19.2	18.3	20.2	31.9	30.5
Petroleum refining (353)	20.4	20.7	21.2	22.1	20.9	24.0	23.0	35.5	100.0	93.8	97.4	69.5	194.5	305.5	323.1	322.0	356.2	454.9	492.6	542.2	575.7	441.9	269.1	330.0	177.5
Rubber products (355)	93.4	92.7	92.9	95.3	95.3	98.8	122.9	137.4	100.0	97.0	90.9	105.4	155.0	209.4	401.7	362.2	2,364.0	1,298.6	1,031.5	1,081.3	467.8	401.9	1,750.3	2,687.8	400.3
Plastic products (356)								178.1	100.0	116.9	103.4	35.0	29.6	44.1	41.2	33.7	23.7	26.5	25.7	19.5	17.5	22.4	33.7	34.8	36.2
Non-metallic minerals (369)	99.8	87.9	70.2	68.6	68.5	62.5	76.5	95.4	100.0	80.6	99.3	78.2	39.2	35.7	34.7	40.6	36.8	49.8	43.6	39.0	42.3	41.9	53.0	62.9	17.3
Metal and products (371-372)	145.7	101.3	52.8	58.8	62.0	75.8	96.8	107.1	100.0	58.4	53.6	52.1	111.1	131.9	142.1	131.0	114.2	98.8	87.4	147.8	122.2	129.6	65.1	206.4	167.5
Machinery (382-383)	199.1	96.7	76.1	48.4	50.6	68.6	76.7	81.0	100.0	76.2	98.0	77.1	148.0	120.7	100.0	124.6	133.9	163.5	151.8	69.4	63.6	78.3	85.2	99 0	27.1
Transport equipment (384)	31.2	28.1	27.8	56.0	60.4	51.7	61.8	67.3	100.0	84.5	170.7	134.4	657.9	419.2	94.6	404.9	404.9	400.0	334.9	365.0	279.5	448.8	519.6	537.8	255.1
All manufactures	76.8	72.5	63.3	56.6	59.6	75.5	83.7	98.4	100.0	60.4	76.1	56.9	46.8	44.4	39.8	46.1	43.7	52.0	49.0	50.4	50.0	45.9	52.1	70.1	18.1

Source:Tables AVII.4- (1.c) & (1.d) in Appendix VII 4.

industries, input costs are largely accounted for by imported material: paper 71%, printing 55%, and chemicals 81%. The rapid rise in wages notwithstanding, the high content of imports in industrial production costs benefited those industries under boom conditions as the price of imports became relatively cheap.

This result would not have been predicted by traditional Dutch disease measures of profitability, which deflate the unit value of exports by domestic wholesale prices (Table VII.5.1-1 above) or by wages, and invariably find profitability of traded goods to have declined during the boom period. In fact deflating by wages gives erroneous results for Jordan as shown in Table VII.5.1-4. For some industries whose price index of profitability increased during the boom, indicating good export performance, the wage-based index of profitability declined (e.g. paper products and chemicals). Over 1975-81 the wage-based index shows profitability to have declined by 60%, as opposed to only 24% according to my total-cost-based index of profitability, which is a substantial difference. Thus according to the wage-based index, most of manufacturing industries in Jordan should have been wiped out during the boom, when in fact we know that most of them prospered.

We conclude that including the price of imports in the profitability deflator yields results that are contrary to Dutch disease wisdom, precisely because the boom leads to relative price changes in favour of imports. And the higher the import content in production costs, the less is profitability squeezed. For industrial economies, deflating by import prices is less important since the import content of production costs is likely to be much lower than for an industrialising economy, due to the highly developed inter-industry structure of production. A wage rise in this case becomes a deciding factor in export competitiveness under boom conditions. The same is not true of industrialising economies, as we have seen for Jordan.

Thus far the analysis has abstracted from any growth in output per unit input, which would lower unit production costs and increase profitability, *ceteris paribus*. To address the question of productivity growth in measuring profitability, I constructed a quantity deflator relating the quantity of output (gross output in real terms) to the quantity of inputs used in the production of this output. Similar to the price index of profitability, the inputs considered in the quantity index of profitability were: quantity of labour (number of workers); quantity of imported material input (imported material deflated by unit value of

imports); and quantity of locally purchased material input (locally purchased material input deflated by wholesale prices). The resulting index is a Laspeyres index, similar to the price index of profitability, with the following structure:

$$Q_{i_t} = \frac{\left\{\sum_{n=0}^{20} a_{j_{1979}} q_{j_t}\right\}}{\left\{\sum_{n=0}^{20} a_{j_{1979}} q_{j_0}\right\}}$$

where Q_{i_t} is the composite quantity index for industry i at time t; $\alpha_{j_{1979}}$ is the cost share of input j in year *1979*; q is the quantity of input j; and o and t are the first year and current year in the series, respectively.

The results are shown in table VII.5.1-5. For the sector as a whole, the index rose by 111% over 1975-82;[25] and for most industries whose exports increased rapidly during the boom (tobacco, furniture and wood, paper products, printing and publishing, chemicals, and non-metallic products) the index indicates substantial gains in productivity. It is worth noting that these results are in total accordance with those obtained from TFP calculations, shown in Table VII.4.2-2 above.

The combination of the price index with the quantity index gives an index that I shall call the 'hybrid' index of profitability - hybrid because it combines two concepts that are not homogeneous, namely prices and productivity. This hybrid index should give an accurate measure of the relative change between output prices and production costs of manufactures over time, all on per unit basis. Table VII.5.1-6 shows without any doubt that - with the exception of beverages - profitability had increased in all the sectors where both output and exports expanded during the boom.

The hybrid index of profitability measures profit margins, and therefore reflects supply-side effects only on profitability. It is worth investigating, at the same time, the effect of demand pull on investment decisions, which may be done by constructing an indicator of total profits. In a very straightforward manner this is done by deflating total revenues by a domestic price index, say

[25]This exceptional rise in productivity, which amounts to an annual increase of 11.3% p.a., may indicate that there were substantial gains in productivity stemming from the use of better material during the boom; and that my TFP calculations, which were based on labour and capital inputs only, and rose at 0.5% p.a. for the sector as a whole, may have a downward bias.

Table VII.5.1-5

Quantity Index Of Profitability in Manufacturing Industries 1/, 1967-1991

	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
Food products (311)	105.4	103.8	133.8	178.9	183.3	169.2	153.7	115.7	100.0	107.0	97.6	87.6	69.8	86.7	84.8	86.3	75.2	83.6	78.7	83.7	70.7	90.3	95.1	78.1	87.1
Beverages (313)	31.0	43.5	50.4	45.9	47.1	46.0	48.6	52.5	100.0	105.7	124.2	92.6	191.6	141.8	131.2	121.4	114.4	118.8	117.6	92.8	124.0	129.7	127.2	126.3	129.4
Tobacco (314)	58.6	81.9	103.3	110.6	107.0	99.9	102.8	87.6	100.0	129.6	236.3	171.6	367.2	302.0	397.1	320.0	373.8	356.4	339.1	268.6	232.9	255.1	282.3	290.3	267.6
Textiles (321)	72.5	73.5	112.4	214.2	220.2	228.2	203.3	84.2	100.0	92.6	93.0	129.6	119.3	166.3	154.5	136.5	100.1	126.2	135.8	103.5	96.2	101.3	106.6	122.7	156.8
Wearing apparel (322)	112.7	83.4	81.0	73.4	76.0	75.7	76.2	67.9	100.0	99.4	97.7	62.8	51.0	55.8	51.6	61.0	11.3	49.1	64.8	48.7	35.6	51.3	41.3	33.6	48.0
Leather products (323)	21.6	32.0	34.7	54.8	59.0	61.3	64.9	35.4	100.0	95.7	43.5	52.1	42.4	46.6	37.2	38.8	134.6	41.7	65.0	61.1	50.5	54.6	29.3	34.3	66.8
Footwear (324)	73.4	107.4	164.6	141.9	91.8	70.2	53.3	21.6	100.0	70.6	60.9	50.1	90.4	127.9	133.4	124.7	254.4	67.8	142.9	66.9	60.8	72.4	63.3	49.8	63.4
Wood & furniture (331-332)	188.6	125.3	167.7	122.1	116.2	103.3	92.8	53.9	100.0	90.1	92.5	114.2	143.5	169.0	162.8	143.5	152.1	143.2	107.0	112.7	102.2	110.1	121.6	93.9	110.4
Paper & products (341)	61.0	63.5	65.3	62.6	82.2	85.9	93.1	90.8	100.0	129.2	132.1	304.9	159.4	133.4	216.4	226.8	220.8	188.1	346.8	197.2	208.7	219.2	149.7	125.7	147.7
Printing & publishing (342)	107.5	52.2	42.2	53.1	52.4	50.3	50.8	52.4	100.0	113.3	124.8	90.2	98.0	131.4	137.2	147.7	148.0	114.0	173.0	149.6	129.5	144.1	90.9	86.5	107.2
Industrial chemical (351)	118.0	101.9	110.4	79.0	66.3	60.9	41.6	59.6	100.0	101.4	115.5	77.6	141.2	156.6	162.5	163.2	195.7	324.9	218.6	220.1	245.4	296.3	262.4	201.6	242.7
Petroleum refineries (353)	64.5	83.6	106.9	128.5	109.1	108.8	93.7	88.9	100.0	114.8	94.6	132.3	191.6	209.0	488.9	436.8	296.0	184.4	348.7	207.4	298.4	261.5	199.2	193.0	192.3
Rubber products (355)	77.5	27.7	45.3	22.0	16.1	11.4	7.4	4.4	100.0	104.8	126.7	111.5	9.3	6.5	11.8	10.7	1.5	0.1	7.5	1.2	11.0	13.3	18.6	20.7	31.3
Plastic products (356)													100.0	99.5	156.4	191.4	177.5	228.8	277.6	243.8	211.1	237.1	295.1	238.2	404.6
Non-metallic minerals (369)	115.7	138.4	162.8	102.1	93.7	70.8	70.6	89.3	100.0	118.6	116.6	57.6	133.0	191.8	292.4	307.1	259.0	256.7	353.8	237.9	164.0	145.5	116.4	105.2	128.8
Metal & products (371-372)	88.0	45.6	127.1	106.5	109.5	108.8	93.8	85.1	100.0	150.1	157.6	72.4	97.4	107.3	134.7	135.8	136.2	119.1	177.2	117.0	84.7	135.2	148.7	138.4	184.9
Machinery (382-383)	51.3	66.0	96.7	117.0	131.6	131.5	130.0	106.8	100.0	98.5	99.6	84.5	3.3	4.5	2.9	2.9	2.6	3.2	2.9	8.9	12.7	13.5	27.5	35.3	37.1
Transport equipment (384)	89.2	97.0	181.9	85.2	80.2	83.5	69.6	59.1	100.0	121.8	109.1	52.2	57.0	57.1	45.3	16.3	9.8	4.6	51.1	7.9	13.1	10.2	15.4	19.5	13.0
All Manufacturing	**78.3**	**83.5**	**108.8**	**108.7**	**108.9**	**105.7**	**100.1**	**78.7**	**100.0**	**110.7**	**111.4**	**104.2**	**113.3**	**124.7**	**205.5**	**211.2**	**190.9**	**182.9**	**221.8**	**149.6**	**139.1**	**161.5**	**146.8**	**132.4**	**148.8**

Source: Table AVII.4- (5.d) in Appendix VII.4.

1/ Index of real output / (index of material input * index of labour input). See text for methodology.

Table VII.5.1-6

The Hybrid Index of Profitability in Manufacturing Industries 1/, 1967-1991

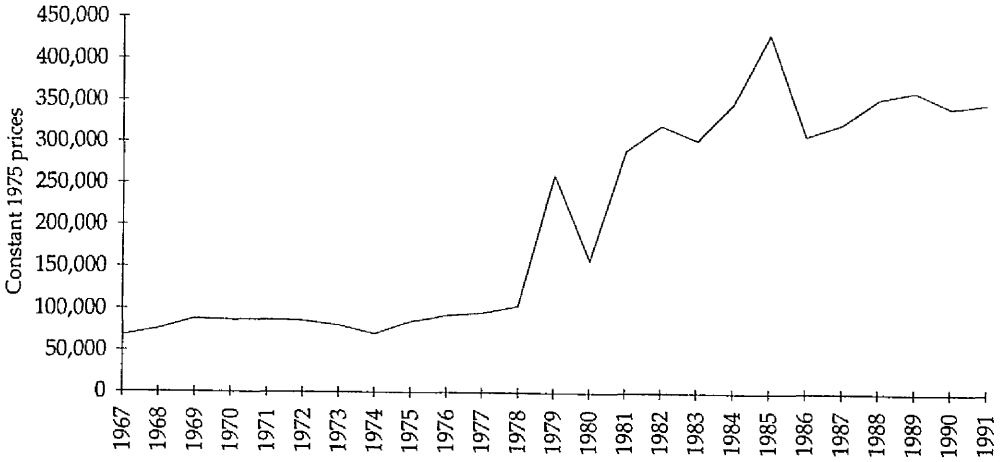
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Food products (311)	99.0	92.9	122.9	146.4	168.0	164.6	159.4	122.1	100.0	195.6	147.3	81.5	97.6	117.2	67.6	51.9	43.1	112.4	54.4	109.7	136.8	144.0	80.5	94.4	147.5
Beverages (313)	53.6	71.7	82.2	57.2	59.3	58.7	56.3	50.8	100.0	107.3	97.1	89.0	171.9	108.9	96.1	88.6	79.8	86.7	79.6	75.6	71.1	64.1	95.3	110.4	101.8
Tobacco (314)	132.0	182.9	194.5	211.6	188.7	172.9	146.9	93.7	100.0	136.5	211.0	189.6	435.8	308.8	315.5	248.9	491.6	249.0	294.2	303.6	295.4	186.7	270.0	297.1	260.6
Textiles (321)	69.4	68.0	93.7	156.4	160.2	168.1	169.5	89.0	100.0	139.6	119.1	187.3	113.7	111.6	166.2	103.1	32.1	76.0	176.4	76.1	96.4	96.6	90.7	101.8	75.9
Wearing apparel (322)	80.6	59.9	57.7	54.9	55.9	53.0	63.7	67.7	100.0	91.1	80.7	43.9	39.1	39.7	46.7	53.3	9.9	68.5	80.5	37.2	29.7	46.6	33.7	34.7	57.5
Leather products (323)	20.6	30.7	31.7	45.7	47.9	48.9	57.8	36.3	100.0	101.5	42.3	52.1	39.0	36.3	30.6	44.3	72.7	40.0	66.0	47.0	34.1	35.9	18.7	18.1	37.7
Footwear (324)	40.2	61.0	101.9	96.7	61.7	48.0	44.0	25.8	100.0	40.0	29.7	32.5	61.0	91.8	148.4	179.5	377.8	133.5	249.5	97.8	89.1	58.8	48.7	44.9	37.5
Wood & furniture (331-332)	144.8	97.6	130.4	98.8	91.5	81.6	85.0	59.9	100.0	62.2	86.7	90.3	100.3	103.9	98.4	106.1	114.7	112.5	85.1	94.4	79.3	83.6	69.8	61.1	18.3
Paper & products (341)	14.5	16.4	18.1	20.1	27.0	30.4	48.0	77.4	100.0	152.0	230.8	517.3	340.1	538.8	1,249.7	1,321.3	1,171.8	798.5	1,616.4	1,058.7	993.6	1,550.0	1,030.4	1,169.7	1,185.4
Printing & publishing (342)	26.0	13.4	11.6	18.6	18.8	19.2	27.2	44.8	100.0	300.3	291.5	742.6	1,019.8	1,053.7	987.9	1,266.0	1,499.7	1,417.7	1,343.3	1,243.1	875.0	1,007.0	443.7	702.2	1,134.0
Industrial chemical (351)	31.8	28.7	32.1	24.2	17.7	22.1	16.7	43.5	100.0	115.6	109.7	93.4	124.8	180.1	228.4	286.4	300.0	503.5	342.0	259.0	283.5	406.2	635.9	559.3	629.7
Petroleum refineries (353)	27.2	35.6	46.4	57.4	46.9	51.5	43.1	54.3	100.0	97.3	96.4	110.1	522.2	853.4	2,326.7	2,111.5	1,711.7	1,521.0	2,780.5	1,890.4	2,951.9	1,876.1	642.5	658.8	444.1
Rubber products (355)	67.9	24.2	39.6	19.5	14.5	10.0	7.7	5.0	100.0	93.3	108.7	93.9	11.6	10.9	17.7	13.6	11.9	0.5	23.2	3.6	13.8	12.2	41.9	80.5	29.2
Plastic products (356)													100.0	86.4	138.6	133.0	120.1	207.2	215.3	149.8	111.8	150.0	197.3	152.6	307.2
Non-metallic minerals (369)	120.6	136.3	144.1	89.7	81.1	58.6	70.5	63.3	100.0	95.7	134.4	53.7	77.5	99.1	147.8	187.2	151.1	181.1	234.0	143.9	99.4	87.6	76.8	81.7	25.9
Metal & products (371-372)	86.3	44.0	117.0	99.2	102.8	106.2	93.5	84.9	100.0	198.0	189.7	85.1	106.7	110.9	175.5	139.0	125.4	99.1	159.6	179.1	202.2	230.1	101.4	282.3	338.2
Machinery (382-383)	40.5	46.6	64.8	69.6	80.8	103.1	109.7	88.2	100.0	70.2	91.0	62.3	2.4	3.2	2.1	2.6	2.5	3.3	2.9	7.2	9.1	10.0	21.2	31.2	8.4
Transport equipment (384)	38.7	39.3	73.2	52.2	51.7	55.3	52.5	45.4	100.0	87.5	118.9	47.6	62.2	66.2	37.5	22.2	12.4	5.9	62.9	8.5	12.0	9.1	10.0	13.8	2.4
All Manufacturing	**77.6**	**81.6**	**102.5**	**99.8**	**97.7**	**95.1**	**96.4**	**83.7**	**100.0**	**103.3**	**104.4**	**92.8**	**92.3**	**95.9**	**156.1**	**159.4**	**147.1**	**169.9**	**163.0**	**109.3**	**97.1**	**114.2**	**92.6**	**101.7**	**91.0**

Source: Table AVII.4-6 in Appendix AVII.4.

1/ See text for methodology.

the consumer price index, to show investors' total profits in real terms. Such an indicator is shown in Figure VII.5.1-4.

Figure VII.5.1-4
Total Profits in Manufacturing Industries in Jordan
1967-1991



Source: Department of Statistics, *Industrial Survey; Industrial Census*, various issues, for profits. Central Bank of Jordan, *Monthly Bulletin*, various issues, for deflators.

The index of profitability as constructed above would have been unnecessary had data on profitability existed for manufacturing industries in Jordan, but such data do not exist. Moreover, it is perhaps not a meaningful exercise to measure profitability at the aggregate level of two-digit manufacturing industries, which includes a large number of firms that are heterogeneous in size, techniques of production, management styles, efficiency and so forth. Only at a firm level can profitability be grasped conceptually, to which I shall turn in the following section.

VII.5.2 Profitability in Jordanian Manufacturing Firms

"Because profits are not things but rather abstract concepts, they may be measured in any number of ways" (Haber, 1989: 103). I shall use two measures of profits, both of which are based on cost accounting, but each is the outcome of a different conceptualisation, and therefore serves a different purpose. These are, namely, profit margin and rate of return on capital stock. In the Dutch disease model, return to the specific factor (capital in the present context) is the

measure of profitability, and so, therefore, also, is the use of return on capital stock. This measure is useful for an understanding of the movement of factors between sectors - in the medium-to-long run - if differential rates of return on these factors exist (which is the case after an exogenous shock such as the oil boom: currency appreciation and the rise in wages increase return to the specific factor in the non-tradeable goods sector, relative to the tradeable goods sector). Profit margins, on the other hand, clarify the profit-squeezing effect of increases in costs, and so they are more useful when comparisons over time for the same firm, or across a number of firms at the same time, are made. Firms whose profit margins were small prior to the boom are likely to be more tightly squeezed by the boom effect of increasing labour costs than those whose profit margins were wider.

The body of evidence employed in this analysis of profits is the financial accounts of the twelve firms I surveyed in the process of conducting this study.[26] The data relating to profit include net profits, gross revenue, and total fixed assets, and cover the period 1970-92. The sample represents a broad range of industries, spanning dairy products, tobacco, textiles, footwear, leather tanning, printing and publishing, soap, pharmaceuticals, metal furniture, and fabricated aluminium. The sample also covers a wide range of firm sizes (whether in terms of paid-up capital or labour employed), technology used, and choice of technique. Type of ownership in these firms is also diverse, and includes family-owned firms, simple partnerships, privately held joint-stock, and jointly - public and private - held joint-stock. Finally, the influence these firms have on the market also varies widely from monopoly (leather tanning), oligopoly (tobacco), and firms holding a large share of the market (dairy and pharmaceuticals), to very small firms with insignificant market power (the remainder). The sample is thus unbiased in every respect except one: obviously the firms chosen are winners, in that they were able to secure a position in the market even in the uncertain environment of the post-boom period. No data exist in Jordan on firms that were squeezed out of the market either because of the boom or post-boom conditions. As to sample size, although the number of

[26]Data series on profits at the two-digit manufacturing level in Jordan are incomplete, and what is recorded seem to be highly unreliable. They are available from Department of Statistics industrial surveys and censuses, which cover 1974 and 1979-1991. Regarding assets, only fixed assets are recorded. Dividing profits, gross of taxes, by physical capital yields very high rates of return, in many cases unreasonably high, of the order of 200%. It is possible that problems of aggregation are arising here. This vindicates the point made earlier regarding the lack of meaning of the concept of profit at the aggregate industry, rather than at the firm, level.

firms is not large (twelve),[27] the population from which the sample was drawn was itself not very large in 1970. The total number of manufacturing establishments in Jordan in 1970 employing five persons or more - which are the firms most likely to retain records - was only 485 (Department of Statistics, 1971, *Industrial Survey*). The percentage of total manufacturing revenue contributed by the twelve firms was 14.1% in 1970 and 8.2% in 1992.[28] In conclusion, the survey sample is quite representative and analysis based on information relating to it is quite illuminating for the purposes of the present study; but the results cannot be generalised.

The rate of return on capital stock, which is one measure of the rate of profit, compares a firm's net profits to the value of the physical assets - inventories, land, machinery and other equipment, and buildings - and cash assets - cash and other negotiable instruments. Unfortunately, only physical stock data were recorded in the survey, so the measure of profit rate has an upward bias; this would not cause problems if the ratio of physical to total assets remained constant, since we are concerned with the trend in profit rates in the boom and pre- and post-boom periods. However, this ratio is more likely to change than not; but on the plausible assumption that the proportion of physical in total assets changes randomly over time, the trend of profit rate as calculated here should be representative of the actual trend. Profit rates were estimated for three distinct periods: 1970-73, representing pre-boom conditions, 1974-82, representing boom conditions; and 1983-92, representing the adjustment to post-boom conditions. The results are given in Table VII.5.2-1 below. The arithmetic mean of profit rates rose from 19.6% in 1973-73 to 40.8% during 1974-82 and declined to 35% in 1983-92. (These rates are high because capital includes fixed assets only instead of total assets).[29] Profit rates in eleven out of twelve firms rose in the boom period from their pre-boom levels; and in seven firms profit rates were higher during the boom from both pre- and post-boom levels, leaving no doubt that profitability increased under boom

[27]The number of firms was determined by three factors: the start of operations prior to the boom of 1973/74 to enable comparisons; the existence of records that go back to 1970; and the willingness of the firm to disclose information, especially in relation to profits. For Jordanian firms the latter factor was as critical as the former two.

[28]The reason for this high contribution, despite the small number of firms in the sample, is that the sample includes the monopoly and oligopoly referred to above, in addition to firms controlling a large share of the market.

[29]Standard deviations for profit rates are high because of the wide variation in these rates among firms; for example, during the boom profit rates ranged between 17.6% and 73.4%.

Table VII.5.2-1
Profit Rates For Twelve Manufacturing Firms in Jordan 1/: 1970-1992

ISIC	Jordan Dairies (3112)	Woollen Textiles (3211)	Qwaasmi Textiles (3211)	BATA Footwear (3240)	Society Publishing (3420)	Al-Tawfiq Publishing (3420)	APM Pharmaceuticals (3522)	Al-Naqah Soap (3523)	Ayoubi Fabricated Metal (3812)	Fabricated Aluminium (3813)	Tobacco & Cigarettes (3140)	Leather Tanning (3231)	All Firms	
1970	8.2	11.5	9.5	12.7	24.2	17.5	22.4	(13.2)	3.0	2.2	-18.2	11.19		
1971	1.4	17.9	11.7	7.2	13.4	53.4	42.7	26.8	1.6	22.3	40.0	26.57		
1972	9.5	3.7	10.9	15.6	15.9	61.1	37.9	31.4	3.4	23.0	23.9	46.77	(1970-72)	
Average													Mean	SD
1970-72	6.3	11.0	10.7	11.8	17.8	44.0	34.3	15.0	2.7	15.8	15.2	28.18	19.6	12.3
1973	36.1	34.4	16.9	18.7	37.7	17.6	52.8	38.3	5.0	10.6	108.5	58.30		
1974	36.0	41.4	17.5	32.9	63.6	15.4	128.1	44.2	22.0	20.1	30.8	50.30		
1975	33.1	54.8	18.9	34.6	62.5	39.2	151.9	32.5	31.0	19.2	27.9	58.75		
1976	74.2	61.6	29.5	39.0	38.9	34.1	59.8	37.0	23.5	22.3	47.4	13.15		
1977	9.0	6.5	30.9	22.8	37.2	46.2	69.2	43.1	10.7	34.5	20.7	32.77		
1978	8.4	1.3	19.5	24.9	40.3	21.6	69.7	38.6	11.0	21.8	10.8	25.73		
1979	4.8	-5.5	50.1	59.5	43.7	23.7	69.8	49.6	11.7	39.3	27.9	37.41		
1980	5.7	18.6	48.8	56.4	41.7	22.7	56.4	57.8	20.2	76.9	33.2	24.84		
1981	11.8	36.1	28.4	243.2	43.0	28.7	41.8	81.5	26.7	71.4	10.1	19.01		
1982	5.2	114.9	12.3	145.4	32.7	40.0	34.3	45.4	14.3	62.4	-6.4	16.68	(1973-82)	
Average													Mean	SD
1973-82	22.4	36.4	27.3	67.7	44.1	28.9	73.4	46.8	17.6	37.9	31.1	33.69	40.8	17.8
1983	2.4	-3.0	15.0	114.2	20.7	9.7	16.2	223.1	14.2	32.3	25.6	16.20		
1984	9.4	-12.5	13.8	137.2	20.2	19.5	15.1	96.0	12.8	9.6	48.1	15.80		
1985	26.2	-9.9	15.2	35.8	9.6	12.8	16.6	29.7	11.8	23.3	28.0	20.01		
1986	16.7	-12.6	34.4	-30.5	3.8	-7.5	0.6	72.8	5.0	29.3	24.5	15.00		
1987	8.7	-2.6	21.0	14.5	47.7	15.6	6.1	65.1	9.8	38.5	64.2	41.35		
1988	4.0	1.9	31.6	4.6	50.4	32.4	8.8	139.7	11.5	18.2	23.5	64.50		
1989	22.7	42.0	1.4	87.8	31.7	56.6	36.4	45.8	82.5	24.5	-65.9	84.97		
1990	31.5	19.8	0.3	70.3	34.9	47.5	39.0	32.2	76.0	36.1	95.8	96.07		
1991	56.4	47.5	31.5	-51.6	0.0	49.9	20.4	28.5	52.6	0.0	180.1			
1992	27.4	20.4	18.5	71.9	0.0	34.0	22.9	30.1	110.5	0.0	10.9	0.00	(1983-92)	
Average													Mean	SD
1983-92	20.5	9.1	18.3	45.4	21.9	27.1	18.2	76.3	38.6	21.2	43.5	39.32	35.0	18.0

Source: Own firm-level survey.
1/ Net profits/Total fixed assets

Table VII.5.2-2
Profit Margins For Twelve Manufacturing Firms in Jordan 1/: 1970-1992

ISIC	Jordan Dairies (3112)	Woollen Textiles (3211)	Qwaasmi Textiles (3211)	BATA Footwear (3240)	Society Publishing (3420)	Al-Tawfiq Publishing (3420)	APM Pharmaceuticals (3522)	Al-naqah Soap (3523)	Ayoubi Fabricated Metal (3812)	Fabricated Aluminium (3813)	Tobacco & Cigarettes (3140)	Leather Tanning (3231)	All Firms	
1970	25.6	28.9	28.0	20.4	13.9	36.5	50.5	4.0	32.9	12.4	-18.2	8.86		
1971	32.4	17.7	30.0	26.4	11.0	34.3	45.0	9.0	35.7	8.9	40.0	13.06		
1972	34.2	14.5	30.0	27.8	11.2	33.5	46.2	9.0	31.2	21.4	23.9	14.85	(1970-72)	
Average													Mean	SD
1970-72	30.7	20.4	29.3	24.9	12.0	34.8	47.2	7.3	33.3	14.2	15.2	12.3	23.1	12.9
1973	46.4	33.4	27.0	25.7	14.2	34.7	52.6	9.0	33.1	8.7	108.5	16.45		
1974	47.8	29.2	23.0	24.0	23.9	25.0	55.4	9.0	45.2	8.0	30.8	11.36		
1975	44.6	32.4	20.0	25.3	18.8	36.6	54.8	9.0	50.3	7.0	27.9	14.10		
1976	17.0	35.3	24.0	27.5	17.3	31.2	44.5	9.0	47.5	4.9	47.4	8.36		
1977	48.0	30.8	23.0	26.7	18.4	32.4	39.0	9.0	42.7	4.8	20.7	17.92		
1978	49.2	28.6	22.0	26.8	19.2	24.4	40.7	9.0	42.4	5.3	10.8	12.82		
1979	21.6	19.2	26.0	27.4	15.0	19.6	50.1	10.0	40.7	4.6	27.9	18.41		
1980	23.2	21.4	25.0	28.8	16.2	16.7	41.1	9.0	47.6	5.3	33.2	12.30		
1981	26.9	39.2	21.0	36.2	20.8	15.5	42.4	10.0	48.9	8.7	10.1	10.57		
1982	26.8	40.4	20.0	33.5	25.3	17.3	44.7	10.0	39.8	8.0	-6.4	10.70	(1973-82)	
Average													Mean	SD
1973-82	35.1	31.0	23.1	28.2	18.9	25.3	46.5	9.3	43.8	6.5	31.1	13.3	24.6	13.5
1983	23.2	28.5	15.0	32.6	7.7	14.4	47.4	10.0	43.0	7.7	25.6	7.53		
1984	29.1	3.0	18.0	33.4	9.8	13.2	42.0	11.0	40.9	6.9	48.1	10.02		
1985	31.8	6.9	18.1	27.2	14.8	12.0	37.8	14.0	42.1	8.9	28.0	12.44		
1986	28.1	9.4	19.0	24.2	19.7	6.6	31.6	9.4	36.1	13.4	24.5	13.53		
1987	22.1	12.6	15.6	31.1	30.1	12.8	30.4	9.1	29.0	9.3	64.2	15.81		
1988	17.7	18.5	16.9	25.8	26.7	15.4	37.7	5.7	37.7	8.7	23.5	9.07		
1989	20.9	29.9	23.4	28.2	21.9	15.1	35.9	9.1	64.1	7.8	-65.9	14.75		
1990	18.6	18.6	25.8	28.6	21.9	15.1	33.1	7.5	41.4	6.2	95.8	13.97		
1991	20.0	29.6	15.8	26.6	0.0	15.7	33.7	7.9	40.8	0.0	180.1	8.76		
1992	18.1	18.1	13.0	30.4	0.0	14.0	37.2	7.4	51.1	0.0	10.9	8.47	(1983-92)	
Average													Mean	SD
1983-92	23.0	17.5	18.1	28.8	15.3	13.4	36.7	9.1	42.6	6.9	43.5	11.4	22.6	14.1

Source: Own firm-level survey
1/ Net profits/Total revenue

conditions. The return to the specific factor in the tradeable goods sector - manufacturing - thus increased rather than declined during the boom, as the Dutch disease model would have predicted, which explains the rapid capital build-up in the sector as a whole.

The second measure of profitability is the profit margin, calculated as net profit over total revenue. Tautologically, profit margins measure producers' shares in total revenues, and therefore enable us to see the position of a firm *vis-à-vis* change in price relatives. If output prices do not change (since commodities are tradeable and therefore have their price determined in international markets), while labour and other non-traded input prices increase, then profits are squeezed and profit margins decline. This happens regardless of the level of demand (if change in demand does not affect production cost, i.e. assuming constant returns to scale and fixed technical coefficients). As I have done with profit rates, I shall estimate profit margins over the three periods 1970-73, 1974-82, and 1983-92, representing pre-, during and post-boom conditions (Table VII.5.2-2). Again taking the arithmetic mean for the twelve firms, profit margins increased from 23.1% in the pre-boom period to 24.6% in the boom period and declined to 22.6% in the post-boom period. In eight out of twelve firms profit margins increased during the boom from their pre-boom period; and in six firms they were higher than both pre- and post-boom levels. Although the rise in profit margins during the boom and its decline in the post-boom periods are not substantial, they indicate clearly that profits were not squeezed during the boom, despite the rapid rise in wages.

How did firms manage to increase profitability, despite the rapid rise in wages (on average 10% p.a. in real terms)? The answer lies, as the hybrid index of profitability devised above has indicated, in productivity growth such that unit wage costs actually declined. One example illustrates the point, which is taken from Bata, an international company that operates a small-scale plant in Jordan manufacturing footwear. The example is given in Table VII.5.2-2.

The growth of labour productivity (12.8% p.a.), by exceeding wage rate growth (8% p.a.), reduced real labour cost during the boom and increased profit margins by an amount proportional to the difference, since material cost and output price increased almost at the same rate. The pre-boom period was one of major political and economic dislocation, and no importance should be attached to its figures. In the post-boom period, because of the devaluation, material costs increased rapidly; but, more important, labour productivity growth was much

lower than in the boom period because of low demand and excess capacity problems, leading to a decline in profit margins.

Table VII.5.2-3
Analysis of Profit Margin for Bata (footwear manufacturing firm)

	Annual rate of Growth (exponential)		
	1970-1973	*1974-1982*	*1983-1992*
Shoe wholesale price	13.6%	7.7%	6.8%
Real wage rate 1/	-9.5%	8.0%	-0.1%
Labour productivity 2/	-17.2%	12.8%	8.2%
Material Cost	2.8%	7.3%	21.6%
Profit margin	-2.0%	4.3%	-1.3%

Source: Own firm-level survey.
1/ Total wage bill, in constant prices, over number of workers.
2/ Value added, in constant prices, per worker.

VII.6 Conclusions

Starting from a small base, the manufacturing sector in Jordan experienced outstanding growth during the seventies oil boom, growing at 16.7% p.a. in real terms. Manufacturing exports, starting from a smaller base, experienced yet more outstanding growth of 30.6% p.a. in real terms. Furthermore, import substitution declined only slowly, given currency appreciation. Clearly, Jordanian manufactures competed well not only in their own market but also internationally. This is especially true as Dar Al-Handasah (1982h) was able to show that the share of Jordanian manufactured exports in traditional export markets (*viz.* Arab oil-exporters) actually increased from the mid- to late-seventies. We can only conclude that Jordanian manufactures gained, rather than lost, competitiveness during the boom period.

Without prior knowledge of the trend in relative price movements during that period, it is plausible to suggest that manufacturers faced favourable relative prices, such as a weak currency relative to trading partners, declining wage rates, etc. Yet investigation of price relatives in Jordan has shown their movement to have been against tradeables, just as would have been predicted by the Dutch disease model. One explanation, therefore, remains for the gain in competitiveness: Jordanian manufacturing was becoming more

efficient during the boom period, compared with the pre-boom and certainly with the post-boom periods.

Investigation of output growth per unit of input has shown productivity gains to have been substantial in all the industries whose output and exports expanded during the boom. These gains were obtained not only from technological change, but also from increases in production efficiency arising from full employment of hitherto idle resources in the sector. The logical conclusion follows, with significant implications for the Dutch disease model: the study of industrialising booming economies within the framework of a model that assumes away growth in output per unit input, either because all resources are assumed to be fully employed at all times, or by assigning zero to changes in production coefficients, is of limited usefulness.

Another conclusion follows from the above: if price indicators are to replace thorough investigation of the effect of the boom on the supply response of manufacturing enterprises at all, these indicators have to take account of productivity growth. A major contribution of this chapter has been to show that traditional relative price measures developed in Dutch disease literature are not only inefficient, but may be quite misleading in this respect; and to suggest a methodology of constructing a new measure that is based on the actual structure of production cost, and on productivity growth.

Chapter VIII

Conclusions

This study offers a new approach to the examination of the effects of favourable exogenous shocks on the structure of industrialising economies. Whilst the study is based on research done on Jordan, there is a presumption that its conclusions may be relevant to the experience of a large number of industrialising economies benefiting from favourable exogenous shocks. Nevertheless, further research is needed before its conclusions can be generalised.

The study's analytical approach has benefited in some ways from the Dutch disease model itself. Specifically, the model's two mechanisms, namely the spending effect and the resource movement, have proven to be valuable in examining the structure of prices under booming conditions. Yet, these analytical aspects are not sufficient to explain the structure of production at the end of the boom; hence the new approach.

The framework of analysis in my approach is no longer one of static general equilibrium. Rather, it is dynamic and starts from disequilibrium conditions in the pre- and post-boom periods. Only during the boom, when demand is buoyant, are resources fully employed. Each tradeable sector is analysed individually, since the technological conditions of production differ considerably between the two. Furthermore, whilst the relative price effect on the supply response is similar in the two sectors, the effect of new demand structure under booming conditions differs considerably, inducing a different supply response. In contrast with development economics literature that applies Dutch disease analysis, my approach does not take either agriculture or manufacturing as the tradeable sector, but the two sectors simultaneously. Partial analysis of only one sector leads to erroneous interpretations of the boom effect on tradeables' production, a point that I will return to later. Finally, although my approach adopts Dutch disease analysis in examining the structure of prices, it develops a new methodology in constructing relative price indices that are used as indicators of profitability. The methodology follows directly from the dynamic analysis employed, and thus considers productivity growth in constructing these indices.

In what follows I will elaborate these points. I will first show the limitations of the Dutch disease model in analysing the Jordanian experience, from which will follow the method of developing the new approach. I will finally suggest how this approach can be developed further with new research.

In analysing the Jordanian experience of favourable exogenous shocks using the Dutch disease model, the effect of the boom on changing the structure of prices, *via* the spending effect and the resource movement, was accurately predicted. The

same is not true of predictions about the composition of output, which is what the theory sets out to do in the first place. On the contrary, the actual sectoral outcome in Jordan was the reverse of what the theory would have predicted, as rapid industrialisation took place during the boom. Further investigation revealed that this outcome is mainly due to the static nature of the Dutch disease model, and above all its failure to take into consideration the effect of productivity growth on resource allocation. As a consequence, the model was also inadequate in assessing the effect of changes in the demand vector on altering the structure of production, by influencing in different ways the level and growth rate of productivity in the different sectors of the economy. In the case of Jordan, rapid industrialisation was achieved by rapid expansion of demand, which instigated significant productivity growth in manufacturing through dynamic economies of scale.

A theoretical ambiguity arises from the model's neglect of demand conditions in the analysis of sectoral shifts in industrialising economies. As the boom gives a disproportionately large stimulus to manufacturing, through the greater-than-unity income elasticity of demand for manufactures, resources will flow into manufacturing out of agriculture, whose share in aggregate output is relatively large in the initial stages of industrialisation and whose income elasticity of demand is less than unity. Thus a decline in agriculture's share in output and employment cannot be interpreted solely as the result of the Dutch disease, or as the adverse effect of relative prices on tradeables' output, but also as the outcome of successful industrialisation. It follows that, despite being a common practice among development economists, to consider agriculture and manufacturing in one category of analysis under booming conditions is inaccurate since, although the two sectors' supply responses are influenced in the same way by adverse relative price changes, they are influenced in opposite ways by the income-demand effect. Corden's (1984: 362-3) assertion that the theory can be applied equally to agriculture and manufacturing is correct only 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, it becomes clear that the analytical treatment of the two sectors needs amendment.

In addition to the effect of changes in consumption patterns, two more aspects of change in the structure of demand can influence the structure of production. These are growth in investment, and changes in the trade position. Faster growth induced by the boom increases the share of investment in GDP, which implies a relative increase in the demand for manufactures. While the

majority of capital goods may be imported in a developing economy such as Jordan's, there must be a spill-over effect to domestic manufactures so long as there exists a certain degree of inter-industry linkage. In Jordan, during the boom, there was a noticeable strengthening of inter-industry linkages not only confined to consumer goods, but also extended to investment goods. In fact, the industries that prospered most during this period were intermediate goods.

The position of the trade balance directly influences the structure of production, and vice-versa. By definition, an industrialising economy is in the process of improving its manufacturing trade balance, either through export expansion or import-substitution. This process will continue during the boom - and probably at an accelerating rate - provided the adverse relative price effect is overcome, possibly through the effect of demand expansion on increasing productivity. If, furthermore, the boom is regional, as in the case of Jordan, demand for manufactured exports is likely to rise (in Jordan's case this demand originated in the Gulf and was quite substantial). Production of manufactures must therefore rise to meet the additional demand. There is also the possibility that faster growth during the boom, by increasing non-manufactured imports and creating a trade deficit in this category, stimulates growth in manufactured exports to cover the deficit.

More generally, the effect of foreign trade on the structure of production should always be considered, even if the boom is not regional. In the case of North European oil exporters, such as the UK and Holland, manufacturing production was greatly hampered during the boom as a consequence of reduced US demand for their manufactured exports, since the oil-price shocks induced a recession in the US.

It should be noted that the demand effect on the structure of production becomes important *only* when dynamic aspects of growth and structural change are taken into consideration. Suppose, for example, that a static model is still employed, where the technical conditions of production do not change under booming conditions. In this case, the supply response of the different sectors is determined solely by relative prices. Changes in demand patterns are only relevant to the extent that they impact on the supply of non-tradeables since increases in demand for tradeables can be met from foreign supplies, whose prices decline under booming conditions. This is precisely the Dutch disease argument. Once productivity growth is introduced, on the other hand, demand expansion can have

a significant impact on manufacturing supply, especially if the economy was constrained by the small size of product markets prior to the boom.

There are three other analytical aspects that undermine the usefulness of applying Dutch disease economics to Jordan. *First,* in the model there are only rational optimising agents, and no governments. *Second,* the economic conditions obtaining in Jordan at the start of the boom challenge the model's assumptions. *Third,* the model considers neither the effect of the new structure of prices on altering technical conditions of production, nor its effect on the structure of production cost, and, therefore, on profitability. I will take up each of these points in turn.

As in all countries reviewed under the Dutch disease literature, government action in Jordan is found to influence resource allocation either directly through investment, or indirectly through fiscal and monetary policies. Investment in irrigation and large industrial schemes enhanced the supply response of the traded sectors significantly. The same result obtained through complementary investment in infrastructure, which increased the production and distribution efficiency of the traded sectors. Fixing interest rates at a level that entailed negative financing cost to producers, while the regulatory framework had a built-in bias to investment in productive sectors, led to two phenomena. The boom-induced relative price movements were exacerbated by further increasing the cost of labour - a non-traded input - and reducing that of capital - a traded input, and, as a consequence of this, capital accumulated rapidly in these sectors. New technology embodying investment in both agriculture and manufacturing enhanced their supply response and lead to an expansion of their profits.

The Dutch disease model assumes macro-equilibrium with full employment and perfect factor and product markets. The pre-boom Jordanian economy, however, had surplus labour of an order of magnitude of 14%, and its manufacturing sector had idle physical capacity of over 50%. Low economic activity was a function mainly of inadequate savings and balance of payments constraints, which also constrained Jordan in world capital markets. Foreign exchange availability during the boom relieved these constraints, with two major outcomes. First, the availability of foreign exchange in turn made available imported raw, intermediate and capital inputs to production, which were likely to embody better technologies than those used under conditions of foreign exchange constraints. Second, the improved balance of payments position allowed an expansion of overall economic activity, thus increasing income and employment.

Since the economy had started from idle capacity, expansion in economic activity allowed increasing capacity utilization and benefits from economies of scale where they existed, thus increasing productivity and, consequently, manufactures' competitiveness.

With regard to relative prices, the model fails to assess the effect of the new price structure on profitability in tradeables. The failure is a result, partially, of lack of appreciation of conditions of industrial production in developing countries, and partially the result of the theory's assumption of static technical conditions of production. As the price of tradeables declines relative to that of non-tradeables, the cost of imported raw and intermediate inputs to tradeables' production also declines accordingly. In developing economies where the industrial structure is not mature and inter-industry linkages are weak, the share of imported material may be greater than that of wages, as was shown for most manufacturing industries in Jordan. Thus, while the Dutch disease argument hinges on the loss of competitiveness in tradeables' production because of rising wage costs, it ignores the over-compensatory effect of the decline in the cost of imported material as the currency appreciates. In addition, and as mentioned above, if the new material embodies better technologies than those used previously, the rise in productivity will further alleviate the effect of wage rises.

There is yet another effect of the change in relative factor prices. As the booming sector pulls labour out of other sectors, the factor distribution profile facing producers in non-booming sectors, both traded and non-traded, becomes more capital-intensive. In the Dutch disease model this does not induce any further change, because the total stock of capital in the economy is fixed and there is no new capital, and because technological conditions of production are assumed to be unchanging. In industrialising booming economies, especially those that were capital-constrained prior to the boom, there is likely to be large capital inflow during the boom. In this case, the increase in capital-intensity of production may not only increase labour productivity, by definition, but also total factor productivity, if the new capital embodies technological progress. This is likely to be more true for manufacturing and agriculture than for services, as I have shown for Jordan.

The Dutch disease model investigates the effect of changes in factor prices on unit costs, and allows for changes in the capital-labour ratio, *via* the elasticity of substitution between capital and labour as factor prices change. The model stops short, however, of considering how technological change can bring down unit

costs. To borrow from Jones (1965), on whose work the Dutch disease model is partially built,

$$\theta_{l_T}\hat{w}+\theta_{k_T}\hat{r}=\hat{P}_T+\pi_T \quad (1)$$

$$\theta_{l_N}\hat{w}+\theta_{k_N}\hat{r}=\hat{P}_N+\pi_N \quad (2)$$

where a circumflex indicates relative change; θ_{i_J} is the share of factor i in sector J, with k referring to capital, l to labour, T to tradeables, and N to nontradeables; P_J is price of commodity J, which equals unit cost under perfect competition - the zero profit condition; w and r are labour and capital cost, respectively; and π is technological change. The Dutch disease assumes technology to be given and thus that π s equal zero. In this case unit costs depend on the cost of capital and labour, and their intensities in terms of value shares in each sector. If technological change is permitted, its effect in any sector is similar to a subsidy for that sector: it brings unit costs down. During the boom in Jordan, in both agriculture and manufacturing, but not in services, productivity growth was significant enough to outweigh the rise in wages. In the equations above, assuming zero π_N and positive π_T we can see how the unit costs in tradeables will decline, pulling more resources towards the sector; and thus pro-industrialisation.

Still on the subject of relative prices, the common practice in empirical Dutch disease literature of using the real effective exchange rate as an indicator of profitability in tradeables needs to be refined because, in Jordan's case at least, it has given erroneous results. This is because the conceptualisation of this index follows directly from the theoretical construct of the model. Thus the same weaknesses found in the theory are reflected in this and similar indices; they do not adequately consider the effect of relative price changes on the structure of production costs, and they abstract from productivity growth.

The foregoing points of discussion make clear the limitations of applying simple comparative statics general equilibrium models, such as the Dutch disease model, in the study of booming industrialising economies. The static nature of the model is the most limiting aspect of the analysis, since the dynamics of demand expansion and productivity growth are the factors that determine growth and sectoral shifts over time. These forces work more powerfully during the boom, which translates into a demand shock if the windfall revenues are monetised. It is imperative, therefore, to employ a dynamic model in assessing the effect of booms

on the structure of production. The general equilibrium assumption ignores prevailing economic conditions in the majority of developing economies, whose constraints in capital markets and balance of payments problems invariably entail that there be a large pool of surplus labour in the economy. How the boom can change these conditions and lead to rapid industrialisation is therefore overlooked by Dutch disease analysis. I have also noted that each of the tradeable sectors, agriculture and manufacturing, is a different unit of analysis, because technical conditions of production differ considerably between the two, and because changes in demand conditions induced by the boom influence their supply response differently. Dichotomising the economy into tradeables and non-tradeables is therefore not only a gross oversimplification, but actually a misrepresentation of booming industrialising economies.

The present study has gone some way towards offering an alternative approach to Dutch disease economics. There remains a need to formalise a theoretical model that incorporates all the analytical aspects considered in the study of industrialising economies that have benefited from favourable exogenous shocks. It should be noted, however, that the accumulation of theoretical Dutch disease literature - or more generally booming sector economics - without a parallel advance in empirical research, underlies some of the misconceptions about the applicability of Dutch disease economics to industrialising economies. Therefore, priority should be given to more empirical research on these economies to generalise some of the conclusions of the present study, and to bring to light other analytical aspects pertaining to booming industrialising economies. In this respect, the work of Bevan, Collier and Gunning (1990) is relevant. It shows the need to study trends in the terms of trade between exports and imports during a commodity boom. It also emphasises the need to formalise government action. Other conceivable points of discussion include the effect of changes in the monetary sphere on real production during a boom. Investment behaviour, and the market conditions that influence it, are also areas that merit further research. There is probably a need to distinguish between investment in the different sectors.

Finally, I have noted the confusion in the literature between the effect of changes in price relatives and of demand conditions on the structure of production. Whilst the former aspect may adversely influence the supply of tradeables, the latter may give a disproportionate stimulus to tradeables' production. The confusion stems, first, from the complexity of processes unleashed by booming conditions in industrialising economies, which of course is no excuse, and, second,

from neglect of the boom effect on changing the initial economic conditions of these economies, including the structure of demand. Future research on booming industrialising economies may, therefore, benefit from organising analytical issues in two distinct, and yet closely linked, areas. The first being the boom effect on relative prices and export competitiveness, which falls mainly in the realm of trade theories, and where the Dutch disease theory can be put to use. The second being the boom effect on changing the initial economic conditions (capital availability, buoyant demand, full employment of resources, etc.) which in turn changes the supply responses of the different sectors. This would generally utilise the economic literature on industrialisation.

APPENDICES

APPENDIX AIV.1
Estimates of real GDP

A major problem encountered in the writing of this dissertation was the estimation of real growth in the Jordanian economy. All national accounts in Jordan are given in current prices up to 1985, when production of constant price national accounts started. This necessitated the construction of GDP deflators over a long time span, 1954-92, with the accompanying hazard of accumulating errors from both personal errors of judgement and from errors inherited in the statistics on which the estimates are based. Nevertheless, since any deflation is better than no deflation, I embarked on the process, using a number of data sources and cross checking with other scholars' work whenever possible. I cannot overstress, however, that these estimates should be treated with considerable caution.

AIV.1.1 Estimates of GDP by Sectoral Value Added

The estimates of GDP adopted in this study are production-based, for two reasons. Statistics on the production side in Jordan are more reliable than those based on expenditure or income. More important, the choice of measuring national output by sectoral value added follows directly from the purpose of this study, which is to examine changes in the structure of production over time.

Porter (1961, in Mazur 1979) gives estimates of GDP by sector in current prices for the period 1954-59. These are adjusted by Mazur in light of later modifications made by the Jordan Department of Statistics (previously JDS, presently DOS) to make them more comparable to JDS estimates for a later period, 1959/60-65/66. GDP estimates by sector are also given by Sayigh (1978) for the period 1954-1973. For the earlier period 1954-59, however, Sayigh's estimates are comparable with the unadjusted estimates of Porter, and for the later period 1967-73 they seem to include the West Bank. For these reasons Sayigh's estimates were not used in this study. For 1964 to date, estimates of GDP by sector are available from the Central Bank of Jordan (CBJ). These are available generally in CBJ's monthly bulletins, while for the period 1964-88 they are compiled in CBJ (1989).

The GDP estimates adopted in this study are Porter's adjusted figures for 1954-58; Mazur's for 1959-1966; and CBJ's for 1967-1992 GDP estimates by sector at current prices are given in Table AIV.1-1, and at constant 1975 prices in Table AIV.1-3.

AIV.1.2 GDP Deflators

As I mentioned in the introduction, there are no continuous price series by which to deflate GDP that cover the whole period under study, 1952 to 1992. There are, however, separate indices of price movements that provide partial coverage of the period in question. For this reason, it was necessary to piece together composite price indexes (Table AIV.1-2).

For the period 1959-66, I adopted Mazur's implicit price deflators that result when his current-price value added is divided by the deflated value added. Mazur deflates only those sectors where data is highly reliable, and thus deflates about 60-68% only of GDP. An overall GDP deflator is calculated by Mazur himself for those sectors that are deflated. I assumed that inflation in the undeflated sectors was the same as the average for the deflated sectors, or 1.5% p.a.. Also using this average rate of inflation, I extrapolated GDP deflators backward to cover the period 1954-1958 (which Mazur's (ibid) analysis seems to indicate as the average rate of inflation for that period). For the period 1966-75, I used the CPI as given in CBJ (1989; and Monthly Bulletins) to deflate all sectors.

From 1975 onward, various price series have been published by CBJ,[1] mainly wholesale prices indices (WPI) and cost of living indices (COL), from which I have constructed deflators for the various sectors. For agriculture, the composite price index is constructed from WPI for cereal, vegetable, and fruit production (CBJ, ibid; and 1983). For mining and quarrying, largely phosphate- and potash-based and mostly exported, I used the unit value of export of 'crude inedible material, except fuel'. For manufacturing I constructed a deflator composed of WPI for various manufacturing industries (CBJ, ibid), which was cross-checked with the World Bank's (1989) deflator for the sector covering the period 1975-85 (see notes to Table AVII.4 (1.a) in Appendix AVII.4 for details). For both agriculture and manufacturing the weights are as given in CBJ, adjusted to add up to unity in each sector. For water and electricity the deflator is the 'fuel and utility' item in the COL index. The value added of electricity accounts for the larger share in this item. The construction deflator is the WPI for 'construction material'. The government and other services deflator is available from 'GDP deflators' in World Bank (1984, Table 2.2: 110). The index is given for 1975-87, which I extrapolated it over 1988-92 using inflation rates implicit in 'general services' in COL index. All GDP deflators covering the period 1975-82 were cross-checked with Naraplasingam's (1985) deflators for the same period, for which a clear methodology is given and as such seem quite reliable.

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[1] Unless otherwise mentioned, all CBJ price indices are from *Yearly Statistical series: 1964-88* (1989); and *Monthly Bulletin*, various issues.

Table AIV.1-1
Industrial Origin of GDP for Jordan, 1954-1992
(in million JD at current prices)

	GDP 1/	Agriculture	Mining 2/	Manufacturing 2/	Electricity & water supply 2/	Construction	Government services	Transport & communication	Business & trade	Other services
1954	53.03	15.73	0.50	3.19	0.30	1.50	8.50	4.70	10.90	7.70
1955	47.89	7.39	0.60	3.83	0.36	1.90	9.00	5.90	10.90	8.00
1956	66.76	20.46	0.73	4.63	0.44	2.10	10.70	7.20	12.30	8.20
1957	68.96	15.36	0.78	4.95	0.47	2.40	12.40	8.80	14.10	9.70
1958	77.80	16.60	0.85	5.43	0.52	3.00	14.50	9.80	16.90	10.20
1959	85.17	15.08	0.86	5.50	0.52	4.66	14.95	10.70	18.81	14.08
1960	89.40	14.62	0.95	6.05	0.58	4.50	15.75	11.12	20.44	15.39
1961	110.87	25.30	1.19	7.59	0.72	4.50	16.74	12.64	25.55	16.64
1962	108.62	20.90	1.10	7.03	0.67	6.15	17.06	12.53	25.09	18.09
1963	117.69	22.10	1.45	9.22	0.88	6.12	17.61	12.77	27.78	19.76
1964	135.55	34.14	1.70	10.83	1.03	5.45	19.70	12.03	29.52	21.15
1965	150.95	34.11	2.49	13.72	1.70	7.87	21.93	12.60	33.54	23.52
1966	149.61	27.65	2.50	14.80	2.00	9.28	22.53	14.42	31.69	25.30
1967	139.40	23.40	2.70	14.80	1.20	6.10	24.50	8.20	35.40	23.10
1968	162.95	16.20	3.14	16.91	1.50	9.70	36.40	12.90	40.60	25.60
1969	194.18	22.50	3.28	18.80	1.60	10.70	40.50	14.40	48.10	34.30
1970	183.76	15.60	3.46	15.90	1.90	7.70	42.50	14.30	50.20	32.20
1971	196.14	23.90	3.64	16.40	2.20	7.40	43.60	14.60	51.40	33.00
1972	214.82	26.60	3.82	18.50	2.50	9.20	45.90	17.30	55.30	35.70
1973	218.50	17.60	4.00	17.20	2.80	15.20	46.70	17.90	59.00	38.10
1974	274.80	30.30	10.80	29.70	3.00	16.80	54.30	22.80	64.80	42.30
1975	358.20	26.00	16.30	39.70	3.10	19.20	65.20	24.90	96.90	66.90
1976	443.80	37.30	17.80	50.00	3.90	26.60	81.70	32.50	113.90	80.10
1977	513.80	41.70	19.90	53.20	5.50	36.80	84.40	35.90	142.20	94.20
1978	637.60	58.60	22.90	71.40	7.20	51.00	95.00	59.30	169.60	102.60
1979	776.10	43.60	27.50	94.10	10.10	70.50	129.10	62.90	214.70	123.60
1980	1,039.90	69.40	39.90	127.20	17.10	97.50	170.20	79.70	272.40	166.50
1981	1,213.50	75.10	43.20	165.10	21.00	110.60	191.20	102.70	307.90	196.70
1982	1,352.20	81.80	45.30	184.90	25.30	121.90	218.50	123.50	340.10	210.90
1983	1,729.30	97.20	40.00	197.60	22.10	188.00	266.10	190.40	486.60	241.30
1984	1,837.30	79.60	60.80	233.70	32.00	177.60	289.50	191.10	520.70	252.30
1985	1,928.90	87.40	62.70	192.90	40.10	144.40	316.90	230.50	563.50	290.50
1986	2,014.40	96.20	63.10	193.90	44.20	144.30	365.10	274.70	559.40	273.50
1987	2,074.20	126.60	66.90	213.60	48.50	126.00	383.70	277.40	562.40	269.10
1988	2,134.80	114.50	82.40	197.00	50.60	118.40	415.00	294.50	605.20	257.20
1989	2,227.20	131.70	154.50	254.70	52.80	106.70	427.80	359.10	559.30	180.60
1990	2,445.70	179.60	158.80	345.20	53.30	111.60	444.90	362.00	582.40	207.90
1991	2,632.90	174.30	124.90	343.70	62.00	125.70	471.30	365.50	710.80	254.70
1992	3,010.90	204.00	116.10	426.00	70.90	152.40	555.00	428.00	788.60	269.90

Source: For 1954-66, Mazur (1972), Table II.1: 51; for 1966-92, Cental Bank of Jordan, 'Monthly Statistical Bulletin', various issues.

1/ At factor cost

2/ For 1954-66 mining, manufacturing and electricity and water supply are aggregated in one category in the source (Mazur, 1972). The disaggregation is made by assuming a similar sectoral contribution in pre-1966 to that in post-1966, for which data are disaggregated.

Table AIV.1- 2
GDP Deflators for Jordan, 1954-92 (1975=100)

	Agricultural	Mining & quarrying	Manufacturing	Water & electricity	Construction	Government services	Other services
1954	40.1	19.1	56.8	87.1	113.0	42.6	44.8
1955	40.7	19.4	57.7	88.5	114.7	43.2	45.5
1956	41.3	19.7	58.6	89.8	116.4	43.8	46.1
1957	41.9	20.0	59.4	91.1	118.2	44.5	46.8
1958	42.5	20.3	60.3	92.5	120.0	45.2	47.5
1959	43.3	19.5	58.0	73.3	122.2	46.0	47.6
1960	46.7	21.0	55.1	61.2	124.7	46.9	49.1
1961	47.8	21.2	51.0	65.9	77.9	47.9	50.7
1962	44.3	20.6	51.4	59.5	45.8	48.9	48.4
1963	45.5	20.9	48.6	56.2	48.3	49.9	48.9
1964	45.2	20.9	48.6	56.2	45.5	50.9	48.9
1965	45.3	21.1	50.4	82.3	46.4	50.4	50.4
1966	49.2	21.6	49.2	80.4	45.4	49.2	49.2
1967	54.7	24.0	54.7	89.4	50.4	54.7	54.7
1968	55.8	24.1	55.8	89.6	55.4	55.8	55.8
1969	55.8	24.3	55.8	90.1	60.6	55.8	55.8
1970	59.9	18.5	59.9	91.6	65.9	59.9	59.9
1971	64.2	18.7	64.2	95.6	71.6	64.2	64.2
1972	67.5	24.3	67.5	96.5	77.9	67.5	67.5
1973	71.5	25.0	71.5	99.0	84.6	71.5	71.5
1974	80.7	78.1	80.7	99.8	92.0	80.7	80.7
1975	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1976	136.2	71.8	103.4	106.7	124.4	117.7	107.6
1977	148.3	59.5	111.0	106.9	131.2	127.9	118.8
1978	167.2	55.8	118.9	189.1	141.4	124.8	115.8
1979	175.9	59.8	131.5	158.8	154.6	142.8	147.6
1980	167.2	82.2	155.2	197.8	187.2	162.1	130.4
1981	179.3	94.8	175.8	220.5	192.7	196.4	161.3
1982	179.3	102.5	187.0	237.8	191.5	190.9	179.0
1983	194.8	90.1	196.0	244.4	195.2	190.9	194.7
1984	182.8	94.5	196.2	245.2	197.7	190.9	178.5
1985	150.0	90.8	207.0	254.3	197.7	203.4	176.5
1986	151.7	73.7	209.7	246.9	197.2	210.4	175.6
1987	162.1	64.7	219.6	242.0	189.5	232.1	191.5
1988	150.0	82.6	229.9	242.2	231.4	253.0	208.8
1989	132.8	144.1	273.7	249.1	329.8	341.6	281.9
1990	170.7	170.4	308.3	261.0	373.3	372.9	307.7
1991	177.6	177.6	339.8	283.2	368.0	390.2	322.0
1992	186.5	186.4	356.7	297.4	386.4	409.7	338.1

Source: Central Bank of Jordan (1989), 'Yearly Statistical Series: 1964-1988; Monthly Bulletin, various issues. 'Mazur (1972; 1979). ' World Bank (1984; 1989). Naraplasingam and Shakhatreh (1985).

Note: See text for method of constructing deflators.

Table AIV.1-3
Industrial Origin of GDP for Jordan, 1954-92
(in million JD, at constant 1975 prices)

	GDP 1/	Agriculture	Mining	Manufacturing	Electricity & water supply	Construction	Government services	Transport & communication	Finance business & trade	Other services
1954	121.2	39.3	2.6	5.6	0.3	1.3	20.0	10.5	24.3	17.2
1955	105.4	18.2	3.1	6.6	0.4	1.7	20.8	13.0	24.0	17.6
1956	147.9	49.6	3.7	7.9	0.5	1.8	24.4	15.6	26.7	17.8
1957	148.9	36.7	3.9	8.3	0.5	2.0	27.9	18.8	30.1	20.7
1958	165.0	39.1	4.2	9.0	0.6	2.5	32.1	20.6	35.5	21.5
1959	177.4	34.8	4.4	9.5	0.7	3.8	32.5	22.5	39.5	29.6
1960	180.5	31.3	4.5	11.0	0.9	3.6	33.6	22.6	41.6	31.3
1961	223.5	52.9	5.6	14.9	1.1	5.8	34.9	25.0	50.4	32.9
1962	230.8	47.2	5.4	13.7	1.1	13.4	34.9	25.9	51.8	37.4
1963	247.3	48.6	6.9	19.0	1.6	12.7	35.3	26.1	56.8	40.4
1964	286.5	75.5	8.1	22.3	1.8	12.0	38.7	24.6	60.3	43.2
1965	315.3	75.4	11.8	27.2	2.1	16.9	43.5	25.0	66.6	46.7
1966	311.6	56.2	11.6	30.1	2.5	20.4	45.8	29.3	64.4	51.4
1967	261.3	42.8	11.2	27.1	1.3	12.1	44.8	15.0	64.7	42.2
1968	298.5	29.0	13.0	30.3	1.7	17.5	65.2	23.1	72.8	45.9
1969	353.0	40.3	13.5	33.7	1.8	17.6	72.6	25.8	86.2	61.5
1970	317.6	26.1	18.7	26.6	2.1	11.7	71.0	23.9	83.9	53.8
1971	317.0	37.2	19.4	25.5	2.3	10.3	67.9	22.7	80.1	51.4
1972	325.6	39.4	15.7	27.4	2.6	11.8	68.0	25.6	82.0	52.9
1973	311.6	24.6	16.0	24.1	2.8	18.0	65.3	25.0	82.5	53.3
1974	337.6	37.5	13.8	36.8	3.0	18.3	67.3	28.2	80.3	52.4
1975	358.2	26.0	16.3	39.7	3.1	19.2	65.2	24.9	96.9	66.9
1976	405.6	27.4	24.8	48.3	3.7	21.4	69.4	30.2	105.9	74.5
1977	438.0	28.1	33.5	47.9	5.1	28.0	66.0	30.2	119.7	79.3
1978	538.5	35.0	41.1	60.0	3.8	36.1	76.1	51.2	146.5	88.6
1979	556.6	24.8	46.0	71.5	6.4	45.6	90.4	42.6	145.5	83.7
1980	735.5	41.5	48.5	81.9	8.6	52.1	105.0	61.1	208.9	127.7
1981	722.2	41.9	45.6	93.9	9.5	57.4	97.3	63.7	190.9	122.0
1982	754.2	45.6	44.2	98.9	10.6	63.7	114.4	69.0	190.0	117.8
1983	911.6	49.9	44.4	100.8	9.0	96.3	139.4	97.8	250.0	124.0
1984	1021.7	43.6	64.4	119.1	13.1	89.8	151.6	107.1	291.7	141.4
1985	1079.4	58.3	69.0	93.2	15.8	73.0	155.8	130.6	319.2	164.6
1986	1136.8	63.4	85.7	92.5	17.9	73.2	173.5	156.4	318.5	155.7
1987	1109.7	78.1	103.5	97.3	20.0	66.5	165.3	144.8	293.6	140.5
1988	1052.1	76.3	99.8	85.7	20.9	51.2	164.1	141.1	289.9	123.2
1989	868.2	99.2	107.3	93.0	21.2	32.4	125.2	127.4	198.4	64.1
1990	854.5	105.2	93.2	112.0	20.4	29.9	119.3	117.6	189.3	67.6
1991	859.8	98.1	70.3	101.2	21.9	34.2	120.8	113.5	220.7	79.1
1992	1134.0	95.1	59.2	120.5	25.6	39.8	247.9	157.1	289.5	99.1

Source: Calculated from Tables AIV.1-1 & AIV.1-2.

1/ At factor cost

APPENDIX AV.1

The Real Effective Exchange Rate for Jordan

After a brief history of Jordan's exchange rate (AV.I.1), I shall discuss exchange rate measurements that reflect export competitiveness (AV.1.2), and finally I shall give the methodology for calculating the real effective exchange rate for Jordan used in this study (chapter V).

AV.1.1 History of Jordan's Exchange Rate

	Period	Exchange Rate Regime
1.	*1950-1956*	Fixed
2.	*1956-1961*	Two-tier
3	*1962-1970*	Fixed
4.	*1971*	First devaluation
5.	*1972-1988*	Pegged to SDR
6.	*1988*	Managed float

(1) In the first and second periods, 1950-1956 & 1956-1961, Jordan belonged to the Sterling Zone and followed the sterling exchange standards. The Jordanian Dinar (JD) was at par with the pound sterling, i.e. JD 1.0 = £ 1.0.

(2) The two tier system began in 1956, with the free rate applying to "non-essentials" in order to compress imports, while the supported rate applied to all other imports and to exports.

(3) In 1967, when England devalued the pound sterling by 14%, the sterling share in Jordan's total gold and foreign reserves was about 30%, the rest being in US dollars, gold and Fund assets (Central Bank of Jordan, 1977, *Annual Report*: 131). At that point Jordan decided not to devalue, thus raising further its overvalued currency (Anani, 1990: 129). The JD was now worth one pound and three shillings - instead of one pound only.[1] Subsequently, the JD was detached from the pound and pegged to the US dollar and, therefore, gold at the rate of JD 1.0 = $ 2.8 (Qandah, 1988).

[1]Jordan's loss from the devaluation, in terms of foreign reserves, was JD 6.43 million.

(4) In 1971, when the US dollar was devalued by 7.89%, and since over 50% of Jordan's reserves were in that currency (Anani, 1990: 25), Jordan followed suit and devalued by the same amount (Central Bank of Jordan, 1974, *Annual Report*: 69). Thus the value of the JD relative to the dollar remained unchanged.

(5) In the following period, 1972-1988, and to avoid the vagaries of the financial markets in the early seventies after the break down of Breton Woods, Jordan resorted to pegging the JD to a basket of currencies[2] (Central Bank of Jordan, 1977, *Annual Report*: 131). The parity value was JD 1.0 = SDR 2.578 ± 2.25% (World Bank, 1988: 32). The JD thus remained stable during the period of the two oil price shocks.

The desirability of a stable exchange rate, as far as the Jordanian government is concerned, stemmed from the need to attract Jordanian workers' remittances, which since 1976 financed over one third of total imports, and averaged one-third of GDP. It is precisely the receipt of remittances, and of Arab aid, that allowed this policy any chance of success, since these foreign exchange inflows propped up the JD by expanding Jordan's foreign reserves considerably. During this period the JD was completely convertible, and there were no significant controls on foreign currency movement. Thus the official price was effectively the market-determined price.

(6) Since the mid-eighties, however, remittances and unrequited transfers began to decline appreciably. To maintain the exchange rate at its high level, borrowing was increased and reserves were drawn down. The two arguments given by government officials' against devaluation, which succeeded in averting a devaluation until 1988, were as follows:

> i) Devaluation would not lead to an increase in exports and a reduction in imports (because of low price elasticities for both imports and exports); instead the money supply would increase, creating inflationary pressure in the economy. Evidence from the first devaluation in 1971 was cited, when the balance of trade deficit increased by 22% in 1972 against

[2]Consisting of US dollar (42%); Sterling Pound (12%); Deutsche Mark (19%); Yen (15%); and French Franc 12%. In 1988, the Pound Sterling and French Franc shares were raised by 1% each, while the Yen's was lowered by 2% (Hadad, 1987: 40).

the 1971 balance. The explanation for this behaviour in the trade balance may be found in Jordan's high import penetration, with a ratio of imports to GDP averaging 80% between 1975-1985.

ii) In addition to Jordan's low price elasticity of demand for imports, substitution between imports and domestic products does not take place in the short run, thus devaluation will merely increase the value of imports and lead to inflation (Anani, 1990: 129, Qandah, 1988).

The artificially high value of the JD, however, was not sustainable in the face of mounting indebtedness, and eventually a second and more substantial devaluation (50%) took place on October 15 1988. The JD was detached from the SDR system, and its value was 'managed' through a controlled float. Under the new regime, the Central Bank of Jordan, in consultation with the main commercial banks, determines the exchange rate for the JD on a daily basis, in accordance with the availability of foreign exchange and the demand for it.

AV.1.2 Measurements of the Exchange Rate

The nominal exchange rate is not a very useful tool for measuring the country's competitiveness in export markets. A measure that reflects the strength of the domestic currency *vis-à-vis* trading partners' currencies is needed instead. Such a measure could be the nominal effective exchange rate (NEER), which measures the value of a domestic currency in terms of a trade weighted composite of foreign currencies, with domestic currency equivalent calculated *via* the US$ cross rate (World Bank, 1988).

However, since a fall in the NEER enhances exports' competitiveness *only* if the differential inflation between domestic and trading partners economies is less than or equal to zero, deflating the NEER with the appropriate inflation rates more accurately measures the degree of competitiveness of domestic exports than does the NEER. The resulting measure is called the real effective exchange rate REER, which is the NEER times the ratio of the domestic price index to a trade weighted composite of consumer price indices in trading partner countries (ibid).

Variations in this main exchange rate measurement are of course possible

and enable the analysis to be focused on one policy issue rather than another. For example, using the wholesale price index (WPI) of the US *vs.* domestic consumer price index (CPI) times the nominal ER can be used as a proxy for measuring the price of tradeables relative to non-tradeables in Dutch disease analyses (Pinto, 1987). Another variation is to use an import-weighted, rather than a trade-weighted, composite. Pinto (ibid) argues for Nigeria that, since oil is Nigeria's major export item, an import weighted measure of the ER is more useful for the following reasons: a) it focuses on non-oil traded sectors; b) it abstracts from the impact of the large increases in oil prices on trade weights; and c) it makes economic sense since resource movements between oil and non-oil sectors are absent. Furthermore, using an import-weighted measure for countries with deep import penetration reflects better the value of its exchange rate.

Another ER concept is the purchase power parity (PPP) doctrine which takes domestic price level as given and tries to depict the ER that equalises the purchasing power of domestic and foreign currencies units. That is, the PPP finds the change in the equilibrium ER from the base period that completely offsets the differential between changes in home and foreign price levels (Caves and Jones, 1985: 352).

AV.1.3 Measurement of Jordan's Real Effective Exchange Rate

I shall attempt in what follows to find Jordan's REER against its main trading partners. From the above, the import weighted REER seems to be the appropriate measure, considering Jordan's high level of import penetration. The step-wise calculations are given in the series of tables at the end of this Appendix numbered AV.1-1 through AV.1-1-6.

(1) Table AV.1-1 gives the nominal exchange rate (NER) for Jordan's main trading partners, measured against the US$.

(2) Table AV.1-2 converts these currencies into a JD equivalent *via* the US$ cross rate, thus giving the bilateral exchange rates between Jordan and its major trading partners.

(3) Table AV.1-3 lists the wholesale price index for Jordan and all its trading partners, taking 1980 as a base year.

(4) Table AV.1-4 gives the bilateral real exchange rate (BRER), which is the bilateral nominal exchange (BNER) rate multiplied by the respective WPI of the domestic and trading partner's economy. That is,

$$BRER = BNER\ (JD/foreign\ currency) \left[\frac{WPI_{foreign}}{WPI_{Jordan}} \right]$$

(5) Tables AV.1-(5.1) to AV.1-(5.3) give the weights for Jordan's trading partners. The weights are the value of trade transacted with the country over the total value of trade transacted in any specific year.

(6) Table AV.1-6 gives the REER which is the BRER calculated in step (4) times a trade/import weighted composite of the foreign currencies of Jordan's trading partners. The weights used in the composite are those calculated in tables AV.1-(5.2) and AV.1-(5.3).

Table AV.1-1
Nominal Exchange Rates for Jordan's Main Trading Partners, 1970-1992 ($US to domestic currency)

	Jordan	U.S.1/	U.K.	Japan	Germany	Italy	France	Greece	Spain	S. Arabia	Kuwait	Syria	Iraq	Egypt	India	Indonesia	Romania
1970	2.8000	1.0000	2.3937	0.0028	0.2741	0.0016	0.1811	0.0333	0.0143	0.2222	2.8000	0.2618	2.7849	2.3000	0.1320	0.0026	0.0500
1971	2.8000	1.0857	2.5525	0.0032	0.3060	0.0017	0.0008	0.0333	0.0151	0.2410	3.0400	0.2618	2.9647	2.3000	0.1374	0.0024	0.0500
1972	2.8000	1.0857	2.3481	0.0033	0.3124	0.0017	0.1953	0.0333	0.0157	0.2410	3.0511	0.2618	2.9792	2.3000	0.1238	0.0024	0.0500
1973	3.0390	1.2063	2.3232	0.0036	0.3700	0.0016	0.2124	0.0333	0.0176	0.2198	3.3705	0.2632	3.3862	2.5556	0.1219	0.0024	0.0500
1974	3.1746	1.2244	2.3486	0.0033	0.4150	0.0015	0.2250	0.0337	0.0178	0.2198	3.4526	0.2703	3.3862	2.5556	0.1227	0.0024	0.0500
1975	3.0303	1.1707	2.0235	0.0033	0.3813	0.0015	0.2229	0.0333	0.0167	0.2833	3.3996	0.2703	3.3862	2.5556	0.1119	0.0024	0.0500
1976	3.0211	1.1618	1.7024	0.0034	0.4233	0.0011	0.2012	0.0281	0.0146	0.2833	3.4849	0.2548	3.3862	2.5556	0.1126	0.0024	0.0500
1977	3.1746	1.2147	1.9060	0.0042	0.4751	0.0011	0.2125	0.0270	0.0124	0.2853	3.5703	0.2548	3.3862	2.5556	0.1218	0.0024	0.0500
1978	3.4130	1.3028	2.0345	0.0051	0.5470	0.0012	0.2392	0.0282	0.0143	0.3017	3.6792	0.2548	3.3862	2.5556	0.1221	0.0024	0.0556
1979	3.3898	1.3173	2.2240	0.0042	0.5775	0.0012	0.2488	0.0278	0.0151	0.2972	3.6615	0.2548	3.3862	2.5556	0.1265	0.0016	0.0556
1980	3.2415	1.2754	2.3850	0.0049	0.5105	0.0011	0.2214	0.0261	0.0126	0.3077	3.6860	0.2548	3.3862	2.5556	0.1261	0.0016	0.0556
1981	2.9498	1.1639	1.9080	0.0045	0.4435	0.0008	0.1740	0.0215	0.0103	0.2928	3.5535	0.2548	3.3862	1.4286	0.1099	0.0016	0.0667
1982	2.8450	1.1031	1.6145	0.0043	0.4173	0.0073	0.1487	0.0174	0.0080	0.2911	3.4838	0.2548	3.2169	1.4286	0.1038	0.0014	0.0667
1983	2.6918	1.0470	1.4506	0.0043	0.3671	0.0006	0.1198	0.0142	0.0064	0.2861	3.4181	0.2548	3.2169	1.4286	0.0953	0.0010	0.0546
1984	2.4691	0.9802	1.1565	0.0040	0.3177	0.0005	0.1043	0.0101	0.0058	0.2797	3.2845	0.2548	3.2169	1.4286	0.0803	0.0009	0.0562
1985	2.7192	1.0984	1.4445	0.0050	0.4063	0.0006	0.1323	0.0068	0.0065	0.2743	3.4601	0.2548	3.2169	1.4286	0.0822	0.0009	0.0636
1986	2.9061	1.2232	1.4745	0.0063	0.5153	0.0007	0.1549	0.0072	0.0076	0.2670	3.4206	0.2548	3.2169	1.4286	0.0762	0.0006	0.0007
1987	3.0395	1.4187	1.8715	0.0081	0.6323	0.0009	0.1873	0.0079	0.0092	0.2670	3.7051	0.2548	3.2169	1.4286	0.0777	0.0006	0.0007
1988	2.0964	1.3457	1.8095	0.0079	0.5617	0.0008	0.1650	0.0068	0.0088	0.2670	3.5384	0.0891	3.2169	1.4286	0.0669	0.0006	0.0696
1989	1.5432	1.3142	1.6055	0.0070	0.5890	0.0008	0.1728	0.0063	0.0091	0.2670	3.4250	0.0891	3.2169	0.9091	0.0587	0.0006	0.0690
1990	1.5038	1.4227	1.9280	0.0074	0.6693	0.0009	0.1950	0.0063	0.0103	0.2670	3.4714	0.0891	3.2169	0.5000	0.0553	0.0005	0.0288
1991	1.4815	1.3040	1.8707	0.0080	0.0007	0.0009	0.1931	0.0057	0.0103	0.2670	3.5178	0.0891	3.2169	0.3003	0.0387	0.0005	0.0053
1992	1.4472	1.3750	1.5120	0.0080	0.6196	0.0007	0.1816	0.0047	0.0087	0.2670	3.3036	0.0891	3.2169	0.3003	0.0382	0.0005	0.0022

Source: IMF, IFS various issues
1/ In terms of SDR.

Table AV.1-2
Bilateral Exchange Rates with Jordan for Main Trading Partners, 1970-1992 ($ US per foreign currency)

	U.S.	U.K.	Japan	Germany	Italy	France	Greece	Spain	S. Arabia	Kuwait	Syria	Iraq	Egypt	India	Indonesia	Romania
1970	0.3571	0.8549	0.0010	0.0979	0.0006	0.0647	0.0119	0.0051	0.0794	1.0000	0.0935	0.9946	0.8214	0.0471	0.0009	0.0179
1971	0.3878	0.9116	0.0011	0.1093	0.0006	0.0002	0.0119	0.0054	0.0861	1.0857	0.0935	1.0588	0.8214	0.0491	0.0009	0.0179
1972	0.3878	0.8386	0.0012	0.1116	0.0006	0.0697	0.0119	0.0056	0.0861	1.0897	0.0935	1.0640	0.8214	0.0442	0.0009	0.0179
1973	0.3970	0.7645	0.0012	0.1217	0.0005	0.0699	0.0110	0.0058	0.0723	1.1091	0.0866	1.1142	0.8409	0.0401	0.0008	0.0165
1974	0.3857	0.7398	0.0010	0.1307	0.0005	0.0709	0.0106	0.0056	0.0692	1.0876	0.0851	1.0667	0.8050	0.0387	0.0008	0.0158
1975	0.3863	0.6678	0.0011	0.1258	0.0005	0.0736	0.0110	0.0055	0.0935	1.1219	0.0892	1.1174	0.8433	0.0369	0.0008	0.0165
1976	0.3846	0.5635	0.0011	0.1401	0.0004	0.0666	0.0093	0.0048	0.0938	1.1535	0.0843	1.1209	0.8459	0.0373	0.0008	0.0166
1977	0.3826	0.6004	0.0013	0.1496	0.0004	0.0670	0.0085	0.0039	0.0899	1.1246	0.0803	1.0667	0.8050	0.0384	0.0008	0.0158
1978	0.3817	0.5961	0.0015	0.1603	0.0004	0.0701	0.0083	0.0042	0.0884	1.0780	0.0746	0.9921	0.7488	0.0358	0.0007	0.0163
1979	0.3886	0.6561	0.0012	0.1704	0.0004	0.0734	0.0082	0.0045	0.0877	1.0802	0.0752	0.9989	0.7539	0.0373	0.0005	0.0164
1980	0.3935	0.7358	0.0015	0.1575	0.0003	0.0683	0.0081	0.0039	0.0949	1.1371	0.0786	1.0446	0.7884	0.0389	0.0005	0.0171
1981	0.3946	0.6468	0.0015	0.1503	0.0003	0.0590	0.0073	0.0035	0.0993	1.2047	0.0864	1.1479	0.8843	0.0373	0.0005	0.0226
1982	0.3877	0.5675	0.0015	0.1467	0.0026	0.0523	0.0061	0.0028	0.1023	1.2245	0.0896	1.1307	0.5021	0.0365	0.0005	0.0234
1983	0.3889	0.5389	0.0016	0.1364	0.0002	0.0445	0.0053	0.0024	0.1063	1.2698	0.0946	1.1951	0.5307	0.0354	0.0004	0.0205
1984	0.3970	0.4684	0.0016	0.1287	0.0002	0.0422	0.0041	0.0023	0.1133	1.3302	0.1032	1.3029	0.5786	0.0325	0.0004	0.0228
1985	0.4009	0.5312	0.0018	0.1494	0.0002	0.0486	0.0025	0.0024	0.1009	1.2725	0.0937	1.1830	0.5254	0.0302	0.0003	0.0234
1986	0.4209	0.5074	0.0022	0.1773	0.0003	0.0533	0.0025	0.0026	0.0919	1.1770	0.0877	1.1069	0.4916	0.0262	0.0002	0.0002
1987	0.4667	0.6157	0.0027	0.2080	0.0003	0.0616	0.0026	0.0030	0.0879	1.2190	0.0838	1.0584	0.4700	0.0255	0.0002	0.0002
1988	0.6419	0.8631	0.0038	0.2679	0.0004	0.0787	0.0032	0.0042	0.1274	1.6878	0.0425	1.5345	0.6815	0.0319	0.0003	0.0332
1989	0.8516	1.0404	0.0045	0.3817	0.0005	0.1120	0.0041	0.0059	0.1730	2.2194	0.0577	2.0846	0.5891	0.0380	0.0004	0.0447
1990	0.9463	1.2821	0.0049	0.4451	0.0006	0.1297	0.0042	0.0069	0.1776	2.3084	0.0592	2.1392	0.3325	0.0368	0.0003	0.0192
1991	0.8802	1.2627	0.0054	0.0004	0.0006	0.1303	0.0039	0.0070	0.1802	2.3745	0.0601	2.1714	0.2027	0.0261	0.0003	0.0036
1992	0.9503	1.0448	0.0055	0.4281	0.0005	0.1255	0.0032	0.0060	0.1845	2.2828	0.0616	2.2228	0.2075	0.0264	0.0003	0.0015

Source: IMF, IFS various issues

Table AV.1-3

Wholesale Price Index for Jordan's Main Trading Partners, 1970-1992 (1980=100)

	Jordan	U.S.	U.K.	Japan	Germany	Italy	France	Greece	Spain	S. Arabia	Kuwait	Syria	Iraq	Egypt	Turkey	India	Romania
1970	51.9	41.1	27.7	48.4	61.0	23.9	45.9	23.4	29.2	31.6		34.4					
1971	52.7	42.4	30.3	48.0	64.1	24.8	46.9	24.4	30.9	33.0		37.7					
1972	54.1	44.3	32.2	48.4	65.1	25.8	49.1	26.0	33.0	34.5	51.5	35.7	80.8	42.2	7.8	45.6	
1973	56.2	50.1	34.5	56.0	69.4	30.1	56.3	31.7	26.4	40.2	62.9	47.4	84.7	45.0	9.4	53.1	98.7
1974	60.4	59.6	42.6	73.7	78.7	42.5	72.7	41.6	43.0	48.8	69.6	54.0	91.3	51.5	12.2	68.2	99.8
1975	63.5	65.0	52.4	75.9	82.3	49.1	68.6	45.0	46.9	65.6	74.7	57.9	100.0	55.4	13.5	70.9	100.0
1976	72.6	68.1	60.9	79.7	85.4	57.1	73.6	51.3	53.1	86.4	80.4	65.1	112.8	59.7	15.7	69.5	5.0
1977	77.5	72.2	72.0	81.2	87.7	66.5	77.7	58.3	63.8	96.2	86.0	70.9	123.1	65.2	19.4	74.8	101.1
1978	81.7	77.9	79.1	79.1	88.7	72.1	81.1	64.4	74.3	94.7	85.5	80.6	128.7	74.9	29.1	74.6	103.1
1979	87.0	87.6	87.7	84.9	93.0	83.4	91.9	77.9	85.1	96.4	90.5	81.0		62.2	47.9	83.1	105.0
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	100.0	100.0	
1981	109.1	109.1	109.6	101.4	107.8	116.6	111.7	126.0	115.6	102.7	106.9	119.0		108.0	136.0	112.2	
1982	112.5	111.3	118.0	103.2	114.1	132.7	123.3	146.0	129.7	103.8	108.0	132.0		118.1	171.3	115.0	
1983	117.1	112.7	124.4	100.9	115.8	145.7	135.9	174.9	148.2	104.8	108.2	136.0		136.9	223.8	124.0	
1984	119.0	115.4	132.1	100.7	119.2	160.8	155.1	212.4	166.3	103.7	128.6	148.0		150.7	340.2	134.6	
1985	120.8	114.9	139.4	99.6	121.9	182.6	161.3	256.1	179.5	100.2	124.4	140.5		170.6	477.1	142.4	
1986	122.5	116.0	142.7	90.5	118.9	181.0	163.2	298.1	181.1	97.0	125.1	196.7		200.1	618.3	150.4	
1987	133.8	120.4	147.3	87.1	115.9	185.7	166.3	327.3	182.7	95.5	129.3	289.6		227.4	816.3	160.8	
1988	123.0	127.0	152.6	86.2	117.3	194.5	173.2	360.3	188.1	96.4	135.2	425.6		338.3	1391.2	174.7	
1989	129.0	130.2	153.2	88.4	121.0	206.9	179.5	408.5	196.0	97.4	147.0	484.7		365.4	2281.5	186.7	
1990	129.9	131.6	152.4	90.2	123.1	222.2	182.1	473.8	200.1	99.4	131.6	591.1		426.8	3474.7	203.5	
1991	128.3	129.0	147.9	90.4	126.0	233.9	182.6	552.9	203.4	103.8	122.3	679.7		503.3	5397.9	231.0	
1992	138.3	131.0	147.5	89.1	127.8	238.7	182.4	615.7	205.9	103.4	145.8	678.3		564.2	8750.0	258.3	

Source: IMF/IFS various issues

Table AV.1-4

Bilateral Real Exchange Rates for Jordan's Main Trading Partners, 1970-1992 (JD per domestic currency)

	U.S.	U.K.	Japan	Germany	Italy	France	Greece	Spain	S. Arabia	Kuwait	Syria	Iraq	Egypt	Turkey	India	Romania
1970	0.4262	0.6884	0.0014	0.1736	0.0004	0.0863	0.0081	0.0043	0.0729		0.0935					
1971	0.4569	0.7673	0.0015	0.1946	0.0004	0.0002	0.0081	0.0046	0.0789		0.0979					
1972	0.4427	0.6960	0.0015	0.1872	0.0004	0.0883	0.0080	0.0048	0.0765	1.4464	0.0860	2.2158	0.8934	0.0089	0.0010	
1973	0.4614	0.6119	0.0015	0.1960	0.0004	0.0913	0.0081	0.0035	0.0675	1.6186	0.0952	2.1897	0.8780	0.0087	0.0010	0.0377
1974	0.4463	0.6120	0.0015	0.1998	0.0004	0.1000	0.0086	0.0047	0.0656	1.4698	0.0893	1.8910	0.8050	0.0092	0.0010	0.0305
1975	0.3954	0.5510	0.0013	0.1631	0.0004	0.0795	0.0078	0.0041	0.0966	1.3197	0.0813	1.7598	0.7358	0.0079	0.0009	0.0260
1976	0.3607	0.4727	0.0012	0.1648	0.0003	0.0675	0.0066	0.0035	0.1116	1.2775	0.0756	1.7415	0.6956	0.0081	0.0008	0.0011
1977	0.3565	0.5578	0.0014	0.1693	0.0003	0.0671	0.0064	0.0032	0.1116	1.2480	0.0734	1.6943	0.6773	0.0096	0.0007	0.0205
1978	0.3640	0.5771	0.0015	0.1740	0.0003	0.0696	0.0065	0.0038	0.1024	1.1281	0.0736	1.5629	0.6865	0.0127	0.0006	0.0205
1979	0.3913	0.6614	0.0012	0.1821	0.0004	0.0775	0.0073	0.0044	0.0971	1.1236	0.0700		0.5390	0.0205	0.0004	0.0198
1980	0.3935	0.7358	0.0015	0.1575	0.0003	0.0683	0.0081	0.0039	0.0949	1.1371	0.0786		0.7884	0.0389	0.0005	
1981	0.3946	0.6498	0.0014	0.1486	0.0003	0.0604	0.0084	0.0037	0.0934	1.1804	0.0942		0.4794	0.0464	0.0005	
1982	0.3836	0.5952	0.0014	0.1488	0.0030	0.0573	0.0079	0.0032	0.0944	1.1756	0.1051		0.5271	0.0556	0.0005	
1983	0.3743	0.5725	0.0014	0.1349	0.0003	0.0516	0.0079	0.0030	0.0951	1.1733	0.1099		0.6205	0.0677	0.0004	
1984	0.3850	0.5200	0.0014	0.1289	0.0003	0.0550	0.0073	0.0033	0.0987	1.4376	0.1283		0.7327	0.0930	0.0004	
1985	0.3842	0.6130	0.0015	0.1508	0.0003	0.0649	0.0053	0.0035	0.0837	1.3104	0.1090		0.7420	0.1193	0.0004	
1986	0.3988	0.5913	0.0016	0.1720	0.0004	0.0710	0.0060	0.0038	0.0728	1.2026	0.1408		0.8031	0.1324	0.0003	
1987	0.4199	0.6778	0.0017	0.1802	0.0004	0.0765	0.0064	0.0041	0.0627	1.1771	0.1813		0.7986	0.1558	0.0002	
1988	0.6627	1.0714	0.0027	0.2555	0.0006	0.1109	0.0094	0.0064	0.0998	1.8560	0.1471		1.8747	0.3610	0.0004	
1989	0.8593	1.2354	0.0031	0.3581	0.0008	0.1558	0.0130	0.0090	0.1306	2.5295	0.2169		1.6686	0.6727	0.0005	
1990	0.9585	1.5043	0.0034	0.4220	0.0010	0.1818	0.0154	0.0106	0.1359	2.3386	0.2696		1.0929	0.9845	0.0005	
1991	0.8853	1.4558	0.0038	0.0004	0.0011	0.1855	0.0166	0.0111	0.1458	2.2644	0.3186		0.7952	1.0994	0.0006	
1992	0.8998	1.1140	0.0036	0.3954	0.0008	0.1655	0.0143	0.0090	0.1379	2.4070	0.3019		0.8464	1.6684	0.0006	

Source: IMF/IFS various issues

Table AV.1-5
Jordan's Direction of Trade, 1971-1990 (percentage of total)

1. Direction of Exports

	1971	*1975*	*1980*	*1985*	*1990*	Average	Adjusted average
US	0.00	0.00	0.00	0.00	0.50	0.10	0.18
UK	0.00	0.00	0.00	0.00	0.26	0.05	0.10
Japan	1.50	4.00	2.20	1.80	1.88	2.28	4.22
Germany	0.00	0.00	0.00	0.00	0.28	0.06	0.10
Italy	0.00	2.60	1.20	1.10	0.61	1.10	2.04
France	0.00	0.00	0.00	1.70	0.86	0.51	0.95
Greece	0.00	0.00	0.00	0.00	0.39	0.08	0.15
Spain	0.00	0.00	0.00	0.00	0.16	0.03	0.06
S. Arabia	13.40	9.80	11.50	11.57	6.63	10.58	19.60
Kuwait	11.70	5.70	3.00	0.00	1.60	4.40	8.15
Syria	13.00	7.40	8.00	0.00	1.19	5.92	10.97
Iraq	6.50	4.60	16.50	21.60	16.83	13.21	24.47
Egypt	4.30	2.00	0.00	1.00	1.50	1.76	3.26
Turkey	1.50	6.00	3.20	1.20	2.16	2.81	5.21
India	8.40	3.40	4.70	14.50	18.33	9.87	18.28
Romania	0.00	0.00	2.70	2.90	0.47	1.21	2.25
Total						53.97	100.00

2. Direction of Imports

	1971	1975	1980	1985	1990	Average	Adjusted average
US	20.00	7.80	8.60	12.00	17.35	13.15	17.73
UK	9.30	9.30	7.80	5.90	5.19	7.50	10.11
Japan	5.00	7.30	7.20	6.30	3.15	5.79	7.81
Germany	6.00	10.50	10.00	6.20	5.85	7.71	10.39
Italy	2.30	4.80	6.30	6.80	3.92	4.82	6.50
France	2.90	3.10	7.30	3.20	5.65	4.43	5.97
Greece	0.00	1.00	2.00	1.00	0.42	0.88	1.19
Spain	5.00	1.10	2.10	1.00	1.08	2.06	2.77
S. Arabia	5.80	9.80	17.10	15.10	4.62	10.48	14.13
Kuwait	11.70	5.70	3.00	0.00	1.54	4.39	5.92
Syria	2.90	2.70	1.60	1.00	0.69	1.78	2.40
Iraq	0.00	0.00	0.00	7.00	15.81	4.56	6.15
Egypt	5.00	2.70	1.00	1.00	1.12	2.16	2.92
Turkey	0.00	2.00	1.20	2.70	2.69	1.72	2.32
India	1.50	1.00	1.00	1.00	1.27	1.15	1.56
Romania	0.00	3.80	1.90	1.30	0.92	1.58	2.14
Total						74.18	100.00

3. Direction of Trade (Exports & Imports)

	1971	*1975*	*1980*	*1985*	*1990*	Average	Adjusted average
US	17.40	6.45	6.94	9.31	13.51	10.72	15.95
UK	8.09	7.69	6.29	4.58	4.05	6.14	9.13
Japan	4.55	6.73	6.24	5.04	2.60	5.03	7.48
Germany	5.22	8.69	8.07	4.81	4.56	6.27	9.32
Italy	2.00	4.42	5.32	5.37	3.09	4.04	6.01
France	2.52	2.56	5.89	2.62	4.46	3.61	5.37
Greece	0.00	0.83	1.61	0.78	0.36	0.72	1.06
Spain	4.35	0.91	1.69	0.78	0.85	1.72	2.55
S. Arabia	6.79	9.80	16.02	12.67	4.12	9.88	14.69
Kuwait	11.70	5.70	3.00	0.00	1.32	4.34	6.46
Syria	4.21	3.51	2.84	0.78	0.64	2.39	3.56
Iraq	0.84	0.79	3.18	7.20	13.65	5.13	7.63
Egypt	4.91	2.58	0.81	0.86	0.99	2.03	3.02
Turkey	0.19	2.69	1.59	2.19	2.27	1.79	2.66
India	2.40	1.41	1.71	1.96	2.49	2.00	2.97
Romania	0.00	3.14	2.05	1.25	0.75	1.44	2.14
Total						67.25	100.00

Source: IMF, Direction of Trade 1972-77; 1978; & 1990.

Table AV.1-6

Real Effective Exchange Rate for Jordan, 1970-1992 (JD per $US)

	Import weighted	REER Index 1972=100	Trade weighted	REER Index 1972=100
1970	29.93	79%	22.10	70%
1971	31.94	85%	23.49	74%
1972	37.71	100%	31.58	100%
1973	38.27	101%	32.30	102%
1974	36.82	98%	30.79	98%
1975	34.04	90%	27.99	89%
1976	32.31	86%	26.29	83%
1977	32.99	87%	26.87	85%
1978	32.54	86%	26.32	83%
1979	33.50	89%	27.16	86%
1980	34.92	93%	28.54	90%
1981	33.25	88%	26.93	85%
1982	32.66	87%	26.40	84%
1983	32.38	86%	26.18	83%
1984	34.13	91%	28.22	89%
1985	34.39	91%	28.31	90%
1986	34.14	91%	28.03	89%
1987	35.40	94%	29.24	93%
1988	53.72	142%	47.61	151%
1989	65.41	173%	59.63	189%
1990	68.92	183%	62.78	199%
1991	61.52	163%	55.99	177%
1992	64.76	172%	59.34	188%
Appreciation				
1972-1978		13.71%		16.66%
1979-82		2.25%		2.39%
1983-88		-85.84%		-105.00%
1989-92		-1.74%		-0.94%

Source: calculated from Tables AV.1-1 to AV.1-5, see text for methodology.

APPENDIX AVI.1
Statistical Tables for Agriculture

Table AVI.1-1
Change in Cropping Pattern, 1973/74-1980/83

	Average area utilised (000 dunums)[1/]		Change in cropped areas	
	1973/74-1975/76	1980/81-1982/83	dunum (000)	per cent
Field crops	2,531.30	1,633.47	-897.83	-35.47
Wheat	1,616.97	975.63	-641.33	-39.66
Barley	499.87	405.63	-94.23	-18.85
Lentils	230.13	83.90	-146.23	-63.54
Legumes	87.43	46.40	-41.03	-46.93
Others	96.90	121.90	25.00	25.80
Vegetables	352.40	493.50	141.10	40.04
Tomatoes	120.93	156.90	35.97	29.74
Others	231.47	336.60	105.13	45.42
Fruit trees	313.59	464.14	150.54	48.01
Olives	163.07	244.10	81.03	49.69
Grapes	86.50	141.67	55.17	63.78
Citrus	20.07	36.37	16.30	81.23
Others	43.96	42.00	-1.96	-4.45
Total	3,197.29	2,591.10	606.19	-18.96

Source: Calculated from World Bank (1990), *Towards an Agriculture Sector Strategy*.
1/ 1 dunum = 0.1 hectare

Table AVI.1-2
Per Capita Food Consumption (kg/annum), 1973 & 1981

	1973	*1981*	*% change*
Cereal	115.20	233.20	102.43
Wheat & Flour	72.60	128.20	76.58
Rice	9.6	15.9	65.63
Vegetables	82.0	83.9	2.32
Fruit & Citrus	81.5	71.5	-12.27
Meat	19.2	38.9	102.60
red	5.3	12.6	137.74
white	13.9	26.3	89.21
Milk & dairy products	46.3	58.6	26.57
Eggs (mn)	65.4	123.9	89.45
Sugar	11.6	38.8	234.48
Coffee, Tea & Cocoa	3.6	3.0	-16.67

Source: Department of Statistics, *Statistical Yearbook*, various issues.

Table AVI.1-3
Production and Imports of Agricultural Commodities
average 1973-1981 (000 tons)

	Consumption	Production	Imports	Production/ consumption	Imports/ consumption
Cereal	384.1	121.0	326.1	31.50	84.90
Vegetables	114.5	251.8	49.9	219.91	43.58
Fruit & Citrus	145.3	124.1	113.6	85.41	78.18
Sugar	71.4	0.0	71.4	0.00	100.00
Meat	48.4	37.3	11.1	77.07	22.93
Fish	3.9	0.1	3.8	2.56	97.44
Milk & Dairy Products	103.2	40.4	64.7	39.15	16.74
Nuts	5.7	2.4	3.4	42.11	59.65
Tea, Coffee & Cocoa	6.2	0.0	6.2	0.00	100.00

Source: Department of Statistics (1973; 1981), *External Trade Statistics.*

Table AVI.1-4
Composition of Agricultural Imports, 1973 & 1981
(000 000 JD)

	1973		*1981*	
	Value	*% total*	*Value*	*% total*
Cereal	10.50	34.07	35.03	20.71
Wheat & Flour	7.00	22.71	23.43	13.85
Vegetables	2.50	8.11	7.01	4.14
Potatoes	0.84	2.73	3.48	2.06
Fruit & Citrus	3.30	10.71	9.11	5.38
Apples	1.41	4.57	3.50	2.07
Citrus	1.45	4.70	3.20	1.89
Sugar	1.80	5.84	21.40	12.65
Meat & Fish	0.80	2.60	18.39	10.87
Milk & Dairy Products	3.30	10.71	8.60	5.08
Tea, Coffee & Cocoa	2.52	8.18	7.08	4.18
Other	6.10	19.79	62.56	36.98
Total	30.82	100.00	169.18	100.00

Source: Ibid.

Table AVI.1-5
Composition of Agricultural Exports, 1973 & 1981
(000 000 JD)

	1973		1981	
	Value	*% total*	*Value*	*% total*
Cereal (Lentils)	0.48	10.43	0.66	1.94
Vegetables	2.42	52.61	19.50	57.20
Tomatoes	0.92	20.00	6.67	19.57
Eggplant	0.40	8.70	1.61	4.72
Onions	0.07	1.52	0.39	1.14
Fruit & Citrus	1.57	34.13	9.98	29.28
Citrus	1.41	30.65	8.74	25.64
Grapes	0.10	2.17	0.31	0.91
Milk & Dairy Products	0.06	1.30	0.26	0.76
Eggs	0.00	0.00	1.62	4.75
Other	0.07	1.52	2.07	6.07
Total	4.60	100.00	34.09	100.00
Ratio to total exports		32.9%		22.5%
Ratio to GDP		2.4%		3.3%

Source: Ibid.

Table AVI.1-6
Agricultural Trade Balance, 1973 & 1981
(000 000 JD)

	1973	*1981*
Cereal	-10.02	-34.37
Lentils	0.48	0.66
Wheat	-7.00	-23.43
Vegetables	-0.08	12.49
Tomatoes	0.92	6.67
Potatoes	-0.84	-3.48
Fruit & Citrus	-1.73	0.87
Apples	-1.41	-3.50
Citrus	-0.04	5.54
Sugar	-1.80	-21.40
Meat & Fish	-0.80	-18.39
Milk & Dairy Products	-3.24	-8.34
Tea, coffee & Cocoa	-2.52	-7.08
Other	-6.03	-60.49
Total	-26.22	-154.07

Source: Calculated from Tables AVI.1-4 & AVI.1-5.

APPENDIX AVI.2
Jordan Valley River Project Investment (000 JD)

Year	Invest-ments	Project	Project	Project	Project	Project	Area Served (ha)
1962	850	EGMC[1]					
1963	850	EGMC					
1964	850	EGMC					
1965	850	EGMC					
1966	2,041	EGMC	8km ext	Kafrein D[2]			
1967	2,041	EGMC	8km ext	Kafrein D			
1968	2,041	EGMC	8km ext	Kafrein D			
1969	1,075	EGMC	8km ext				10,108
1970							10,108
1971							10,108
1972	2,314		KTD/ZTI[3]				10,108
1973	2,314		KTD/ZTI				10,108
1974	2,314		KTD/ZTI				10,108
1975	3,714	18km ext	KTD/ZTI				10,108
1976	5,357	18km ext	KTD/ZTI	HsKafrein	WZDEJI[4]		10,108
1977	5,357	18km ext	KTD/ZTI	HsKafrein	WZDEJI		10,108
1978	11,025	18km ext	KTD/ZTI	HsKafrein	WZDEJI	W.ArabDam	14,060
1979	10,542		LTD/ZTI		WZDEJI	W.ArabDam	16,188
1980	5,667					W.ArabDam	16,188
1981							18,380
1982							18,380
1983	4,950	KingTalal(raising)				W.ArabIrrg	18,380
1984	7,300	KingTalal		14.5 km ext		W.ArabIrrg	18,380
1985	7,300	KingTalal		14.5 km ext		W.ArabIrrg	18,380
1986	7,300	KingTalal				W.ArabIrrg	18,380
				14.5 km ext			
1988	3,250			14.5 km ext		W.ArabIrrg	23,891

Source: Tech International, 198?, AIII.2-1.778

[1]East Ghor Main Canal

[2]Southeast Ghor Complex- Kafrein Dam and Hisban kafrein Irrigation.

[3]King Talal Dam and Zarqa Triangle Irrigation.

[4]Wadi Ziglab Dam and Wadi Jurum Irrigation.

APPENDIX AVI.3

Index of Profitability of Agricultural Production (Real Producers' Price)

This appendix documents the steps involved in constructing an index of profitability for agricultural production, or what is called in Dutch disease literature 'real producers' price'. Real producers' prices are obtained by deflating the wholesale price index (WPI) by a composite cost index for three groups of commodities: cereals, vegetables, and fruit. The new approach in constructing this index, which differentiates it from Dutch disease indexes, is that technical coefficients of production are taken into consideration, thus accommodating the effect of technological change in the estimate of profitability (via productivity growth).

The structure of the cost index is based on the following identity:

$$C_{in} = \sum \{ p_{in} \cdot a_{in} \}$$

That is total cost, C, for individual commodities, r, in the respective year, n, equals the sum of input prices, p_i, weighted by technical coefficients, a_i.

(1) Cost structure for a representative farm in the Jordan Valley is available for 1975 from ECWA (1978) (Table AVI.3-1). For 1982, a similar table was constructed from data available from Zehlan (1985) and Burrel (1986) (Table AVI.3-2). The 1982 figures were deflated by FAO (Yearbook, various issues) indices of prices paid by farmers for the different inputs covering the period 1975-81 (Table AVI.3-3), thus establishing the cost structure for 1982 at constant 1975 prices (Table AVI.3-4).

(2) Cost shares of inputs were taken as the technical coefficient of production, a_i, considering 1975 as the base year (Tables AVI.3-4 & AVI.3-5). Interpolating between the two end years 1975 and 1982, technical coefficients for all years between 1975 and 1982 were obtained.

(3) Input prices, p_i, are taken from FAO statistical series (Table AVI.3-6).

(4) From technical coefficients, a_i, and input prices, p_i, total costs, C, were obtained according to equation (1) above for single crops (Table AVI.3-7).

(5) Indexes for groups of commodities (cereals, vegetables, and fruit) were then constructed using crop shares in total cultivated area as weights (from World Bank, 1990, statistical appendix), the result is shown in Table AVI.3-8.

(6) Wholesale price indexes (WPI) for the main commodity groups are available from the Central Bank of Jordan, 1989 (Table AVI.3-9).

(7) Real producers' prices are obtained by deflating WPI by the composite cost index for the respective commodity group (Table AVI.3-10).

Table AVI.3-1
Per Hectare Production Costs for Irrigated Farm Enterprises in the Jordan Valley, 1975
(at current prices)

	Land	Machinery	Material	Water	Labour	Total
Wheat	35.00	4.30	6.50	27.30	25.60	98.70
Maize	40.00	6.60	3.20	35.50	57.00	142.30
Tomato	75.00	8.00	118.20	25.20	149.80	376.20
Potato	89.00	12.30	202.00	25.80	96.40	425.50
Eggplant	79.00	7.50	104.00	51.00	207.80	449.30
Cucumber	60.00	11.70	86.70	24.80	188.30	371.50
Citrus	100.00	9.50	157.70	59.20	185.90	512.30
Banana	100.00	9.50	289.70	111.30	324.80	835.30
Onion	71.00	7.60	163.70	25.00	17.00	284.30

Source: FAO/ECWA, 1987.

Table AVI.3-2
Per Hectare Production Costs for Irrigated Farm Enterprises in the Jordan Valley, 1982
(current prices)

	Land	Machinery	Material	Water	Labour	Total
Wheat	200.00	28.00	33.80	40.00	5.30	307.10
Tomato	350.00	25.00	1129.00	36.00	195.00	1,735.00
Potato	350.00	15.00	1,500.00	60.00	150.00	2,075.00
Eggplant	350.00	25.00	415.00	60.00	183.00	1,033.00
Cucumber	350.00	170.00	1,0204.0	20.00	1,808.00	1,2552.0
Citrus	250.00	10.00	660.00	60.00	80.00	1,060.00
Banana	250.00	10.00	1,000.00	111.30	160.00	1,531.30

Sources: Mitchel (1986), Table 4.1: 42 for wheat (land rent is assumed); Abu Howayej (1985): 95 for vegetables; Qasem (1986): 96-98, for fruit and vegetables.

Table AVI.3-3
Per Hectare Production Costs for Irrigated Enterprises in the Jordan Valley, 1982
(at constant 1975 prices)

	Land	Machinery	Material	Water	Labour	Total
Wheat	101.33	10.29	22.38	40.00	1.77	175.78
Tomato	177.32	9.19	747.68	36.00	65.31	1035.50
Potato	177.32	5.51	993.38	60.00	50.23	1286.45
Eggplant	177.32	9.19	274.83	60.00	61.29	582.63
Cucumber	177.32	62.50	6757.62	20.00	605.50	7622.93
Citrus	126.66	3.68	437.09	60.00	26.79	654.21
Banana	126.66	3.68	662.25	111.30	53.58	957.47

Source: Table AVI.3-2 for current price values, deflated by FAO price series (Table AVI.3-6)

Table AVI.3-4
Input Shares in Production Costs for Irrigated Farm Enterprises, 1975
(JD per hectare, at current prices)

	Land	Machinery	Material	Water	Labour	Total
Wheat	0.35	0.04	0.07	0.28	0.26	1.00
Tomato	0.20	0.02	0.31	0.07	0.40	1.00
Potato	0.21	0.03	0.47	0.06	0.23	1.00
Eggplant	0.18	0.02	0.23	0.11	0.46	1.00
Cucumber	0.16	0.03	0.23	0.07	0.51	1.00
Citrus	0.20	0.02	0.31	0.12	0.36	1.01
Banana	0.12	0.01	0.35	0.13	0.39	1.00

Source: Calculated from Table AVI.3-1.

Table AVI.3-5
Input Shares in Production Costs for Irrigated Farm Enterprises. 1982
(JD per hectare, at constant 1975 prices)

	Land	Machinery	Material	Water	Labour	Total
Wheat	0.58	0.059	0.127	0.23	0.01	1.00
Tomato	0.17	0.009	0.722	0.03	0.06	1.00
Potato	0.14	0.004	0.772	0.05	0.04	1.00
Eggplant	0.30	0.016	0.472	0.10	0.11	1.00
Cucumber	0.02	0.008	0.886	0.00	0.08	1.00
Citrus	0.19	0.006	0.668	0.09	0.04	1.00
Banana	0.13	0.004	0.692	0.12	0.06	1.00

Source: Calculated from Table AVI.3-3.

Table AVI.3-6
Index of Prices Paid by Farmers (1975=100)

	Land	Machinery	Fertilisers	Seeds	Pesticides	Material	Wages
1975	100	100	100	100	100	100	100
1976	112	107	73	110	104	99	120
1977	125	112	59	111	80	90	144
1978	140	118	50	140	67	99	173
1979	157	120	74	128	88	104	207
1980	176	272	109	166	107	137	249
1981	197	272	116	186	116	151	299
Average	12.0%	24.2%	6.7%	11.7%	4.3%	7.8%	20.0%

Source: FAO *Production Yearbook*, various issues.

Notes: Wages are assumed to increase at 20% p.a. (based on El-Akel's (1985) findings). Land is assumed to increase at 12% p.a., slightly ahead of COL rate. Material index is a composite of 50% fertilisers, 25% pesticides, 25% seeds.

Table AVI.3-7
Cost Index for Major Crops Grown in the Jordan Valley (1975=100)

	Wheat	Tomato	Potato	Eggplant	Cucumber	Citrus	Banana
1975	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1976	82.34	102.81	100.50	99.71	104.62	97.91	95.40
1977	92.31	108.34	101.82	107.88	111.29	102.68	99.36
1978	78.11	76.51	112.56	121.35	123.72	112.40	110.52
1979	92.50	130.59	120.67	133.53	132.99	123.04	119.15
1980	140.40	157.39	148.39	158.66	161.06	147.57	143.40
1981	154.50	170.84	161.34	173.68	173.32	159.58	155.20

Source: Calculated from Tables AVI.3-1 to AVI.3-6.

Table AVI.3-8
Composite Cost Index for Groups of Agricultural Commodities (1975=100)

	Cereals	Vegetables	Fruit
1975	100.00	100%	100%
1976	82.34	102%	101%
1977	92.31	108%	107%
1978	78.11	92%	118%
1979	92.50	131%	128%
1980	140.40	158%	154%
1981	154.50	172%	166%

Source: Calculated from AVI.3-7, with weights given the different enterprises equivalent to their share in cultivated area (from World Bank, 1990, Annex)

Table AVI.3-9
Wholesale Price Index for Major Agricultural Commodity Groups (1975=100)

	Cereals	Vegetables	Fruit
1975	100%	100%	100%
1976	126%	178%	148%
1977	133%	196%	170%
1978	133%	207%	214%
1979	141%	243%	216%
1980	153%	300%	229%
1981	149%	267%	231%

Source: Central Bank of Jordan, 1989, *Yearly Statistical Series 1964-88,*

Table AVI.3-10
Index of Real Producers' Prices (1975=100)

	Cereals	Vegetables	Fruit
1975	100%	100%	100%
1976	153%	174%	146%
1977	144%	181%	159%
1978	170%	226%	181%
1979	153%	185%	168%
1980	109%	189%	148%
1981	97%	156%	139%

Source: Calculated from Tables AVI.3-1 to AVI.3-9.

APPENDIX AVII.1
Total Factor Productivity Calculations: Methodology

I use the method adopted by Krueger and Tuncer (1980) in their calculation of TFP growth for two-digit manufacturing industries in Turkey over the period 1963-1976. My calculations are done at both the firm-level using my own industrial survey data collected as an integral part of this study, and two-digit manufacturing industries using officially published data from the Department of Statistics (DOS). The firm-level data include: nominal value of output, physical capital stock, number of workers, wage payments, purchased inputs disaggregated into domestically produced and imported inputs, unit value of imports for each imported material input, and occasionally unit output price. The two-digit manufacturing industries data include: value added, fixed capital stock, number of workers, and wages, all values are given in current prices. The following data series were constructed for deflation purposes using officially published data from DOS (*External Trade Statistics*, various issues) and Central Bank of Jordan (1989, *Yearly Statistical Series*, & 1992, *Monthly Bulletin*, Dec.); wholesale price indexes for output; unit value of imports for imported material and capital; and a capital stock deflator (using data for unit value of imports of machinery and equipment and wholesale prices for construction material; with 75% and 25% weights respectively).

At the firm-level, I included raw materials in TFI, and output was gross of material; at two-digit manufacturing, however, I only included labour and capital, and output was therefore net of raw material - value added.

Competitive markets are assumed where factors are paid the value of their marginal products, the elasticity of output with respect to factor input is equal to the factor's share in the value of output. The methodology of measuring total factor productivity growth is that of growth accounting, where the growth rate of output less the weighted average rate of growth of identified inputs equals total factor productivity growth. For estimating the growth of output and inputs an exponential time trend was assumed and growth rates estimated accordingly. This method was thought appropriate because the growth in capital and labour was not smooth. Labour input was taken as the number of workers, rather than hours worked, because data on the latter were not given. (While interviewing industrialists it became clear that the total days worked per year did not change in most firms. However, changing the number of shifts per

day, which depends on demand and therefore produced output, would have changed total hours worked per year.)

No adjustment for the quality of inputs was attempted, due to unavailability of data with which to make such adjustments. Normally where shares of inputs in total output vary over time, a Divisia index for estimating aggregate inputs is ideal (as Tsao, 1982, has done for Singapore, and Ahluwalia, 1992, for India). I did not follow this procedure because input shares were quite stable over the periods considered, and period averages were therefore used for weighting. For firms, the data on wage payments was used to estimate the share of labour; purchased inputs to estimate the share of material; and the return to capital was estimated as a residual. For two-digit manufacturing, the share of capital was the residual of value added over the wage share, after netting out depreciation.

TFP growth was calculated over three distinct periods: 1970-73, 1974-1982, and 1983-1992 which cover the pre-boom, boom, and post-boom periods respectively. The results are given in Tables VII.4.2-1 and VII.4.2-2 in the text.

APPENDIX AVII.2
Correlation Among Manufacturing Industries

Here I present the results of a simple analysis of correlation among growth rates of output, labour, capital, etc. and absolute values of other variables, such as wage levels, relative prices, etc. Seventeen variables, listed in Table AVII.2-1, were used. The correlation is performed on 18 manufacturing industries (the 20 discussed in chapter VII, with the exclusion of plastic products, for which the data are unsatisfactory, and a combination of non-electric and electric machinery into one set); and for three periods: pre-boom (1967-73), boom (1974-82), and post-boom (1983-91). The analysis is in two parts: (1) correlation coefficients between two different variables in the same period, and (2) correlation coefficient between the same variables in successive periods. In this appendix I will only present the results and draw attention to some of the more significant figures. Some of the correlation coefficients are quoted in chapter VII to support or refute particular hypotheses.

Table AVII.2-1
Variables Used in Correlation Analysis

Variable	Abbreviation
Annual percentage growth rates of:	
Output	^q
Labour	^l
Capital	^k
TFI	^f
TFP	^p
Labour productivity	^q-^l
Capital per worker	^k-^l
Capital per unit output	^k-^q
Exports	^x
Output per man (first year of period)	q/l
Capital per worker (first year of period)	k/l
Capital-output ratio (first year of period)	k/q
Proportion of output exported (first year of period)	x/o
Proportion of total cost spent on imported intermediate input	m/c
Relative export to domestic wholesale price (last year as a percent of first year of period)	r
Wage rate (first year of period)	w
Wage rate (last year as percent of first year of period)	$(1+\hat{}w)^t$

The within-period correlation coefficients are shown in Table AVII.2-2. The most salient features being:

(1) Output growth is strongly correlated with growth in labour productivity, capital productivity, and, therefore, TFP (Verdoorn's law).

(2) There is no significant correlation between output growth and changes in relative prices; nor was output growth dependent on initial factor intensities, or their growth (Dutch disease model).

(3) TFI seems to have been influenced by growth in capital only, and not in labour; and, during the boom, it is positively correlated with absolute levels of wages. (The explanation for the positive correlation between TFI and wages is *via* capital input, which itself is positively correlated to wages: since TFI seems to be strongly correlated with capital input, the higher the wage level, the higher is capital input and, therefore, TFI.)

(4) The growth of TFP is positively and significantly correlated with growth in labour productivity; and negatively and significantly correlated with growth in the capital-labour ratio.

(5) The growth in capital-intensity (relative to labour) seems to have been correlated with labour productivity levels during the boom. However, increases in capital intensity do not seem to have influenced wages.

(6) There is no correlation between capital intensity and the proportion of output exported. Generally, the proportion exported and the growth in exports seem to have been autonomous, i.e. they do not seem to have been related to any of the variables considered here.

(7) In all three periods, industries with a high labour productivity level also had high wages.

(8) For the boom period, but not the other two periods, growth in capital input and TFI are positively correlated with high wages.

Between-period correlations are shown in Table AVII.1-3. There was a tendency for the same industries to have high capital per unit of output in all periods. In the pre-boom (1967-73) and the boom (1974-82) periods, but not in the post-boom period (1983-92), there was a tendency for the same industries to experience rapid growth in labour input, to have high wages, and to export a greater proportion of their output. The between-period correlations of growth in output, TFI, TFP, and labour and capital productivity are remarkably low, and even more remarkable is the preponderance of negative signs, which may indicate that the conditions leading to growth in those variables in one period were reversed in the following period. Those industries that experienced rapid growth during the boom had a slow rate of growth in the post-boom period.

Table AVII.2-2

Within-Period Correlation Coefficient for Nineteen Manufacturing Industries in Jordan, 1967-73; 1974-82; & 1983-91.

Variable	^l	^k	^f	^p	^q-^l	^k-^l	^k-^q	q/l	k/l	k/q	^x	x/o	m/c	r	w	(1+^w)t
^q	-0.30	-0.29	-0.33	0.97	0.99	-0.15	-0.94	-0.24	-0.09	-0.13	-0.30	-0.33	-0.29	-0.06	-0.17	-0.41
	0.08	0.05	0.05	0.88	0.94	0.01	-0.78	-0.36	0.28	0.15	0.12	0.24	0.21	0.05	-0.19	0.45
	0.04	0.04	0.13	0.93	0.96	0.02	-0.86	-0.12	0.25	0.37	-0.29	0.26	0.35	0.16	0.36	-0.38
^l		-0.32	0.05	-0.31	-0.43	0.14	-0.58	-0.09	-0.24	0.24	-0.12	0.43	0.45	0.19	-0.11	0.57
		-0.30	-0.01	0.01	-0.27	-0.25	-0.62	-0.17	0.39	-0.02	-0.35	-0.19	0.53	0.58	-0.14	-0.13
		0.32	0.53	-0.16	-0.23	0.13	-0.19	-0.51	0.15	-0.05	-0.06	-0.27	-0.05	-0.09	-0.10	-0.17
^k			0.99	-0.39	-0.23	0.60	0.96	0.12	-0.16	-0.03	0.50	-0.29	-0.34	-0.33	0.08	-0.13
			0.93	-0.37	0.15	0.59	0.93	0.67	-0.20	-0.19	-0.18	-0.09	-0.20	0.04	0.62	0.11
			0.92	-0.31	-0.05	0.48	0.87	-0.47	0.07	-0.04	0.14	-0.50	-0.28	0.45	-0.28	0.03
^f				-0.53	-0.32	0.57	0.88	0.23	-0.03	0.02	0.07	-0.19	-0.18	-0.46	0.16	0.05
				-0.39	0.05	0.55	0.77	0.64	-0.05	-0.20	-0.24	-0.13	0.01	0.21	0.58	-0.02
				-0.26	-0.03	0.36	0.69	-0.67	0.11	-0.03	0.10	-0.29	-0.37	0.30	-0.34	-0.13
^p					0.97	-0.95	-0.24	-0.28	-0.09	-0.12	-0.23	-0.26	-0.24	0.06	-0.20	-0.40
					0.85	-0.94	-0.31	-0.62	0.31	0.31	0.24	0.28	0.14	-0.06	-0.42	0.39
					0.95	-0.98	-0.24	0.13	0.21	0.4	-0.32	0.36	0.48	0.05	0.48	-0.32
^q-^l						-0.06	-0.06	-0.21	-0.05	-0.15	-0.26	-0.37	-0.34	-0.08	-0.15	-0.47
						0.22	0.22	-0.29	0.13	0.15	0.23	0.30	0.02	-0.15	-0.14	0.48
						0.07	0.07	0.04	0.22	-0.10	-0.23	0.30	0.35	0.21	0.39	-0.32
^k-^l							0.47	0.14	-0.11	-0.10	0.45	-0.31	-0.45	-0.23	0.11	-0.27
							0.58	0.62	-0.31	-0.15	-0.02	-0.01	-0.37	-0.18	0.56	0.14
							0.43	-0.22	0.00	-0.01	0.18	-0.38	-0.26	0.51	-0.24	0.12
^k-^q								0.24	0.02	0.09	0.43	0.17	0.12	-0.07	0.17	0.30
								0.72	-0.35	-0.24	-0.21	-0.25	-0.30	-0.01	0.54	-0.30
								-0.13	-0.19	-0.35	0.33	-0.48	-0.45	0.08	-0.46	0.35
q/l									-0.13	-0.09	-0.06	-0.17	-0.25	0.41	0.95	-0.21
									-0.03	0.00	-0.19	-0.32	-0.13	-0.11	0.91	-0.50
									0.00	-0.11	-0.29	-0.14	0.40	-0.09	0.61	-0.03
k/l										-0.13	-0.34	-0.34	0.07	-0.33	-0.19	-0.11
										0.74	-0.24	-0.24	0.16	0.08	0.16	-0.37
										-0.17	0.16	0.16	0.32	0.43	0.45	0.06
k/q											0.40	0.40	-0.04	-0.02	0.15	-0.34
											-0.19	-0.19	-0.04	-0.11	0.27	-0.56
											-0.20	-0.20	-0.05	-0.23	-0.14	-0.16
^x												-0.14	0.10	0.07	0.02	-0.24
												-0.17	-0.15	-0.48	-0.33	0.13
												-0.09	0.15	0.02	-0.04	0.56
x/o													0.19	0.03	-0.21	0.57
													0.21	-0.14	-0.25	0.11
													-0.09	-0.01	-0.14	-0.29
m/c														-0.23	-0.34	0.15
														0.20	-0.24	0.01
														0.27	0.58	0.29
r															0.37	0.22
															-0.06	0.19
															-0.11	0.22
w																-0.34
																-0.56
																-0.16

Source: Department of Statistics, 'Industrial Survey'; 'Industrial Census'; & 'External Trade Statistics', various issues. Central Bank of Jordan, 'Monthly Bulletin' various issues.

Note: The first figure in each cell refers to 1967-1973, the second to 1974-82, and the third to 1983-91.

An asterisk refers to a correlation coefficient significantly different from zero at the 5% level (the critical value is ± .576)

Table AVII.2-3
Between-Period Correlation Coefficient for Nineteen Manufacturing Industries in Jordan: 1967-73, 1974-82, and 1983-91

Variable	*Between 1967-73 and 1974-82*	*Between 1974-82 and 1983-91*	Variable	*Between 1967-73 and 1974-82*	*Between 1974-82 and 1983-91*
^q	-0.09	-0.14	q/l	-0.05	-0.22
^l	0.70	0.29	k/l	0.41	0.45
^k	0.05	-0.38	k/q	0.99*	1.00*
^f	-0.11	-0.14	x/o	0.81	0.06
^p	-0.04	-0.34	m/c	0.37	0.21
^q-^l	-0.05	-0.22	r	-0.19	-0.15
^k-^l	0.30	-0.22	w	0.97*	-0.00
^k-^q	-0.01	-0.39	(1+^w)t	-0.38	-0.29
^x	-0.02	-0.17			

Source: Department of Statistics, *Industrial Survey, Industrial Census, External Trade Statistics*, various issues; Central Bank of Jordan, *Monthly Bulletin*, various issues.
Note: An asterisk refers to a correlation coefficient significantly different from zero at the 5% level (the critical value is ± 0.576)

Similarly, those industries where the stock of capital grew relatively rapidly during the boom had relatively slow growth in capital stock in the post-boom period; and since TFI is strongly correlated with capital growth, a negative - albeit insignificant - correlation exists for TFI between periods. Most surprising, perhaps, is the fact that industries experiencing high labour and capital productivity growth in one period experienced a slower growth in those productivities in the following period. These tendencies in partial factor productivities are responsible for negative between-periods TFP growth.

APPENDIX AVII.3
Estimation of Capacity Utilization in Manufacturing Industries in Jordan, 1967-93

Assume that the relation between capacity utilization and unemployment is linear as follows:

Table AVII.3-1

Relation Between Capacity Utilization and Unemployment (%)

	Unemployment	Capacity Utilization
1967	9.9	57.1
1968	9.9	57.1
1969	11.8	55.9
1970	13.7	55.0
1971	13.8	55.0
1972	14.0	54.9
1973	11.1	56.3
1974	8.0	58.8
1975	4.9	64.6
1976	1.6	94.8
1977	2.2	82.1
1978	2.9	74.9
1979	3.5	70.4
1980	3.5	70.4
1981	3.9	68.3
1982	4.3	66.6
1983	4.8	64.9
1984	5.4	63.1
1985	6.0	61.8
1986	8.0	58.8
1987	8.3	58.4
1988	10.1	56.9
1989	11.8	55.9
1990	13.5	55.1
1991	15.3	54.5
1992	17.0	54.0
1993	14.0	54.9

$$CU = a + b/UE \qquad (1)$$

where CU is capacity utilization, and UE is percentage of overall unemployment, a and b are constants.

- For 1970 CU is given from 'Industrial Survey' (Department of Statistics 1971) at 55% (unweighted average for 32 industrial groups).
- For 1976 it is assumed to be maximum at 95%. Therefore,

for 1970 formula (1) becomes $55 = a + b/13.8$

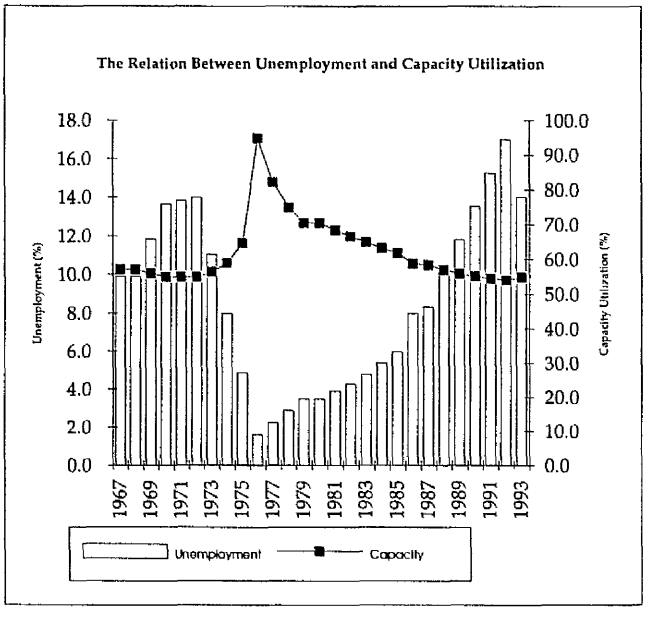
& for 1976 formula (1) becomes $95 = a + b/1.6$

Solving simultaneously gives:

$a = 49.8$

$b = 72.4$

From which CU is found for all other years, as shown in table and graph



Source: Calculated from Royal Scientific Society, 1989, 'The Data Base for the Jordanian Labour Market', for employment; Department of Statistics, 1971, 'Industrial Census', for capacity utilisation.

APPENDIX AVII.4
Statistical Tables for the Hybrid Index of Profitability

Table AVII.4-(1.a)
Wholesale Price Index for Jordan 1967-91

	VA share in 1979	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
Agriculture		31.8	33.1	34.5	35.9	37.4	38.9	40.6	63.7	100.0	157.0	174.0	193.0	136.0	163.0	188.0	203.0	209.0	210.0	220.0	222.0	228.0	237.0	276.0	314.0	352.0
Mining & quarrying 1/		36.4	37.9	39.5	41.2	42.9	44.7	46.5	186.1	100.0	53.7	46.0	43.3	49.3	70.1	74.6	62.7	55.2	56.7	50.7	52.6	57.8	63.6	75.4	89.4	105.9
Food products	7.0	33.5	38.4	44.0	50.5	57.9	66.3	76.1	87.2	100.0	114.7	130.9	135.8	143.7	159.3	172.1	180.3	184.9	188.6	192.7	185.2	185.6	168.8	179.9	235.2	310.3
Beverages	3.2	78.9	80.5	82.2	83.9	87.4	91.0	94.8	105.3	100.0	94.9	94.9	102.6	112.2	127.7	133.6	223.8	223.8	231.5	275.8	295.4	296.2	299.7	350.2	385.0	435.6
Tobacco	12.9	71.3	72.7	74.2	75.7	78.9	82.2	85.6	95.1	100.0	105.1	111.7	120.8	128.4	134.7	150.6	171.9	228.1	228.6	263.4	263.4	290.2	290.2	347.5	374.5	381.5
Textiles	2.4	68.1	69.5	70.9	72.4	75.4	78.5	81.8	90.9	100.0	110.0	117.1	122.8	131.6	138.2	155.9	149.9	150.5	147.4	144.5	137.5	148.2	164.6	223.8	261.6	277.8
Wearing apparel	2.3	68.1	69.5	70.9	72.4	75.4	78.5	81.8	90.9	100.0	110.0	117.1	122.8	131.6	138.2	155.9	149.9	150.5	147.4	144.5	137.5	148.2	164.6	223.8	261.6	277.8
Leather products	0.7	73.4	74.9	76.5	78.0	81.3	84.7	88.2	98.0	100.0	102.0	123.2	107.1	119.8	132.7	141.9	150.1	159.5	167.5	174.1	174.1	174.0	173.1	210.7	262.8	266.1
Footwear	1.2	73.4	74.9	76.5	78.0	81.3	84.7	88.2	98.0	100.0	102.0	123.2	107.1	119.8	132.7	141.9	150.1	159.5	167.5	174.1	174.1	174.0	173.1	210.7	262.8	266.1
Wood & furniture	4.9	74.8	76.3	77.8	79.4	82.7	86.2	89.8	99.7	100.0	100.3	106.9	114.3	126.9	169.0	195.6	181.5	169.0	166.5	165.5	163.6	170.8	202.8	352.0	435.7	459.1
Paper & products	2.7	76.7	78.2	79.8	81.5	84.9	88.4	92.1	102.3	100.0	97.7	102.7	111.0	113.1	113.9	115.6	103.3	98.3	104.8	105.4	97.7	102.5	109.6	206.2	222.6	219.7
Printing & publishing	2.0	76.7	78.2	79.8	81.5	84.9	88.4	92.1	102.3	100.0	97.7	102.7	111.0	113.1	113.9	115.6	103.3	98.3	104.8	105.4	97.7	102.5	109.6	206.2	222.6	219.7
Chemical products 2/	7.5	73.0	74.5	76.0	77.6	80.8	84.2	87.7	97.5	100.0	102.6	112.0	113.1	113.5	121.3	127.0	131.9	130.8	130.2	136.4	150.3	155.1	167.0	220.1	247.8	255.6
Petroleum refining	13.7	27.8	28.3	28.9	29.5	30.7	32.0	33.3	100.0	100.0	100.0	100.0	100.0	125.0	213.1	309.5	351.4	372.3	373.5	398.1	398.1	398.1	398.1	428.9	441.5	441.5
Rubber products 3/	0.1	56.6	57.8	58.9	60.1	62.6	65.3	68.0	75.5	100.0	132.4	139.1	167.8	216.0	246.2	189.8	152.1	187.7	166.3	140.6	145.7	160.3	176.3	208.9	247.7	293.6
Plastic products 4/	3.5	74.0	75.5	77.0	78.6	81.9	85.3	88.8	98.7	100.0	101.3	111.5	128.2	145.1	159.1	159.9	157.8	153.6	150.8	152.0	157.5	173.2	190.5	225.8	267.7	317.3
Non-metallic mineral products 4/	20.7	74.0	75.5	77.0	78.6	81.9	85.3	88.8	98.7	100.0	101.3	111.5	128.2	145.1	159.1	159.9	157.8	153.6	150.8	152.0	157.5	173.2	190.5	225.8	267.7	317.3
Basic metal products 5/	5.7	64.3	65.6	67.0	68.4	71.2	74.2	77.3	85.8	100.0	116.5	122.7	126.2	135.1	151.4	155.9	159.1	162.2	163.4	161.6	167.0	165.1	202.3	170.4	216.2	365.4
Metal manufactures 4/	0.0	74.0	75.5	77.0	78.6	81.9	85.3	88.8	98.7	100.0	101.3	111.5	128.2	145.1	159.1	159.9	157.8	153.6	150.8	152.0	157.5	173.2	190.5	209.5	230.4	253.4
Machinery 4/	8.9	74.0	75.5	77.0	78.6	81.9	85.3	88.8	98.7	100.0	101.3	111.5	128.2	145.1	159.1	159.9	157.8	153.6	150.8	152.0	157.5	173.2	190.5	209.5	230.4	253.4
Transport equipment	0.5	68.5	69.9	71.3	72.7	75.8	78.9	82.2	91.3	100.0	109.5	116.6	124.8	129.9	129.9	136.9	143.8	158.2	164.0	170.4	194.0	212.6	250.8	410.3	503.5	547.9
Other manufactures	0.1	72.5	73.9	75.4	77.0	80.2	83.5	87.0	96.7	100.0	103.4	111.0	118.9	131.5	155.2	175.8	187.0	196.0	196.2	207.0	209.7	219.6	229.9	273.7	308.3	339.8
All Manufactures 6/	**100**	**63.8**	**65.4**	**67.1**	**68.8**	**72.1**	**75.5**	**79.1**	**96.8**	**100.0**	**103.6**	**111.4**	**119.7**	**132.6**	**155.9**	**175.7**	**186.1**	**194.7**	**194.7**	**205.0**	**207.6**	**217.8**	**228.3**	**270.8**	**305.8**	**338.9**

Source: Central Bank of Jordan (CBJ), 1989, 'Statistical Series 1964-1988'; 'Monthly Bulletin', various issues. World Bank, 1988, ANNEX D: 7.

Notes: 1/ Phosphate rock price, from World Bank (1988) for 1975-85; extrapolated backward & forward for all other years based on growth rates of WPI for all manufactures, from CBJ.
2/ Average of pharmaceutical drugs and soaps
3/ Rubber price index from World Bank, 1988, for 1975-85; extrapolated for all other years, as in 1/ above.
4/ Manufactured unit value price index as estimated by World Bank (1988) for 1975-85; extrapolated for all other years as in 1/.
5/ Average of construction material and durable consumer goods.
6/ Weighted by share in value added in 1979.

Table AVII.4-(1.b)
Index of Manufactured Unit Value of Imports, 1967-1991

	Value share in 1979	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
Food products	6.6	32.4	33.0	33.7	35.0	43.1	49.4	59.0	79.8	100.0	89.3	105.1	113.0	99.5	110.6	145.5	149.7	182.5	190.5	177.7	168.0	71.0	178.3	275.0	340.9	289.4
Beverages 1/	0.0	76.9	78.4	80.0	83.2	86.7	94.5	91.9	88.7	100.0	109.8	99.2	139.5	140.8	132.2	140.0	160.2	158.9	160.9	156.3	185.5	125.8	131.6	223.1	313.6	429.2
Tobacco 1/	0.7	76.9	78.4	80.0	83.2	86.7	94.5	91.9	88.7	100.0	113.3	106.5	111.3	93.3	97.3	123.5	137.8	218.3	157.3	280.3	186.2	175.9	181.5	310.5	376.8	462.6
Textiles	4.1	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	95.1	104.5	104.7	115.4	126.3	152.0	146.5	139.7	148.3	155.6	137.1	113.5	140.8	207.5	227.9	257.7
Wearing apparel 2/	0.1	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	92.5	92.1	88.9	99.0	121.0	125.9	122.0	124.1	130.4	129.4	121.1	124.5	145.0	216.3	256.8	277.9
Leather products	4.7	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	112.4	201.9	125.2	150.2	179.6	248.4	191.4	240.4	214.3	215.0	126.2	187.5	185.1	326.5	423.2	557.7
Footwear	0.6	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	57.0	61.4	56.5	82.7	78.8	88.2	101.4	108.4	107.2	132.7	121.9	129.3	144.6	237.8	274.7	256.6
Wood products 2/	3.1	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	92.5	92.1	88.9	99.0	121.0	125.9	122.0	124.1	130.4	129.4	121.1	124.5	145.0	216.3	256.8	277.9
Paper & products	1.8	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	93.4	117.7	86.5	105.8	126.2	132.1	132.2	115.4	88.5	106.9	101.5	102.2	127.1	203.3	226.8	242.5
Printing & publishing	0.3	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	100.1	117.1	126.3	99.0	149.8	191.2	214.1	162.4	439.0	133.6	160.5	179.4	222.0	334.9	508.2	560.9
Chemical products	5.1	50.8	51.8	52.8	55.0	50.9	60.3	64.3	84.5	100.0	135.9	119.4	150.7	135.8	147.0	155.5	189.3	173.8	120.6	170.0	159.3	158.2	188.3	347.3	412.4	315.7
Petroleum refining 3/	15.0	18.9	19.3	19.7	20.5	20.5	23.4	22.6	34.4	100.0	135.9	119.4	150.7	135.8	147.0	155.5	189.3	173.8	120.6	170.0	159.3	158.2	188.3	347.3	412.4	315.7
Rubber products	1.7	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	107.4	109.8	98.3	132.1	148.6	159.9	162.0	143.1	156.8	136.1	141.6	140.3	157.2	213.6	280.1	281.1
Plastic products	2.4	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	97.3	103.5	83.5	107.4	164.5	134.0	133.6	124.5	107.7	110.6	102.5	109.5	159.3	204.6	235.0	234.1
Non-metallic mineral products 2/	2.2	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	312.9	183.1	281.9	371.3	453.9	472.3	457.7	465.5	489.3	485.4	454.4	467.0	544.2	811.6	963.6	1042.7
Basic metal products	14.3	44.7	45.6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	101.5	103.0	120.9	97.4	149.0	149.2	162.0	156.1	147.7	149.6	130.2	63.4	134.1	181.4	234.5	180.7
Metal manufactures	1.5	44.7	45.6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	93.8	90.9	101.4	111.9	138.5	149.4	146.5	275.3	271.0	156.8	124.4	130.7	139.9	221.0	323.1	307.5
Machinery 4/	16.8	44.7	45.6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	95.0	95.1	93.8	96.2	116.2	155.7	147.0	121.0	130.4	132.1	111.9	115.2	138.4	179.9	306.2	335.7
Transport equipment 4/	14.3	44.7	45.6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	95.0	95.1	93.8	96.2	116.2	155.7	147.0	121.0	130.4	132.1	111.9	115.2	138.4	179.9	306.2	335.7
Other manufactures 5/	4.5	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	117.7	170.8	241.5	262.7	253.1	301.9	337.3	350.8	379.6	384.6	303.8	361.2	342.3	503.1	598.5	725.4
All Manufactures 6/	**100**	**44.0**	**44.9**	**45.8**	**47.6**	**49.9**	**60.9**	**69.1**	**81.1**	**105.9**	**116.0**	**118.7**	**128.2**	**128.2**	**152.5**	**178.3**	**182.5**	**175.4**	**168.4**	**182.2**	**161.4**	**157.6**	**186.6**	**287.0**	**363.9**	**384.3**

Source: Department of Statistics (DOS), 1970-91, External Trade Statistics'; Central Bank of Jordan (CBJ), 'Monthly Bulletin', various issues. All values are calculated from DOS, unless otherwise noted.

Notes: 1/ From CBJ, for beverages and tobacco
2/ From CBJ, for manufactured goods
3/ From CBJ, for mineral fuels
4/ From CBJ, for machinery and transport equipment
5/ From CBJ, for various manufactured goods
6/ Weighted by value shares in 1979.

APPENDIX AVII.4
Statistical Tables for the Hybrid Index of Profitability

Table AVII.4-(1.c)
Index of Manufactured Unit Value of Exports, 1967-1991

	Value share in1979	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
Food products	4.3	32.4	33.0	33.7	35.0	43.1	49.4	59.0	79.8	100.0	229.5	213.3	144.7	176.7	199.4	139.4	111.2	113.9	271.4	142.9	267.4	333.8	339.7	222.7	373.0	542.2
Beverages	1.3	76.9	78 4	80.0	83.2	86.7	94.5	91.9	88.7	100.0	109.8	99.2	139.5	140.8	132.2	140.0	160.2	158.9	160.9	156.3	185.5	125 8	131.6	256.3	320.3	277.7
Tobacco	8.8	76 9	78.4	80.0	83.2	86.7	94.5	91.9	88.7	100.0	99.8	99.5	134.8	141.5	133.2	135 9	148.1	280.1	149.1	173 6	218.0	139.9	145.3	279.9	359.7	309.3
Textiles	2.3	48 0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	145.2	132.3	156.2	136.9	120.2	189.5	133.7	57.5	114.0	263.4	141.8	181.5	185.6	210.0	230.4	143.0
Leather products	0.2	48.0	49.0	50 0	52.0	52.5	54.9	68.7	92.0	100.0	110.5	105.4	116.8	121.5	116.5	140.8	196.8	87.9	165.1	179.6	145.2	110.9	127.1	155.8	145.4	167.2
Wearing apparel	15.7	48.0	49.0	50.0	52 0	52.5	54.9	68.7	92.0	100.0	96.7	99.8	93.6	101.3	109.0	159 4	157.6	155 8	233.7	202.9	119.0	125 7	159.2	178 6	250.3	323.3
Footwear	0.9	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	64.0	56.5	81.2	105.9	134.8	245.5	309.8	300.7	405.9	382.5	305.9	289.1	183.6	202.0	248 6	179.6
Wood products	13.4	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	69.8	97.1	89.2	82.8	93.1	102.3	124.9	126.6	134.5	136.2	129 0	123.0	132.6	153.0	204.9	56.2
Paper & products	3.0	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	117.4	149.6	182.8	177.1	275.6	325.0	295.4	274.4	267.2	251.2	267.2	248.5	328.0	482.0	689.7	572.2
Printing & publishing	0.8	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	242.3	195.2	801.3	897.7	554.2	477.5	517.3	585.0	770.3	427.6	448.2	373.3	364.3	388.1	679.1	815.9
Chemical products	17.6	50.8	51.8	52.8	55.0	50.9	60.3	64.3	84.5	100.0	87.9	86.3	93.2	67.1	86.2	88.1	109.6	94 7	121.5	102.9	88.7	89.8	97.9	138.6	165.3	188 2
Petroleum refining	0.0	18.9	19.3	19.7	20.5	20.5	23.4	22.6	34.4	100.0	109.4	124.9	140.4	472.8	733 8	994 8	1255.8	1516 8	1777.8	2038.8	2299.8	2560.8	2038.8	1255 2	1434.2	871 3
Rubber products	0.0	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	104.2	98.0	101.7	153.4	227.0	171.0	157.4	925.8	466.8	345.0	340.1	139.5	114 4	429.9	888.9	193.5
Plastic products	6.2	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	110.9	114.5	93.1	132.5	148.1	165.3	153.7	161.7	175.4	188.7	145.8	121.9	164 3	266.6	294.6	284.5
Non-metallic mineral products	6.2	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	69.8	97.1	89.2	82.8	93.1	102.3	124.9	126.6	134.5	136.2	129.0	123.0	132.6	153.0	204.9	56.2
Basic mtals products	9.9	44.7	45.6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	146.5	136.0	154.1	110.2	152.2	194.2	163.4	142 6	122.9	135.9	204 8	182.9	242 9	123.4	474.8	362.4
Metal manufactures	0.6	44.7	45.6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	93.3	111.0	166.6	184.3	196.8	209.4	328.9	449.7	996.2	288.5	381.4	708.1	1066 5	633.4	764.0	556.9
Machinery, non-electric	2.9	44.7	45 6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	69.8	97.1	89.2	82.8	93.1	102.3	124 9	126 6	134.5	136.2	129.0	123.0	132 6	153 0	204.9	56.2
Electric machinery	1.3	44.7	45 6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	69.8	97.1	89.2	82.8	93.1	102.3	124.9	126.6	134.5	136.2	129.0	123.0	132.6	153.0	204 9	56.2
Transport equipment	0.6	44.7	45.6	46.5	48.3	51.8	68.7	76.3	79.9	100.0	69.8	97.1	89.2	82.8	93.1	102.3	124.9	126.6	134.5	136.2	129.0	123.0	132.6	153 0	204 9	56 2
Other manufactures	4.0	48.0	49.0	50.0	52.0	52.5	54.9	68.7	92.0	100.0	75.6	85.2	81.3	89.7	102.6	152 2	155.5	127.4	175.2	174.5	144.0	118 7	155.1	222 2	236 3	280 5
All Manufactures 1/	**100**	**50.2**	**51.2**	**52.2**	**54.4**	**55.1**	**61.6**	**71.0**	**87.9**	**100.0**	**102.3**	**108.3**	**114.6**	**110.8**	**123.9**	**143.0**	**148.2**	**153.6**	**175.7**	**151.3**	**139.6**	**132.6**	**153.2**	**177.6**	**255.8**	**218.0**

Source: Ibid.
Note: Values for 1967-74 are assumed to be the same as import unit values.
1/ Weighted by value shares in 1979.

Table AVII.4-(1.d)
Index of Wage Rates in Manufacturing Industries, 1967-91 (at constant 1975 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
Food products	53.5	63.9	49.0	90.1	91.8	92.9	105.3	105.2	100.0	106.8	117.3	136.8	149.9	180.8	209 0	214.4	216.8	212.0	247.0	249.3	224.8	251 0	242.8	250.1	282.9
Beverages	43.5	51.1	52.6	110.8	110.8	111.1	113.0	111.3	100.0	96.8	155.1	181.2	251.5	275.7	295 8	357.4	369.6	383.8	383.4	387.7	448.4	486 5	494.6	431.3	494 5
Tobacco	45.8	48.6	99.3	97.9	90.3	92.1	105.0	108.9	100.0	106 9	129.6	152.9	234.7	240.5	323.4	436.4	402.0	355 1	331.6	336 2	312.8	310.1	406.9	429.4	478 8
Textiles	49 4	57.2	81.9	120.6	122.0	123.7	118.1	73.0	100.0	94.4	95.5	111.4	220.8	330.4	246 0	265.8	292.9	310 3	345.6	356.7	367.5	344 7	357.1	412.4	400.1
Leather products	79.0	79.6	82.9	75.6	76.6	94.7	92.7	95.5	100.0	103.6	140.5	178.6	145.1	204.0	237 0	269.5	261.3	224.6	209.2	207.7	182.6	223 2	217 2	210 1	262.4
Wearing apparel	50.3	47.7	60.1	88.3	91.1	93.5	99.9	92.0	100.0	105.4	114.3	133.4	196.5	223.4	277 5	270.8	211.3	270.9	276.3	355.9	282.2	303 7	250.5	219.1	335 3
Footwear	136.3	128 7	107.2	88.9	89.3	88.2	87.8	42.1	100.0	125.2	121.3	141.6	232 3	314 2	392 3	378.2	336 6	357.4	395.9	369.5	311.3	368.5	344.8	302 6	371.0
Wood products	58 7	55 4	56.8	49.7	53.5	52.1	51.7	33.5	100.0	107.1	105.9	134.8	123.2	163.1	188.1	214.7	213.9	234.1	247.8	179 7	181.6	155.0	187 7	169 9	190.0
Paper & products	44.7	56 2	65.8	88.0	89.1	89.3	90.9	91.8	100.0	113.4	134.1	156.5	248.8	325.4	488.3	483.7	478.1	454.7	530.7	555.6	551.5	654 6	637.4	579.8	564 2
Printing & publishing	39.1	43.5	49.0	88.7	88.7	86.8	87.4	89.3	100.0	138.7	145.4	169.5	191 2	270.6	291 7	287.6	319 9	364.4	407.6	386 4	397.2	432.6	400 1	368 1	406 6
Chemical products	59.9	62 2	60 6	53.0	49.4	51.1	38.9	93.3	100.0	132.7	151.1	136.6	248.3	268 5	515.0	377 9	475.0	453.5	463.5	462.6	467.7	535.7	685.7	518.5	616.1
Petroleum refining	92.7	93 2	92.7	92.7	97.8	97.8	98.0	96.9	100.0	116.7	128.2	202.0	243.1	240.2	307.9	389 9	425 8	390.8	413.9	424.2	444 8	461.4	466.5	434.6	490.9
Rubber products	51.4	52.8	53.8	54.6	55.1	55.5	55.9	66.9	100 0	107 4	107.9	96.5	99.0	108 4	42.6	43.5	39 2	35.9	33.4	31.5	29.8	28 5	24 6	33.1	48.4
Plastic products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.6	100.0	94.9	110.7	266.1	447.9	336.1	400 8	455.7	681 6	662.2	734.0	747.5	697 1	732 2	792.4	847.2	785.2
Non-metallic mineral products	48.1	55 8	71.2	75.9	76.7	87.8	89.7	96.4	100 0	86.6	97.9	114.2	211.3	260.9	294.8	307.6	343.6	270.1	312.2	331.0	291.0	316.7	288.6	325.7	324.4
Basic metal products	30.6	45.0	88 0	82.2	83.6	90.7	78.8	74.6	100.0	250.9	253.6	295.8	99.2	115.4	136.7	124.7	124 9	124.4	155.5	138.5	149.7	187.4	189.5	230 1	216.4
Metal manufactures	30.6	45 0	88.0	82.2	83.6	90 7	78.8	74.6	100.0	250.9	253.6	295.8	99.2	115 4	136 7	124.7	124.9	124.4	155 5	138.5	149.7	187.4	189.5	230 1	216.4
Machinery	22.4	47 1	61.0	99.9	102.3	100.2	99 4	98 6	100.0	91.5	99.1	115.7	56.0	77.1	102.3	100.3	94 5	82.2	89.7	185.9	193 5	169.3	179.5	206 9	207.2
Transport equipment	143.1	162 2	167.2	86.3	85.8	133 1	123.5	118.7	100.0	82.6	56.9	66.4	12.6	22.2	108.2	30.9	31.3	33.6	40.7	35.3	44.0	29 5	29 4	38 1	22.0
All Manufactures	**58.2**	**62.8**	**73.4**	**85.3**	**86.8**	**91.0**	**91.1**	**81.2**	**100.0**	**115.6**	**127.6**	**156.9**	**177.1**	**209.3**	**256.8**	**270.9**	**289.8**	**258.8**	**278.0**	**256.1**	**246.0**	**288.7**	**293.7**	**292.2**	**310.6**

Source: DOS, 'Industrial census; Industrial Survey , 1974-92 for wages in current prices and for number of workers. CBJ, 'Monthly Bulletin' various issues for deflator (CPI).
1/ Wage Rates = (Sum of wages, social benefits, etc. / Number of workers)

APPENDIX AVII.4
Statistical Tables for the Hybrid Index of Profitability

Table AVII.4- (2.a)
Cost Shares of Labour, Imported Material and locally Purchased Material,1979

	Input Costs (000 JD)				Share in total cost (%)			
		Total	of which	Total		Total	of which	
	Labour	Material	Imported	Cost	Labour	Material	Imported	Local
Food products	2,187	18,151	6,623	20,338	0.11	0.89	0.33	0.57
Beverages	1,017	2,636	1,902	3,653	0.28	0.72	0.52	0.20
Tobacco	1,109	7,201	6,828	8,310	0.13	0.87	0.82	0.04
Textiles	1,078	3,170	2,789	4,248	0.25	0.75	0.66	0.09
Wearing apparel	587	1,675	421	2,262	0.26	0.74	0.19	0.55
Leather products	201	736	500	937	0.21	0.79	0.53	0.25
Footwear	403	926	132	1,329	0.30	0.70	0.10	0.60
Wood & Furniture	921	3,667	1,439	4,588	0.20	0.80	0.31	0.49
Paper & products	657	2,478	2,241	3,135	0.21	0.79	0.71	0.08
Printing & publishing	746	1,898	1,452	2,644	0.28	0.72	0.55	0.17
Chemical products	1,710	10,830	10,177	12,540	0.14	0.86	0.81	0.05
Petroleum refining	4,355	8,041	8,041	12,396	0.35	0.65	0.65	0.00
Rubber products	23	43	28	66	0.35	0.65	0.42	0.23
Plastic products	718	4,649	4,306	5,367	0.13	0.87	0.80	0.06
Non-metallic minerals	4,951	8,244	1,748	13,195	0.38	0.62	0.13	0.49
Basic metal products	827	13,993	12,758	14,820	0.06	0.94	0.86	0.08
Machinery, except electrical	2,110	7,471	3,134	9,581	0.22	0.78	0.33	0.45
Machinery, electric	212	554	81	766	0.28	0.72	0.11	0.62
Transport equipment	29	34	0	63	0.46	0.54	0.00	0.54
All Manufacturing	23,841	96,397	64,600	120,238	0.20	0.80	0.54	0.26

Source : Department of Statistics, 1979, 'Industrial Census'.

Table AVII.4- (2.b)
Main Types of Material Inputs to Manufacturing Production

	1st Input	2nd Input	3rd Input
Food products	Agriculture. (5,000)	Food (1,000)	
Beverages	Chemicals (1,000)	Food (770)	Agriculture. (220)
Tobacco	Agriculture. (5,000)		
Textiles	Textiles		
Wearing apparel	Textiles		
Leather & Footwear	Clothing (800)	Food (300)	Chemicals (300)
Wood & Furniture	Wood (2,200)	Fabricated metal(250)	Chemicals (200)
Paper & products	Paper		
Printing & publishing	Paper		
Chemical products	Chemicals (6,000)	Paper (100)	
Petroleum refining	Crude oil		
Rubber products	Chemicals (3,000)	Rubber (800)	Petroleum (200)
Plastic products	Chemicals		
Non-metallic mineral products	Mining (5,000)	N-M Mineral (2,500)	Petroleum (1,000)
Basic metal products	Basic Metal (8,634)		
Non-electrical machinery	Basic Metal (681)		
Machinery, electric	Basic Metal (204)		
Transport equipment	Basic Metal (204)		

Source: Dar Al-Handasah, 1982b, 'Industrial Programming Study, The 1979 Input-Output Tables for Jordan'.

Table AVII.4- (2.c)
Cost Shares of Production Inputs (1979)

	Labour	Imported Material			Local Material			TOTAL
Food products		Agriculture.	Food		Agriculture.	Food		
	0.11	0.27	0.05		0.47	0.09		1.00
Beverages		Chemicals	Food	Agriculture.	Chemicals	Food	Agriculture.	
	0.28	0.26	0.21	0.05	0.10	0.08	0.02	1.00
Tobacco		Agriculture.			Agriculture			
	0.13	0.82			0.04			1.00
Textiles		Textiles			Textiles			
	0.25	0.66			0.09			1.00
Wearing apparel		Textiles			Textiles			
	0.26	0.19			0.55			1.00
Leather products		Clothing	Food	Chemicals	Clothing	Food	Chemicals	
	0.21	0.30	0.11	0.11	0.14	0.05	0.05	1.00
Footwear		Clothing	Chemicals		Clothing	Chemicals		
	0.30	0.07	0.03		0.43	0.16		1.00
Wood & Furniture		Wood	Metal	Chemicals	Wood	Fabricated metal	Chemicals	
	0.20	0.26	0.03	0.02	0.40	0.05	0.04	1.00
Paper & products		Paper			Paper			
	0.21	0.71			0.08			1.00
Printing & publishing		Paper			Paper			
	0.28	0.55			0.17			1.00
Chemical products		Chemicals	Paper		Chemicals	Paper		
	0.14	0.80	0.01		0.05	0.00		1.00
Petroleum refining		Crude oil						
	0.35	0.65			0.00			1.00
Rubber products		Chemicals	Rubber		Chemicals	Rubber		
	0.35	0.32	0.11		0.17	0.06		1.00
Plastic products		Chemicals			Chemicals			
	0.13	0.80			0.06			1.00
Non-metallic minerals		Mining	N-M Minerals	Petroleum	Mining	N-M Minerals	Petroleum	
	0.38	0.08	0.04	0.02	0.29	0.14	0.06	1.00
Basic metal products		Basic Metal			Basic Metal			
	0.06	0.86			0.08			1.00
Machinery, except electrical		Basic Metal			Basic Metal			
	0.22	0.33			0.45			1.00
Machinery, electric		Basic Metal			Basic Metal			
	0.28	0.11			0.62			1.00
Transport equipment		Basic Metal			Basic Metal			
	0.46	0.00			0.54			1.00
All Manufacturing	0.20	0.54			0.26			1.00

Source: Calculated from Tables AVII.4- (2.a) & (2.b).

APPENDIX AVII.4
Statistical Tables for the Hybrid Index of Profitability

Table AVII.4-3
Composite Price Index of Manufacturing Production Inputs 1/, 1967-91

	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
Food products	34.5	36.9	36.7	42.8	47.0	50.7	56.9	75.6	100.0	125.6	141.4	155.5	126.3	147.5	174.9	184.7	198.9	201.8	206.6	203.9	172.5	212.9	263.0	308.5	320.2
Beverages	44.4	47.5	49.0	66.8	68.9	74.1	79.3	91.8	100.0	108.3	126.9	145.2	157.0	172.1	191.1	219.6	227.8	220.3	230.9	227.6	219.6	266.0	341.8	366.3	352.9
Tobacco	34.1	35.1	42.5	43.5	49.1	54.6	64.3	82.9	100.0	94.7	111.5	122.0	119.2	130.3	171.1	190.4	213.0	213.3	200.2	192.9	110.3	198.5	292.6	351.5	317.5
Textiles	50.2	52.9	60.0	71.2	72.2	74.5	82.4	87.1	100.0	96.2	103.4	108.0	143.6	179.2	176.2	177.0	179.6	189.3	202.8	192.9	181.1	194.7	246.9	277.7	295.6
Wearing apparel	67.2	68.3	70.2	69.4	71.5	78.3	82.2	92.3	100.0	105.6	120.8	133.9	132.1	153.0	176.2	180.3	177.3	167.6	163.3	155.7	150.7	175.4	219.1	242.0	270.0
Leather products	50.5	51.0	54.7	62.4	64.7	68.8	77.1	89.6	100.0	104.1	108.2	117.0	132.0	149.3	170.9	172.5	162.6	171.9	177.0	188.6	164.4	193.1	244.6	275.2	296.4
Footwear	87.7	86.3	80.8	76.3	78.2	80.2	83.2	77.1	100.0	112.9	115.8	125.2	156.9	187.8	220.7	215.2	202.5	206.3	219.0	209.3	197.3	226.1	262.7	275.5	303.5
Furniture & wood products	62.6	62.9	64.3	64.3	66.7	69.4	75.0	82.8	100.0	101.1	103.6	112.8	118.5	151.3	169.3	169.0	167.9	171.2	171.2	154.2	158.6	174.6	266.6	314.9	338.3
Paper & products	49.5	52.7	55.6	61.8	62.6	64.6	75.1	92.7	100.0	97.9	120.0	103.0	136.3	167.0	205.5	203.7	190.1	166.5	195.6	196.4	196.4	236.3	294.5	300.5	308.2
Printing & publishing	50.4	52.4	54.8	67.3	68.2	69.5	77.9	93.0	100.0	106.9	123.0	114.0	131.1	164.8	174.3	171.2	170.2	169.1	191.5	181.3	185.5	210.3	259.3	266.0	284.9
Chemical products	53.1	54.4	55.1	55.8	52.3	60.2	62.2	86.4	100.0	133.2	123.3	145.9	149.6	161.9	202.7	211.2	211.8	166.1	207.4	199.4	199.4	233.7	384.9	415.8	352.5
Petroleum refining	44.9	45.3	45.3	45.8	47.6	49.6	49.0	56.4	100.0	129.2	122.5	168.7	173.5	179.7	209.0	259.8	262.3	215.6	255.7	252.4	258.9	284.2	389.2	420.2	377.2
Rubber products	54.8	56.1	57.2	58.7	58.3	62.4	66.0	80.9	100.0	117.1	114.2	120.8	123.3	135.0	113.7	123.7	117.1	99.2	111.4	110.6	111.1	125.0	191.1	228.7	207.4
Plastic products	45.4	46.3	47.2	49.1	46.0	53.8	57.2	80.9	100.0	128.3	117.7	163.7	176.1	170.6	186.5	221.3	239.0	193.7	243.3	237.4	230.1	259.7	398.7	460.0	374.7
Non-metallic mineral products	46.1	49.8	56.4	59.2	60.7	66.2	68.8	129.8	100.0	86.4	84.3	95.6	142.1	180.1	202.3	205.0	216.9	190.6	206.0	213.3	203.0	220.2	231.8	263.8	279.7
Basic metal products	45.5	47.2	50.5	51.9	55.2	70.4	76.5	80.1	100.0	111.1	113.1	131.1	100.6	147.3	149.1	159.7	154.8	147.7	150.9	133.7	76.7	142.8	180.9	232.7	198.1
Fabricated metal	53.0	59.4	63.5	73.4	76.5	83.2	87.1	92.5	100.0	97.1	103.4	114.2	109.5	127.0	145.9	141.6	129.9	129.0	131.8	148.8	158.7	168.8	193.2	250.0	270.1
Machinery	56.6	64.5	69.4	81.3	84.3	87.7	90.4	96.7	100.0	97.9	106.3	121.1	115.3	131.8	143.5	140.7	133.8	129.7	132.6	160.5	172.7	179.1	198.1	231.9	249.3
Transport equipment	102.8	112.4	115.4	79.0	80.4	103.8	101.2	103.9	100.0	97.1	89.1	97.9	75.9	80.3	123.7	91.8	99.8	104.0	110.7	121.0	135.0	148.9	235.0	289.3	305.8
All manufactures	**50.6**	**52.4**	**55.4**	**59.2**	**61.5**	**68.6**	**73.7**	**82.7**	**100.0**	**109.6**	**115.5**	**128.7**	**136.0**	**161.0**	**188.3**	**196.3**	**199.4**	**189.2**	**206.0**	**191.2**	**190.0**	**216.6**	**281.3**	**332.9**	**356.5**

Source: Calculated from Tables AVII.4- (1.a), (1.c),(1.d) and (2.c). For details of methodology, see text in Chapter VII, section VII.5.1

1/ This is a Laspeyres price index, where price indexes of inputs (labour, imported and local materials) are weighted by their cost shares in 1979.

Table AVII.4-4
Price Index of Profitability In Manufacturing Industries 1/, 1967-91

	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
Food products	93.9	89.6	91.8	81.8	91.6	97.3	103.7	105.5	100.0	182.8	150.9	93.1	139.8	135.2	79.7	60.2	57.3	134.5	69.2	131.1	193.5	159.5	84.7	120.9	169.3
Beverages	173.0	164.9	163.1	124.5	125.9	127.6	115.9	96.6	100.0	101.5	78.2	96.1	89.7	76.8	73.3	72.9	69.7	73.0	67.7	81.5	57.3	49.5	75.0	87.4	78.7
Tobacco	225.1	223.4	188.3	191.4	176.5	173.0	142.9	107.0	100.0	105.3	89.3	110.5	118.7	102.2	79.4	77.8	131.5	69.9	86.8	113.0	126.8	73.2	95.6	102.3	97.4
Textiles	95.7	92.6	83.4	73.0	72.7	73.7	83.3	105.6	100.0	150.8	128.0	144.5	95.3	67.1	107.6	75.5	32.0	60.2	129.9	73.5	100.2	95.3	85.0	83.0	48.4
Wearing apparel	71.5	71.7	71.3	74.9	73.5	70.0	83.6	99.7	100.0	91.6	82.6	69.9	76.7	71.2	90.5	87.4	87.9	139.5	124.2	76.5	83.4	90.8	81.5	103.4	119.7
Leather products	95.2	96.1	91.4	83.3	81.2	79.8	89.1	102.7	100.0	106.2	97.4	99.9	92.0	78.0	82.4	114.1	54.0	96.0	101.5	77.0	67.4	65.8	63.7	52.9	56.4
Footwear	54.8	56.8	61.9	68.2	67.2	68.4	82.6	119.3	100.0	56.7	48.8	64.9	67.5	71.8	111.2	143.9	148.5	196.8	174.6	146.1	146.5	81.2	76.9	90.2	59.2
Furniture & wood products	76.8	77.9	77.8	80.9	78.7	79.0	91.6	111.1	100.0	69.0	93.8	79.1	69.9	61.5	60.4	73.9	75.4	78.5	79.6	83.7	77.6	75.9	57.4	65.1	16.6
Paper & products	23.8	25.8	27.8	32.1	32.9	35.4	51.6	85.3	100.0	117.6	174.7	169.7	213.4	404.0	577.5	582.5	530.8	424.5	466.1	536.9	476.1	707.2	688.4	930.9	802.6
Printing & publishing	24.2	25.7	27.4	35.0	35.8	38.1	53.5	85.5	100.0	265.1	233.7	823.4	1040.8	802.0	720.0	857.3	1013.1	1243.5	776.6	831.2	675.7	699.0	488.0	811.3	1058.1
Chemical products	27.0	28.1	29.1	30.7	26.6	36.3	40.0	73.0	100.0	114.0	95.0	120.3	88.4	115.1	140.5	175.5	153.3	155.0	156.4	117.7	115.5	137.1	242.3	277.4	259.5
Petroleum refining	42.2	42.6	43.4	44.7	43.0	47.3	46.0	61.1	100.0	84.7	102.0	83.2	272.6	408.3	475.9	483.4	578.2	824.7	797.4	911.3	989.2	717.3	322.6	341.3	231.0
Rubber products	87.6	87.4	87.4	88.7	90.1	87.9	104.0	113.8	100.0	89.0	85.8	84.2	124 4	168.2	150.4	127.3	790.8	470.7	309.6	307.6	125.5	91.5	225.0	388.6	93.3
Plastic products	105.8	105.8	105.8	106.0	114.1	102.0	120.0	113.7	100.0	86.5	97.2	56.9	75.2	86.8	88.6	69.5	67.7	90.6	77.5	61.4	53.0	63.3	66.9	64.0	75.9
Non-metallic mineral products	104.3	98.4	88.6	87.9	86.5	82.9	99.9	70.9	100.0	80.7	115.3	93.3	58.3	51.7	50.6	61.0	58.3	70.6	66.1	60.5	60.6	60.2	66.0	77.7	20.1
Basic metal products	98.1	96.5	92.0	93.1	93.9	97.6	99.7	99.7	100.0	131.9	120.3	117.5	109.6	103.3	130.3	102.3	92.1	83.2	90.0	153.1	238.6	170.1	68.2	204.0	183.0
Machinery	78.9	70.7	67.0	59.5	61.4	78.4	84.3	82.6	100.0	71.2	91.4	73.7	71.9	70.6	71.3	88.8	94.6	103.7	102.7	80.4	71.2	74.0	77.2	88.4	22.5
Transport equipment	43.4	40.5	40.3	61.2	64.4	66.2	75.4	76.8	100.0	71.8	109.0	91.1	109.2	115.9	82.7	136.1	126.9	129.3	123.1	106.6	91.1	76.3	65.1	70.8	18.4
All manufactures	**99.2**	**97.7**	**94.3**	**91.8**	**89.7**	**89.9**	**96.3**	**106.3**	**100.0**	**93.3**	**93.7**	**89.1**	**81.4**	**76.9**	**75.9**	**75.5**	**77.1**	**92.9**	**73.5**	**73.1**	**69.8**	**70.7**	**63.1**	**76.8**	**61.1**

Source : Calculated from Tables AVII.4- (1.c) and AVII.4-3.

1/ Ratio of Price Index of Exports to Composite Price Index of Production Inputs

APPENDIX AVII.4
Statistical Tables for the Hybrid Index of Profitability

Table AVII.4- (5.a)
Index of Material Input to Manufacturing Production (at constant 1975 Prices), 1975=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
Food products	66.8	63.9	90.7	110.5	104.9	100.1	101.3	125.3	100.0	88.4	81.2	81.2	99.5	148.1	140.3	147.4	150.5	161.6	200.3	210.2	223.9	244.4	230.2	237.6	261 5
Beverages	75.1	72.8	82.6	104.9	131.5	149.8	145.6	128.2	100.0	93.9	104.4	136.8	131.3	167.4	171.9	168.0	179.7	204.1	205.0	95.8	271.9	282.0	288.7	259.2	333.1
Tobacco	181.8	195.5	137.4	51.2	47.0	48.0	51.3	114.6	100.0	138.7	122.4	123.1	227.6	268.8	216.8	206.0	194.0	203.5	239.3	240.3	470.8	256.8	163 8	146.4	171.7
Textiles	109.5	110.5	65.3	27.6	35.9	38.0	35.4	121.4	100.0	116.4	119.8	123.8	103.8	101.1	116.2	128.9	140.1	145.3	157.2	141.2	178.4	254.0	253.5	248 5	315 4
Wearing apparel	26.3	40.9	44.9	51.8	55.9	61.2	65.7	75.3	100.0	60.0	64.9	61.5	78.1	70.1	91.0	118.5	150.5	190.9	213.4	169.8	153.0	194.7	206.8	200.6	244.7
Leather products	103.1	81.2	58.6	29.6	40.6	47.7	44.4	120.8	100.0	95.8	107.1	104.0	85.8	96.5	84.8	84.4	90.0	85.6	79.6	56.0	83.2	92.9	72.5	197.5	360.5
Footwear	150.7	229.9	155.5	158.7	236.5	250.0	253.7	483.8	100.0	338.9	341.5	331.6	282.8	404.3	380.8	428.2	495.3	525.4	495.0	420.1	588.6	623.5	933.7	432.6	534.0
Furniture & wood products	37.1	46.1	56.6	105.9	109.8	119.1	115.2	117.0	100.0	99.9	98.6	95.0	136.7	152.3	222.5	309.5	398.6	476.2	467.7	287.4	267.7	350.4	367.5	286.2	300.4
Paper & products	68.8	56.2	122.5	155.3	77.9	84.5	76.6	98.2	100.0	156.9	134.7	164.8	235.1	399.6	417.2	514.2	650.7	857.5	844.2	816.2	1,106.7	1,018.5	1,107.0	1,565.2	1,643.5
Printing & publishing	47.8	148.8	135.7	103.5	114.3	118.4	109.3	84.2	100.0	83.4	87.4	103.7	281.7	182.5	283.2	401.2	516.7	634.3	486.5	557.3	586.7	760.7	712.8	897.0	877.4
Chemical products	53.6	56.5	64.0	81.5	102.4	97.8	101.3	128.6	100.0	83.1	115.8	127.1	425.2	552.5	1,325.7	2,120.6	2,961.2	4,856.0	2,001.7	1,605.7	2,549.7	2,315.3	2,184.9	2,690.5	3,135.3
Petroleum refining	121.0	113.5	109.0	79.7	115.5	119.7	157.3	163.4	100.0	109.2	114.5	87.0	102.7	104.2	710.9	1,072.0	1,556.8	2,497.0	2,023.5	1,820.3	1,179.4	1,201.0	1,310.2	1,330.2	1,477.5
Rubber products	0.0	11.8	0.0	96.3	99.6	91.9	88.2	108.1	100.0	93.5	127.9	145.1	149 6	143.6	178.6	171.6	189.2	232.7	215.4	225.4	232.6	285.3	351.2	250.3	184.9
Plastic products													100.0	137.5	155.7	156.5	168.2	236.3	171.3	195.9	246.3	348.3	308 4	275.0	379.3
Non-metallic mineral products	21.4	21.2	30.3	72.3	93.3	162.5	163.5	91.6	100.0	136.1	178.1	204.0	210.9	189.0	198.9	226.7	242.8	309.0	358.0	304.2	600.8	604.9	751.9	792.7	988.1
Basic metal products	34.9	49.1	62.0	93.9	90.5	94.2	93.4	91.3	100.0	120.2	138.6	143.4	204.6	152.3	190.1	214.4	259.2	311.6	340.2	379.9	731.8	482.6	630.5	413.6	664.1
Machinery	80.6	45.3	47.3	55.7	41.5	39.1	43.6	92.1	100.0	109.6	114.7	110.6	2,426.1	3,879.2	3,656.6	3,825.0	4,124.1	4,357.9	6,727.3	4,455.2	5,249.8	6,014.7	8,383.2	6,362.8	7,576.2
Transport equipment	32 9	26.8	39.9	89.2	92.0	74.4	82.2	87.6	100.0	100.8	129.2	141.2	183.1	173.9	113.5	153.7	142.2	137.1	129.4	119.0	107.2	195.2	215.5	95.4	133.3
All Manufacturing	**70.8**	**73.6**	**80.5**	**89.6**	**94.1**	**99.0**	**103.3**	**120.0**	**100.0**	**104.0**	**108.7**	**110.3**	**170.1**	**202.3**	**303.4**	**390.4**	**495.8**	**702.9**	**575.9**	**514.2**	**581.9**	**564.3**	**607.7**	**591.3**	**705.1**

Source: Department of Statistics, Industrial Department, unpublished data covering the years 1967-1973; 'Industrial Census' 1979, 1984, and 1988; and 'Industrial Survey', various issues for all other years.
Note: Sources above give material input in current prices. For deflation, the composite price index of material input, constructed in Table AVII.4-3, is used.

Table AVII.4- (5.b)
Index of labour Input to Manufacturing Production (number of workers), 1975=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
Food products	58.4	64.5	62.1	42.1	42.1	46.8	52.0	69.3	100.0	100.4	108.9	130.7	132.7	151.3	167.5	173.5	183.0	230.5	273.4	289.6	305.8	336.0	384 2	411.9	446.6
Beverages	56.5	54 6	54.6	70.0	71.4	78.8	83.0	87.6	100.0	103.8	119.5	143.3	168.5	204.0	198.7	161.3	195.6	181.9	206.9	181.1	162.8	145.2	151 5	179.2	177.9
Tobacco	136.4	124.2	110.5	110.5	110.5	111.4	101.0	102.9	100.0	95.2	100.6	120.8	104.8	145.0	131.6	113.9	122.3	139.0	143.6	149.9	168.8	184.4	143.2	155.2	180.4
Textiles	116.5	104.1	65.4	41.1	41.1	41.4	51.7	118.8	100.0	116.8	126.9	152.3	96.9	67.1	100.0	94.3	91.0	91.1	90.8	86.8	93.7	107.3	129.6	119.9	144.1
Wearing apparel	43.5	66.5	64.5	75.8	76.0	77.4	77.5	88.7	100.0	98.8	106.6	117.2	119.0	126.0	168.9	199.4	255.3	262.2	294.4	264.6	292.2	288.3	293 8	368.0	422.3
Leather products	76.5	75.8	70.4	54.9	54.9	56.0	57.8	102.9	100.0	97.1	94.2	113.0	78.7	82.3	70.4	73.3	87.7	89.2	85.2	70.0	79.1	96.8	131 0	191.7	191.3
Footwear	43.0	45 9	46.0	44.6	45.4	47.9	50.2	80.6	100.0	114.3	130.7	156.8	76.4	71.5	87.3	99.4	119.7	111.3	116.4	96.3	146.2	137.1	145 1	154.5	165.8
Furniture & Wood products	44.8	68.5	54.8	64.7	64.8	68.3	74 2	138.4	100.0	95.2	101.2	111.3	115.8	119.0	138 5	149.1	151.8	277.0	290.2	249.8	268.2	296.9	348 1	344.6	376.6
Paper & products	116.6	65 4	73.9	84.4	85.8	87.1	87.1	90.0	100.0	109.0	126.9	152.2	183.4	249.9	289.7	310.6	310.8	237.2	271.8	285.2	334 3	310.8	362.3	427.7	505.3
Printing & publishing	88.1	196.4	189.0	155.0	156.1	161.4	161.4	163.1	100 0	98.5	106.2	127.4	168.2	171.5	195.3	221.2	285.8	353.3	323.8	358.2	349.7	398.5	364 8	480.5	475.4
Chemical products	74.6	75.8	82.5	108.3	118.8	118.8	163.1	93.5	100.0	106.9	112.3	216.7	282.3	325.8	371.7	617.7	669.2	708.5	794.6	823.3	939.8	867.3	891.7	1,215.8	1,164.4
Petroleum refining	56 9	61.3	57 3	60.1	66.2	68.7	74.2	83.6	100.0	118.6	152.7	144.9	127.6	139.9	148.1	152.2	150.6	160.3	172.4	170.8	173.4	179.4	188 7	206.9	208.7
Rubber products	64 1	78.2	92.4	106.5	120.7	134.8	148.9	136.9	100.0	100.9	108.2	129.7	134.9	130.9	353.1	365.0	426.5	488.0	549.5	611.0	672.5	734.0	884.8	682.4	484.0
Plastic products								149.8	100.0	100.3	109.7	183.4	190 8	300.8	301.7	331.3	277.2	364 0	384.9	390.3	454.1	510.2	443.4	528.8	636.0
Non-metallic mineral products	52.8	50.2	50.2	69.2	70.3	71.1	71.9	79.9	100.0	103.7	108.2	129.8	170.8	185.0	200 0	214.5	226.3	238.2	248.1	255.4	266.3	275 2	300.5	306.1	352.8
Basic metal products	114.5	90.5	52.7	63.6	63.6	64.1	75.5	83.9	100.0	92.1	98.0	117.6	122.4	117.3	127.9	135.1	167.5	201.4	176.9	227.8	224.6	197.6	239.5	201.9	218.2
Fabricated Metal																				100 0	107.2	84 7	95.6	94.5	106.4
Machinery	112 3	110.1	108.0	91.2	91.2	96.8	100.6	111.9	100 0	110.1	112.1	134.5	1,765.2	1,953.2	2,199.9	2,145.0	2,112.9	2,862.3	3,375 6	224.4	489.5	815.4	885.3	760.5	861.0
Transport equipment	40.9	30.5	25.1	46.1	47.0	50.8	59.8	70.3	100.0	101.2	104.8	125.8	130.9	99 8	197.4	379.3	392.6	177.5	188.6	221.8	299.5	681.0	607.8	264.0	665.5
All Manufacturing	**65.9**	**70.8**	**63.5**	**64.2**	**65.6**	**67.9**	**72.8**	**95.9**	**100.0**	**104.3**	**114.8**	**135.8**	**160.4**	**176.2**	**198.9**	**213.0**	**225.2**	**264.4**	**288.3**	**314.6**	**340.7**	**319.7**	**347.4**	**374.5**	**409.2**

Source: Ibid.

APPENDIX AVII.4
Statistical Tables for Hybrid Index of Profitability

Table AVII.4- (5.c)

Index of Manufacturing Output (at constant 1975 prices), 1975=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
Food products	69.5	66.8	87.2	88.4	89.5	88.8	88.0	87.2	100.0	106.0	103.4	109.8	90.1	130.8	139.6	147.3	135.1	186.4	209.0	235.2	210.0	294.5	349.6	307.0	371.8
Beverages	21.7	25.9	31.5	36.6	41.5	45.3	48.8	51.9	100.0	106.8	143.3	131.1	303.0	274.8	250.9	198.1	218.7	223.4	242.8	146.0	239.7	237.6	241.2	254.4	286.2
Tobacco	103.0	109.5	117.8	113.4	109.1	102.9	97.0	91.4	100.0	130.9	244.6	207.8	444.9	487.6	567.8	403.8	492.8	526.1	530.3	435.1	486.9	494.9	412.1	447.3	479.5
Textiles	80.7	77.7	73.5	80.8	87.7	92.5	96.8	100.6	100.0	108.1	116.4	188.0	117.7	125.9	160.8	140.6	103.6	132.3	146.2	104.1	110.9	146.5	171.8	187.2	294.2
Wearing apparel	34.7	50.0	48.1	51.0	53.8	55.4	56.7	57.9	100.0	88.2	93.6	64.6	55.3	62.2	76.7	108.8	25.7	119.7	177.2	116.8	91.1	135.5	112.0	108.9	180.6
Leather products	21.1	24.6	23.5	27.1	30.6	33.2	35.6	37.8	100.0	92.6	42.1	57.9	34.0	39.7	27.3	29.4	118.7	36.8	54.6	40.9	40.4	52.3	34.7	66.1	152.0
Footwear	86.7	109.2	130.4	112.3	94.9	76.6	59.6	43.8	100.0	128.8	118.5	105.1	125.6	220.5	235.2	248.2	594.3	160.7	330.3	130.2	170.5	206.0	243.3	118.8	175.8
Wood & Furniture	72.9	80.2	92.5	89.1	85.9	81.1	76.6	72.3	100.0	86.6	93.1	123.3	172.2	212.4	252.9	260.3	306.2	454.0	348.6	290.1	274.1	338.8	427.9	312.4	398.8
Paper & products	48.0	40.4	54.9	62.2	69.1	74.3	79.0	83.2	100.0	153.8	169.8	472.2	309.5	375.1	684.7	801.3	843.5	690.7	1,358.4	781.9	1,035.4	1,006.3	775.9	837.0	1,098.6
Printing & publishing	63.6	95.5	73.4	74.5	75.6	75.1	74.5	73.8	100.0	106.8	125.8	108.9	196.2	229.4	302.0	401.7	519.5	493.2	639.5	619.7	539.4	721.3	420.9	517.5	631.0
Chemical products	66.7	74.6	88.3	82.7	77.3	70.6	64.4	58.6	100.0	105.1	130.2	158.7	426.2	558.5	815.4	1,342.7	1,920.8	4,139.4	2,097.2	2,047.3	2,845.4	3,155.1	2,802.7	2,856.6	3,477.9
Petroleum refining	63.5	66.6	80.7	86.1	91.2	94.2	96.9	99.2	100.0	132.4	131.7	164.8	227.7	266.3	1,690.7	2,076.3	1,908.2	1,809.7	2,868.8	1,556.5	1,572.2	1,407.9	1,160.8	1,161.0	1,258.3
Rubber products	17.3	15.3	27.3	22.7	18.2	13.7	9.5	5.6	100.0	103.1	145.8	150.6	13.0	8.8	34.5	31.8	5.2	0.5	32.5	5.7	57.0	77.0	130.0	110.2	119.0
Plastic products	0.0	0.0	0.0	37.2	72.9	105.1	134.8	162.0	100.0	83.2	123.1	212.1	250.3	277.6	441.2	589.4	466.1	794.0	989.2	888.3	899.7	1,158.1	1,255.1	1,178.7	2,434.2
Non-metallic mineral products	38.4	54.4	69.5	71.8	74.0	74.6	75.0	75.3	100.0	137.4	156.7	90.8	247.1	357.7	583.6	672.8	602.0	679.5	1,023.9	651.3	642.5	580.7	547.0	514.2	761.3
Basic metal products	34.6	40.2	67.7	69.6	71.3	71.6	71.7	71.7	100.0	140.6	158.1	86.3	123.7	128.0	176.9	189.5	235.1	247.2	329.7	276.4	214.3	288.8	388.4	295.8	449.3
Non-electrical machinery	1.3	1.1	2.4	25.8	48.3	68.5	89.1	104.3	100.0	95.1	97.6	643.3	653.7	821.4	1,202.7	1,121.4	1,044.0	898.5	1,774.8	1,143.8	164.2	1,062.3	1,693.1	1,234.6	1,236.2
Machinery electric	45.9	60.8	88.2	95.3	102.0	106.4	110.2	113.7	100.0	108.3	112.4	108.0	64.3	112.4	75.7	76.5	70.3	105.3	123.2	124.7	230.1	304.8	813.1	815.1	1,008.6
Transport equipment	32.6	27.9	58.1	56.2	54.3	51.5	48.8	46.3	100.0	123.0	126.7	69.3	88.3	76.5	72.0	45.0	27.1	7.2	82.5	13.9	27.7	46.5	65.9	36.2	54.7
All Manufacturing	**54.7**	**59.6**	**72.7**	**75.2**	**77.6**	**78.3**	**78.9**	**79.2**	**100.0**	**115.4**	**126.6**	**136.2**	**184.0**	**226.2**	**451.3**	**524.2**	**532.5**	**642.7**	**766.0**	**529.9**	**540.6**	**594.5**	**585.7**	**552.5**	**696.1**

Source: Ibid.

Note: Sources above give manufacturing output in current prices. For deflation, the wholesale price index for manufacturing production, constructed in Table AVII.4-(1.a), is used.

Table AVII.4- (5.d)

Quantity Index of Profitability in Manufacturing Industries 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
Food products	105.4	103.8	133.8	178.9	183.3	169.2	153.7	115.7	100.0	107.0	97.6	87.6	69.8	86.7	84.8	86.3	75.2	83.6	78.7	83.7	70.7	90.3	95.1	78.1	87.1
Beverages	31.0	43.5	50.4	45.9	47.1	46.0	48.6	52.5	100.0	105.7	124.2	92.6	191.6	141.8	131.2	121.4	114.4	118.8	117.6	92.8	124.0	129.7	127.2	126.3	129.4
Tobacco	58.6	81.9	103.3	110.6	107.0	99.9	102.8	87.6	100.0	129.6	236.3	171.6	367.2	302.0	397.1	320.0	373.8	356.4	339.1	268.6	232.9	255.1	282.3	290.3	267.6
Textiles	72.5	73.5	112.4	214.2	220.2	228.2	203.3	84.2	100.0	92.6	93.0	129.6	119.3	166.3	154.5	136.5	100.1	126.2	135.8	103.5	96.2	101.3	106.6	122.7	156.8
Wearing apparel	112.7	83.4	81.0	73.4	76.0	75.7	76.2	67.9	100.0	99.4	97.7	62.8	51.0	55.8	51.6	61.0	11.3	49.1	64.8	48.7	35.6	51.3	41.3	33.6	48.0
Leather products	21.6	32.0	34.7	54.8	59.0	61.3	64.9	35.4	100.0	95.7	43.5	52.1	42.4	46.6	37.2	38.8	134.6	41.7	65.0	61.1	50.5	54.6	29.3	34.3	66.8
Footwear	73.4	107.4	164.6	141.9	91.8	70.2	53.3	21.6	100.0	70.6	60.9	50.1	90.4	127.9	133.4	124.7	254.4	67.8	142.9	66.9	60.8	72.4	63.3	49.8	63.4
Furniture & Wood products	188.6	125.3	167.7	122.1	116.2	103.3	92.8	53.9	100.0	90.1	92.5	114.2	143.5	169.0	162.8	143.5	152.1	143.2	107.0	112.7	102.2	110.1	121.6	93.9	110.4
Paper and products	61.0	63.5	65.3	62.6	82.2	85.9	93.1	90.8	100.0	129.2	132.1	304.9	159.4	133.4	216.4	226.8	220.8	188.1	346.8	197.2	208.7	219.2	149.7	125.7	147.7
Printing and publishing	107.5	52.2	42.2	53.1	52.4	50.3	50.8	52.4	100.0	113.3	124.8	90.2	98.0	131.4	137.2	147.7	148.0	114.0	173.0	149.6	129.5	144.1	90.9	86.5	107.2
Industrial chemicals	118.0	101.9	110.4	79.0	66.3	60.9	41.6	59.6	100.0	101.4	115.5	77.6	141.2	156.6	162.5	163.2	195.7	324.9	218.6	220.1	245.4	296.3	262.4	201.6	242.7
Petroleum refining	64.5	83.6	106.9	128.5	109.1	108.8	93.7	88.9	100.0	114.8	94.6	132.3	191.6	209.0	488.9	436.8	296.0	184.4	348.7	207.4	298.4	261.5	199.2	193.0	192.3
Rubber products	77.5	27.7	45.3	22.0	16.1	11.4	7.4	4.4	100.0	104.8	126.7	111.5	9.3	6.5	11.8	10.7	1.5	0.1	7.5	1.2	11.0	13.3	18.6	20.7	31.3
Plastic products													140.1	99.5	156.4	191.4	177.5	228.8	277.6	243.8	211.1	237.1	295.1	238.2	404.6
Non-metallic mineral products	115.7	138.4	162.8	102.1	93.7	70.8	70.6	89.3	100.0	118.6	116.6	57.6	133.0	191.8	292.4	307.1	259.0	256.7	353.8	237.9	164.0	145.5	116.4	105.2	128.8
Basic metal products	88.0	45.6	127.1	106.5	109.5	108.8	93.8	85.1	100.0	150.1	157.6	72.4	97.4	107.3	134.7	135.8	136.2	119.1	177.2	117.0	84.7	135.2	148.7	138.4	184.9
Machinery	51.3	66.0	96.7	117.0	131.6	131.5	130.0	106.8	100.0	98.5	99.6	84.5	3.3	4.5	2.9	2.9	2.6	3.2	2.9	8.9	12.7	13.5	27.5	35.3	37.1
Transport equipment	89.2	97.0	181.9	85.2	80.2	83.5	69.6	59.1	100.0	121.8	109.1	52.2	57.0	57.1	45.3	16.3	9.8	4.6	51.1	7.9	13.1	10.2	15.4	19.5	13.0
All Manufacturing	**78.3**	**83.5**	**108.8**	**108.7**	**108.9**	**105.7**	**100.1**	**78.7**	**100.0**	**110.7**	**111.4**	**104.2**	**113.3**	**124.7**	**205.5**	**211.2**	**190.9**	**182.9**	**221.8**	**149.6**	**139.1**	**161.5**	**146.8**	**132.4**	**148.8**

Source: Calculated from Tables AVII.4- (5.a), (5.b) and (5.c).

Note: 1/ Index of real output / (index of material input * index of labour input)

APPENDIX AVII.4
Statistical Tables for the Hybrid Index of Profitability

Table AVII.4-6
The Hybrid Index of Profitability in Manufacturing Industries 1/, 1967-1991

	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*
Food products	99.0	92.9	122.9	146.4	168.0	164.6	159.4	122.1	100.0	195.6	147.3	81.5	97.6	117.2	67.6	51.9	43.1	112.4	54.4	109.7	136.8	144.0	80.5	94.4	147.5
Beverages	53.6	71.7	82.2	57.2	59.3	58.7	56.3	50.8	100.0	107.3	97.1	89.0	171.9	108.9	96.1	88.6	79.8	86.7	79.6	75.6	71.1	64.1	95.3	110.4	101.8
Tobacco	132.0	182.9	194.5	211.6	188.7	172.9	146.9	93.7	100.0	136.5	211.0	189.6	435.8	308.8	315.5	248.9	491.6	249.0	294.2	303.6	295.4	186.7	270.0	297.1	260.6
Textiles	69.4	68.0	93.7	156.4	160.2	168.1	169.5	89.0	100.0	139.6	119.1	187.3	113.7	111.6	166.2	103.1	32.1	76.0	176.4	76.1	96.4	96.6	90.7	101.8	75.9
Wearing apparel	80.6	59.9	57.7	54.9	55.9	53.0	63.7	67.7	100.0	91.1	80.7	43.9	39.1	39.7	46.7	53.3	9.9	68.5	80.5	37.2	29.7	46.6	33.7	34.7	57.5
Leather products	20.6	30.7	31.7	45.7	47.9	48.9	57.8	36.3	100.0	101.5	42.3	52.1	39.0	36.3	30.6	44.3	72.7	40.0	66.0	47.0	34.1	35.9	18.7	18.1	37.7
Footwear	40.2	61.0	101.9	96.7	61.7	48.0	44.0	25.8	100.0	40.0	29.7	32.5	61.0	91.8	148.4	179.5	377.8	133.5	249.5	97.8	89.1	58.8	48.7	44.9	37.5
Furniture & Wood products	144.8	97.6	130.4	98.8	91.5	81.6	85.0	59.9	100.0	62.2	86.7	90.3	100.3	103.9	98.4	106.1	114.7	112.5	85.1	94.4	79.3	83.6	69.8	61.1	18.3
Paper & products	14.5	16.4	18.1	20.1	27.0	30.4	48.0	77.4	100.0	152.0	230.8	517.3	340.1	538.8	1,249.7	1,321.3	1,171.8	798.5	1,616.4	1,058.7	993.6	1,550.0	1,030.4	1,169.7	1,185.4
Printing & publishing	26.0	13.4	11.6	18.6	18.8	19.2	27.2	44.8	100.0	300.3	291.5	742.6	1,019.8	1,053.7	987.9	1,266.0	1,499.7	1,417.7	1,343.3	1,243.1	875.0	1,007.0	443.7	702.2	1,134.0
Chemical products	31.8	28.7	32.1	24.2	17.7	22.1	16.7	43.5	100.0	115.6	109.7	93.4	124.8	180.1	228.4	286.4	300.0	503.5	342.0	259.0	283.5	406.2	635.9	559.3	629.7
Petroleum refining	27.2	35.6	46.4	57.4	46.9	51.5	43.1	54.3	100.0	97.3	96.4	110.1	522.2	853.4	2,326.7	2,111.5	1,711.7	1,521.0	2,780.5	1,890.4	2,951.9	1,876.1	642.5	658.8	444.1
Rubber products	67.9	24.2	39.6	19.5	14.5	10.0	7.7	5.0	100.0	93.3	108.7	93.9	11.6	10.9	17.7	13.6	11.9	0.5	23.2	3.6	13.8	12.2	41.9	80.5	29.2
Plastic products													105.4	86.4	138.6	133.0	120.1	207.2	215.3	149.8	111.8	150.0	197.3	152.6	307.2
Non-metallic mineral products	120.6	136.3	144.1	89.7	81.1	58.6	70.5	63.3	100.0	95.7	134.4	53.7	77.5	99.1	147.8	187.2	151.1	181.1	234.0	143.9	99.4	87.6	76.8	81.7	25.9
Basic metal products	86.3	44.0	117.0	99.2	102.8	106.2	93.5	84.9	100.0	198.0	189.7	85.1	106.7	110.9	175.5	139.0	125.4	99.1	159.6	179.1	202.2	230.1	101.4	282.3	338.2
Machinery, electrical	40.5	46.6	64.8	69.6	80.8	103.1	109.7	88.2	100.0	70.2	91.0	62.3	2.4	3.2	2.1	2.6	2.5	3.3	2.9	7.2	9.1	10.0	21.2	31.2	8.4
Transport equipment	38.7	39.3	73.2	52.2	51.7	55.3	52.5	45.4	100.0	87.5	118.9	47.6	62.2	66.2	37.5	22.2	12.4	5.9	62.9	8.5	12.0	9.1	10.0	13.8	2.4
All Manufacturing	77.6	81.6	102.5	99.8	97.7	95.1	96.4	83.7	100.0	103.3	104.4	92.8	92.3	95.9	156.1	159.4	147.1	169.9	163.0	109.3	97.1	114.2	92.6	101.7	91.0

Source: Calculated from Tables AVII.4-4 & AVII.4- (5.d). See text, section VII.5.1 for methodology.

1/ Price index of profitability * Quantity index of profitability

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