Commercial Policy And Industrialisation in Nigeria (1963 - 1978)

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SUMMARY

As a contribution to the continuing debate among trade and development economists as to the role of industrial strategies in the pattern of economic development, this study analyses the experience of one developing country, Nigeria, with an import substitution strategy. The performance of the industrial sector is critically assessed and related to the trade policy adopted. Using published data, the study covers 24 industries and a period of 16 years, beginning 1963 and extending to 1978.

An analysis of the structure of protection reveals a considerably high and wide ranging levels of effective protection, in favour of consumer-goods oriented sectors. The relationship between these rates of effective protection on the one hand and import substitution and sectoral growth on the other was examined using various parametric and non-parametric tests of association. The evidence, which is only suggestive in nature, indicates that the structure of protection does play a role, albeit a minimal one, in stimulating industrial growth.

Using Input-Output techniques, the employment, foreign exchange and output implications of the present strategy of Import-Substitution and of a hypothetical strategy of export promotion are analysed. There is a general absence of 'key' employment sectors and, paradoxically, an export promotion strategy is found to be less employment generating and more capital using but less foreign exchangeusing than the existing strategy.

Although there is a considerable scope for capital-labour substitution in many industries, it was found that the often recommended policy of getting prices 'right' will not be sufficient to bring about an appreciable improvement in the employment situation.

The development of factor productivity between 1963 and 1978 for each of the 24 industries was analysed; and three possible determinants of productivity are investigated: capital intensity and technical progress, output growth (the Verdoorn's Law) and trade policy. With regards to the latter, it was found that periods of especially slack productivity growth roughly correspond to those in which there was especially restrictive trade policy as quantified by high erps. The economic efficiency of the manufacturing sector was appraised using the criteria of net social profitability, social rate of return and Domestic Resources Costs (DRCs). Evidence was found in support of the hypothesis that the resource pull of protection to the protected industries is accompanied by higher rates of private, but lower rates of social profitability for the more heavily protected sectors.

The overall conclusion of the thesis is that the policies of protection should have been more rationally applied and the IS strategy more rationally executed in line with the country's enunciated objectives.

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CHAPTER ONE

GENERAL INTRODUCTION

1:1 Introduction

The emphasis on rapid industrialisation in the less developed countries (LDCs) is often regarded as a sinequanon in national efforts to cope with the general features of underdevelopment. Industrialisation is expected not only to contribute to economic growth but to be the 'engine of growth' and technical progress, to accomplish structural change and diversification of the economy, to generate financial surplus (including domestic investible surplus, foreign exchange etc), to alleviate the urban unemployment problem, to help absorb the often redundant rural labour force and develop their skills, to raise the earnings per head of the population, and to help in the growth and development of technological and material self-reliance etc.

The degree of emphasis on particular objective(s) could vary from one developing country to another and over time, depending upon historical, political and socio-economic factors. For example, in an industrially backward country, with low per capita income, abundant unskilled labour and limited familiarity with advanced technology, the priority may be on the establishment of industries which generate higher income and employment. An oil rich economy could afford to foster industrial development without the unnecessary worries about foreign exchange etc. Very often however, majority of the LDCs have a multiplicity of objectives and would prefer to foster industrial development on all fronts.

For majority of the LDCs, trade policy has proved to be the most convenient tool at their disposal for the promotion of industrialisation. The protection of 'infant industries', it is usually argued, is necessary to give entrepreneurs sufficient encouragement to achieve the necessary levels of industrial investment and the desired degree of diversification of industrial activity. This view is indicative of the scepticism regarding the efficacy of market forces in allocating resources. In general, policy makers (and some economists) in the LDCs are profoundly suspicious of the ability of the market to generate and allocate investment resources effectively.

The degree of overall protection to the industrial sector varied greatly among the LDCs and within LDCs for different activities and at different time periods. Numerous studies[1] carried out on Latin American and Asian countries during the 1970's indicated that these differences in policy were by and large responsible for the differences in the pace and efficiency of industrial growth and hence in the levels of industrialisation achieved. Specifically, the appraisal of industrial policies in these countries has revealed that the benefits to the national economy of a strategy which emphasises protection have not been as was expected. Thus, while industrialisation has been fairly rapid and the manufacturing sectors have registered fairly high rates of growth, the strategy has produced rather disappointing results on other fronts: the explicit and implicit resource costs of 'nourishing' the 'infants' is often unbearable; in some cases, the industrial policies turn out industries with negative value-added at world prices - implying a negative effect on the balance of payments - and burden the growth of other industries; real incomes are often depressed because of the high prices industries must charge in order to make even a low rate of return etc.

It is important therefore, especially for those countries on the threshold of industrial development to undertake a periodic comprehensive review of their industrial policy and strategy and to evaluate and select those sectors the promotion of which would ensure the rapid realisation of an appropriate mix of objectives. This is the main objective of this study. We intend to evaluate the Nigerian industrial sector performance in view of the multiplicity of objectives thrust upon it and examine the extent to which its performance is influenced by the trade policy adopted.

The starting point of an analysis of performance is the identification of the country's broad and specific objectives as well as the strategy of industrialisation. This will be briefly examined next.

1:2 Objectives and Strategy of industrialisation in Nigeria

At the time of independence in 1960, the Nigerian economy exhibited all the features that characterize an underdeveloped economy: it was an arche-typical dual economy with a small export enclave devoted almost entirely to agricultural produce, which constituted over 90 percent of the country's exports. As the colonial administration was preoccupied with the expansion of trade in raw materials, the economy emerged at independence without any basis of industrialisation, as neither the infrastructure nor the trained manpower for industrialisation was developed. Because of the widespread pessimism regarding the long-term prospects of agricultural exports from LDCs, the independent government viewed structural change in favour of industry as a necessary prerequisite for modernisation and long-term growth. Given the low base of industrialisation in the country and the increasing demand for manufactured goods from abroad, the strategy of 'planned' and 'regulated' industrial development - via import-substitution - became particularly attractive after independence and has remained the dominant feature of the country's industrialisation efforts.

The Nigerian policy makers view national development planning as the most effective way of dealing with the numerous problems of economic backwardness. Thus since independence, a series of four five-year plans have been elaborated[2]. This is in addition to various other documents which reflect the thinking of the government with regards to the desired degree and form of industrialisation[3]. Government committment to 'planning' was explicitly stated in one of the recent 'guidelines'

> In order to ensure that industrialisation brings in its wake truly beneficial economic and social development, the growth of industries has to be regulated and guided along definite channels to achieve certain set of objectives.[4]

What are those objectives?

The major goals of economic policy after independence as set out in the first development plan (1962-68/70) were

> i. to stimulate the establishment and growth of industries which contribute both directly and materially to economic growth.
>
> ii. to enable Nigerians to participate to an ever increasing extent in the ownership, direction and management of Nigerian industry and trade.[5]

The industrial development objectives enunciated in the subsequent plans were no more than a continuation and further elaboration of the above objectives. The main objectives for the second plan (1970-74) were to

i. promote even development and fair distribution of industries in all parts of the country

ii. ensure a rapid expansion and diversification of the industrial sector of the economy

iii. increase the incomes realised from manufacturing activity

iv. create more employment opportunities

v. promote the establishment of industries which cater for overseas markets in order to earn foreign exchange

vi. continue the programme of import substitution.[6]

These objectives feature prominently in the most recent plan document (1981-85), with added emphasis on growth, maximisation of local value-added (i.e. industrial linkages), efficiency and competitiveness, and employment generation. Thus:

> while the strategy of import substitution will continue to be pursued, greater emphasis will henceforth be placed on industries that will rely on local resources thereby reducing the sectors dependence on imported inputs... This is one way to reduce foreign exchange leakages and maximize the benefit from our industrialisation efforts[7]

Accordingly, the government plans to ban the importation of materials for industrial use if such materials are locally available and promises 'active support and encouragement' to industries which explore the possibilities of increasing local inputs.

The government's interest in efficiency and competitiveness is perhaps influenced by the experiences in the newly industrialising countries of Asia and Latin America. According to the fourth plan:

> Competition will be encouraged to ensure cost effectiveness and to ensure that the gains of industrialisation are passed to consumers. The need for international competitiveness underscores the need for efficiency rather than reliance on permanent protection by government.[8]

Other specific objectives of the industrial policy in the fourth plan are to

i. ensure increased level of self-reliance in the supply of industrial products.

ii. increase employment opportunities

iii. maintain rapid growth of the manufacturing sector with a view to increasing its share in the gross domestic product to a minimum of 12%

iv. give maximum encouragement to private sector industries[9] etc.

In industrial, as in many other aspects of development, the enunciated objectives may be conflicting. The output and employment objectives are often cited as examples: the promotion of labour-intensive industries may generate high level of employment, a large share of wages in output and possibly a small investible surplus and a slower rate of growth of output and employment; learning skills, so essential to industrial progress, may sometimes be achieved only at the cost of sacrifices in efficiency or in programmes with only very slow private returns and this may run counter to the objective of raising output rapidly; the pursuit of the growth objective may lead to increasing inequalities in income distribution and wealth; a policy in which investment is made on the basis of technological linkages may suffer from lack of adequate employment creation etc. According to the government, "these inconsistencies are fully recognised and efforts will be made to strike a reasonable balance between the specified objectives".[10] However, while government objectives often include the creation of "a just and egalitarian society" and "a land of bright and full opportunities for all citizens"[11], the encouragement of "maximum growth of investment and output consistent with our economic potential and national aspiration"[12] remain the overall and overriding objective.

1:3 Constraints and Potentials

The Nigerian government seem to be fully aware of, and view with seriousness certain "institutional constraints and bottlenecks which constitute obstacles to industrialisation". These are listed as

> i. infrastructural inadequacy in the supply and management of water, electricity, communication facilities, transport especially railway, port facilities etc.
>
> ii. restrictive industrial policy and administrative bottlenecks that frustrate investments in a number of worthwhile projects;
>
> iii. shortage of industrial manpower and the relative unattractiveness of manufacturing to indigenous business-men;
>
> iv. slow implementation of the public sector manufacturing projects which are generally to act as the foundation for the growth of the sector as a whole[13].

They are equally optimistic however, that the economy has the potentials and opportunities of "creating an industrial base that can guarantee self-sustaining growth in the future". The favourable conditions are that:

> Nigeria is richly endowed with the physical as well as the human resources necessary for industrial development. The domestic market is large and expanding ... The emerging entrepreneurial group in the country is dynamic and capable of exploiting the potential in both the domestic and world markets.[14]

Above all, the tremendous increase in oil revenues as a result of higher prices and greater production in the 1970's provided the government with much larger revenues than it had ever anticipated and thus offered distinct opportunities for the government to accomplish its social, political and economic objectives.

In this study we shall be concerned with the objectives of (manufacturing) growth, industrial diversification (linkages), employment provision, productivity and efficiency. The main questions to which we shall try to provide answers are: to what extent has the country's reliance on industrialisation via import-substitution hindered or promoted the realisation of these objectives? Does the performance of the Nigerian industrial sector provide any basis for advocating a re-orientation of industrial policy and strategy? The specific lines of enquiry will be examined next.

1:4 Organisation of the Study

The present study contains 8 chapters. In the next chapter, we shall be concerned with the role of international trade in the efficient allocation of resources in the LDCs. The assumptions, implications and critiques of the classical and neo-classical theories of international trade are examined. We also briefly review some of the consequences, observed in other LDCs, of departing from the 'free trade' principle. In order to provide the necessary basis for the evaluation of investment efficiency using cost-benefit analysis, we examine the essentials of the Little and Mirrlees method of project appraisal.

The third chapter provides a detailed description of the overall structure of the Nigerian economy. We examine how the structure has evolved over the years and whether the changes which have occured are indicative of any meaningful structural change.

The historical evolution of the instruments of industrial protection, their quantification and effectiveness in the re-allocation of resources within the manufacturing sector will be examined in chapter four.

Using input-output techniques, we examine in chapter five, the employment, foreign exchange and output implications of the industrialisation process. Attempts are made to answer questions such as: to what extent can reliance on the IS strategy lead to unfavourable results with respect to employment? What are the employment potentials of a hypothetical export promotion strategy as compared to the present strategy? To what extent do domestic industries carry out exchanges among themselves? Are there any conflicts between the various objectives?

In chapter six further issues related to the employment effects of industrialisation are examined. Using production functions, we examine the extent to which factors of production can be substituted for each other. To what extent are factor requirements influenced by factor prices? What will be the exact impact on factor requirements and hence employment when input prices are adjusted for distortions? We also examine measures of, and various factors influencing, factor productivity growth in the manufacturing sector. Both 'partial' and total factor productivity growth over a period of time are analysed.

In chapter seven, using cost-benefit analysis, we examine the efficiency of investment in the industrial sector. Measures of private, as well as social profitability are examined. Using the concept of Domestic Resource Costs (DRC), we examine the international competitiveness of industries and hence the extent to which resources are being effectively used to save and/or earn foreign exchange.

Finally, in Chapter 8, we examine the major findings, conclusions and limitations of the study.

1:5 Period of study and statistical basis

i. Period of Study

The study covers a period of 16 years, from 1963 to 1978 although for some specific emperical investigations, emphasis is placed on only one or two years. Thus for example, while rates of profitability and effective protection are estimated for only 1974 and 1977, the rates of growth of labour and total factor productivity, as well as substitution elasticities are computed for a period beginning in 1963 and extending to 1978. In all cases, the availability of data is the principal determinant of the period chosen. For example, estimates of nominal rates of protection, (which are required to obtain effective rates of protection) are not available to us for any years other than 1974 and 1977. Similarly the period of study could not be extended beyond 1978 because detailed information about the manufacturing sector is available only up to that date.

ii. Data used

The main source of data used in this study is the Industrial Survey of Nigeria published by the Federal Office of Statistics (FOS) Lagos, Nigeria. The survey covers all manufacturing establishments employing ten or more persons and is published on an annual basis. The main variables are defined below:

(a) Gross Output: the sum of output produced and sold by the establishments, value of goods sold in the same condition as purchased, value of assets produced by own efforts and receipts from contract done by the establishments.

(b) Value-added: the difference between gross output and industrial costs and is 'census value added'. In otherwords, it is defined by the FOS in such a way that excise taxes paid on domestic production are treated as part of value-added. Thus, the published value added data are not at factor cost. No data is available to net out excise tax and move closer to the 'pure concept of value-added'

(c) Labour: This is simply the number of people who are regularly on the payroll of establishments. It thus does not include working proprietors, unpaid family workers and apprentices. The number of hours worked by employees, which is the more frequently used concept of labour input, is not available.

(d) Wages and salaries: These are the earnings of employees and do not include contributions to national provident funds and other benefits received by employees.

(e) Industrial costs/cost of purchased inputs: This category includes cost of raw materials, component parts, fuel, electricity and other incidental expenses by the establishments.

(f) Capital: Unfortunately, no estimates of the value of capital stock are reported by FOS. However, the original book value of fixed assets at industry level is provided from 1963 to 1972. We found it necessary therefore to generate the industry level physical capital stock series using the formula:

$$K_{t+1} = I_t + (1-\delta)K_t$$

where

K_t = base year capital stock (the original book value of fixed assets)

I_t = Net capital expenditure

δ = rate of depreciation of the capital stock.

The reported original book value of fixed assets and net capital expenditure are each made up of the value of residential and non-residential buildings, transport equipment, machinery and equipment, land and land improvement. As there is no reason to believe that residential buildings form a 'productive' part of industry's assets, these were deducted from the total figures provided. Since no sector specific depreciation rates are available, we applied a uniform rate of 11%.

(g) Nominal rates of protection: The nominal tariff rate (t_j) on output is estimated as the ratio of the total duty collection (T_j) for each sector to the sectoral c.i.f. import values (M_j):

$$t_j = \frac{T_j}{M_j}$$

As is to be expected, the collection nominal tariff rate, as defined above, differs a great deal from the scheduled rate as provided in the tariff codes perhaps due to the numerous exemptions of duties granted to various importers. For instance, the scheduled rate varies in the transport equipment sector from about 10%-500% while in 1977, the ratio of duty collection to c.i.f. import value for the same sector was 84%. Although the scheduled rates are provided in much more detail and are therefore more precise, they are often less reliable being constantly revised, sometimes up to 3 times a year. Except therefore in cases where we are unable to obtain total duty collections for some sectors, we have chosen to work with the collections rates as obtained above.

(h) The input-output table: To our knowledge, there are only 3 input-output (I-O) tables available for the Nigerian economy. The first one was constructed by N. Carter (1963)[16] and published in 1963. 20 sectors were identified, 4 of which were primary, 5 tertiary and the rest engaged in some form of manufacturing. Using various techniques and data from other LDCs, Oyejide (1975), Clark (1972) and Kuyvenhoven (1978)[17] had at different times updated and disaggregated the Carter Table. Of these, only that of Clark is available to us. The third input-output table available to us was constructed using 1973 as a base, by the National Accounts Survey Commission (NASC)[18] and published in 1981 by the Federal Ministry of National Planning, Lagos. All productive activities in the economy were aggregated into 25 sectors, 6 of which are primary, 9 manufacturing and 10 tertiary. In addition, there are five categories representing final demand and one composite category representing value-added.

There is no doubt that an indepth analysis of development problems would require not only a more recent but also a less highly aggregated table, than is presently available. For example, even though one could make the assumption that the 1-0 coefficients are fairly stable over a short period, the conclusions derived from the use of a table constructed more than 10 years ago could be misleading especially in a world that is undergoing rapid technological transformation.

By nature, however, 1-0 tables are almost always historical especially in an economy like Nigeria with a weak statistical base and where modern techniques of compilation and reconciliation of data are virtually non-existent.

We decided to disaggregate the NASC table into 35 sectors (5 primary, 24 manufacturing and 6 tertiary) and to update it using 1977 as a base year. The method of disaggregation is discussed, briefly, in Chapter 5 and further examined and illustrated in the Appendix.

1:6 Classification of Sectors used in the Study

This study deals essentially with the manufacturing sector only, although reference is made to other economic sectors especially in chapter 5 where we deal with input-output analysis. The following classification, dictated by the availability of data, is adopted:

Sector code	NASC classification (1973 input-output)	Sector code	ISIC code	Our Classification (updated input-output)
PRIMARY				
1	Agriculture	1		Agriculture
2	Livestock	2		Livestock
3	Forestry	3		Forestry/Fishing
4	Fishing			
5	Oil Mining	4		Oil mining
6	Other mining and Quarrying	5		Other mining and Quarrying
MANUFACTURING				
7	Food, Drink, Beverages and Tobacco	6	3111/3122	Food processing
		7	3131/3133	Alcoholic beverage
		8	3134	Non-alcoholic beverage
		9	3140	Tobacco.

Sector code	NASC classification (1973 input-output)	Sector code	ISIC code	Our Classification (updated input-output)
8	Textiles, wearing apparel & leather goods	10	3211	Textiles
		11	3213	Made-up textiles
		12	3220	Wearing Apparel
		13	3231/3233	Leather products - except for footwear
		14	3240	Footwear
9	Wood & wood products including furniture	15	3311/3320	Wood products and Furniture
10	Paper & paper products printing & publishing	16	3412/3420	Paper & paper products, printing & publishing
11	Drugs and Chemicals	17	3511/3512	Industrial Chemicals including Fertilizers.
		18	3521	Paints
		19	3522	Drugs & Medicines
		20	3523	Soap, perfumery, cosmetics & other cleaning preparations.
		21	3529/3540	Other chemical products products of Petroleum and coal.
12	Rubber & Plastic products	22	3551/3560	Rubber & plastic products
13	Basic metal products	23	3610/3699	Cement, glass & other building materials
		24	3710/3812	Basic Metals, Cutlery & Metal Furniture.

Sector code	NASC classification (1973 input-output)	Sector code	ISIC code	Our Classification (updated input-output)
14	Fabricated Metal products, machinery equipment	25	3813/3819	Fabricated & structural metal products
		26	3822/3829	Machinery I (industrial and agricultural)
		27	3832/3839	Machinery II (electrical, including TV and Radio repairs etc)
		28	3841/3843	Transport equipment (including vehicle repair & assembly).
15	Miscellaneous Manufacturers	29	3851/3909	Miscellaneous Manufacturers
TERTIARY				
16	Electricity & water	30		Electricity & water
17	Building & construction	31		Building & construction
18	Transport	32		Transport and
19	Communication			Communication
20	Distributive Trade	33		Trade
21	Finance & Insurance	34		Finance & Insurance
22	Producer of government services			
23	Hotel and Catering	35		Other services
24	Professional Business & other services			
25	Housing			

NOTES

1. The most comprehensive text on trade and development strategies is the comparative study by Little, I., Scitovsky, T., and Scott, M. (1970) Industry and Trade in some Developing Countries, Oxford University Press, London. See also Balassa, B. and Associates (1971) The Structure of Protection in Developing Countries, John Hopkins, University Press, Baltimore. For individual country studies see for example, Bergsman, J. (1970) Brazil: Industrialisation and Trade Policies, Oxford University press, London. Lewis, R.S. (1970) Pakistan: Industrialisation and Trade Policies, Oxford University Press, London. King, T., (1970) Mexico: Industrialisation and Trade Policies since 1940, Oxford University Press, London. The more recent texts are published by the National Bureau of Economic Research and Jointed edited by Bhagwati, J. and Krueger, A.O. (1975) Foreign Trade Regimes and Economic Development. The countries covered are Brazil, Chile, Columbia, Egypt, Ghana, India, Israel, Phillipines, South Korea and Turkey.

2. These include Federation of Nigeria, National Development Plan: 1962-68, Federal Ministry of Economic Development, Lagos; The Guideposts for Second National Development Plan, Ministry of Economic Development, Lagos. The Second National Development Plan 1970-74, Federal Ministry of Information, Lagos. The Guidelines for the Third National Development Plan 1975-80, Central Planning Office, Lagos. The Third National Development Plan 1975-80, Central Planning Office, Lagos. The Fourth National Development Plan 1981-85, Central Planning Office, Ministry of Economic Planning, Lagos.

3. Federal Ministry of Industries (1974) *Nigerian Investment Centre: Your Guide to Profitable Investment in Nigeria*, FMI, Lagos. *Incentives to Invest in Nigeria*; Federal Republic of Nigeria (1980) *Nigerian Industrial Policy and Strategy: Guidelines to Investors*, Federal Government Press, Lagos (to be subsequently referred to as *The Guidelines*.

4. Federal Republic of Nigeria (1980), *The Guidelines* *ibid* p10.

5. Federal Republic of Nigeria, *First Plan (1962-68)* *op cit* p60.

6. *Ibid*, *The Second Plan (1970-74)*.

7. *Ibid*, *The Fourth Plan (1981-85)*, p142.

8. *Ibid*, p142.

9. *Ibid*, p142.

10. *Ibid*, *Guideposts for Second National Development Plan* (1966).

11. *Ibid*, *The Third Plan (1975-80)*, p29.

12. *Ibid*, *The Fourth Plan (1981-85)*, p141.

13. *Ibid*, *The Third Plan (1975-80)*, p149.

14. *Ibid*, p147.

15. Clark, P.B. (1972) Planning Import Substitution, Amsterdam, North Holland; Kuyvenhoven, A. (1978), Planning with the Semi-Input-Output Method, Leiden Martinus, Nijhoff; Oyejide, T.A. (1975) Tariff Policy and Industrialisation in Nigeria, Ibadan University Press.

16. Carter, N.D. (1963) An Input-Output Analysis of the Nigerian Economy 1959-1960, MIT, Cambridge, Mass.

17. Federal Republic of Nigeria (1981) The National Accounts of Nigeria 1973-1975, *Federal Ministry of National Planning, Lagos.*

CHAPTER TWO

Free Trade, Resource Allocation and Economic Development in the Less Developed Countries

2:1. Introduction

There are two vital interrelated theoretical and practical issues to the LDCs in the field of international trade and development literature. The traditional central issue is whether the economic development of the LDCs is, (or could be) on balance, hindered or promoted by 'free trade'. A related issue concerns the applicability of the conventional or orthodox theories of trade to the present day conditions of LDCs. In the development literature, the question is often asked: how useful a guide is the principle of comparative cost advantage to the best pattern of resource allocation in these countries?

Conflicting views have been put forward by different writers. At one extreme, the classical and neo-classical writers have generally conceived of the role of international trade as an 'engine of growth'. In other words, they saw no conflicts between gains from trade and those from growth. As Robertson (1938)[1] puts it,

> 'The specialisations of the 19th Century were not simply a devise for using to the greatest effect the labours of a given number of human beings; they were above all, an engine of growth'

The neo-classicists[2] have upheld and re-affirmed the conclusions of the older theories and have argued that the conventional theories offer a reasonable approximation to the role of free-trade in the development process but that actual policies in the LDCs are misguided - being the result of short-run political expediency rather than economic rationality.

At the opposite extreme are theorists[3] who express scepticism about the virtues of free-trade as an engine of growth. They contend that international trade has operated with a fundamental bias against the poor countries - a bias which, they argue, cannot be overcome without a qualitative change in the internal structure and external relations of the LDCs. They dismiss the classical and neo-classical theories of free-trade since the structures upon which they are built are completely irrelevant and unrealistic to the long-run development aspirations of the LDCs.

Between the two extremes are those who argue for the 'rehabilitation' of the 'neglected elements' of conventional trade theory or who argue that as it stands, the theory is only partially relevant or that it can be made more operational by recasting it in a dynamic framework and by an explicit consideration of certain 'elements of reality' which are hitherto either totally ignored or treated as special cases or considered as oddities. Such elements include (product, labour and money) market imperfections, externalities and various other distortions and barriers - both social and institutional - that stand in the way of the LDCs in achieving an optimum pattern of resource allocation. It is consideration of these "elements of reality" that has made economists devise criteria for resource allocation which use 'shadow prices' in preference to the prices established by 'free' market forces.[4]

In the following section (2.2) we shall critically examine the assumptions, implications and conclusions of the classical and neo-classical theories of trade. In section 2:3 we shall point out some of the consequences of a protectionist development strategy which have been noted in the growing body of trade and development literature. The discussion will be brief since similar issues will be examined in later chapters. Then in section 2:4 we shall briefly outline one of the well-established approaches to project analysis in the LDCs and also show how efficiency prices, needed for optimum resource allocation in the presence of distortions can be practically estimated.

2:2 The Classical and Neo-classical Theories of Trade

The basic proposition of the classical (comparative cost) doctrine is that if trade is left free, each country in the long-run tends to specialise in the production of, and to export those commodities in whose production it enjoys a comparative advantage in terms of real costs and to obtain by importation those commodities which could be produced at home only at a comparative disadvantage in terms of real costs and that such a specialisation and exchange is to the mutual advantage of the participating countries. The classical doctrine rests explicitly on the premises that there is a single factor of production whose productivity is invariant in each activity, international differences in production functions which are the dominant factor determining comparative advantage, perfect competition, absence of barriers to trade and flexibility of wages and prices.

As a theorem, no logical objections can be raised against this doctrine: that is, if the assumptions under which it is based are correct or hold in the real world, then it becomes almost trivial - though no longer illuminating - to show that comparative costs differences will lead to a profitable exchange of commodities. But the fundamental issues are: (a) why and how do real costs come to differ among countries and (b) in a world of imperfect competition, where prices do not necessarily reflect real costs and where all countries irrespective of their level of development, impose varying degrees of restrictions on their foreign trade, will 'free trade' necessarily reflect the structure of comparative advantage?

The Heckscher-Ohlin (H/O) theorem (i.e. the neo-classical theorem) supplies answers to the first question above. According to the theorem, different initial endowments of factors of production give rise to differences in comparative costs. It states that international trade will be conducted in accordance with international factor endowment so that assuming only two factors of production (labour& capital), those countries with relatively abundant supplies of labour will specialize in the production of, and export labour intensive commodities while countries with relatively abundant supplies of capital will specialize in the production of, and export capital intensive goods and obtain by importation labour intensive commodities. This arises simply because the former countries will be able to produce labour intensive goods relatively more cheaply while the latter will produce capital intensive goods relatively more cheaply.

The H-O model may be said to be based on the following assumptions.

A1. All productive resources are fully employed, completely immobile internationally, fixed in quantity and constant in quality.

A2. Within each country, factors of production (labour and capital) are perfectly mobile, prices of products and of factors are flexible and there is perfect competition.

A3. Tastes, preferences and technology are identical between countries.

A4. There is full-equilibrium in the sense that all consequences of adjustment are fully absorbed into the system; all changes are fully reflected in market prices.

Although the classical and neo-classical theories rest explicitly upon totally diverging premises with regards to the explanatory factor in determining trade flows - [differences in initial factor supplies in the case of the neo-classical model, rather than international differences in production functions or real costs as in the classical model] - they reach virtually the same conclusion: namely that the extension of the international division of labour offers a unique combination of advantages viz - it widens the extent of the market, allows a more efficient use of world resources and promotes, therefore, economic development. By raising the national income of all participating countries, free trade could allow the achievement of higher levels of savings, capital formation and income growth than would be possible without trade. From these follows the famous dictum that free-trade (no restriction) is potentially better than no trade (total prohibition) - although it is also realized that restricted trade is better than no trade.

This free-trade theory can be readily demonstrated using a 2-good (X and Y) and one country example, using figure 1. The economy produces only 2 goods Y and X measured along the horizontal and vertical axis respectively. TT is the economy's production

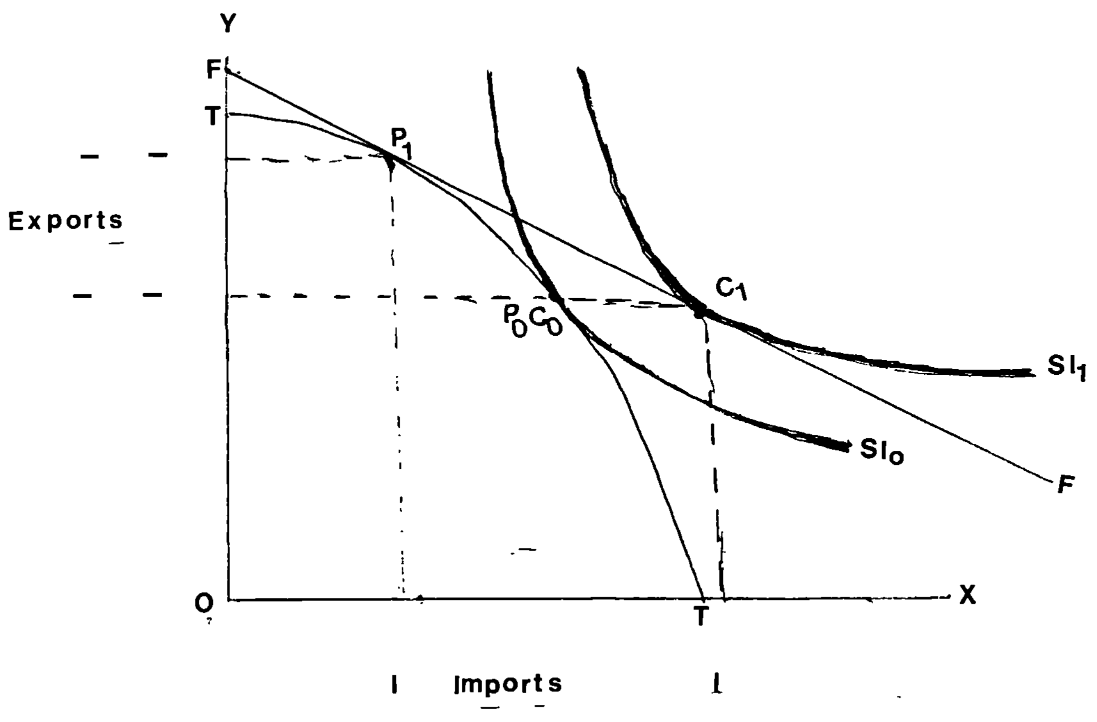

Figure 1

possibility (or transformation) curve. Before the country has the opportunity to trade, the production - cum - consumption point is at P_O, C_O, where the marginal rate of substitution in consumption (MRsxy) is equal to the domestic marginal rate of transformation in production (MRT^d). With no trade, this is the country's 'best' position i.e. at which highest welfare is achieved (as described by the social indifference curve, SI_O).

The opening up of the opportunity to trade will now expose the country to a (new) set of relative commodity prices which will affect both production and consumption patterns. The slope of the line FF represents the (new) international exchange rate. At this rate of exchange, existing factors will be reallocated in such a way that more of the relatively inexpensive goods (Y) will be produced and fewer of the expensive ones (X). In terms of the diagram this means that the economy moves along the production frontier from point P_O to a point such as P_1 where the domestic marginal rate of transformation (MRT^d) is equal to the marginal rate of transformation through trade (MRT^f). Similarly, there will be a movement away from the pre-trade consumption point C_O to a point such C_1 on a higher indifference curve SI_1. That such an exchange of goods can or does lead to gains can be seen by noting that FF lies everywhere (except at P_1) above the economy's production possibilities frontier, so that with trade and with production at P the community can consume more of both commodities.

2:2:1 **Major Implications of Trade Theories**

A. A central theorem of trade and welfare is that in the absence of any domestic or foreign impediments to trade (or distortions), the allocation of resources that result from 'free trade' is <u>Pareto Optimal</u> or efficient, in the sense that it is impossible to make any one person better off except by making someone else worse off. The necessary conditions for pareto-efficiency are the following: with perfect competition the domestic price ratio p^d_x/p^d_y must be equal to the ratio of marginal costs MC_x/MC_y and the foreign price ratio $p_x f/p_y f$.

$$p^d_x/p^d_y = MC_x/MC_y = p^f_x/p^f_y \qquad 2{:}1$$

If, in addition, we assume no factor price differential in the economy, the factor-price ratio in X, $(p_L/p_K)_x$ is equal to the factor-price ratio in Y, $(p_L/p_K)_y$

$$\left(\frac{P_L}{P_K}\right)_x = \left(\frac{P_L}{P_K}\right)_y \qquad 2{:}2$$

As we have observed in equilibrium (point C_1 in fig. 1) the following relationship holds:

$$MRS_{xy} = MRT^d_{xy} = MRT^f_{xy} \qquad 2{:}3$$

(given, respectively by the relevant absolute slopes of SI_1 TT and FF). Finally, efficiency also requires that for production to take place on the economy's production-possibilities frontier, the marginal rate of substitution of one factor (labour, L) for another (Capital, K) must be the same in both X and Y i.e.

$$MRS^x_{LK} = MRS^y_{LK} \qquad 2{:}4$$

The equalities (2:1)-(2:4) can be brought together to show the optimality of trade and perfect competition; P^d_y/p^d_x is identified with MRS_{xy}; MC_y/MC_x with MRT^d_{xy}, (P_K/P_L) with MRS^x_{LK} and MRS^y_{LK} and P^f_y/p^f_x with MRT^f_{xy}. Thus equations (2:3) and (2:4) can be obtained by making the proper substitutions in equations (2:1) and (2:2). Hence, the free trade equilibrium is necessarily pareto-efficient.

B. The second implication concerns the world distribution of income. If, in addition to those assumptions (A1-A4) enumerated above we further assume incomplete specialisation in production of both or any of the commodities and non-reversability of factor intensities, the international exchange of goods will tend to equalise the prices of factors of production between the participating countries.

C. Third, in the 'pure theory' of international trade with its assumptions of flexible domestic and international prices and of capital immobility internationally, trade is always balanced for each country and balance of payments problems will never arise: or more appropriately, balance of payments deficits can be covered or eliminated by the use of fiscal policies. Thus internal and/or external disequilibrium can only arise from faulty expenditure policies.

D. Finally, one of the most emphasized implications concerns the allocation of resources, including productive factors into different economic activities. Since international differences in factor supplies are the dominant explanatory factors of trade flows, it follows that for the capital poor, labour rich LDCs like Nigeria, the most favourable type of export-industry is one requiring more labour and less specialised capital and material inputs, in order to boost employment and to enjoy all the benefits of comparative advantage.

2:2:2 A Critique of Trade Theories

The arguments against the free-trade principle or theory are many and varied and it will be necessary therefore to be selective. The main arguments often put forward are that some of the assumptions underlying the theory are grossly irrelevant and inappropriate for an analysis of development patterns and that the theory has failed to deal adequately with certain real world phenomena despite their evident and increasing importance.

Implicit in the argument for free-trade is the assumption that the productive structures of economies (LDCs) are flexible and markets elastic enough for these countries to adjust themselves quickly to the changing conditions of the world market by specialising in a new line of production. Technically, in terms of our earlier diagram, this implies that economies are actually on their production possibility frontiers and that it is 'painless' and easy to move along the curve in either direction. While this may, to some extent, be true in the relatively developed and diversified economies, it can hardly be applicable to an underdeveloped economy that relies heavily on one or two products for exports. For such countries, one can meaningfully speak of comparative advantage only if they have a choice say, between diversifying their economies and promoting exports or starting import substitution. For reasons to be advanced shortly, the applicability of the first option cannot always be guaranteed and this makes the very idea of comparative advantage indeterminate.

The ability to re-allocate or the 'capacity to transform' in these economies could be inhibited not only by the frictions and distortions which characterize the majority of LDCs - unemployment and under-employment of resources, factor immobility and factor price rigidity and low levels of productivity etc - but also by the conspicuous absence of 'input-imports' which are important, indeed necessary, to avoid further underutilisation of existing resources and frustration of the growth potential[5]. The neo-classical writers however argue that the inability to reallocate resources with the opening up of the opportunity trade need not prevent a country from realising the potential gains from trade - specifically that the country in question could realise at least a consumption gain. This is so long as factor prices are flexible enough to prevent the under employment of resources[6]. But it should also be realised that, at the same time, the opening up of the opportunity to trade could result in production losses which may be great enough to more than offset the potential gains from a reallocation of consumption. This can be seen by noting that where a potential traditional 'import-competing' sector exists before trade, the opening up process could mean that those factors in the LDC sector must accept much lower rewards otherwise the 'import-competing' products they produce will be unmarketable and therefore extinguished, and *the factors unemployed. But as Linder* (1967)[7] argued, it is most unlikely that factors of production in this sector will accept lower rewards since by definition, incomes in a backward country are necessarily at a subsistence level and therefore irreducible. This in effect implies that the sector will be destroyed. One could thus reach a completely different result from that of the conventional theory: the opening up of the opportunity to trade need not lead to a rational allocation of resources, it could destroy some productive sectors and lead to unemployment and therefore a loss, rather than a gain to the country. It must not be thought that these are merely theoretical curiosities. Historical studies show that when a backward country is linked up, usually under duress (e.g. as a result of colonial conquest) with the more economically advanced nations, the opening up process undermines, rather than rationalises the productive structures. Lewis (1955)[8] argues for example, that during the 'free-trade' era between Britain and India "quite highly developed industries were adversely effected by cheap imports from Lancashire and from Birmingham". The colonial governor of Northern Nigeria once commented upon the impact of imports on industrial production thus:

> I foresee with great regret the decline of Kano as a commercial centre when European goods supersede her manufactures..... the cotton of Zaria will then cease to come to the looms of Kano or the skins and hides to her tannaries.[9]

Even if the internal reallocation of resources was possible with the opening up of the opportunity to trade, many of those opposing openness will argue that the comparative cost doctrine will have a limited validity since it ignores the fact that the LDCs face certain external and internal obstacles in exploiting their comparative advantage and promoting exports whether of primary products or of manufactures. First, it is often argued that, there are certain supply limitations to the expansion of exports. In a backward country, the general level of productivity may be so low as to inhibit the production of a sufficient amount of these goods which are in fact demanded abroad. To be a successful export producer an LDC must import from abroad the most essential imports in the form of capital and intermediate goods; since there is no reason to believe that the productivity of the imported inputs will be high in the LDCs, one could arrive at the paradoxical result that the requirement of these inputs for export production might demand more foreign exchange than the exports eventually yield. In addition, there are often the problems of shortage of skill and of entrepreneurial ability for producing the type of product for which world demand is expanding and which can be supplied at low cost. Finally there also is the existence of certain institutional limitations which take the form of an inability or difficulty of providing export credits, the absence of a coherent sales organisation and knowledge of required designs etc, which could interact with the above, to inhibit the profitable development of exports.

It is true that in the case of primary export production, the low productivity in the export sector and the institutional barriers enumerated above may not inhibit exports. In fact, history has shown that particular primary export lines could create prosperity although typically for a short time. However, over the long-run, primary exports could cease to be profitable either because of adverse shifts in demand consequent on competition from cheaper sources of supply or from synthetics, or because of the income - and/or price - inelasticity of foreign demand, or simply because of changes of tastes. Sustained growth then would require resource flexibility and innovation sufficient to permit shifts into new exports line or into production for the domestic market. Thus the comparative cost doctrine and its prediction that trade will always balance will have a limited validity so long as

(i) a country is 'import-sensitive' in the sense that essential inputs have to be imported so as not to grind the growth process to a halt

(ii) a less developed country is not able to export the goods in which it is most competitive since there might be limited or no demand for these products in the advanced countries

(iii) a backward country, even when faced with a favourable foreign demand, is not able to export enough of those goods in the production of which it has a comparative advantage, since the expansion of output will steeply raise costs of production.

The second major limitation of the theory derives from its assumption about technology. By assuming identity of production functions, the neo-classical theory cannot adequately handle international trade in knowledge and technological services - a topic of particular interest for the less developed countries. In a world where technology is produced and sold in imperfect markets, where huge sums are expended in the form of R & D to further monopolise technology and where knowledge is neither immediately nor freely available across countries, it is hardly realistic to assume that production functions are the same everywhere. Moreover, since technology is monopolised, any initial difference (i.e. any initial gap) is likely to be perpetuated and production functions will continue to differ. Neither is it realistic, whether in a static or dynamic framework, to discuss international trade in complete isolation from the movement of factors of production, especially capital. For this ignores the enormous role of the multinational corporations, not to mention the fact that a good deal of international trade takes the form of capital goods - and these are precisely the forms in which real capital and technology are transferred from one country to another. The above considerations will help to make the whole idea of constant technology and fixed endowments illusory: this is because the process of technology transfer could cause a shift in their (i.e. LDC's) production function and could potentially contribute to capital accumulation. This in turn will tend to gradually increase and/or change the comparative advantage in relatively capital intensive and sophisticated commodities. As such, the factor proportions and the resulting comparative advantages which guide the optimum allocation of resources cannot be regarded as absolute and unchangeable but should be viewed as a continuing process.

Some models of international trade flows which attempt to incorporate on going changes in technology have in more recent years been formulated[10]. It should be recognised that these models are not a replacement of the factor proportions theory. Instead, they are developed as a supplement, providing some insight into the neglected aspects of the international economy. The 'Technological-gap' and 'product-cycle' models seek to explain how dynamic comparative advantage may operate; that is, ways in which the composition of a country's trade could be determined by the rate of technical progress. Specifically, they show how products and process innovated in the industrialised countries may subsequently become more efficiently produced in the LDCs. According to the 'product-cycle' model, the production of certain products undergoes a similar evolution from "initiation" through a 'maturing' phase to a "standardised" phase with input requirements changing over the life cycle of the products (skill intensive initially, then capital intensive and finally labour intensive). A new product is likely to be initiated in the large industrial countries like the U.S. where skilled labour is available and where their high percapita incomes create a unique consumption pattern and provides a favourable market. However, as the product becomes standardised, other smaller developed countries may have a comparative advantage in the production of the commodities. Innovation will then be disseminated, as the technology is transferred to the third world, and mass production of the product will be feasible. This represents the third and final stage of the products life cycle.

The chief difficulty with these models is that they are positive rather than normative theories of trade flows. As a consequence, they can say very little about an appropriate trade strategy for an underdeveloped country. Should the LDCs pursue a free-trade policy and therefore rely on the ability of the industrialized countries to innovate and 'transfer' technology to them? or should the LDCs pursue an appropriate strategy with a view to developing an indigeneous technology to their own needs? The typical view of the 'anti-openess' group is that dynamic comparative advantage as outlined in these models involves continuous technological dependence[11].

The classical and neo-classical trade models are also criticized for being so preoccupied with the question of production, consumption and exchange (i.e. with static allocative efficiency) which emerge as a result of trade between economies with given tastes, technology and fully utilised resource endowments, that little, if any, attention is paid to real developmental issues except in the narrowly restricted domain of arguments for infant industry tariff protection. 'Economic progress' in the trade models is equated with increasing the aggregate availability of consumable goods and/or increasing the degree of exchange (i.e. exports) with the outside world. But for some countries it is argued, neither of these need be a sufficient specification of what is meant by progress and for some neither may even be considered a necessary condition. Governments may be concerned with explicating an economic strategy that attaches priority to satisfying basic needs, to achieving economic self-reliance, or self sufficiency or even to creating a better pattern of income distribution; industries may be developed for their "effect on the general level of education, skill, way of life, inventiveness, habits, store of technology, creations of new demand, dynamism as well as the direct Marshallian external economies"[12] etc. In the neo-classical approach all these objectives may be regarded as economically irrational, since their pursuit may lead to a pattern of investment allocation that is sub-optimal in welfare terms, in the sense that it does not maximise the flow of consumption over a given period. The neo-classicists will further argue that the static effects of trade which have been the subject of so much criticism and discussion were after all not the only positive effects of free trade: As Haberler (1959) stated, "trade bestows very important indirect benefits which also can be described as dynamic benefits upon the participating countries"[13]. Myint (1958) also reminds us of Adam Smith's productivity doctrine: international trade not only widens the extent of the market and the scope of the division of labour but as a result also "raises the skill and the dexterity of the workmen, encourages technological innovations, overcomes technical indivisibilities and generally enables a country to enjoy increasing returns and economic development"[14].

But whether such dynamic benefits actually accrued to the LDCs with the introduction of free-trade is really misty, as can be verified from the historical experiences of some LDCs. Ashworth (1952) for example notes that for many LDCs,

> contact with the outside world did not bring about a comparable change in the methods of existing native industries and activities carried on for local consumption...[15]

The neo-classicists will argue that these potentially positive dynamic effects of free-trade are blocked by the imperfect nature of local LDC markets; the anti-openness group would, on the other hand, prefer to believe that it was the specialisation in technologically stagnant commodities with unstable world prices that is responsible. Myint (1958) himself admits that in many cases, the expansion in primary export production was "achieved simply by bringing more land under cultivation with the same methods of cultivation used in the subsistence economy... and exports were produced by fairly simple methods involving no radical departure from the traditional techniques of production employed in subsistence agriculture"[16].

A final, though by no means least important, issue relates to the optimality of the market mechanism in providing an essential ingredient for guiding economic development. The core of the neo-classical paradigm is based upon the assumption of rational and well-informed actors interacting upon perfectly competitive markets in pursuit of their self-interest. This assumption of perfect competition is necessary for differences in comparative costs to be reflected in differences in comparative prices. It is well known however, that markets are far from being perfect and prices observed in the market could differ from the 'social' or 'shadow' prices because of such factors as non-competitive behaviour, externalities and distortions introduced by government policy, with the latter being perhaps the most pervasive especially in the LDCs. As such, the free-market mechanism will not provide an adequate guide for a socially optimum resource allocation. Even where prices reflect real costs, they can be usefully employed only in cases where economic and social institutions are highly developed as to respond to market signals. In most LDCs where there is in fact a pre-market level of organisation, poorly integrated markets and where information about trading opportunities is not freely available, market signals or incentives may not have much effect. It will not be appropriate therefore to talk of 'specialisation' along a 'comparative advantage' as a result of relative price changes.

These arguments as presented above have furnished strong incentives for underdeveloped countries to adopt explicit strategies for economic growth and development which center on a strategy of industrialisation via import substitution. For example, the inevitable structural imbalance between the capacity to import and the capacity to export (demand and supply of foreign exchange) provides a natural incentive to avoid balance of payment problems by substituting domestic production for imports. The possible existence of dynamic external economies and the assertion that they are seldom reflected in market costs and prices has formed the basis for the infant industry argument for tariff protection. Central to this arguement is the idea that during the initial stages of industrial (or economic) development, the 'infants' are assumed to learn both from their own experiences and from each other and that they will eventually 'grow up' and be able to generate sufficient savings in costs to compensate the economy for the losses they suffer during the learning period when protection is necessary. In principle therefore, the infant-industry argument is an argument for temporary protection to correct a 'distortion' which does not last forever but disappears gradually with the passage of time. The crucial question is whether such 'infants' will infact eventually grow and overcome their historical handicap to compete effectively and without protection against imports, and this can only be verified by an empirical investigation of the actual experiences of countries that pursued such a strategy. More fundamentally, the question might be asked, how well do countries which adopt anti-trade policies perform, vis-a-vis those that accept the 'free-trade' doctrine? This will be briefly examined next.

2:2:3 The Neoclassical Critique of IS

The defenders of the free-trade principle could point out that most of these criticisms are unfounded and that the LDCs are only being unnecessarily pessimistic; they could argue too, that the growth performance of those countries which took a relatively favourable view of foreign trade has not been a story of almost unrelieved gloom such as had been suggested by the sceptics. It was forcefully argued especially by Nurkse (1959), for example, that the largest source of economic change in the economies of the regions of new settlement in the 19th century - such as Australia, Canada, New Zealand - was the rapid growth of import demand from the industrializing countries, notably Britain, both to satisfy domestic consumption demand and to provide the raw materials needed for their industries. This in turn induced foreign private investment in the new areas and led not only to an enlargement of their export sectors but also to the building of 'overhead facilities essential to the expansion of domestic facilities as well'. For these countries, therefore, international trade could have provided a dynamic impetus to the economy and acted as an 'engine of growth'. In more recent years, the highly successful records of economic growth and structural change achieved by those LDCs, notably Korea, Taiwan, Singapore and Hong Kong, with an 'outward-oriented' posture might have impressed even the pessimists.

In contrast, experience of recent decades has shown that the adoption of an 'inward-looking' posture - the continual use of high and very uneven protection combined with exchange controls - by some LDCs results, often in inferior and unsatisfactory results in industrial development as well as in economic growth. The examples most cited are those of India, Pakistan, Chile and a dozen or so of other countries in Latin America and Africa. Empirical evidence tends to suggest that although some of these countries have achieved fairly rapid rates of growth in manufacturing output, this has not been accompanied by any appreciable dynamic changes in their economic structures; that the growth in their real income has been rather disappointing and the strategy has been inimical to the realisation of the very objectives that industrialisation was set out to achieve. The most widely discussed effects of protection assessed within the neo-classical framework include (i) the production inefficiency costs, as measured by the effective rate of protection (erp), (ii) the generation of structural imbalances in the economy - such as sectoral imbalances between agriculture and industry and greater inequality in income distribution - and the apparent inability to make the national income grow as fast as envisaged by policy makers, (iii) the excessive dependence on imported inputs by industries and hence the inability to save foreign exchange, (iv) the tendency to suppress the growth of exports which in combination with (iii) above, further creates a divergence between the demand and supply of foreign exchange culminating in serious balance of payments problems, (v) the inability to generate enough employment opportunities for the rapidly growing labour force, (vi) the tendency to encourage the growth of an industrial structure which is economically and technically inefficient, and whose input requirements are independent of domestically supplied inputs, as a result of which little, if any, interindustrial linkages are fostered and there is often relatively little impact upon the country's technology as measured in aggregate production functions and (vii) the emergence of a structure of production in which it is impossible to use all available capacity without large scale capital inflows[18] etc.

Clearly, not all LDC industrial structures will exhibit these features at the same time and for particular economies other features may emerge. But the 'mainstream' view is that such basic pattern is applicable to the majority of LDCs pursuing the IS strategy. Let us further examine a few of these issues here, while deferring the rest to later chapters.

The overall growth and foreign exchange effects of the IS strategy have been the greatest source of concern in the literature especially because they are the most emphasized objectives of industrialisation in the LDCs. The growth effects are attributed to, or manifested in, several factors, not mutually exclusive, including the tendency of ISI to create substantial structural imbalances in the economy, the 'exhaustion' of IS opportunities and the difficulty in moving to a 'higher phase' of the process, the excessive reliance on activities that have detrimental effects on the economy's saving rate and the effects of IS policies on other sectors in the economy.

The generation of structural imbalance between subsectors of manufacturing and agriculture is a fairly complex phenomena and a generalisation of the causes will be difficult. It is now widely agreed however, that an important factor are the IS industrial policies which inevitably turn the terms of trade against the latter (agriculture) and hence lead to a transfer of real income and resources to the former (manufacturing). Empirical evidence suggests that, in promoting the industrialisation process, the usual fashion in most LDCs is to favour consumer industrial goods and often selected intermediate goods, by offering high effective protection, while the primary sector, which has hitherto been the main source of income and foreign exchange is so highly taxed or disprotected that it often receives much less when trading domestically than if it trades in the international market. Specifically, the depression of the primary sector is accomplished in various ways: first, export taxes are often imposed with a view to encouraging domestic use of local raw materials; second, with the objective of ensuring a regular supply of agricultural produce at 'reasonable' or 'affordable' prices for consumers, producer prices are fixed at below market levels; third, there is the over-valued exchange rates which result from the high tariffs granted to the manufacturing sector, with the consequence that the foreign currency obtained from exports is converted into a relatively small amount of domestic currency. In all three cases, primary producers will thus receive only a fraction of the world market prices of their exports. On the other hand, because of restrictions on competing imports, the prices of domestic manufactures are substantially increased. In other words, an artificial price differential is created between primary produce and manufactured goods, with the latter being the more favoured.

While the extent of discrimination varies from country to country, the problem is shown to be widespread. In Brazil, according to Bergsman (1970), while the bias against agricultural output is difficult to discern, 'the bias against agricultural exports is much clearer. The implicit tax on exports (relative to the free-trade situation) averaged 31 percent in the period 1954-64'. He further estimated that value-added for the domestic market was about 50% more than for export[19]. Hansen and Nashashibi (1975) estimated effective rates of protection (erp) and DRC for 14 major crops in Egypt to show the degree of protection for the years 1961, 1963 and 1964. In each of the years, close to 50% of the crops received negative protection and "typically, it is the export crops that were negatively 'protected'"[20]. They also found that between 1961 and 1969, the weighted average rate of taxation for 9 major field crops increased from - 0.5 (1961) to -25.3% (1969). For the main export crop (cotton), the taxation was even higher, reaching 41%, if value-added was valued at international prices and above 50% if valued at domestic prices[21]. Similarly, Lewis (1970) found that in Pakistan, the terms of trade agriculture received were less than 2/3 what it might have received had it been able to trade directly in world markets[22].

The overall effect will be a substantial loss of growth opportunities for the economy as a whole. This can be seen in at least 2 ways. First, export earnings, critical for financing the foreign exchange component of industrial inputs will be severely depressed and so will the saving capacity of the economy; second, the potential market for manufactured goods from the industrial sector is diminished or even destroyed since the main source of wage income is neglected. This limited internal purchasing power of the primary sector compounded by the absolute level of poverty, the often highly skewed income distribution which characterize the majority of the LDCs, and the high prices of manufactures will further imply that the demand for most of the domestically produced consumer goods will expand only relatively slowly especially if the development process does not involve significant changes in the direction of more progressive income distribution. Even in the unlikely event of rapid industrial expansion, the size of the domestic market for a previously imported good now domestically produced, will be limited to the volume of goods previously imported and may fail to sustain the momentum of domestic-marked-based industrialisation for long. As pointed out by Power (1963)[23] once consumer goods become completely import-substituted - i.e. the limits of domestic market are reached - one or more of the following become necessary if growth is to continue unabated: (a) the penetration of the export market by the already established industries (b) the extension of the process from finished consumer goods production to a 'second phase' of import-substitution involving the development of industries manufacturing intermediate and capital goods and other consumer durables and (c) the 'search' for an internal market for new consumer goods. The latter option may be constrained unless supported by either (a) and/or (b).

However, the incentive to expand exports could be severely limited because (i) the often excessive protection provided the 'infants' forces domestic costs above the world level causing factors to shift out of export producing and/or (ii) of the deflation of

foreign exchange associated with protected import substitution. The problem could be aggravated because of the supply and institutional problems already enumerated in the previous section. Moreover, further industrial growth on the basis of the profitable establishment of a producer goods sector may not be automatically induced and could be constrained by several factors. First, such industries are said to be by nature highly sophisticated, capital and import intensive and subject to important economies of scale. Thus success in their operation will depend crucially on the resource endowment of the economy, its market size and not the least, the efficiency of the previous import substitution. However, if the market for consumer goods is extremely narrow, that of the equipment necessary to produce them will be even narrower. Secondly, investment in the new industries may be unattractive - given the high profitability of the already established consumer goods, thanks to the higher protective tariff rates - unless they can either effectively cut into the subsidy of the consumer goods industry or press for increases in protection. Both options will no doubt be resisted by existing producers, for fear of higher costs, possible poorer quality of inputs and irregular supply.

In view of these problems, most - though by no means all - countries then take the 'easy' option, which is the tendency to cover the widest possible range of consumer products, "in quest of a very high level of self-sufficiency"[24]. But the continued spread of protection over a wide range of goods:

> .... implies in some cases an uneconomically small scale of production... It means scattering thinly scarce capital, foreign exchange, technical and organisational talent. It means in short doing many things poorly instead of few things well[25]

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The 'excessive' concentration of investment in the consumer goods sector which appears as the 'easiest' option could moreover work to retard the growth of the economy. The analysis of Pakistan's industrialisation policy by Soligo and Stern (1965) shows how the growth of real income was retarded: "as the indigenous production of consumer goods increases, consumption is 'liberalised' and savings do not increase as quickly as they otherwise might. Ultimately, the rate of growth in real income will be lower when import substitution in consumer goods is permitted"[26]. Similar conclusions were arrived at by Power (1963) and Kahn (1963)[27].

Perhaps the second most serious defect of the IS process is that once it is adopted as a development strategy, there are 'built-in' tendencies which not only confine output to the domestic market and suppress the growth of exports as we have already noted, but also lead to excessive dependence on imported inputs. The sources of this dependence are many and include the nature of the products being import substituted, and, often, the lack of capital and intermediate goods sectors etc. Evidently, the more domestic IS is limited to consumer goods production or to the assembly of durable goods, though the output of these may rise, the more equipment, components and raw materials to produce them are needed and must be imported; with low tariffs on and preferential exchange rate treatment of capital goods, imports make for lavish orders. But the further this process is extended and the longer it continues the more technically complicated and costly the equipment that must be imported, so that unless exports could expand fast to generate the needed foreign exchange, to purchase inputs, countries must resort to foreign borrowing or aid. But as one writer puts it, this option "can only keep the wolf from the door temporarily while making him more rapacious in the very long-run"[28]. Not only will this entail the use of an ever larger share of foreign exchange earnings to service the debts but "can be used only to permit the economy to continue to live with the policies that produced the specific shortages to begin with"[29]. When new loans are not forthcoming, the inevitable consequence will be to grind the expansion of the import-substitution industries to a halt or to operate with considerable under-utilized capacity due to shortage of inputs.

Even the non neo-classical economists admitted the dismal 'failure' of the ISI strategy. It is instructive to note that Prebisch himself, the architect of the strategy in Latin American countries remarked that

> "The proliferation of industries of every kind in a closed market has deprived the Latin American countries of the advantages of specialisation and economies of scale. Owing to the protection afforded by excessive tariff duties and restrictions, a healthy form of competition has failed to develop to the detriment of efficient production"[30].

They, however, argue that it is not import substitution *per se* that is to blame, but a badly conceived import substitution. First, it is argued, in many instances, the strategic targets of industrialisation were not adequately identified, nor was there any analysis of the optimum feasible sequence of the exploitation of resources through manufacturing; second, most countries would have found it extremely difficult to choose the priority industry branches which could undertake the domestic production of capital goods and intermediate products, adequately diversify the industrial structure and promote exports, since the IS strategy is based on the existing market and socio-economic structures, with highly unequal income distributions. Finally and most importantly, it is argued that a real, i.e. sustained, broadly based and widely acceptable pattern of development cannot come about by a spontaneous process of trial and error which was all that IS strategy entailed. Thus if what is sought is rapid economic development and structural change, comprehensive economic planning is indispensable. The need for 'planning' and/or project selection and evaluation is also widely accepted even within the neo-classical school although differences of opinion remain as to the nature and form that it should take. In the face of distortions and market imperfections, what should be the principles underlying a proper selection of projects in LDCs? This will be our next topic of discussion.

Market Imperfection and Resource Allocation:
2:3 Application of Little and Mirrlees Project Appraisal Methods

If there exist distortions (policy-imposed or otherwise) in the economic system, then the value of a commodity expressed in terms of its domestic market price is generally different from its true economic, or efficiency or accounting value; to arrive at the latter, several adjustments have to be made to domestic market prices. Such distortions need not affect the value of commodities only. It has been argued for example, that wages paid to manufacturing employees in LDCs are often above the value of their marginal product in alternative employment which is the relevant economic cost of labour, and the social cost of borrowing or the opportunity cost of capital may be understated as a result of certain imperfections in the capital market. Here too, adjustments to domestic market prices (including interest rates) are called for to arrive at their economic contribution. In the following sections we shall discuss and illustrate, in simple terms, the standard methods and assumptions employed in the estimation of the opportunity costs (or shadow prices, or accounting prices or efficiency prices) of output and inputs. It must be emphasized that our analysis does not purport to provide a comprehensive and rigorous theory of shadow pricing, on the contrary, we take as given the theory as developed by Little and Mirrlees (LM)[31] and reinterpreted by Squire and Van de Tak (ST)[32]. We shall first briefly discuss the main and relevant (for our purposes) features of the methodology, then consider its main shortcomings and finally show how the relevant prices will be practically estimated for application in later chapters.

2:3:1 **Main Features of LM/ST Methodology:**

(i) **Valuation of output and material inputs**

Essentially, the LM approach is concerned with the estimation of shadow prices that can be used in the evaluation of the outputs (or benefits) and inputs (or costs) of public sector industrial projects in the LDCs, although it has also been recommended for use in the private sector in situations where government commercial and industrial policies 'have a large or dominant influence' as in Nigeria.

The components of a project are divided into 3 broad categories for purposes of the analysis: (1) traded goods and services, (2) non-traded goods and services and (3) unskilled labour. Traded goods are further subdivided into those (i) "goods which are actually imported or exported (or very close substitutes are actually imported or exported) and (ii) goods which would be exported or imported if the country had followed policies which resulted in an optimum industrial development"[33].

Traded outputs (benefits) and inputs (costs) of the project are to be valued at prices which they command on the world market or at border prices which will be c.i.f. for importables and f.o.b. for exportables. Such a procedure "expresses their real cost or benefit to the country in terms of foreign exchange: and free foreign exchange is a good yardstick of value because it can be used to satisfy almost any need"[34]. The goods which fall into the second category of traded goods (partially traded goods or potentially traded) could be valued either directly at border prices as in the case of actually traded goods or treated as non-traded goods, depending on one's estimation as to whether present distortionary policies will continue or are likely to be changed. Alternatively, a mixed procedure could be followed: first, they can be considered as fully traded only, and valued at border price directly, then they are considered as non-traded and valued at border prices using the procedure to be shortly described. The two values are then weighted together according to the likelihood that they will be imported and domestically produced. To estimate, even approximately, if and in what proportion goods in a sector will be partially imported or produced domestically, may however be difficult. It is usually assumed therefore that output is either actually traded or non-traded.

With respect to the latter, the recommended approach is also to value them at their 'border prices' to "ensure that we are valuing everything in terms of a common yardstick"[35]. This can be done by making the assumption that increases in the demand for the goods are met only by an increase in supply and that there is a constant per unit cost of production. In this event, the accounting price of a non-traded good can be approximated by its marginal social cost of production. The latter can be expressed in terms of the total cost of the inputs - traded and primary - needed for the production of the non-traded good by again invoking the assumption that prices are independent of the structure of domestic preferences. The value of each non-traded input is then broken down into their traded, non-traded and primary inputs elements; one would then go on breaking the non-traded elements until one is left with the primary and tradable input elements only of the non-tradable input. The tradable input element is then valued directly as previously discussed and the primary inputs are shadow priced using the procedure to be discussed below. The shadow price of the good is then obtained as the sum of the border price of traded inputs plus the border price of the primary inputs.[36]

(ii) <u>The Valuation of Primary Inputs</u>

In valuing factor inputs, the same general principles apply, once the relevant primary inputs are chosen. Usually these consist of labour employed, capital inputs and foreign exchange. The border price of the latter is of course unity since it is the unit of account. To obtain the border prices of labour and capital, one should first estimate their marginal productivities in alternative use.

The value of the foregone marginal product of labour is estimated by making appropriate assumptions about the operation of the labour market in the economy. In perfect labour markets with no significant unemployment or under-employment, the market price of labour (the wage rate = W) is determined by the interaction of demand and supply, the former being the marginal productivity curve. The marginal product of labour (m) in its alternative employment is then taken as a reasonable measure of foregone output and is equivalent to the market wage. The market for unskilled labour especially in the rural areas of LDCs is often cited as a case which approximates this situation and hence the opportunity cost of unskilled labour may b e approximated by the wage rate prevailing in the rural labour market. In other words, the supply price of labour to the project (or industry) is equal to the marginal productivity of labour in agriculture, which could be significantly lower than the going market wage rate in the industrial sector. One would then apply a conversion factor to express it at border prices.

It has been suggested that in estimating the supply price, or the social opportunity cost of labour one should take into account not only the differential marginal productivity in agriculture and industry but also a multitude of such factors as the opportunities for alternative jobs, the private disutility of effort, the private cost of any migration and job training etc. Thus for example, if the creation of a new urban job induces an additional migration from the agricultural sector, it will be reasonable to assume that the migrant will incur some (monetary and social) costs in moving to an urban life and in acquiring special skills. In this eventuality, the relevant measure of the social opportunity cost of labour may indeed be higher than the agricultural wage he sacrificed, and the market wage rate will be taken as a rough approximation of the shadow wage rate.

In imperfect labour market situations where there is unemployment/under-employment and/or surplus labour, the measurement of m is much less straightforward and a careful analysis is therefore required to obtain reasonable measures of m. In general, it is often assumed that if the economy is characterized by surplus labour and/or disguised unemployment, the physical marginal product of labour may be significantly below the prevailing market wages and could be close to zero. This is because, in agricultural work for example, where work is shared by family units, the withdrawal of the labour of one worker from the unit need not significantly affect the level of output since other members could take over the work hitherto performed by the worker whose labour is withdrawn. Indeed, if the additional worker employed by a given industrial enterprise has been hired from a pool of unemployed, then the opportunity cost of labour is assumed to be zero. However, one should be careful in equating m to zero especially since unemployment in agriculture is often seasonal. Moreover as Sen (1975) pointed out:

> "Even if the MPL could fall to zero for total amount of labour that would not be a point of work equilibrium unless the peasants had no disutility of work whatsoever. With a positive marginal disutility of effort, the work equilibrium would be at a positive marginal product of labour"[37].

If the open and/or disguised unemployment is essentially a seasonal phenomenon, m could be estimated by employing a weighted average of market wages, the weights being the ratio of labour utilisation to labour availability in the different seasons. Thus at peak periods (when the available labour is fully utilised) m approximates the market wage, while in slack periods, it is suggested that $A \leq m < W$, where A is some unspecified lower bound determined by an assumed marginal disutility of work which is in turn partly determined by some minimum subsistence level[38]. In practice this procedure will be immensely difficult and would involve accurate sample survey observations of seasonal wages as well as rates of seasonal utilisation and availability of labour, which we do not have. The assumptions which we shall use to estimate a value of m in Nigeria will be specified in the next section.

The need for a shadow rate of interest - or a discount rate - has received a great deal of attention in the LM method. Any project, it is asserted, will have effects on savings, investments and thus future growth as well as on present consumption. LM are of the view that more rapid growth (and higher savings and investments) may be preferred by governments to immediate consumption. Indeed it would appear that their main test of a project's worth is its ability to generate savings and growth. However, they are also of the view that saving and investment could be below the socially optimum level, for various reasons, which range from the 'irrationality' of individuals who prefer to consume now than later, to market imperfections and other government constraints, economic or political. It may be difficult for the government through its fiscal policy to ensure that the additional savings generated to promote growth and future consumption are as valuable as the additional present consumption. It is therefore necessary to choose an appropriate discount rate which can be used to make benefits and costs in later years commensurate with those occuring now. Various discount rates can be suggested, each corresponding to the 'numeraire' in which costs and benefits are expressed. For example, using consumption as the 'numeraire' the appropriate discount rate is the Consumption Rate of Interest (CRI): It is then the rate of fall overtime in the value of the marginal utility of consumption, at the average level of consumption. L-M suggested the use of the Accounting Rate of Interest (ARI), using public income as the 'numeraire': It is then the rate of fall over time in the value of public income measured in domestic currency equivalent of foreign exchange. Ideally, the ARI should be chosen such that the demand and supply of public projects are in balance. Other things being equal, high ARI will result in an excess supply of investible funds since only few projects will pass the test of a positive net present value; conversely, a low ARI will result in demand for investible funds exceeding supply, since too many projects will have a positive net present value. As a lower bound estimate of ARI, the real rate of return on foreign lending (if the country is lending abroad) or the marginal cost of foreign borrowing (if the country is borrowing from abroad) is suggested. Ideally however, it is suggested that the ARI should equal the rate of return, evaluated at accounting prices, on marginal investment in the public sector; i.e. to the opportunity cost of capital[39]. The estimation of the latter using Nigerian data will be undertaken in section 2:4.

When all project's inputs and outputs are expressed or valued in terms of their foreign exchange value, LM point to the potential benefits, one of which is that "import substitution and exporting is encouraged to the maximum desirable extent"[40]; in addition, this takes care of the possible employment problems since "producers are encouraged to use labour, instead of imported inputs to the maximum desirable extent"[41]. More fundamentally, once such revaluations have been adopted, balance of payments problems or foreign exchange crises can be avoided since, "a really acute foreign exchange crises would be reflected in a high ARI, which would discourage the part of the economy controlled by government from undertaking projects with large initial foreign exchange requirements"[42].

One of the added attractions and desirable features of the LM/ST methodology is the explicit consideration given to certain social objectives such as the trade-off between growth and equity. Traditional approaches to project appraisal in LDCs have hitherto considered and emphasized only the former objective and have accordingly estimated only efficiency as opposed to social pricing parameters. Consider for example, the valuation of labour input. In the 'traditional' approach the efficiency price of labour is measured simply as its opportunity costs in an alternative form of employment: in effect the marginal output of labour forgone elsewhere because of its use in the industrial project. In social pricing however, attempts are made to incorporate distributional and other considerations by introducing income weights which vary according to the real income of the recipient. Specifically, if one wishes to take into account the objective of altering the income distribution in favour of the poor, then the change in consumption of a poor man is given a higher weight than the same change in consumption of a rich man derived from a project. Where there are constraints on achieving the desired level of investment and growth, savings may be valued differently from consumption etc. We however, consider that the incorporation of the equity objective would require a much more detailed treatment than can be done within the limited scope of this thesis. Besides, we do not think that the Nigerian government takes seriously such objective even though it is stated in every plan document. We shall thus consider only the efficiency prices.

2:3:2 Critique of LM/ST Methodology[43]

Despite the growing applications of the LM methodology in cost-benefit analysis, its practical usefulness has been questioned. One of the main - indeed the main - criticism of the approach is the reliance on 'border prices' as indicators of the best pattern of resource allocation in LDCs. The use of world prices can be rationalised, it is argued, only in so far as they are 'optimum' or 'efficient'. This is however not necessarily so, as pointed out by many economists in the literature. According to Kaldor (1963), for example,

> the underdeveloped countries are confronted by Monopolistic Markets in their purchases of manufactured goods, where prices are kept at higher than competitive levels by international private cartels, or simply by the absence of price competition among producers operating in imperfect markets[44].

It can be argued, therefore, that what LM have done is simply a replacement of domestic prices that are distorted by taxes, tariffs etc and hence do not reflect the social value of costs and benefits, by world prices that are themselves distorted by non-competitive behaviour of producers. Moreover, as Lal and Streeten (1977) have pointed out "the relative values of these products represent the demand patterns and preferences of the developed countries"[45] which are "what programes of industrialisation in underdeveloped countries ought to be designed to change"[46]. Perhaps even LM recognised such shortcomings when they admitted that the use of world prices is not necessarily because they are "more 'rational' than domestic prices, but simply because they represent the actual terms on which the country can trade"[47].

But even if world prices are by themselves 'efficient', or 'optimum' the method has the additional drawback that it ignores the existence of a multitude of constraints - external and internally imposed - preventing the adoption of optimum policies. Moreover, their appropriateness in project appraisal will crucially depend on how fully integrated the economy is to the world market and on the extent to which world prices can be properly identified.

It can be said that the underlying assumption in the LM approach is that all aspects of LDC industrial planning should be or can be seen in terms of their integration with the industry of the outside world or that world prices should heavily influence all domestic investment decisions in the LDCs. This implies and/or requires that the outputs and inputs of the projects in question are in fact fully traded in the sense that increases in domestic supply of the goods or increases in domestic demand for them affect only the foreign balance but not production and consumption decisions and/or prices elsewhere in the economy. Thus if all output of a project will be exported or at least can have an unlimited access to the world market, it certainly makes a perfectly good sense to value at the going f.o.b. prices its output since that necessarily represents the actual trading opportunities facing the country. The real challenge to the methodology is however constituted by the presence of 'potentially' or 'partially' traded goods as well as that of non-traded goods. The former are certainly not unimportant in view of the many trade restrictions imposed by LDCs, and if one assumes that such restrictions are not likely to be radically altered, then it makes little sense to value these at world prices. The problem posed by the presence of non-tradables is that their prices are set in the local market and therefore any change in their supply will affect domestic production and consumer prices. In addition, their marginal value to consumers could differ significantly from their marginal production cost as a result of market imperfections or policy induced distortions such as indirect taxes. The divergence between price (i.e. marginal value) and marginal social cost does not arise if the commodity is fully traded since it can be assumed that its supply can be increased at a fixed international price. With non-traded goods such as electricity, an incremental unit could be obtained not necessarily by increasing production but by depriving other users or by a combination of the two. Thus the world price rule is not strictly applicable without a knowledge of the internal demand conditions.

Joshi (1974), Stewart (1972) and Stewart and Streeten (1974)[48] have discussed extensively why in fact many goods may be non-traded or why integration with the world market may be less than perfect and in some cases not even desirable for the LDCs. The possible range of non-traded goods may be greater than is conventionally assumed (a) if there exists under-utilised capacity in local industry, (b) if local markets are badly articulated or poorly integrated such that they fail to respond quickly to changes in prices, (c) because of non-optimal trade policy which discourages exports and/or imports and/or (d) because the external demand of the good is non-existent or is less than perfectly elastic, or simply limited. The four factors are of course, interrelated: for example (d) could arise because of either (b) or (c); and (a), as we shall see, could arise because of (c), but each could also operate independently of the others. We can illustrate the situation by considering first, the problem of excess capacity. The operation of a new industrial project in the economy may neither increase exports nor decrease imports if it stimulates the local demand for, or local supply of, hitherto dormant resources. In other words, it is not international trade but local production and/or prices which are changed. This argument depends of course, on the assumption that the existence of idle capacity was initially caused by inadequate domestic demand rather than by factors such as (i) inefficiency in the utilisation of inputs or in management (ii) poor labour relations (iii) internal supply bottlenecks of inputs and/or (iv) the adoption of non optimal policy in trade. If for example, the latter is the most important or proximate cause, then it can be argued that the use of a more optimal policy such as the adoption of a realistic exchange rate could eliminate the excess capacity by boosting exports. In this event, the increase in the demand for inputs by the project could only be met by a reduction in the amount of the good that could be potentially exported and hence it cannot be said that the use of world prices is inappropriate in valuing the good. Problems could still arise however, if the external demand elasticity for these goods is less than perfect. Thus an increase in the demand for, or supply of them by the new project will lead to a change in their world price which will in turn have repercussions on domestic consumption and production. However, it is also argued that less than perfectly elastic demand does not by *itself provide any* argument for abandoning the world price rule for valuing commodities. LM argue that the 'problem' could be easily dealt with by expressing the marginal export revenue as an approximate measure of the accounting price of the good. There are three major problems involved here: first, the procedure requires accurate estimates of foreign demand elasticities which may be difficult in practice. Second, the procedure ignores the social value and foreign exchange costs of changes in domestic producer and consumer incomes i.e. the substitution effects - resulting from the price change which could be as important as the <u>direct</u> foreign exchange effects of the change in price of exports and third, it is assumed that any incremental unit of the good will be made available for exporting. The latter assumption may not be valid if export opportunities are limited, for reasons other than the adoption of a non-optimal trade policy.

The second major criticism is that the LM approach excludes from consideration many of the issues raised by the critics of free-trade theory which we have already examined. Such issues relate to government objectives other than increases in consumable goods as well as to the consideration of the dynamic issues of growth and development which the LDCs are most concerned with. For various reasons, few LDCs have evidenced a desire - rightly or wrongly - to accept the discipline of existing international prices and postpone industrial investments in lines they regard as important but in which do not have an international comparative advantage. Thus, an iron and steel industry may be preferred to a cotton textile industry even in an economy with a shortage of capital, if the former industry is deemed more likely to foster greater inter-industrial linkages in the economy and generate further external economies. The possibility of formulating objectives that do not explicitly consider integration with the world market was either ignored by LM or considered as an oddity. For example, on the objective of self-sufficiency, they argue that "there is rather seldom a very good reason for making (relative or complete) self-sufficiency in particular goods a policy objective"[49]. The important indirect effects of projects are also ignored by LM not only because "these ... would generally be exceedingly difficult to measure" but also that "they will on balance be unimportant"[50].

Admittedly, whatever objective is formulated by the LDCs the cost-effectiveness of projects is still relevant: but whether it should be determined on the basis of world prices even in the event that output does not enter into world trade is the real question.

The applicability of the world price rule in project evaluation implicitly assumes that such prices can indeed be unambiguously identified. It has however been emphasized in the literature[51] that for many of the goods that enter world trade considerable variations in prices exist depending upon factors such as the quantity traded, the technical and quality specifications, sources and conditions of supply and even the times at which transactions take place. The ambiguity and irrelevance is increased in cases where international transactions are the subject of bilateral agreements and/or contracts. A more serious error in the conventional assumption that there is a unique set of border prices is the possibility of intra-firm transfer pricing which takes place often for a variety of reasons, including different rates of profit taxes in different economies and overcoming capital repatriation laws. Since such prices are not necessarily those that would be set in a normal competitive commercial transaction on the world market, they bear little relation to a 'hypothetical border price' and could be subject to considerable fluctuation in response to tax and other industrial policies of the governments[52]. The problem posed by the possibility of transfer pricing could in principle be avoided if the project analyst could identify with some degree of certainty a reference price that would be charged for similar items in a commercial transaction in the world market. In practice, this maybe difficult, especially when the problem is prevalent, and when the number of goods involved is not one, but several.

The existence of the various problems enumerated may no doubt impair - though not necessarily completely invalidate - the operational usefulness of the LM approach. Some of these problems posed could be real, rather than merely theoretical and could be difficult to accommodate; others, while real, could be exaggerated and yet others may be less important or even non-existent at all times in all countries. The challenge posed by 'potentially' traded goods is perhaps the most real but its importance will vary from country to country depending upon the extent of government intervention in the economy. As will be shown in later chapters, the Nigerian government's interference with trade has been fairly extensive and therefore most commodities are <u>defacto</u> only partially traded. However, given the economy's lack of productive capacity, a move to an optimal situation would certainly entail an increasing importation of these goods - i.e. the goods will become fully traded. We need not assume of course that such a move will in fact take place. But at least one is not far off the mark by valuing these at border prices bearing in mind of course the limitations. The problem of non-traded goods 'proper' is, perhaps, of lesser magnitude. The proportion of those goods we can identify from our input-output table as non-traded inputs in total (raw material) inputs varies from only 8% (in Petroleum & coal products industry) to about 27% (in paints). The share of non-traded inputs in <u>total</u> costs ranges from about 7% (in made-up textiles, leather and petroleum & coal industries) to about 21% (in paints). This implies that even if distortions were to increase the price of non-traded inputs by 50%, raw material cost will go up only by about 4 to 13%; and total costs will go up only by about 3.5 to 10.5%. Thus even if non-tradables are not properly valued, the magnitude of the bias will not be great. Besides, we can argue with Baldwin[53] that most of the non-traded goods (e.g. electricity) consist mainly of traded goods which can be easily 'border priced', others (e.g. construction) consist mainly of labour, which can be shadow priced, while the rest (e.g. transport) consist of both traded goods and labour. Thus while some problems could indeed arise, they should not be exaggerated.

The problems of transfer pricing can also be assumed to exist in Nigeria without our being able to fully substantiate the claim. The Nigerian government recognised the problem and attempted to deal with it by promulgating the pre-shipment Inspection of Imports Decree in 1978, which makes it compulsory for all importers of goods into Nigeria to obtain a Clean Report of Findings attesting to the quality, quantity and price of the goods being imported[54]. This is not a place to evaluate the success or otherwise of the decree but it at least gives us the assurance that if the problem does exist, it is being checked and possibly minimized.

Finally, as to the consideration of other objectives such as industrial linkages, we accept that they cannot be easily incorporated into the cost-benefit analysis. But we hope that we have taken care of these by considering them as separate topics of discussion in other chapters.

We shall now move on to consider how the accounting values of goods and of primary inputs could be practically estimated.

2:4 Practical Estimation of Conversion Factors

2:4:1 Conversion factors for traded goods

The general formula for conversion factors is specified as

$$B_i = \Sigma_j a_j \lambda_j / P_j \quad 2:5$$

$$\Sigma a_j = 1$$

[55]

a_j = proportion of marginal expenditure devoted to the jth commodity

λ_j = shadow price of the jth commodity

P_j = market price of the jth commodity.

In practice this formula will be difficult to apply given that it requires a detailed information on the consumption pattern of the individual at different income levels or on the consumption patterns of different income groups and expenditure elasticities which are not readily available.

As an approximation and under certain assumptions, use can be made of

$$SCF = \frac{M + X}{M(1+t_m) + X(1-t_x)} \quad 2:6$$

M = value of imports

X = value of exports

t_x = ad valorem taxes on exports

t_m = ad valorem taxes on imports.

Equation (2:6) is used under the assumptions that (a) the economic environment in Nigeria will not alter radically in the next few years;

(b) all goods are (potentially) tradable or at least that consumption expenditure on non-tradable items is small or negligible and (c) export demand and import supply are infinitely elastic; an assumption which appears realistic in the Nigerian situation.

It may prove useful sometimes to obtain SCF separately for consumption, intermediate and capital goods. One needs only reinterprete X, M as say the value of exports and imports of the relevant category and obtain average import and export taxes levied on each category. As these are not specifically required in this study, no attempt is made at their estimation.

The SCF obtained from (2:6) bears a close relation to the more familiar concept of shadow exchange rate (SER):

$$SCF/OER = 1/SER^{56} \qquad 2:7$$

where OER - Official exchange rate.
Thus it translates domestic values into world values expressed in units of the domestic currency and division by the OER expresses the results in foreign exchange. Thus it will be particularly useful especially in situations where the direct estimation of the SER proves difficult as is usually the case.

Of more relevance than the SCF are the sectoral conversion factors derived by slightly modifying equation (2:6) thus

$$\alpha_j = \frac{M_j}{M_j(1+tm_j)} = \frac{1}{1+tm_j} \qquad 2:8$$

$$\beta_i = \frac{M_i}{M_i(1+tm_i)} = \frac{1}{1+tm_i} \qquad 2{:}9$$

where $\alpha_j(\beta_i)$ = output (input) conversion factor.

Thus, for each sector, the conversion factor is expressed as the reciprocal of one plus the nominal tariff. The use of only import values and taxes in equations (2:8) and (2:9) can be justified since Nigeria's manufactured export structure remains undeveloped and sectoral exports of manufactures are quite negligible[57]. Another modification introduced is with regards to the effects of non-tariff distortions on the domestic price level. In estimating these conversion factors we assumed that the ratio of the maximum possible domestic price to import price is determined more or less by the tariff rate on output and input alone. We do, however, recognise the existence of various distortions that contribute to the divergence of domestic prices from border prices and which, therefore, make the domestic price of the commodities generally much higher than the c.i.f. plus tariff price. We have in mind the effects on prices of advance deposits on imports, quantitative restrictions and exemptions, monopoly power of importers and domestic producers etc. Admittedly, many or all of these are hard to quantify precisely and to include in our calculation. For example, the effect of quantitative restrictions (QR) can be formally incorporated by including an additional item in equation (2:8) or (2:9), say tQM, representing the tariff equivalent of QR. This would be done by expressing the border price of each good subject to a quota or restriction as a percentage of the domestic retail market price less a transport marketing margin. But it has to be recognised that this is not easy to do and may take considerable time. However, ignoring these influences will no doubt grossly underestimate the impact of protectionist policy in Nigeria. We therefore assume at the risk of extreme over simplification, 2 premium rates of 40% and 60% in adjusting for the divergence of the c.i.f. plus tariff rates and the domestic prices of the commodities. The premium inclusive sectoral conversion factors are then given as

$$\alpha_j^1 = \frac{1}{1+tm_j + \phi} \quad , \qquad \phi = \begin{matrix} 40\% \\ 60\% \end{matrix}$$

$$\beta_i^1 = \frac{1}{1+tm_i + \gamma} \qquad \gamma = \begin{matrix} 40\% \\ 60\% \end{matrix}$$

These are displayed in tables 2:1 and 2:2 respectively for the years 1974 and 1977.

2:4:2 The Accounting Price of Labour and Capital

The economic price of labour or the shadow wage (SWR) can be estimated using the expression

$$SWR = SCF.M^{58} \qquad 2:10$$

where M = foregone marginal product of labour at domestic prices

SCF = standard conversion factor which translates M in to border prices.

The various assumptions needed to obtain an accurate (or an approximate value of m) have already been discussed in the previous section. In general, the estimation of (2:10) would require a detailed knowledge of the rural and urban labour markets of the economy.

Table 2:: Sectoral Conversion Factors for Output and Material Inputs -1974.

SECTOR			Tariff-adjusted (1)	(2)	Adjusted with a premium rate of 35%. (3)	(4)
6	3111/3122	Food	0.876	0.769	0.621	0.687
7	3131/3133	Alcoholic bev.	0.531	0.769	0.448	0.687
8	3134	Non-alcoh.bev.	0.489	0.769	0.418	0.606
9	3140	Tobacco	0.562	0.769	0.470	0.606
10	3211	Textiles	0.745	0.769	0.591	0.690
11	3212	Made-up text.	0.742	0.769	0.589	0.690
12	3220	Apparel	0.667	0.769	0.541	0.606
13	3231/3233	Leather	0.917	0.800	0.694	0.625
14	3240	Footwear	0.482	0.769	0.413	0.606
15	3311/3320	Wood	0.600	0.769	0.496	0.606
16	3412/3420	Paper	0.717	0.909	0.573	0.690
17	3511/3512	Chemicals	0.812	0.909	0.632	0.690
18	3521	Paints	0.698	0.909	0.561	0.690
19	3522	Drugs	0.684	0.909	0.552	0.690
20	3523	Soap	0.308	0.909	0.278	0.609
21	3529/3540	Other Chem.	0.775	0.909	0.609	0.690
22	3551/3560	Rubber	0.816	0.769	0.635	0.690
23	3610/3699	Cement	0.861	0.833	0.622	0.690
24	3710/3812	Basic Metals	0.952	0.909	0.714	0.690
25	3813/3819	Fab.Metals	0.812	0.769	0.632	0.714
26	3822/3829	Machinery	0.843	0.909	0.651	0.609
27	3832/3829	Elect.Machinery	0.701	0.909	0.563	0.690
28	3841/3843	Transport Equip	0.841	0.909	0.649	0.690
29	3851/3909	Misc.products	0.801	0.909	0.626	0.690

Notes: Cols (1) and (3) output conversion factors derived as $a_j = 1/1+t_{mj}$ and $1/1+t_{mj}+r$ respectively; Cols(2) and (4) material input conversion factors derived as $B_i = 1/1+t_{mi}$ and $1/1+t_{mi}+r$ respectively, where t_{mj} =tariff on output, t_{mi} =tariff on inputs and r= premium rate.

Table 2:2 Sectoral Conversion Factors for Output and Material Inputs -1977.

Sector			Tariff-adjusted		Adjusted with a premium rate of 40%		60%	
	Code	Name	(1)	(2)	(3)	(4)	(5)	(6)
6	3111/3122	Food	0.757	0.876	0.581	0.649	0.521	0.574
7	3131/3133	Alcoholic bev.	0.718	0.833	0.558	0.625	0.502	0.556
8	3134	Non-alcoh.bev.	0.891	0.903	0.657	0.663	0.581	0.586
9	3140	Tobacco	0.434	0.750	0.586	0.577	0.344	0.517
10	3212	Textiles	0.703	0.617	0.549	0.689	0.494	0.606
11	3212	Made-up text.	0.826	0.952	0.621	0.495	0.552	0.450
12	3220	Apparel	0.580	0.756	0.471	0.581	0.430	0.520
13	3231/3233	Leather	0.943	0.833	0.685	0.625	0.602	0.556
14	3240	Footwear	0.465	0.833	0.392	0.625	0.363	0.556
15	3311/3320	Wood	0.588	0.717	0.476	0.557	0.434	0.502
16	3412/3420	Paper	0.891	0.753	0.657	0.579	0.581	0.519
17	3511/3512	Chemicals	0.757	0.750	0.581	0.577	0.521	0.512
18	3521	Paints	0.630	0.547	0.503	0.449	0.547	0.553
19	3522	Drugs	0.682	0.897	0.536	0.660	0.484	0.583
20	3523	Soap	0.461	0.855	0.389	0.637	0.361	0.566
21	3529/3540	Other Chem.	0.969	0.944	0.698	0.685	0.613	0.603
22	3551/3560	Rubber	0.860	0.909	0.640	0.667	0.567	0.588
23	3610/3699	Cement	0.909	0.751	0.667	0.645	0.588	0.571
24	3710/3812	Basic Metals	0.506	0.848	0.458	0.633	0.419	0.562
25	3813/3819	Fab.Metals	0.827	0.826	0.621	0.641	0.553	0.568
26	3822/3829	Machinery	0.836	0.913	0.626	0.669	0.557	0.590
27	3832/3839	Elect.Machinery	0.758	0.909	0.582	0.667	0.521	0.588
28	3841/3843	Transport Equip.	0.891	0.952	0.657	0.690	0.580	0.606
29	3851/3909	Misc.products	0.868	0.870	0.644	0.645	0.571	0.571

Note: cols (1),(3),and (5) are output conversion factors;
cols (2),(4) and (6) are input conversion factors.

Ideally, since labour employed is not homogeneous, the estimation of SWR would entail an investigation into the various types of labour used... skilled, unskilled, professional, clerical etc. - by an industry and into their likely employment alternatives and/or supply prices. One would presumably arrive at a different SWR for each category of labour. Unfortunately, the scarcity of detailed income and wage statistics in the Nigerian manufacturing sector will not permit this. The SWR estimates to be derived are therefore to be interpreted as representing the average of the skill mix of workers employed in the Nigerian industry.

It would also be desirable to obtain estimates of SWR separately for say rural and urban sectors in order to represent the usual segmentation of the labour market in LDCs. However, very little is known to us about the operation of the labour market in the rural areas except that it is characterized by considerable under-employment and unemployment. Given the large agricultural base of the Nigerian economy, a great many problems arise with regards to estimates of wage trends in the rural sector. For one thing, agricultural income consists largely of 'subsistence output' or products consumed by the farm family out of its own production. For another, even where such estimates are available, a comparison with urban incomes will be inherently difficult given the existing urban rural price differences which are in turn difficult to measure. A recent study[59] sets the average rural income at N92 at rural prices and N128 at town prices which may or may not be a good guide to agricultural wages and certainly does not provide an acceptable measure of output forgone in the case of say, skilled labour.

The urban labour market is itself highly segmented and characterized by a fairly high level of unemployment. There is a 'modern' wage sector, consisting of government establishments and the modern industrial sectors; the latter could be further segmented into large-scale and small-scale establishments. What is significant is that wage determination could differ from one segment to the other. Then there is also a 'traditional' non-wage sector which will not be considered here.

In the urban wage sector government intervention (e.g. minimum wage legislation) and unionisation are important aspects of the labour market. In addition, some employers - statutory corporations and large multinational firms especially - appear to pursue a conscious policy of paying wages that are far above what can be considered as the going market wage rate[60].

Usually every 4 or 5 years the government sets up public service commissions to review salaries and wages of government employees[61]. Usually the scope of each commission includes a broad spectrum of subjects such as wages, social welfare, transport, government reorganisation etc. A minimum wage is then established to be applied to the civil service only, although often with the recommendation that the private sector should follow suit. Nigerian trade unions then regard the resulting changes in minimum wages as providing an insight into the rate of change of market wages and accordingly use them in their negotiation with employers. The government claims that it "fully supports the principles and practice of free and voluntary negotiation, collective bargaining and joint consultation"[62]. To a large extent therefore, in the private sector, it is the operation of market forces rather than the opinion of government appointed tribunals that determine wages. Although unionisation seems to be an important aspect of the urban labour market, the rapidly growing urban labour force plus several restrictive union legislations would limit the unions' ability to derive manufacturing wages significantly in excess of the marginal productivity of labour in the sector. This is more so in the small scale establishments where unionisation may be non existent. It may therefore not be too unrealistic to assume that the manufacturing sector wage approximates m. However, given the existence of minimum wage legislation - even though strictly applicable to the public sector only - one cannot rule out the possibility of a 'spill-over' into the private sector[63]; and given also the growing open and disguised unemployment, it would be safer to set m at a lower level than what the average market wage level represents and then carry out a sensitivity analysis to test the roboustness of our results. Thus it is assumed further that m is 20% and 25% below the actual market wage. We in addition used the SCF to obtain SWR at border prices.

The Opportunity cost of Capital (OCC)

The derivation of the opportunity cost of capital (OCC), like the estimation of the capital stock itself, is highly problematic and inherently hypothetical and our estimates should be regarded only as a rough guide to the true value of the parameter. We shall follow the general S-T and related approaches in deriving such estimates.

In the general S-T methodolgy[64], the OCC at domestic prices is given by the incremental labour/capital ratio multiplied by the incremental wage/labour ratio (the marginal product of labour) less the incremental output/capital ratio. The value of OCC so derived can be translated into border prices by multiplying it by the ratio of the standard conversion factor to a conversion factor for investment.

More formally the OCC can be expressed as

$$OCC = \left[\frac{\Delta Q}{\Delta K} - \left(\frac{\Delta L}{\Delta K} * \frac{\Delta W}{\Delta L}\right)\right] * \frac{SCF}{ICF}$$

where

Q = net domestic product

K = net fixed investment

L = employed labour force

W = wages

The value of $\Delta Q/\Delta K$ (which is the inverse of the incremental capital-output ratio) is assumed to lie within the range .30-.35 which is not very different from the values found for most LDCs[65]. Estimate of the employment investment ratio [= 0.000113] is obtained by dividing the change in labour employed in the manufacturing sector between 1975 and 1978 (= 61252) by the change in net investment in the sector during the same period (N541221 thousands). As a rough approximation, the marginal productivity of labour ($\Delta W/\Delta L$) is assumed to be equal to N 1110, obtained as the difference between wages per head in 1975 and 1978, at 1975 prices. Thus the value of OCC will lie somewhere between 0.205 and 0.225, and when multiplied by a conversion factor of 0.65, the value at border prices will be somewhere in the region 13.2% to 14.6%. (The conversion factor is the four-year average conversion factor, from 1975-1978 and is equal to 0.87; when a premium of 40% is added, the value of 0.65 is arrived at). This may or may not represent the true OCC since the values of the parameters used in the estimation are derived from the manufacturing sector only, rather than from the whole economy as should ideally be the case.

The value of OCC can also be derived from a C-D type production function. Let

$$Q = A\ e^{rt}\ K^{\alpha}L^{\beta} \quad 66$$

where

Q = output

A = constant

r = rate of technical progress

K = capital stock employed

L = labour employed.

The incremental output/capital ratio is then given by

$$\frac{dQ}{dK} = \alpha A e^{rt} K^{\alpha-1} L^{\beta}$$

which with little manipulation can be equivalently written as

$$\frac{dQ}{dK} = \alpha A e^{rt} K^{\alpha-1} L^{\beta}\ \frac{K}{K}$$
$$= \alpha\ \frac{Q}{K}$$

where α is the share of capital stock in output, which here is assumed to be .761. Thus OCC ~ .228 - 2.66 (or 14.8% - 17.29% at border prices). Here again, we have had to rely on data from the manufacturing sector to obtain estimate of the share of capital in value-added. It could be significantly biased especially since it was derived as a residual.

Finally, the value of OCC is often approximated by the prevailing interest rates in the economy, by project specific economic rates of return and/or by the average rate of return on foreign loans. The use of interest rates in the economy is based on the assumption that capital markets are perfect and therefore the rate of interest represents a perfect and rational guide to investment opportunities in the economy. The prevailing lending rates of interest (from April 1982) in the Nigerian economy are as follows

	Minimum	Maximum
Commercial Banks	10.5	14
Nigerian Industrial Development Bank	11.5	14
Nigerian Bank for Commerce & Industry	11.5	14
Federal Mortgage Bank	8	14
Insurance Companies	8	14

Source: Central Bank of Nigeria (1982) "Monetary circular No. 15: Central Bank Credit Guidelines", 21st April, Lagos.

Thus this gives a wide range (8-14 percent) for OCC and if it is assumed that the rates are set to attract investment and do not truly reflect the economic environment, the maximum may be significantly higher.

The various estimates then suggest a value of OCC which could range from as low figure as 8% to as high as 26.6%. The choice of an approximate value for OCC will thus be highly value-judgemental and probably subject to errors of unknown magnitude. We shall generally work with a figure of 15% with alternative rates of 10% and 20% being employed for a sensitivity analysis.

2.5. Summary and Concluding Remarks

In this chapter, we discussed fairly extensively some of the inadequacies of the 'free-trade' principle. The main argument presented is that the comparative advantage doctrine cannot be accepted as a basis for development policy in the LDCs either because some of its underlying assumptions cannot be empirically validated or because of its neglect of certain dynamic considerations in development. Such criticisms reflect fairly accurately the views held not only by those who prescribe the IS strategy for LDCs but also by some neo-classical economists.

We also pointed out many of the problems associated with the IS strategy as observed in empirical studies, from the neo-classical perspective. It was pointed out in particular that this form of industrialisation could retard, rather than promote, growth and could worsen, rather than improve, the foreign exchange position of a country because of its high import-intensity and its effects on exports.

The mounting criticisms of the comparative cost doctrine - especially with its assumption of perfect markets - and of the costs of the IS strategy in the LDCs generated a distinct but related literature on cost-benefit analysis. The LM/ST approach which uses border prices as a basis for calculating the shadow prices of all benefits and costs of industrial projects was briefly discussed. It was pointed out that the approach may not be wholly accepted within the protectionist school because like the Orthodox 'free-trade' theories, it is concerned mainly with the question of resource allocation efficiency assessed in the context of international trade. The approach is criticised both on the question of methodology and on the basic principles underlying it.

Our acceptance of the LM/ST methodology does not mean that we believe in 'free-trade' or that we do not recognise that Nigeria does have other objectives. World prices are used simply to enable us to get a standard of reference in planning industrial investment in Nigeria, because we believe that the country's productive base must allow for, among other things, a profitable specialisation in the international economy if and when such opportunities exist. In any case, the prices estimated in section 2:4 are only 'second-best' which implies, the assumption that existing non-optimal policies in Nigeria will remain in force during the period of the analysis, rather than 'first-best' which would have amounted to predicting the values which would prevail when policies have been changed.

NOTES

1. Robertson, D.H. (1938) "The Future of International Trade" Economic Journal, 48, March, pp1-14.

2. Represented by, for example, Haberler, Johnson, and Viner etc. The writings of these authors are too numerous to mention in a single footnote. See for example, Haberler, A. (1959), "International Trade and Economic Development", Fiftieth Anniversary Commemoration Lectures, National Bank of Egypt, Cairo. Viner, J. (1953) International Trade and Economic Develompment, Oxford, Clarendon Press. Johhnson, H.G. (1957) "Factor Endownments, International Trade: Some Theoretical Issues", Journal of Development Studies, 1, 1, October pp3-30.

3. See for example, Prebisch, R. (1950) The Economic Development of Latin AMerica and its Principal Problems, Economic Commission for Latin America, United Nations, New York; Prebisch, R. (1959) 'Commercial Policy in Underdeveloped Countries" American Economic Revew, Papers and Proceedings Vol. 49, May, pp251-273. Sachs, I. (1965) Foreign Trade and Economic Development of Underdeveloped Countries, Asia, Singer, H. (1950) "The distribution of gains between investing and borrowing countries" American Economic Review, Vol. XL, May, pp473-85. Myrdal, G. (1959), "Development and Underdevelopment", Fifth Anniversary Commemoration Lectures, National Bank of Egypt, Cairo.

4. See for example, Chenery, H.B. (1961), "Comparative Advantage and Development Policy", American Economic Review, 51, pp18-51.

5. The capacity to import has been considered a primary limit upon a country's development performance by various authors. See for example Chenery, H.B. and Strout, A.M. (1966). "Foreign Assistance and Economic Development" American Economic Review, 56, 4, September, pp679-733 and Linder, S.B. (1967) Trade and Trade Policy for Development, Praeger, New York.

6. See Haberler, G. (1950), "Some problems in the pure theory of international trade" Economic Journal, 60, June, pp223-240. See also Viner, J. (1953) International Trade and Economic Development, Oxford, especially pp37-38.

7. Linder, S.B. (1967) op cit.

8. Lewis, W.A. (1955) The Theory of Economic Growth, London, p347.

9. Colonial Annual Reports No. 476, Northern Nigeria, 1904, pp88-9, cited in Ekundara, R.O. (1973), An Economic History of Nigeria 1860-1960, Methuen, Chapter 9, p175.

10. See especially Hafbauer, G.C. (1970), "The Impact of National Characteristics and Technology on the Commodity Composition of Trade in Manufactured Goods" in Veron, R. (ed.), The Technology Factor in International Trade, Columbia University Press, New York; and Vernon, R. (1966) "International Investment and International Trade in the Product Cycle", Quarterly Journal of Economics, 80, May, pp190-207.

11. Stewart, F. (1974), "Trade and Technology" in Streeten, P. (ed.) Trade Strategies for Development, Macmillan, London.

12. Singer, H.W. (1950), op cit, pp476-7.

13. Harbeler, G. (1959), op cit, p10.

14. Myint, H. (1958), "The Classical Theory of International Trade and Underdeveloped Countries", Economic Journal, 68, pp318-319.

15. Ashworth, W., (1952), A Short History of the International Economy 1850-1950, London, pp76-77.

16. Myint, H. (1958), op cit, pp321.

17. Nurske, R. (1959), Patterns of Trade and Development, Stockholm.

18. See References in Footnote 1 of Chapter 1.

19. Bergsman, J. (1970) op cit, p98.

20. Hansen, B. and Nashashibi, K. (1975), Foreign Trade Regimes and Economic Development, Egypt, National Bureau of Economic Research, New York, p159.

21. Ibid, p159.

22. Lewis, S.R. (jnr) (1970), op cit, p56. In a survey of African economies, a World Bank report states that "It is now widely agreed that insufficient price incentives for agricultural producers are an important factor behind the disappointing growth of African Agriculture... The high level of taxation of export crops.... have kept export production in many countries below what it could have been, and hence contributed to the steep fall in Africa's share in the World market.." World Bank (1981) Accelerated Development in Sub-Saharan Africa: An Agenda for Action, Washington, D.C., p55.

23. Power, J.H. (1963), "Industrialisation in Pakistan: A case of frustrated take-off"? Pakistan Development Review, 3, 2, Summer, pp201-202.

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25. Power, J.H. (1963) op cit, p201.

26. Soligo, R. and Stern, J.J. (1965), "Tariff Protection, Import Substitution and Investment Efficiency", Pakistan Development Review, Summer, pp251 and 267.

27. Power, J.H. (1963), op cit; Khan, A.R. (1963), "Import Substitution, Export Expansion and Consumpation Liberalisation: A Preliminary Report", Pakistan Development Review, Vol. III, no. 2, Summer, pp208-231.

28. Frank, A.G. (1969), Capitalism and Underdevelopment *in Latin* America, Monthly Review Press. On the Import Intensity of Industrialisation, see also, Diaz-Alejandro, C.F. (1965), "On the Import Intensity of Import Substitution", Kyklos, 18, pp495-511; Doherty, N. (1970) "Import-Substitution and the balance of Payments", Eastern African Economic Review, 2, 2, December, pp39-51.

29. Bruton, H.J. (1970), "The Import-Substitution Strategy of Economic Development: A Survey", Pakistan Development Review, Vol. 10, no. 2, p133.

30. Prebisch, R. (1963), Towards a Dynamic Development Policy for latin America, United Nations, p71.

31. Little, I.M.D. and Mirrlees, J.A. (LM) (1969), Manual of Industrial Project Analysis in Developing Countries, Vol. II, OECD, Development Centre, Paris.

32. Squire, L., and Van der Tak, H.G. (ST) (1975), Economic Analysis of Projects, John Hopkins, University Press, Baltimore.

33. LM (1968), op cit, p92.

34. Ibid, p92.

35. Ibid, p93.

36. This is simply an application of input-output analysis. See for example, Bulmer-Thomas, V. (1982), Input-Output Analysis in Developing Countries: Sources, Methods and Applications, John Wiley, pp. For reasons to be outlined later, such a procedure is not applied here.

37. Sen, A.K. 91975), Employment Technology and Development, A Study prepared for the ILO, Clarendon Press, Oxford, p33.

38. The relevant formula can be stated as:

$$m = \frac{\sum_{j=1}^{n} \frac{d_j}{S_j} * W_j}{n_j}$$

where W_j = seasonal wage rate; D_j = seasonal utilisation of labour; S_j = seasonal availability of labour; and j = number of seasonal periods = 1, 2, ..., n.

39. The Accounting Rate of Interest will be equal to the opportunity cost of capital if no account is taken of income distribution considerations and if the assumption is made that no constraints exist on the allocation of public income between consumption and savings. For a more detailed analysis see ST (1975). op cit, p76 and 114.

40. LM op cit, p137.

41. Ibid, p137.

42. Ibid, p138.

43. As an alternative to the LM/ST method, some analysts may prefer to use the UNIDO approach to project evaluation. The latter, like the former, is also based on the principle that because of market imperfections, commercial profitability is an inadequate guide in the assessment of industrial projects. The two approaches differ fundamentally in certain respects, although, as Dasgupta (1972) argues, under certain conditions, both could result in the same accept-reject position. The first difference is in the breakdown into categories of the components of a project. Under the UNIDO method, components of a project are divided into 3 broad categories: (1) Direct Present Benefits: [(a) consumer goods, (b) producer goods and (c) foreign exchange]; (2) Direct Present Costs, [(a) producer goods, (b) foreign exchange] and (3) Indirect Future Benefits and Costs. The Second difference arises from the use of a unit of account. While the LM approach uses uncommitted foreign exchange as the numeraire, in the UNIDO method, the above items are valued in terms of the present aggregate consumption. This, however, as pointed out by Dasguspta (1972) "makes no difference to project evaluation" and is more or less a "matter of convenience". The third fundamental difference concerns the revaluation of non-tradables. We have seen that in the LM approach, the correct shadow price is the marginal social cost (MSC) of producing the good; under UNIDO, the shadow price valuation is based on the willingness (of producers or consumers) to pay for the commodity. Unless the economy is producing efficiently, such that the social cost of production is equal to the willingness for pay for an extra output of the commodity, the two approaches could lead to different accept-reject positions. We follow the LM approach because, we do not think that the problem posed by

the existence of non-tradables is sufficient to invalidate the essentials of the method. Moreover, even the UNIDo method is not without its problems. For example, it is well known that the estimation of a shadow price of foreign exchange poses some emperical problems and the use of a conversion factor is much more straight forward. It can also be argued that the use of aggregate consumption in the UNIDo could give rise to some ambiguities. Whose consumption should one use? A poor man's? a rich man's? or an average level of consumption? Different sets of results will be obtained depending on which is used. See Dasgupta, p (1972), "A Comparative Analysis of the UNIDO Guidelines and the OECD Manual", Bulletin of the Oxford Institute of Economics and Statistics, 34, February.

44. Kaldor, N. (1963), Stabilizing the Terms of Trade of Underdeveloped Countries, Mimeographed paper submitted to Rio de Janeiro Conference organised by Yale University, January. Cited in Theberge, J.D. (ed.), Economics of Trade and Development, John Wiley, New York, p173.

45. Lal, D., and Streeten, (1977), p186.

46. Sutcliffe, R.B. (1976), Industry and Underdevelopment, Addison Wesley, p298

47. LM (1968), op cit, p92.

48. Joshi, H. (1972), "World prices as shadow prices: a critqiue", Bulletin of the Oxford University Institute of Economics and Statistics, 34, 1, February, pp53-74; Stewart, F. and Streeten,

P. (1972), "Little-Mirrlees methods and project appraisal", Bulletin of the Oxford University Institute of Economics and Statistics, 34, 1, February, pp75-92.

49. LM (1968), op cit, p47.

50. Ibid, p50.

51. Stewart, F. and Streeten, P. (1972), op cit; Guisinger, S., and Papageorgino, D. (1976), "The Selection of Appropriate Border Prices in Project evaluation", Bulletin of the Oxford University Institute of Economics and Statistics, 38, 2, May, pp79-98.

52. In a study of intra-firm pricing practices in Columbia, Voitos showed that the problem could often be serious as actual prices differ significantly from the quoted prices. For example, he found that 'the weighted average of overpricing.. of the seventeen firms selected amounted to 155% for 1968" and individual firm over-pricing ranged from 1% to 483%. The extent of over-pricing was estimated using the expression. (Price paid by Colombia) - (FOB prices quoted in different markets of the world) / (FOB prices quoted in different markets of the world). Vairtsos, C. (1970), "Transfer of Resource and Preservation of Monopoly Rents", Development Advisory Service, Harvard University. Cited in Rweyemanu, J., (1972), Underdevelopment and Industrialisation in Tanzania, Oxford, p141.

53. Baldwin, G.b. (1972), "A Layman's Guide to Little-Mirrlees" in Livingstone, I. (1981) (ed.), Development Economics and Policy: Readings, George Allen, pp223-228.

54. Federal Republic of Nigeria (1978), "Pre-shipment Inspection of Imports Degree 1978", Supplement to Official Gazette Extraordinary, No. 59, Vol. 65, 1978 (December).

55. ST (1975), op cit, p128.

56. Ibid, p93.

57. For a discussion of Nigeria's Manufactured exports see chapter 4 of this thesis.

58. ST (1975), op cit, pp83-86.

59. ILO, (1982).

60. Multinational firms for example, often pay twice as much to employees than domestic firms. In the textile industry for example, the average wage rate paid by multinational enterprises was N 436, N 444 and N 730 respectively in 1963, 1968 and 1972 as opposed to N 312, N 332 and N 564 paid by domestic enterprises. A similar situation is to be found in many other firms as well. See ILO (1982), ibid.

61. Federal Ministry of Labour, Annual Report, 1968/69, para. 118. This is of course, highly contentious, as a number of economists have argued. See Note 63 below, for references.

62. Since 1946, there have been more than a dozen of such commissions. These include Harragin (1946), Gorsuch (1955),

Newns (January 1959), Mbanefo (November 1959), Morgan (1964), Elwood (1966), Adebo (1971), Udoji (1975).

63. The extent to which, and by how much, wages in the private sector are influenced by the government appointed salary review commisions has remained controversial. On the impact of minimum wage legistlations and the role of the Nigerian trade unions see for example Kibly, P. (1967), "Industrial relations and Wage Determination: the failure of the Anglo-Saxon Model", Journal of Developing Areas, Vol. 1, No. 4, July; Weeks, J.F., "A Comment on Peter Kilby: Industrial Relations and wage Determination", The Journal of Developing Areas, Vol. 3, No. 1, October 1968; "Further Comment on the Kilby/Weeks Debate: An emperical rejoinder" ibid, Vol. 5, No. 2, january, 1969.

64. ST (1976), op cit, pp110-112.

65. See also Chapter 3 (Table 3:11).

66. See Mashajekhi, A. (1980), Shadow prices for project Appraisal in Turkey, World Bank Staff Working Paper No. 392, May, pp30-31.

CHAPTER 3

The Growth and Development of the Nigerian Economy

3.1 Introduction

The rate of economic transformation of Nigeria during the last two or three decades has been fairly rapid and surpassed that of almost any other country in the African continent. Less than 3 decades ago, the country was classified as poor, predominantly agricultural and highly dependent for its revenue and foreign exchange earnings on exports of few agricultural commodities. In 1960, for example, the total Gross National Product (GNP) of the country was estimated to be slightly above US$4 billion and with an estimated population of about 53 million, per capita income was thus less than US$100. Between 1960 and 1970, the annual rate of per capita GNP growth was significantly less than 1 percent. With a share of 11 percent in Gross Domestic Product (GDP) in 1960, industrial activity was virtually non-existent and manufacturing, with a contribution of only 4.5 percent to GDP was confined to simple processing of agricultural products. The GDP shares of industry and manufacturing were far below the average shares for Less Developed Countries (LDCs) in Africa, Latin America and Asia[1]. The underdevelopment of the economy was further suggested by other economic indicators of growth. In 1960 for example, the ratios of gross domestic savings and gross domestic investment to income were respectively seven and thirteen percent. Domestic savings were therefore enough to finance only about one-half of the gross domestic capital formation. Moreover, the savings income ratio was considerably lower than the average ratio for low income countries in Africa, less than one-half of the average for all low income countries and far below the realised ratio in twenty-two of the thirty nine African countries for which data was available[2].

Following the discovery and subsequent production and export of petroleum, Nigeria began to experience the first "tremor" of economic change. The petroleum sector had, by the middle of the last decade taken over the agricultural sector, as the main agent of economic growth. Since 1973, more than 75 percent of Federal Government revenue and 90 percent of foreign exchange earnings have come from the petroleum sector; these have made it possible to finance and execute expensive infrastructural and industrial projects. The persistent balance of payments deficits which characterised the late 1950's and early 1960's were turned into surpluses and foreign reserves continued to cumulate. By 1979 for example, the level of international reserves was 26 times higher than the 1970 level[3]. In 1979, the total GNP was estimated to be about US$75 billion, almost 20 times the 1960 level and at least 3 times bigger than the GNP of any one single country in Africa[4]. With an estimated population of about 80 million, per capita income was almost 10 times the 1960 figure.

Of the 39 sub-Saharan African countries for which data is available, only Gabon had a higher saving income ratio in 1979 than Nigeria and the latter's investment ratio of 31 percent was surpassed only by that of Mauritiania, Guinea-Bissau, Togo, Botswana and Mauritius[5]. The rate of growth of the domestic investment-income ratio in 1970-79 (17.8 percent) more than doubled the figure achieved between 1960 and 1970[6]. Between 1960 and 1979 per capita income increased by less than 1 percent per annum in 17 African countries, averaged less than 2 percent for all sub-Saharan countries and less

Table 3:1. Comparison of Indicators of Economic Growth

Region/ Countries	Average annual growth rate GDP		Distribution of GDP Agriculture		Industry		Manufacturing		Savings/income ratio		Investment/income ratio	
	19[illegible] (%)	1970-79 (%)	1960	1979	1960	1979	1960	1979	1960	1979	1960	1979
WORLD												
Low income countries	4.5 *	4.7	51W	34W	17W	36W	13W	13W	16W	23W	18W	26W
Middle income countries	6.1	5.5	22W	14W	30W	38W	21W	24W	19W	25W	21W	26W
Industrialised countries	5.1	3.2	6W	4W	40W	37W	30W	27W	21W	23W	22W	22W
AFRICA												
Low income countries	3.7W	1.7W	56	44	12	16			9W	6W	11W	15W
Middle income countries Middle in blding)	4.5W	3.1W	30	36	30	24	23	26	21W	16W	22W	19W
Middle income (exports of oil)	3.4W	4.6W	58	23	12	44	17W	19W	10W	31W	15W	30W
NIGERIA	3.1	7.5	63	22	11	45	5	5	7	32	17	32
Sub-Sahara	3.9W	2.9W	49	32	16	36	n.a.		13W	20W	15W	32W
Selected Countries in Africa												
Kenya	6.0	6.5	38	34	18	21	9	12	17	15	20	22
Ghana	2.1	-0.1	41	66	-	21	10	9	17	5	24	5
Ivory Coast	8.0	6.7	43	26	14	23	7	13	17	27	15	31
Zambia	5.0	2.3	11	17	63	39	4	17	41	28	25	21

W indicates weighted averages; with countries GDP used as weights.

SOURCE: 1960 and 1979 figures are from The World Bank Accelerated Development in Sub-Saharan Africa An Agunda for Action, The World bank, Washington, D.C. 1981. Statistical Annex. Figures for 1978 from The World Bank World Devt. Report 1981 Statistical Annex.

than 1 percent for all low income countries in Africa, compared with Nigeria's 3.7 percent[7]; during the last decade, a significant number of African countries recorded a negative rate of growth of income per capita, compared with Nigeria's 4.2 percent, a figure that surpassed even that of the so-called high growth countries like Kenya, Malawi and Ivory-Coast whose per capita income growth had averaged an annual 2.7 percent between 1960 and 1979.

Clearly, compared to other developing areas in Africa, insofar as these figures can be taken as indicative, Nigeria's per capita GDP and its overall performance must be rated as fairly impressive. However, the growth in GNP and/or GNP per capita, while significant, can be a very partial criterion of success. Of crucial importance is the extent of economic diversification and its corrollary, the ability to generate and sustain growth from within. It is pertinent therefore to examine the extent to which we can interpret these changes in Nigeria during the past decades as reflecting a meaningful diversification of the economy. Do these rapid changes, brought about essentially by an influx of external rent signify an unambiguous economic development? Would they enhance the country's ability for sustained economic growth?

As a convenient analytical starting point, we shall be concerned in this chapter, with the growth of the country's national income and its components; hence with the evolving structure of the economy. Specific factors to be discussed are (a) the level and growth of gross domestic product (b) the industrial origin of GDP and the performance of the major sectors of the economy. These are discussed in the section which follows. In Section 3:3 the importance of the external sector in the economic growth of Nigeria will be examined. In section

3:4 we shall discuss the growth and structural characteristics of the manufacturing sector and section 3:5 provides a summary of, and conclusion to the chapter.

Table 3:2 Growth in the GNP per capita in Selected Countries and Sub-regions

Countries	Population (millions) (Mid-1979)	GNP per capita average annual growth rate (percent) 1960-70	1960-79	1970-79
Sub-Sahara	343.9	1.3	1.6	0.8
Low income	187.1	1.6	0.9	-0.3
Nigeria	82.6	0.1	3.7	4.2
Other Middle Income	74.2	1.9	3.2	-0.5
South Asia[a]	890.5	1.5	-	1.5
All developing	3245.2	3.5	-	2.7[b]
Low income	2260.2	1.8	1.6	1.6[b]
Middle income	985.2	3.9	3.8	2.8[b]
All industrialised	671.2	4.1	4.0	2.5[b]

a Bhutan, Bangladesh, Nepal, Burma, India, Sri Lanka and Pakistan;
b 1979-80, 1970-78

SOURCES: The World Bank, Accelerated Development in Sub-Saharan Africa, Tables 1.1 p3, Table 2, p144; and World Development Report, 1980.

3:2 The Level, Composition and Growth of GNP: 1950-1980

The overall performance and the changing structure of the economy can be judged from the growth and composition of GDP as well as the growth of gross fixed capital formation. Estimates of GDP at constant factor costs are presented in column 1 of Table 3:3, while columns 2 and 3 show the average annual growth rates of the series. For analytical convenience and given the discontinuity in the series (see end of Table 3:3) we find it appropriate to consider three distinct phases of GDP growth: the first from 1950 to 1957, the second from 1958/59 to 1972/73 and the third thereafter. What is immediately evident from the table is that the performance of the economy during the entire period under review - and even within the sub-periods - was far from smooth. It can be observed that during the first period, there was a general deceleration of growth, especially from the second half of the 1950's. Although Gross Domestic Product increased in absolute terms in each of the years (except 1954), it can be seen that its rate of growth during the period was on the decline, from 7.7 percent in 1951 to 2.6 percent in 1955 and -2.4 percent in 1956. Between 1950 and 1957, the average annual rate of growth was only about 4 percent. The growth rate of GDP picked up again during the immediate post independence years, reaching very impressive levels of 11 percent in 1960/61, 9 percent in 1963/64 and averaging 6.6 percent between 1958/59 and 1965/66. Thereafter, the annual percentage increase in output declined sharply from 6.74 percent in 1965/66 to -3.24 percent in 1966/67. The decline in absolute as well as in percentage terms, continued throughout the war years[5], reaching an alarming level of -15.5 percent in 1967/68. This was followed by a period of recovery from 1969/70. The annual percentage increase in output rose to 27 percent and to 31 percent in 1970/71. The absolute levels of GDP in 1969/70 (N3234.5 million) and 1970/71 (N4242 million) were far above the pre-war level of N3146 million. This rapid recovery which started even before the end of the civil war, clearly

Table 3:3 Amount and Rate of Growth of Gross Domestic Product of Nigeria,1950 -1979/80*

Year	Gross Domestic Product(GDP) (Nm)	Change in GDP (Nm)	(%)
1950	1377.40	----	----
1951	1482.80	105.40	7.70
1952	1587.00	104.20	7.70
1953	1623.20	36.20	2.30
1954	1744.20	121.00	7.50
1955	1790.40	46.20	2.60
1956	1747.40	-43.00	-2.40
1957	1820.00	72.60	4.20
1958/59	2084.20	-----	----
1959/60	2230.40	146.20	7.00
1960/61	2483.40	253.00	11.34
1961/62	2492.20	8.80	0.35
1962/63	2597.60	105.40	4.23
1963/64	2825.60	228.00	8.80
1964/65	2948.00	122.40	4.33
1965/66	3146.80	198.80	6.74
1966/67**	3044.80	-102.00	-3.24
1967/68**	2572.20	-472.60	-15.52
1968/69**	2544.20	-28.00	-1.09
1969/70**	3234.50	690.30	27.13
1970/71	4242.00	1007.50	31.15
1971/72	4721.50	479.50	11.30
1972/73	5007.10	285.60	6.05
1973/74	11223.62	------	----
1974/75	12194.54	970.90	8.70
1975/76	12500.50	306.00	2.50
1976/77	13744.30	1243.80	9.90
1977/78	14749.20	1004.90	7.30
1978/79	13966.90	-782.30	5.60
1979/80	14618.40	651.50	4.70

Notes: * Figures for 1950-1957 are at constant 1957 factor cost and fiscal year beginning January 1st; those for 1958/59 to 1972/73 are at constant 1962/63 factor costs, while those for 1973/74 to 1979/80 are at constant 1973/74 factor costs and fiscal year beginning April 1st.

** Figures do not include estimates from the war affected areas

Sources: Federal Office of Statistics,Annual Abstract of Statistics;National Accounts of Nigeria (1976);and Gross Domestic Product of Nigeria and Allied Macro Aggregates,Vol.1,No.1,April 1982.

demonstrated the resilience and strength of the economy. It can be seen that inspite of the interruptions, the annual average rate of output growth achieved during this (i.e. 58/59 - 72/73) period surpassed the corresponding rates in the first and third periods.

In the latter period (73/74 - 79/80) the rate of output growth achieved amounted to 4.5 percent, only slightly higher than the average rate of growth during the 1950-57 period. Assuming an average rate of growth of population of 2.5 percent per annum, the average GDP growth rates imply average per capita income growth rates of 1.5 percent (1950-1957), 4.1 percent (1958/59 - 1965/66), 4 percent (1958/59 - 1972/73) and 2 percent (1973/74 - 1979/80).

The growth rates achieved, and the proportion of output supplied by each of the main economic sectors - viz agriculture, mining, manufacturing and services - are presented respectively in tables (3:5) and (3:4). These can be used not only to assess the relative importance of the various economic sectors in the economy but also to examine the extent to which any meaningful structural shift has occurred over the years.

Virtually all the major sectors of the economy developed rapidly though unevenly. During the periods 1950-1957 and 1958/59 - 1972/73, the annual average increase of production were respectively 2.9 percent and 2.3 percent in the Agricultural sector, 8.1 and 11.32 percent in the Mining and 5.6 and 10.75 in the Manufacturing sector. The relatively higher rate of growth for the latter emanates possibly from the low base from which it started. The growth in the primary i.e. agricultural sector, has further slowed down since the middle of the 1970's. Annual percentage increases fluctuated considerably from 10 percent in 1974/75 to -10 percent the following year, to about 6

Table 3:4 Distribution of Nigeria's Gross Domestic Product by Four Major Economic Sectors (1950 - 1979/80)

Year	Agriculture		Mining		Manufacturing		Services	
	Nm	%	Nm	%	Nm	%	Nm	%
1950	913.60	66.48	95.20	6.93	37.80	2.75	327.60	23.8
1951	989.00	66.81	105.80	7.15	38.00	2.75	347.60	23.4
1952	1006.00	63.43	98.80	6.23	41.60	2.62	439.60	27.7
1953	1042.80	64.86	112.40	6.94	42.60	2.63	421.60	26.0
1954	1099.00	63.00	140.00	8.02	45.40	2.60	460.00	26.3
1955	1128.20	62.81	144.80	8.06	47.20	2.63	476.00	26.5
1956	1087.20	62.19	149.20	8.50	53.40	3.05	458.40	26.2
1958/59	1344.40	60.96	187.20	8.49	90.60	4.11	462.00	26.4
1959/60	1409.00	68.81	229.20	11.19	104.00	5.08	305.60	14.9
1960/61	1597.80	64.42	29.80	1.20	109.60	4.40	746.20	30.0
1961/62	1549.80	62.20	43.40	1.70	130.20	5.20	768.80	30.8
1962/63	1605.80	61.80	54.00	2.10	146.40	5.60	791.40	30.5
1963/64	1737.80	61.50	58.80	2.10	170.00	6.00	859.00	30.4
1964/65	1731.40	58.70	79.60	2.70	181.00	6.20	956.00	32.4
1965/66	1742.20	55.40	149.80	4.80	221.00	7.00	1033.80	32.9
1966/67**	1581.80	52.00	210.40	6.90	221.60	7.30	1031.00	33.9
1967/68**	1358.00	52.80	163.80	6.40	190.00	7.40	860.40	33.5
1968/69**	1338.00	52.60	85.00	3.30	200.40	7.90	920.80	36.2
1969/70**	1539.50	47.60	261.30	8.10	263.40	8.10	1170.30	36.2
1970/71	1890.10	44.60	508.90	12.00	317.60	7.50	1525.40	36.2
1971/72	1982.90	42.00	711.60	15.10	307.70	6.50	1719.30	36.4
1972/73	1852.10	37.00	840.60	16.80	378.60	7.60	1935.80	38.6
1973/74	3371.50	30.00	2020.60	18.00	496.90	4.40	5334.60	47.5
1974/75	3718.40	30.50	2246.90	18.40	480.50	3.90	5748.70	47.1
1975/76	3339.90	26.70	1802.60	14.40	593.80	4.80	6764.20	53.9
1976/77	3307.10	24.10	2279.60	16.60	732.40	5.30	7425.20	54.2
1977/78	3502.90	23.70	2370.90	16.10	778.20	5.30	8097.20	54.9
1978/79	3128.70	23.10	2180.60	15.60	889.90	6.40	7677.70	54.9
1979/80	3135.10	21.40	2446.70	16.70	995.00	6.50	8081.60	55.3

Notes: * * Excludes data from the war affected areas.

Sources: FOS, Annual Abstract of Statistics, National Accounts of Nigeria and Gross Domestic Product and Allied Macro Aggregates, vol 1, no 1, April 1982.

Table 3:5 Annual Average Growth Rates of Major Economic Sectors

Year	Agriculture (Nm)	Agriculture (%)	Mining (Nm)	Mining (%)	Manufacturing (Nm)	Manufacturing (%)	Services (Nm)	Services (%)
1950	----	----	----	----	----	----	-----	----
1951	75.4	8.2	10.6	11.1	0.2	0.5	20.0	6.1
1952	17.0	1.7	-7.0	-6.6	3.6	9.5	92.0	26.5
1953	36.0	3.8	13.6	13.8	1.0	2.4	-18.0	-4.1
1954	56.4	5.8	27.6	24.6	2.8	6.6	38.4	9.1
1955	29.2	2.7	4.8	3.4	1.8	3.9	16.0	3.5
1956	-41.0	-3.6	4.4	2.9	6.2	13.1	-17.6	-3.7
1957	26.8	2.4	15.2	9.2	1.8	3.4	28.0	6.1
1958/59	----	----	---	---	---	----	----	---
1959/60	64.6	4.8	42.0	22.5	13.4	14.8	-156.4	-33.9
1960/61	188.8	13.4	-199.4	-86.9	5.6	5.4	440.6	144.2
1961/62	-48.0	-3.0	13.6	45.6	20.6	18.8	22.6	3.0
1962/63	56.0	6.6	10.6	24.4	16.2	12.4	22.6	2.9
1963/64	132.0	8.2	4.8	8.9	23.6	16.1	67.6	8.9
1964/65	-6.0	-0.4	20.8	35.4	11.0	6.5	97.0	11.3
1965/66	10.8	0.6	70.2	88.2	40.0	22.1	77.8	8.1
1966/67	-160.4	-9.2	60.6	40.5	0.6	0.3	-2.8	-0.3
1967/68	-223.8	-14.2	46.6	-22.2	-101.0	-45.6	-170.6	-16.5
1968/69	-20.0	-1.5	-78.8	-48.1	10.4	5.5	60.4	7.4
1969/70	201.5	15.1	176.3	207.4	63.0	31.4	249.5	27.1
1970/71	350.6	22.8	247.6	94.8	54.2	20.6	355.1	30.3
1971/72	92.8	4.9	202.7	39.8	-9.9	-3.1	193.9	12.7
1972/73	130.8	-6.6	129.0	18.2	70.9	23.0	216.5	12.6
1973/74	----	----	----	----	----	----	----	----
1974/75	346.9	10.3	226.3	11.2	-16.4	-3.3	414.1	7.8
1975/76	-378.5	-10.2	-444.3	-19.8	113.3	23.6	1015.5	17.7
1976/77	-32.8	-0.9	477.0	26.5	138.6	23.3	661.0	9.8
1977/78	195.8	5.9	91.3	4.0	45.8	6.3	672.0	9.1
1978/79	-284.2	-8.1	-190.3	8.0	111.7	14.4	-419.5	-5.2
1979/80	-83.6	-2.6	266.1	12.0	65.1	7.3	403.9	5.3

Source: Computed from Table 3:4.

percent in 1977/78, and to 8 percent and -3 percent in 1978/79 and 1979/80 respectively. The average annual compound rate of growth between 1973/74 and 1979/80 was -1.2 percent, while the corresponding rates for the manufacturing, mining and services sectors were respectively 11.5, 3.2 and 7.2 percent.

Relating these sectoral developments to the growth of the economy between 1950 and 1979 suggests that the period of higher average rate of economic growth was between 1958/59 and 1972/73. This was precisely the period when both manufacturing and mining were expanding at a fast rate, while the agricultural sector was virtually stagnant.

Table 3:6 Summary of Growth Rates of GDP and Main Economic Sectors

(Percent)

Growth in:	1950 - 1957	1958/59 - 1972/73	1973/74 - 1979/80
GDP	4	6.5	4.5
GDP/Capita	1.5	4	2
Agriculture	2.9	2.3	-1.2
Mining	8.1	11.32	3.2
Manufacturing	5.6	10.75	11.5
Services	5.8	8.95	7.2

Note: A further breakdown of this period indicates that even higher rate of output growth was achieved between 1970/71 and 1972/73. This amounted to 8.6 percent, an impressive figure given that it was much higher than the growth rate of 6.3 percent projected in the 2nd National plan. A large part of this growth was due to increased production of petroleum which grew at 28.5 percent p.a. and the services sector with a 12.65 percent rate of growth.

SOURCE: Computed from Tables 3:3 to 3:5.

Inspite of the slower rate of growth, the predominance of agriculture in economic activity is evident, from Table 3:4. The sector's contribution to GDP averaged more than 60 percent between 1950 and 1963/64 and more than 50 percent between 1965/66 and 1968/69. Indeed, it can be seen that throughout the 1950's and early part of the 1960's (until 1964) there was more or less a parallel movement in the output of the agricultural sector and in GDP such that variations in the latter were almost always accompanied by variations in the former, in the same direction. By the middle of the 1960's however, it was clear that the economy was changing direction. This can be illustrated by the following sectoral contributions to increases in GDP between 1950 and 1957, 1958/59, 1972/73, 1973/74 and 1979/80.

Table 3:7 Sectoral Contributions to Increases in GDP

Growth in:	1950 - 1957		1958/59 - 1972/73		1973/74 - 1979/80	
	(Nm)	(%)	(Nm)	(%)	(Nm)	(%)
GDP	442.60	100.00	2922.90	100.00	3394.80	100.00
Agriculture	200.00	44.90	507.70	17.37	-236.40	-6.69
Mining	69.20	15.54	653.40	22.35	426.10	12.55
Manufacturing	17.40	3.91	288.00	9.85	458.10	13.49
Services	158.80	35.69	1473.80	50.42	2747.00	80.82

SOURCE: Computed from tables 3:4 and 3:5.

Thus the remarkable features of the late 1960's and early 1970's when compared to the earlier period was the reversal in the role of agriculture from a 'leading' to a 'lagging' sector in the economic development of Nigeria, the rising importance of the mining and manufacturing sectors, and the tremendous growth of the services sector. That more than 80 percent of the increment to GDP in the 1973/74 - 1979/80 was due to the expansion of the services sector casts some doubts on the real significance of recent economic growth, especially in view of its weak linkages with the rest of the economy.

Along with the significant expansion in output and the change in the pivot of the economy, was the impressive growth in the value of gross fixed capital formation (GFCF); from N76 million in 1952/53 to N615 million in 1965/66, just before the war. There was an absolute decline thereafter, until 1979/81 when the pre-war level was surpassed.

The average annual rate of growth implied by the figures in Table 3:8 was 20 percent during the period 1952/53 - 1978/79 (1975 prices). The increases were particularly rapid at the beginning and end of the period: in 1952/53 - 1960/61, the average rate of growth was 16.51 percent while in 1970/71 - 1978/79 a rate of growth averaging 33.73 percent was achieved. Even more impressive perhaps is the rising share, with only minor fluctuations, of capital formation in GDP throughout the period under review. The share increased significantly from only 6 percent in 1952/53 to more than 31 percent in 1978/79. The average ratio was 9.6 percent during the years 1952/53 - 1960/61 rising to 14.88 and 22.75 percent during the years 1961/62 - 1971/72 and 1972/73 - 1978/79 respectively. The decline during the war years was not particularly significant since, as can be seen, the ratios achieved during these years surpassed the corresponding ratios achieved throughout the 1950's and early part of the 1960's.

Table 3:8 Domestic Capital Formation,Savings and Related Macro Variables (at 1975 Prices).

Year	GDP	Gross fixed Capital formation		Domestic saving	
	(Nm)	(Nm)	%of GDP	(Nm)	%of GDP
1952/53	1174	76	6.47	97	8.30
1953/54	1262	108	8.56	140	11.09
1954/55	1368	118	8.62	151	11.04
1955/56	1592	129	8.10	186	11.68
1956/57	1704	181	10.62	132	7.75
1957/58	1802	182	10.09	127	7.05
1958/59	1880	226	12.02	147	7.82
1959/60	1940	218	11.23	139	7.16
1960/61	2400	258	10.75	121	5.04
1961/62	2378	258	10.85	129	5.42
1962/63	2516	305	12.12	183	7.27
1963/64	2946	393	13.34	328	11.13
1964/65	3145	503	15.99	378	12.02
1965/66	3361	615	18.29	548	16.30
1966/67	3614	602	16.65	562	15.55
1967/68	2950	484	16.40	384	13.02
1968/69	2878	438	15.21	344	11.95
1969/70	3851	550	14.28	531	13.79
1970/71	5621	883	15.71	900	16.01
1971/72	7098	1283	18.08	1377	19.39
1972/73	7703	1401	18.19	1637	21.25
1973/74	9001	1506	16.73	2165	24.05
1974/75	16962	3231	19.05	6732	39.69
1975/76	20405	4939	24.20	5404	26.48
1976/77	25449	6335	24.89	7101	27.90
1977/78	28015	8243	29.42	7937	28.24
1978/79	28737	9031	31.43	6814	23.71

Source:International Monetary Fund,International Financial Statistics, 1982.

Table 3:9 Composition of Gross Fixed Capital Formation.
{Amount (Nm) and Percentage Distribution (%)}
1960/61 -1981*

Year	Total	Building &Construction		Land		Transport		Machinery	
	(Nm)	(Nm)	(%)	(Nm)	(%)	(Nm)	(%)	(Nm)	(%)
1960/61	321.0	184.2	57.4	23.0	7.2	48.0	15.0	65.8	20.5
1961/62	370.2	194.4	52.5	62.0	16.7	41.8	11.3	72.0	19.4
1962/63	352.0	210.2	59.7	51.2	14.5	24.0	6.8	66.6	18.9
1963/64	388.6	220.8	56.8	66.2	17.0	33.2	8.5	68.4	17.6
1964/65	501.2	237.8	47.3	64.2	12.8	52.2	10.4	147.0	29.3
1965/66	585.0	300.0	51.3	68.2	11.7	56.2	9.6	160.6	27.5
1966/67	550.0	296.2	53.9	64.8	11.8	52.2	9.5	136.8	24.9
1967/68	462.0	252.2	54.6	49.4	10.7	49.8	10.8	110.6	23.9
1968/69	405.0	217.2	53.6	42.8	10.6	46.0	11.4	99.0	24.4
1969/70	465.6	292.0	62.7	25.9	5.6	59.1	12.7	88.6	19.0
1970/71	689.9	417.0	55.7	24.1	3.2	127.7	17.1	179.3	24.0
1971/72	954.4	588.2	55.2	28.9	2.7	152.3	14.3	295.9	27.8
1972/73	1140.2	712.9	62.3	32.6	2.9	151.1	13.2	248.2	21.2
1973/74	2502.0	1919.4	76.7	30.7	1.2	228.6	9.1	323.3	12.9
1974/75	2491.5	1852.3	74.4	45.8	1.8	291.1	11.7	302.3	12.1
1975/76	3249.7	2001.6	61.6	43.6	1.3	531.0	16.3	673.5	20.7
1976/77	5218.5	2942.3	56.5	47.1	0.9	1025.0	19.7	1203.2	23.1
1977/78	5857.6	3445.2	58.4	51.7	0.9	937.0	16.0	1422.9	24.3
1978/79	5491.2	3506.1	63.8	51.7	0.9	687.0	12.5	1246.0	22.7
1979/80	5044.7	3510.9	69.6	51.2	1.0	626.0	12.4	856.5	17.0
1980/81	5790.6	3874.6	66.9	56.7	1.0	754.0	12.9	1104.8	19.1
1981	6215.1	4095.2	65.9	56.6	0.9	866.1	13.9	1197.2	19.3

* figures for 1960/61 -1972/73 are at 1962/63 factor costs; the rest are at 1973/74 factor costs.

Sources: Federal Office of Statistics, National Accounts of Nigeria, and Gross Domestic Product and Allied Macro Aggregates, Vol. 1, No. 1 April 1982.

It is however, interesting to observe that the structure of the Nigerian GFCF has barely changed over the years. Since the 1950's it has been dominated by the expenditure on building and construction which in 1981 accounted for more than 65 percent of total capital formation in the economy. The contribution of machinery and of transport equipment sectors has remained fairly low and been subject to considerable fluctuations. The distribution of GFCF over the years is depicted in Table 3:9. It can be seen that out of a total positive increase of about N819 million (1962/63 factor cost), the increases of the expenditures on building and construction, transport equipment and machinery were respectively N528.7 million (64.5%), N103.1 million (12%) and 182.4 million (22%); similarly the increase of N371.3 million recorded for the value of GFCF (at 1973/74 factor cost) between 1973/74 and 1981 was contributed largely by increases in expenditure on building and construction (N2175.8 million or 59%) followed by machinery (N973.9 or 23.5%) and transport equipment (N637.5 or 17%). This is hardly a reflection of the rapid structural shifts in the economy and clearly indicates the relative insignificance of the machinery producing sectors in the economy.

Under normal circumstances the high ratio of capital formation to GDP would indicate a similarly high ratio of saving to income. However, until quite recently the saving performance of the country was anything but impressive. In columns 4 and 5 of table 3:8 are presented the level of savings and the ratio of savings to GDP in 1975 prices. Both have to be interpreted with care since they were derived as a residual and could therefore be subject to some statistical errors of unknown magnitude. The saving-income ratio rose from 8.3 percent in 1952/53 to slightly above 11 percent in 1956/57. Between

1957/58 and 1969/70, the ratio fluctuated considerably from about 5 percent in 1961/62 to 16 percent in 1965/66. The discrepancy-often large - between the saving - ratio and the investment ratio is a notable feature of the economy during most of the period. Such a discrepancy was probably not as disturbing to the government as one would have thought, especially in the latter years since it could easily be financed by the running down of external reserves or as in earlier years, of surpluses accumulated by the Statutory Marketing Boards. In addition, the financing of investment has often been made available on very easy terms from governmental sources and as a result the need of the business sector to save would have been considerably reduced.

The savings performance of the economy in more recent years while not spectacular, is more respectable, thanks mainly to the increasing earnings from the export of petroleum. Between 1971/72 and 1978/79, the saving income ratio averaged more than 20 percent, rising from 19 percent in the former to 23.7 percent in the latter year, having reached a peak of 39.7 percent in 1974/75.

Of particular interest is also the response of output to the substantial increases in the capital stock. This can be usefully employed to assess the extent to which the capital stock was used productively and efficiently. One such measure is the incremental output-capital ratio (or its inverse the capital-output ratio) computed and presented in Table 3:10. The ICOR has been so highly erratic as to make any firm conclusion about investment productivity during the entire period difficult. In general terms, and making use of the results of studies elsewhere conducted, it does seem that investment efficiency in Nigeria was on the low side. For example,

Table 3:10 Incremental Output-Capital and Capital-Output Ratios in the Nigerian Economy (1952/53 -1978/79)

Year	Capital Output Ratio	ICOR*
1952/53	----	----
1953/54	1.16	0.86
1954/55	0.98	1.02
1955/56	1.96	0.52
1956/57	0.90	1.11
1957/58	0.55	1.83
1958/59	0.43	2.35
1959/60	0.27	3.76
1960/61	2.12	0.47
1961/62	0.08	11.94
1962/63	0.53	1.87
1963/64	1.41	0.71
1964/65	0.51	1.96
1965/66	0.43	2.32
1966/67	0.41	2.44
1967/68	-1.11	-0.90
1968/69	-0.15	-6.83
1969/70	2.22	0.45
1970/71	3.22	0.31
1971/72	1.69	0.59
1972/73	0.47	2.13
1973/74	0.93	1.08
1974/75	5.26	0.19
1975/76	1.06	0.94
1976/77	1.02	0.98
1977/78	0.41	2.46
1978/79	0.88	11.31

* GDP(t+1) - GDP(t)/GFCF(t).
Source: Computed from Table 3:8.

the gross investment ratio increased from 11 percent to 13 percent during the period 1960-65 and 1965/70 respectively, and averaged about 12.0 percent in the period 1960-1970; On the other hand, for the same periods GDP decreased from about 5 percent to about 3 percent and averaged about 4 percent, indicating the fact that the increased investment was not matched with corresponding increased output as one would expect, at least on theoretical grounds.

Table 3:11 Growth Rates of GDP, Investment Ratio and the Incremental Capital Output Ratio (1960-1970)

(%)

Year	Annual rate of growth of GDP	Gross Investment Ratio (constant prices)	ICOR (constant prices)
1960-65	4.78	11.4	2.4
1965-70	2.69	12.9	4.8
1960-70	3.73	12.2	3.3

SOURCE: Olaloku, F.A. et.al. The Structure of the Nigerian Economy. The University of Lagos Press 1979, Table 8:4, p156.

3:3 The Nigeria's External Sector 1950-1978

Although in a formal sense, the saving/investment disequilibrium is identical with the export/import imbalance, one may gain a better insight by analysing these variables separately. In this section therefore we focus on the level and growth of Nigeria's traditional exports (i.e. agricultural and petroleum exports) and imports while deferring the discussion on manufactured exports to later sections.

One of the principal features of Nigerian economy is its extreme dependence on external trade. Since the end of the second World War, the propulsive and dominant sectors in the economy have always been external: during the 1940's and 1950's, agricultural exports played the dominant role only to be replaced by oil exports from the middle of the 1960's[9]. The openness of the economy is partly suggested by the fairly high ratios of exports and imports to GDP over the years. Thus during each of the years 1952/53 to 1969/70, Nigeria's exports and imports were typically close to 15 percent of GDP and during most of the 1970's the ratios were typically much higher. The composite ratio has remained slightly above 30 percent throughout the 1950's and 1960's, reaching a peak of about 62 percent in 1977/78.

The importance of trade is further suggested by the following figures: Nigeria's total exports in 1970, 1971, 1972 and 1979 amounted to US$1,239.6, 1,810.6, 2,180.3 and 18,073 million respectively and represented (a) 41.5, 53.6, 53.4 and 76.0 percent of the total exports of all West-African countries combined and (b) 10.6, 15.1, 15.4 and 16.0 percent of the total exports of all African countries except South-Africa. It is instructive to note also that in each of these years except 1979, the value of Nigeria's exports was the second highest in Africa, while in value-terms, Nigeria's imports surpassed that of any single country in the region[10].

Table 3:12 depicts the level of merchandise imports, domestic exports and re-exports and the behaviour of trade balance from 1950 to 1978. Broadly speaking the period can be divided into 3 parts, the first from 1950 to 1954, the second from 1955 to 1965 and the third thereafter. The principal feature of the first and the third periods is the relatively large surplus on trade recorded for each of the years. Between 1950 and 1954, total exports - including re-exports -

Table 3:12 Value of Nigeria's External Trade and Visible Balance 1950-1978 (N,000)

Year	Merchandise Imports	Merchandise exports Domestic	Re-exports	Visible Balance
1950	123732	176974	3470	56604
1951	169108	233220	6910	71020
1952	226536	250270	8790	32524
1953	216580	241778	6686	31884
1954	228138	292484	6580	70926
1955	272234	259632	5436	-7166
1956	305426	264522	4624	-36280
1957	304936	248354	6714	-49868
1958	332548	265582	5518	-61448
1959	356810	321010	5984	-29632
1960	431782	382428	n.a.	-92354
1961	445038	340134	7122	-97782
1962	406438	328028	9216	-69194
1963	415112	369730	9614	-35768
1964	507760	420924	8376	-78460
1965	550788	526492	10046	-14250
1966	513992	557394	10774	54176
1967	447100	476192	7444	36536
1968	385162	413010	9160	37008
1969	497382	629262	7042	138922
1970	756420	877060	8306	128946
1971	1078906	1280836	12500	214430
1972	990064	1421770	12442	444148
1973	1224786	2269370	9045	1053629
1974	1737324	5783883	10954	4055713
1975	3721476	4920185	9148	1189857
1976	5148475	6743715	7351	1602591
1977	7089718	7621716	8971	540969
1978	8140788	6308490	16271	-1816027

* fiscal year beginning January 1st.

Sources: Central Bank of Nigeria, Economic and Financial Review
Federal Office of Statistics, Annual Abstract of Statistics, (1981 edition), p 107.

Table 3:13 Share of Nigeria's Foreign Trade in GDP 1952/53 - 1978/79 (1975 prices)

Year	Exports		Imports		Composite
	Nm	%of GDP	Nm	%of GDP	ratio
	1	2	3	4	5=2+4
1952/53	228	19.42	207	17.60	37.02
1953/54	253	20.05	221	17.51	37.56
1954/55	257	18.79	224	16.37	35.16
1955/56	309	19.41	252	15.83	35.24
1956/57	256	15.02	305	17.89	32.91
1957/58	283	15.70	338	18.76	34.46
1958/59	272	14.47	351	18.67	33.14
1959/60	287	14.79	366	18.87	33.66
1960/61	350	14.58	487	20.29	34.87
1961/62	346	14.55	475	19.97	34.52
1962/63	364	14.47	486	19.32	33.79
1963/64	410	13.92	475	16.12	30.04
1964/65	462	14.69	587	18.66	33.35
1965/66	578	17.19	645	19.19	36.38
1966/67	599	16.57	639	17.68	34.25
1967/68	521	17.66	621	21.05	38.71
1968/69	467	16.23	561	19.49	35.72
1969/70	683	17.74	702	18.22	35.96
1970/71	954	16.97	937	16.67	33.64
1971/72	1422	20.03	1328	18.71	38.74
1972/73	1522	19.76	1286	16.69	36.45
1973/74	2467	27.41	1808	20.09	47.50
1974/75	6244	36.81	2743	16.17	52.98
1975/76	5453	26.72	4988	24.44	51.16
1976/77	7840	30.81	7074	27.79	58.60
1977/78	8481	30.27	8787	31.36	62.63
1978/79	7373	25.66	9590	33.37	59.03

Source: computed from IMF(1982),op cit.

grew at a compound rate of 14 percent, per annum compared with a corresponding rate for imports of 7 percent. The higher value of exports than imports in each of the years resulted in favourable trade balances. It has been suggested by economic historians that the tremendous increase in the value of total exports during most of these years resulted mainly from the post-war economic reconstruction in Europe which led to increased demand for Nigeria's major export products; meanwhile the wartime restrictions on the importation of many of the goods were only partially lifted so that the level of imports was much lower than it would have been[11].

During the second period however, the value of merchandise exports increased rather slowly and throughout the period, there was a persistent deficit in the country's balance of trade. Imports continued to accelerate partly because of the relaxation of import controls just before independence and partly too because the growth of the economy from the boom in agricultural exports in the previous period, was generating demand for increased amounts and a wider range of consumer goods. From 1966, the non-oil sector continued to record large deficits on current account. These however, were turned into surpluses, thanks to the tremendous growth in petroleum exports. Between 1966 and 1970 the average annual rate of growth of exports (imports) was about 12 percent (10 percent) while between 1971 and 1978 an average annual growth rate of about 27 was recorded.

The diversification of Nigeria's exports in the past three decades is an interesting aspect of their performance. In each of the years between 1950 and 1961, exports originating from the agricultural sector formed at least 81 percent of total exports. Between 1962 and 1968 the proportion fluctuated between 50 percent and 77 percent and

Table 3:14 Annual Average Growth rates of Nigeria's Mqjor Export Groups 1950-1978.

Year	Exports			
	Agricultural		Petroleum	
	Nm	%	Nm	%
1950	---	---	---	----
1951	47.95	29.97		
1952	19.93	9.59		
1953	-1.34	-5.85		
1954	46.48	21.67		
1955	-35.87	-13.75		
1956	6.42	2.85		
1957	-14.68	-6.34		
1958	21.97	10.13		
1959	35.98	15.07		
1959	35.98	15.07	3.45	176
1960	7.20	2.62	3.41	63.14
1961	1.00	0.35	14.27	161.89
1962	-2.30	-8.13	10.39	44.98
1963	25.90	9.96	6.87	20.53
1964	13.10	4.58	23.76	58.89
1965	23.40	7.82	72.08	112.42
1966	-29.90	-9.72	47.75	35.06
1967	-28.00	-9.57	-39.73	-21.59
1968	9.90	3.74	-70.22	-48.69
1969	13.80	5.03	198.02	267.61
1970	-23.00	-7.98	237.77	87.41
1971	-27.00	-10.18	443.21	86.94
1972	-89.20	-34.15	223.20	23.42
1973	78.10	45.41	717.30	60.98
1974	25.90	10.36	3472.20	183.37
1975	-45.40	-16.45	-802.60	14.96
1976	43.50	18.86	1758.50	38.54
1977	101.60	37.07	751.20	11.88
1978	37.10	9.87	-1671.00	-23.63

Source: computed from Table 3:15.

Table 3:15 Value of Exports of Major Commodities 1950-1978.
(N,000)

Year	Total exports*	Non-Petroleum exports	%	Agricultural exports	%	Petroleum exports	%
1950	180444	180044	100.0	155960	88.7	------	----
1951	240130	240130	100.0	207904	86.6	------	----
1952	259060	259060	100.0	227834	87.9	------	----
1953	248464	248464	100.0	214498	86.3	------	----
1954	299064	099064	100.0	260982	87.3	------	----
1955	265068	265068	100.0	225108	84.9	------	----
1956	269146	269146	100.0	231526	86.0	------	----
1957	255068	255068	100.0	216846	85.0	------	----
1958	271100	269144	99.3	238818	88.1	1956	0.70
1959	326994	321590	98.4	274800	84.1	5404	1.65
1960	339428	321200	94.6	282000	83.1	8816	2.59
1961	347256	323800	93.3	283000	81.5	23092	6.65
1962	337072	300700	89.2	260000	77.2	33478	9.93
1963	379344	338992	89.4	285900	75.4	40352	10.64
1964	429300	365100	85.1	299000	69.7	64114	14.14
1965	536538	400600	74.7	322400	60.1	136194	25.38
1966	568168	384300	67.6	292500	51.5	183946	32.38
1967	483636	338800	70.1	264500	54.7	144216	29.82
1968	422170	348200	82.5	274400	65.0	73998	17.53
1969	636304	364282	57.25	288200	45.3	272022	42.75
1970	885366	375400	42.4	265200	29.9	509790	57.58
1971	1221337	268337	21.9	261200	21.4	953000	78.03
1972	1434212	258000	18.0	172000	12.0	1176200	82.01
1973	2277442	383900	16.9	250100	11.0	1893500	83.14
1974	5794837	429100	7.4	276000	4.8	5365700	92.59
1975	4925493	362400	7.4	230600	4.7	4563100	92.64
1976	6751066	429500	6.4	274100	4.1	6321600	93.64
1977	7630687	557900	7.3	375700	4.9	7072800	93.64
1978	6324761	923160	14.6	412800	6.5	5401600	85.40

* including re-exports.
Sources: Central Bank of Nigeria, Economic and Financial Review; FOS, Annual Abstract of Statistics (1981 edition), p107.

by 1969, it began to decline steadily from about 45 percent to an average of about 4 percent in the period 1974-1977. During the 1950's and 1960's, the export crops of cocoa, ground nuts, cotton, palm products and rubber were the strategic products of the Nigerian economy providing more than 75 percent of the total export earnings. Nigeria was the world's largest exporter of ground-nuts in the 1950's and 1960's, and of palm oil products until the beginning of the last decade, and was the second largest exporter of cocoa. In 1946, 1950 and 1960 these three export crops accounted for 63.5, 70 and 61 percent of Nigeria's total exports. By the middle of the 1960's, these export products still accounted for about 50 percent of total export earnings although the value of petroleum exports by 1965 surpassed the export value of any single crop. Earnings from oil exports increased from less than N2 million in 1958 to about N9 million in 1960 and N1,176 million in 1972. The major turning point was in 1973 when oil prices almost quadrupled (from a level of US$3.8 per barrel to a level of US$14.7 per barrel). Nigeria's exports of petroleum thus increased between 1973-1974 by almost 300 percent. This tremendous increase in the value of petroleum exports dwarfed the role of agricultural export earnings in total exports. Whereas agricultural exports in 1960 accounted for 3/4 of the value of total exports, they fell to a minimum level of 2.4 in 1980, while petroleum exports moved in the opposite direction from a level of 2.7 percent of total export value in 1960 to a level of more than 95 percent in 1980.

The change in the relative position of the agricultural and petroleum exports is further depicted in the table below. Between 1950 and 1957, total exports, including re-exports increased by about N75 million. Agricultural exports alone contributed about N57 million

(76 percent) to the increase, the rest being accounted for by the export of tin ores and columbite. Between 1958 and 1965, oil exports contributed slightly more than 50 percent of the total increase in exports, leaving agriculture with a share of 31 percent. By the middle of the 1960's the transformation of Nigeria to a predominantly oil exporting economy was virtually complete. Of the increase in exports amounting to N5756.6 million, exports of petroleum amounted to N5217.7 (90 percent) leaving agriculture with just 2 percent.

Table 3:16

Contribution of Major Exports to Increases in Total Exports: 1950-1978

Increase in	1950-1957		1958-1965		1966-1978	
	Nm	%	Nm	%	Nm	%
Total Exports	74.624	(100)	215.438	(100)	575.66	(100)
Petroleum Exports		-	134.238	(50.5)	521.78	(90.63)
Non-Petroleum Exports	74.624	(100)	131.456	(49.48)	538.86	(9.4)
Agriculture Exports	56.886	(76.23)	83.582	(31.49)	120.3	(2.09)

SOURCE: computed from table 3:15

The relative worsening of the agricultural exports was however not entirely because of the rising relative importance of petroleum exports. Indeed as table 3:14 reveals, the former have been characterised by low rates of increases, save for few odd years, even before the advent of the latter. It can be discerned from the table

Table 3:17 Distribution of Nigeria's Primary Exports by Major Commodities 1946 - 1977.

Commodity	1946 Nm	1946 %	1950 Nm	1950 %	1960 N	1960 %	1965 N	1965 %	1970 Nm	1970 %	1974 Nm	1974 %	1976 Nm	1976 %	1977 Nm	1977 %
Cocoa	7.6	15.4	38.0	21.1	73.5	21.7	85.4	15.9	133.0	15.0	159.0	2.7	218.9	3.3	311.1	4.1
Groundnuts	11.3	22.9	30.4	16.9	45.8	13.5	75.6	14.1	43.6	4.9	6.8	0.1	0.2	*	*	*
G/nut oil	n.a	n.a	0.5	0.3	10.6	3.1	20.0	3.7	23.2	2.6	11.4	0.2	*	*	*	*
Palm kernel	8.3	16.9	33.4	18.5	52.1	15.4	53.1	9.9	21.8	2.5	43.7	0.8	27.0	0.4	32.6	0.4
Palm oil	4.1	8.3	24.1	13.4	28.0	8.2	27.2	5.1	1.2	0.2	*	*	0.5	*	*	*
Hides&Skins	2.7	5.5	12.8	7.1	8.6	2.5	9.1	1.7	5.6	0.6	10.6	0.2	6.8	0.1	5.7	0.1
Rubber	2.8	5.7	5.7	3.1	28.5	8.5	22.0	4.1	17.4	2.0	33.2	0.6	14.4	0.2	11.1	0.1
Timber	0.7	1.4	4.9	2.7	14.1	4.1	12.5	2.3	6.2	0.7	11.2	0.2	0.9	*	0.5	*
Cotton	1.1	2.2	6.0	3.3	12.4	3.7	6.6	1.2	13.2	1.5	*	*	*	*	10.1	0.1
Petroluem	n.a	n.a	n.a	n.a	8.8	2.6	136.2	25.4	510.0	57.6	5365.7	92.6	6321.7	93.7	7072.8	92.7
Columbite	0.3	0.6	0.6	0.3	4.2	1.3	2.3	0.4	2.0	0.2	1.4	*	2.5	*	6.3	0.1
Tin Ore	5.7	11.6	12.0	6.7	12.1	3.6	*	*	*	*	*	*	*	*	*	*
Tin Metal	n.a	n.a	n.a	n.a	n.a	n.a	29.8	5.6	33.8	3.8	26.4	0.4	15.5	0.2	13.3	0.2
Others	4.6	9.3	8.5	4.7	35.5	10.4	56.7	10.6	74.4	8.4	125.4	2.2	142.7	2.1	167.2	2.2
	49.3	100.0	180.4	100.0	339.4	100.0	536.5	100.0	885.4	100.0	5794.8	100.0	6751.1	100.0	7630.7	100.0

Notes: n.a. implies not data not available.
* negligible.

Sources: Olaloku,F.A.(1976),op cit,p228;Central Bank of Nigeria,Annual Reports and Statement of accounts.

that by the middle of the 1960's agricultural exports began to decline even absolutely. Various possible explanations offered run from the familiar arguments of inherent instability in international market demand for agricultural exports, through to the domestic investment and agricultural policy of the government, to the recent developments in the Nigerian economy, although it is extremely difficult to disentangle the effects of each of these with any degree of precision.

The single most emphasised factor contributing to the decline was perhaps the Nigerian government's exploitative Marketing Board policy. When initially set up in 1946 and 1949 by the colonial administration, these monopoly trading institutions - the Marketing Boards - were charged with the responsibility of stabilising export prices by setting up a buffer between export producers and the fluctuating world commodity prices. Over the years however, they were increasingly used to extract surpluses from the agricultural export producers for the financing of regional development projects. Very often export producers were paid only about half of the world market prices for their produce while the rest accrued to the governments. This was clearly noted by a World Bank Mission to Nigeria:

> "Although the original objective in establishing the Marketing Boards was to stabilise prices earned by farmers to improve the Marketing Organisation, they have been used during the sixties as a convenient instrument for taxing agriculture... the return to the farmers engaged in production of exports is low"[12]

The 1972 Marketing Board reforms introduced by the Federal Government did little to encourage the farmers back to the farm. Apparently the peasants had by then decided to shift to the production of food crops the prices of which were rising and not subject to government controls[13].

It is also generally agreed that some of the poor performance of the 1970's had certainly been due to bad weather. The sub-Sahara region experienced a quick succession of drought years between the late 1960's and 1973/74 with only one or two years of recovery in between. A period of satisfactory weather in the mid 1970's was then followed by a number of poor years starting in 1977/78.

The changes that have occurred in the country's trade structure cannot be divorced from the recent developments in the domestic economy. From the middle of the 1970's the booming economy of the Nigerian home market, demanded a growing share of agricultural produce which would normally be exported. Thus for example, advances in manufacturing might have accounted, at least partially, for the decline in the export of cotton, palm oil, hides and skins and rubber, while population growth and rising income levels could have led to increases in the demand for items such as vegetable oil. The export of such raw materials were either banned or regulated by means of a general export tariff, licencing and quotas in order to produce an adequate domestic supply at favourable prices, and foster the elaboration of national raw material goods. The attempt to alter the allocation of resources in favour of industry became more real.

3:4 The Manufacturing Sector: Growth and Structural Characteristics

From the foregoing it is apparent that modern manufacturing activity in Nigeria is a fairly recent phenomena and the country's degree of industrialisation must be rated as one of the lowest in the world, despite, as we shall see, the recent - i.e. post independence - industrial tempo. The relative backwardness of the manufacturing sector has its roots in the colonial policy and structure. Prior to independence in 1960, the country like all other colonies in Africa and Asia was seen mainly as a vast source of raw materials for, as well as a vast market of consumer goods manufactured in the industrially advanced West. The indigenous small scale village industry that there was, was said to have been virtually destroyed by imports of consumer goods and the few foreign firms which dominated the export-import trade resisted further industrialisation in the country in order to protect their trading interests[14].

In this section we shall examine the contribution of the sector to the growth in National Income and the growth as well as the output and input structure of the individual branches of the manufacturing sector. The policies that were employed to promote industry will be examined in the next chapter.

The sector's contribution to National income over the period 1950 to 1979/80 was depicted in Table 3:4. Its share in GDP averaged 21.7 percent between 1950 and 1957 and 6.51 and 5.82 percent respectively during the 1960's and 1970's. The largest contribution made by the sector (8.10%) was in 1969/70. This fell to less than 4 percent in 1974/75 and remained thereafter close to the average of 5.82 percent.

The relative insignificance of the sector can be judged by comparing these shares with the corresponding shares achieved in other countries. In 1960 and 1979, the average contribution of manufacturing to GDP was 11 and 13 percent respectively for all low income countries, 22 and 25 percent for middle income and 30 and 27 percent for industrialised countries. Moreover of the 79 developing (low and middle income) countries for which data is available, 63 had a share of at least 9 percent in 1978; in 1960 of 71 countries, 59 had

Table 3:18 Comparison of Actual (A) and Derived or Normal (N) Structure of Nigeria's Manufacturing Industry, 1957 - 1972.

		Sector	1957		1967		1972	
			(A)	(N)	(A)	(N)	(A)	(N)**
6	3111/3122	Food					10.50	16.53
	3111/3122)	Food)						
7	3131/3133)	Alcoholic bev.)	0.202	0.899	0.613	0.903	15.10	7.51
8	3134)	Non-alcoh.bev.)						
9	3140)	Tobacco)					8.70	5.68
10	3211	Textiles	0.029	0.650	0.478	0.655	15.50	17.46
12	3220	Apparel					1.51	1.51
13	3231/3233	Leather	0.992	0.760	0.999	0.765	0.51	0.58
14	3240*	Footwear	0.004	0.970	0.519	0.990	0.30	0.86
15	3311/3320	Wood	0.774	0.803	0.882	0.812	2.30	2.01
16	3412/3420	Paper	0.312	0.757	0.539	0.761	2.00	1.55
17	3511/3512)	Chemicals)					0.40	5.06
18	3521)	Paints)						
19	3522)	Drugs)	0.364	0.640	0.570	0.643	8.20	7.29
20	3523)	Soap)						
21	3529/3540)	Other Chems.)					9.40	2.19
22	3551/3560	Rubber	0.398	0.900	0.749	0.959	3.40	1.90
23	3610/3699	Cement	0.098	0.666	0.596	0.753	4.30	4.75
24	3710/3812	Basic metals					0.50	3.93
25	3813/3819	Fab.metals	0.057	0.395	0.295	0.410	10.70	3.51
26	3822/3829	Machinery	---	0.169	0.049	0.172	0.20	1.62
27	3832/3839	Elect. equip.					1.20	2.64
28	3841/3843	Transp. equip.	0.036	0.549	0.488	0.578	----	4.43
29	3851/3909	Misc. products					0.50	0.80

* 1957 and 1967 figures are for 3240(Footwear) and 3220(Wearing apparel)

** (A)=actual shares, (N)=normal shares.

Sources: Oyejide,T.A.(1975),op cit,pp.25
Federal Republic of Nigeria,<u>The Third Plan(1975-1980)</u> pp.150

shares greater than the 5 percent share achieved in Nigeria (see Table 3:1 and reference therein).

A comparison of the actual with the derived or expected 'normal' pattern of industrial output can also be used to indicate the infancy and relative backwardness of the sector[15]. The relevant information is depicted in Table 3:18. As of 1957, of the number of industries for which data is available, only one, leather products, had an actual share greater than its expected or normal; in 1972, 21 of the 28 industrial branches had actual shares much below their expected 'normal' shares. For the remaining nine sectors - Beverages, Tobacco, Wood and Furniture, Paper, Printing and Publishing, Petroleum Products, Rubber and Plastic products and Metal products - the higher than normal shares achieved is more of a reflection of the availability of raw materials in the economy than of any extra effort at industrialisation.

To determine more closely the intertemporal changes that have occurred within the manufacturing sector we present in table 3:19 time series estimates of gross output, value-added, number of establishments, number of people employed, wages and salaries paid and net capital expenditure incurred over the 1963-78 period. The annual rate of change of each variable is also presented. In table 3:20 we present the annual rate of growth of output, purchased inputs and primary factors for each of the 24 manufacturing sub-sectors.

Over the 16 year period under consideration, the number of industries employing ten or more people increased by 426 from 649 in 1963 to 1075 in 1978. This represented only a 2-fold increase and a 3 percent annual average growth rate.

However, it can hardly be denied that the real gain in industrial production since independence has been immense. Over the

Table 3:19 Trend in Output, Value-added, Employment and Related Variables, Total Manufacturing Sector (1963 - 1978).
[1975 Prices]

Year	Establishments no.	Establishments rate of change%	No. of People Employed total	rate of change%	Nigerians	Foreign	Gross output (N,000)	Rate of change %	Value-added (N,000)	rate of change% %	Value-added/output	Wages (N,000)	rate of change %	Wages/output %
1963	649	---	65798	---	64155	1643	5339.88	---	2145.7	----	40.20	790.6	----	9.9
1964	687	5.9	76342	16.02	72560	1782	7007.38	31.22	2084.9	25.12	38.30	845.3	6.9	8.6
1965	776	12.9	95614	25.24	93271	2343	8571.71	22.32	3325.5	23.86	38.80	862.5	2.0	8.2
1966*	464	-40.2	65260	-31.75	63541	1719	6803.92	-20.62	2626.0	-21.03	38.60	893.9	3.6	6.8
1967*	555	19.6	76440	17.13	74500	1940	8024.91	17.95	3204.8	22.04	39.90	965.3	7.9	8.1
1968*	625	12.6	86728	13.46	84688	2040	9509.23	18.49	3925.8	22.49	41.30	1008.4	4.5	9.2
1969*	639	2.5	102532	18.22	100106	2426	11119.51	16.93	5073.9	29.25	45.60	895.7	-11.2	8.3
1970	704	10.17	127162	24.02	124911	2251	13280.47	19.43	5184.3	2.18	39.00	847.1	-5.4	9.4
1971	870	23.58	145445	14.38	142990	2455	13215.57	-0.49	6128.1	18.21	46.40	850.7	0.4	9.4
1972	1052	20.9	167470	15.14	164731	2739	14486.86	9.62	6849.8	11.78	47.30	890.6	4.7	10.3
1973	1008	-4.2	166820	-0.39	164487	2333	16486.62	13.80	7753.8	13.19	47.00	950.8	6.8	8.9
1974	1036	2.8	175299	5.08	172648	2651	19201.68	16.47	9114.4	17.55	47.50	1065.9	12.1	9.7
1975	1290	24.5	244243	39.33	n.a	n.a	26110.91	35.98	11853.3	30.05	45.40	1025.8	-3.8	9.4
1976	1276	-1.1	271382	11.11	266990	4388	30939.17	18.49	14196.7	19.77	45.90	1054.5	2.8	9.3
1977	1418	11.1	324442	19.55	321140	3307	33473.06	8.19	14387.7	1.35	43.00	1036.1	-1.7	10.1
1978	1078	-24.2	305495	-5.83	302020	3477	36670.83	9.55	16657.2	15.77	45.40	1214.8	17.2	10.1
Average annual growth	3%		10.80%		10.8%	5.12%	13.71%		14.64%			1.9%		

Note: * do not include figures from the eastern part of Nigeria.
Source: Federal Office of Statistics, Industrial Survey of Nigeria, 1963-1978.

period 1963-78, the manufacturing sector output has grown at an annual compound rate of 14.6 percent. An analysis of value-added originating from the sector shows that in current prices, it has increased ten fold from N109 million in 1963 to N226 million in 1978. It is significant that even after allowing for price increases, the increase in value-added was about eight-fold between these periods from N2,145,700 in 1963 to N16,65 7,000 in 1978. It can also be seen that the gross output series has shown a fairly consistent upward trend except for the sharp drop during the country's political crisis.

The growth rates of both gross output and value-added look rather impressive for at least two reasons. First, the sector had not only kept pace with the phenomenal process of expansion of the whole economy but surpassed even the latter's rate of growth throughout the decade of the sixties and seventies. The rate of GDP growth rose from about 3 percent during the period 1960-70 to about 8 percent during the period 1970-79. Corresponding growth rates of the sector during these two periods have been 12 and 11 percent respectively. Second, despite its relative infancy, it has kept pace with the rate of growth of the manufacturing sector in other countries. For example, of the 9 African countries for which the average annual growth rates of manufacturing are available for the decade 1960-70, the Nigerian sector ranks 2nd. Of the 27 countries for which 1970-79 data are available it ranks highest and of the 66 middle-income countries only 4 - Indonesia, Yemen, Syria and Republic of Korea - had annual average rate of manufacturing growth that surpassed that of Nigeria, between 1970-79[16]. Table 3:21 depicts the average annual rates of growth of manufacturing output in selected countries.

There is considerable variation in the rate of output growth achieved by the individual industries within the sector - with the

Table 3:20 Average Annual Growth Rates of Output and Factor Inputs in Manufacturing Industry,1963 -1978.

Sectors	labour	capital	raw mat	value added	gross output	wages/ head
consumer goods	10.56	13.94	12.62	14.31	13.04	1.37
Food	13.30	17.00	9.10	14.20	10.90	0.42
Alcoholic bev.	9.70	12.60	12.10	12.10	10.70	1.10
Non-alcoh.bev.	14.10	9.70	21.30	16.20	18.40	3.90
Tobacco	8.20	2.50	-2.70	-4.30	-3.90	-5.00
Textiles	14.60	16.30	17.80	15.30	16.60	2.60
Made-up text.	14.30	22.20	12.90	24.70	15.70	4.70
Apparel	9.30	30.50	8.50	15.30	12.60	2.60
Leather	9.50	-1.20	10.10	11.90	10.80	1.80
Footwear	11.40	12.50	10.40	15.80	13.00	1.90
Wood	6.00	20.20	9.60	6.90	9.20	-5.60
Paints	12.80	9.50	13.60	17.60	15.70	3.40
Drugs	10.10	15.50	33.60	35.70	33.90	1.96
Soap	14.30	17.00	18.70	18.10	18.50	1.71
Misc.products	1.20	10.80	1.70	0.80	1.50	3.70
Intermediates	11.28	18.03	11.89	15.14	12.77	1.87
Paper	9.30	5.10	17.50	17.70	17.80	3.50
Chemicals	13.20	28.10	12.40	12.50	12.50	2.50
Other Chems.	2.90	14.80	12.70	13.30	13.10	1.90
Rubber	12.60	5.30	12.70	14.80	13.70	1.30
Cement	12.60	12.60	11.70	13.30	12.30	-0.12
Basic metals	17.40	22.90	1.20	21.30	5.50	-0.01
Fab. metals	11.00	37.40	15.00	13.20	14.50	4.00
Capital goods	11.90	18.47	13.10	17.30	15.17	2.43
Machinery	19.00	23.30	17.20	26.50	21.90	-1.40
Elect. equip.	22.00	22.60	19.00	22.30	20.30	5.00
Transp. equip.	-5.30	9.30	3.10	3.10	3.30	-5.70

* trend rates of Growth
Sources: Computed from FOS,Industrial Surveys 1963 - 1978.

Table 3:21 An International Comparison of Average Annual Growth Rates of Manufacturing Sectors 1960-70 and 1970-1979.

Country/Region	Growth Rates (%)	
	1960-1970	1970-1979
Low-income	6.5m	3.7m
Middle-income	7.0m	6.6m
-Oil exporters	7.0m	8.2m
-Oil importers	7.5m	6.6m
Industrialized	6.2m	3.0m
Selected Countries		
(1) Africa		
Nigeria	9.10	11.80
Kenya	---	11.40
Ghana	---	4.40
Zambia	----	0.40
Ivory Coast	11.60	7.20
(2) Latin America		
Brazil	-----	10.90
Mexico	9.40	6.40
Chile	5.50	-1.00
Argentina	5.70	1.90
(3) Asia		
India	4.80	4.50
Pakistan	9.40	3.70
Malaysia	----	12.40
Korea	17.60	17.80

m implies median value;
-- implies not available
Source: The World Bank (1981),World Development Report, Table 2 pp. 138

lowest rate of - 4 percent registered for Tobacco products and the highest of 34 percent for Drugs and Medicines. On the whole however, the performance is fairly impressive. Of the 24 industries considered, about half have had a rate of output growth above the mean of 13 percent. Important growth sectors include Drugs and Medicine, Machinery and Electrical equipment, Soap and Perfumery and Paper Products, Printing and Publishing.

To facilitate a further analysis of structural changes, and assess the relative importance of industries in the manufacturing sectors we computed the percentage contribution of industries to total gross output, value-added employment and wages. These are presented in Table 3:22. In the first 5 columns of the table are simple averages of these variables for each sector while the sectoral shares of 1963, 1968, 1973 and 1978 are shown in the other columns.

The dominance of import-substituting industries producing mainly consumer goods can be readily observed from these tables. Over the 16 year period the average share of this group of industries in total gross output and value-added amounted to respectively 56.4 percent and 64.4 percent. The dominant constituents of the consumer goods sector in terms of contribution to output and value-added are industrial branches manufacturing food and related products, textiles, soap and perfumery and alcoholic beverages. Together these accounted for around 32 percent to 44 percent of the total output of the manufacturing sector in different years. In terms of employment provision, a similar pattern is observable: the consumer oriented sectors have maintained the lead over the years increasing their share from 60 percent in 1963 to about 65 percent in 1978. Here the bulk of the employment is accounted for by the industrial sectors producing

Table 3:22 Structure of Manufacturing by Output,Employment and Wages,in Selected years.

Sector	1963 - 1978 Average				1963			
	Gross output	Value added	Labour employed	Wages& salaries	Gross output	Value added	Labour employed	Wages& salaries
Consmer goods	0.564	0.644	0.616	0.595	0.591	0.729	0.605	0.600
6 3111/3122 Food	0.171	0.135	0.139	0.103	0.169	0.107	0.106	0.089
7 3131/3133 Alcoholic bev.	0.056	0.131	0.029	0.058	0.086	0.154	0.038	0.071
8 3134 Non-alcoh.bev.	0.013	0.017	0.012	0.012	0.017	0.031	0.012	0.011
9 3140 Tobacco	0.050	0.080	0.025	0.041	0.087	0.151	0.025	0.041
10 3211 Textiles	0.122	0.123	0.196	0.171	0.050	0.073	0.123	0.118
11 3212 Made-up text.	0.007	0.000	0.010	0.006	0.014	0.011	0.026	0.018
12 3220 Apparel	0.004	0.003	0.008	0.005	0.002	0.001	0.008	0.004
13 3231/3233 Leather	0.009	0.006	0.010	0.008	0.005	0.004	0.011	0.004
14 3240 Footwear	0.012	0.012	0.018	0.017	0.008	0.010	0.016	0.009
15 3311/3320 Wood	0.032	0.040	0.104	0.083	0.050	0.076	0.157	0.113
18 3521 Paints	0.008	0.009	0.005	0.008	0.006	0.006	0.004	0.005
19 3522 Drugs	0.017	0.019	0.015	0.021	0.044	0.044	0.033	0.052
20 3523 Soap	0.057	0.061	0.036	0.053	0.044	0.049	0.033	0.052
29 3851/3909 Misc.products	0.006	0.007	0.009	0.009	0.009	0.012	0.013	0.013
Intermediates	0.329	0.326	0.328	0.359	0.314	0.274	0.348	0.364
16 3412/3420 Paper	0.041	0.046	0.073	0.092	0.026	0.042	0.079	0.088
17 3511/3512 Chemicals	0.005	0.006	0.004	0.006	0.006	0.008	0.003	0.005
21 3529/3540 Other Chems.	0.063	0.083	0.021	0.031	0.044	0.044	0.033	0.052
22 3551/3560 Rubber	0.048	0.051	0.069	0.066	0.056	0.052	0.114	0.087
23 3610/3699 Cement	0.041	0.052	0.051	0.052	0.045	0.065	0.045	0.051
24 3710/3812 Basic metals	0.057	0.029	0.035	0.033	0.078	0.008	0.009	0.011
25 3813/3819 Fab. metals	0.074	0.059	0.075	0.079	0.059	0.055	0.065	0.070
Capital	0.110	0.065	0.074	0.092	0.205	0.115	0.140	0.174
26 3822/3829 Machinery	0.006	0.008	0.006	0.006	0.004	0.005	0.004	0.006
27 3832/3839 Elect. equip.	0.015	0.012	0.012	0.013	0.002	0.002	0.004	0.004
28 3841/3843 Transp. equip.	0.089	0.045	0.056	0.073	0.119	0.108	0.132	0.164

contd.

Table 3:22 contd. (Structure of Industry by output and employment)

Sector	1968 Gross output	1968 Value added	1968 Labour employed	1968 Wages& salaries	1973 Gross output	1973 Value added	1973 Labour employed	1973 Wages& salaries
Consmer goods	0.581	0.674	0.609	0.640	0.621	0.653	0.599	0.599
6 3111/3122 Food	0.176	0.134	0.109	0.085	0.191	0.147	0.133	0.106
7 3131/3133 Alcoholic bev.	0.084	0.158	0.028	0.129	0.106	0.183	0.028	0.055
8 3134 Non-alcoh.bev.	0.007	0.012	0.010	0.007	0.015	0.012	0.009	0.007
9 3140 Tobacco	0.044	0.078	0.028	0.050	0.047	0.079	0.025	0.054
10 3211 Textiles	0.144	0.162	0.200	0.162	0.129	0.107	0.236	0.187
11 3212 Made-up text.	0.019	0.016	0.039	0.023	0.009	0.006	0.018	0.014
12 3220 Apparel	0.004	0.005	0.008	0.004	0.002	0,002	0.004	0.002
13 3231/3233 Leather	0.009	0.007	0.012	0.009	0.009	0.005	0.010	0.008
14 3240 Footwear	0.010	0.006	0.012	0.012	0.016	0.014	0.024	0.031
15 3311/3320 Wood	0.021	0.024	0.106	0.080	0.024	0.026	0.057	0.060
18 3521 Paints	0.006	0.006	0.005	0.007	0.001	0.001	0.007	0.009
19 3522 Drugs	0.004	0.007	0.008	0.011	0.009	0.007	0.009	0.013
20 3523 Soap	0.049	0.054	0.034	0.054	0.061	0.062	0.035	0.049
29 3851/3909 Misc.products	0.004	0.005	0.010	0.007	0.002	0.002	0.004	0.004
Intermediates	0.301	0.286	0.286	0.270	0.332	0.301	0.319	0.364
16 3412/3420 Paper	0.033	0.067	0.075	0.087	0.056	0.055	0.069	0.105
17 3511/3512 Chemicals	0.005	0.006	0.005	0.006	0.003	0.004	0.007	0.005
21 3529/3540 Other Chems.	0.023	0.034	0.008	0.008	0.058	0.072	0.010	0.010
22 3551/3560 Rubber	0.048	0.052	0.054	0.059	0.053	0.043	0.081	0.087
23 3610/3699 Cement	0.061	0.042	0.037	0.044	0.042	0.053	0.053	0.052
24 3710/3812 Basic metals	0.058	0.019	0.023	0.018	0.039	0.019	0.030	0.029
25 3813/3819 Fab. metals	0.073	0.066	0.084	0.048	0.081	0.055	0.069	0.075
Capital	0.160	0.096	0.101	0.072	0.024	0.015	0.026	0.027
26 3822/3829 Machinery	0.002	0.002	0.005	0.006	0.001	0.000	0.002	0.001
27 3832/3839 Elect. equip.	0.009	0.006	0.009	0.008	0.017	0.008	0.016	0.017
28 3841/3843 Transp. equip.	0.149	0.088	0.087	0.058	0.006	0.007	0.008	0.009

(Continued)

Table 3:22 contd. (Structure of Industry by output and employment)

Sector	1978 gross output	1978 value-added	1978 labour employed	1978 wages &salaries	Ratio of Value-added to Gross output 1963-78 (average)	1963	1968	1973	1978
Consmer goods	0.540	0.603	0.644	0.579	0.482	0.462	0.465	0.483	0.513
6 3111/3122 Food	0.144	0.144	0.155	0.103	0.344	0.254	0.315	0.363	0.458
7 3131/3133 Alcoholic bev.	0.069	0.116	0.030	0.044	0.691	0.724	0.770	0.812	0.761
8 3134 Non-alcoh.bev.	0.021	0.026	0.023	0.025	0.622	0.725	0.720	0.619	0.583
9 3140 Tobacco	0.021	0.026	0.023	0.025	0.661	0.699	0.723	0.787	0.583
0 3211 Textiles	0.103	0.106	0.207	0.188	0.456	0.576	0.465	0.391	0.469
1 3212 Made-up text.	0.026	0.028	0.054	0.045	0.326	0.024	0.349	0.306	0.478
2 3220 Apparel	0.003	0.003	0.006	0.004	0.357	0.243	0.046	0.339	0.359
3 3231/3233 Leather	0.006	0.006	0.009	0.005	0.328	0.328	0.300	0.268	0.405
4 3240 Footwear	0.101	0.013	0.016	0.011	0.484	0.501	0.248	0.535	0.604
5 3311/3320 Wood	0.028	0.033	0.067	0.062	0.529	0.609	0.455	0.514	0.546
8 3521 Paints	0.012	0.011	0.005	0.009	0.493	0.468	0.429	0.533	0.429
9 3522 Drugs	0.018	0.026	0.012	0.011	0.498	0.400	0.749	0.393	0.659
0 3523 Soap	0.076	0.062	0.034	0.052	0.447	0.400	0.454	0.479	0.371
9 3851/3909 Misc.products	0.003	0.003	0.003	0.004	0.505	0.513	0.496	0.421	0.483
Intermediates	0.329	0.330	0.326	0.335	0.461	0.417	0.409	0.443	0.463
6 3412/3420 Paper	0.042	0.042	0.062	0.049	0.530	0.641	0.462	0.463	0.454
7 3511/3512 Chemicals	0.009	0.009	0.007	0.013	0.536	0.532	0.545	0.525	0.445
1 3529/3540 Other Chems.	0.063	0.063	0.020	0.022	0.537	0.399	0.615	0.587	0.452
2 3551/3560 Rubber	0.054	0.062	0.069	0.074	0.471	0.375	0.456	0.386	0.516
3 3610/3699 Cement	0.043	0.058	0.058	0.054	0.558	0.574	0.280	0.598	0.607
4 3710/3812 Basic metals	0.036	0.035	0.032	0.031	0.259	0.042	0.138	0.235	0.434
5 3813/3819 Fab. metals	0.082	0.061	0.078	0.092	0.332	0.355	0.369	0.304	0.336
Capital	0.134	0.088	0.047	0.064	0.366	0.371	0.393	0.350	0.390
6 3822/3829 Machinery	0.026	0.032	0.017	0.019	0.501	0.436	0.465	0.445	0.573
7 3832/3839 Elect. equip.	0.025	0.022	0.014	0.019	0.406	0.460	0.219	0.201	0.408
8 3841/3843 Transp. equip.	0.083	0.034	0.016	0.026	0.190	0.218	0.495	0.405	0.189

Source:Calculated from FOS,Industrial Survey of Nigeria,1963-1975/78.

(End of table 3:22).

textiles, wooden furniture and fixtures and food and related products. The textiles sector has on the whole remained the highest employer of labour since 1963 through to 1978.

The output and employment shares of the intermediate goods sectors have been subject to considerable fluctuations over the years. The sector's output share fell slightly to 30 percent in 1968, from 32 percent in 1963, then rose again to 32 percent a decade later. Within this group, the dominant activities are chemical products, basic and fabricated metal products in terms of output contribution and fabricated metal products and paper products in terms of employment shares. The former 3 sectors contributed about 19 percent of the total output in the manufacturing sector or close to 60 percent of the total output produced by the intermediate goods sector.

There is hardly any capital goods production in the Nigerian economy. In 1963, the dominant industry within the capital goods sector was Transport equipment - which consists mainly of vehicle repairs, sales and service and bicycle assembly - with a gross output share of 20 percent. A decade later the share dropped to less than 1 percent rising again to 8 percent in 1978. The electrical equipment sector - which consists mainly of assembly and repair of radio and T.V. sets - looks perhaps as the most promising within this category, increasing its gross output share from 0.2 percent in 1963 to about 3 percent in 1978.

On the whole it can be observed that the ratio of the output share of consumer to producer oriented sectors has increased from 2.88 in 1963 to 3.63 in 1968 and 4.03 in 1978. The corresponding ratio of consumer-intermediate oriented sectors are 1.88, 1.87 and 1.64. Not surprisingly, the ratio of the employment share of consumer to intermediate (capital) oriented sectors has also been on the increase from 1.73 (4.32) in 1963 to 1.98 (13.70) in 1978.

In table 3:23 the contribution of manufacturing industries at the 4 digit level to total value-added in the manufacturing sectors of Brazil, India, Mexico, Republic of Korea and Turkey, is compared to that of Nigerian industries as at 1970 and 1978. In column 3 of the table we show the 1970 average shares achieved by each industry group in the 6 countries combined. It can be seen that only in five industrial groups did the Nigerian manufacturing sector exceed the average achieved by the countries. These sectors include Beverages, tobacco, textiles, petroleum and coal products and fabricated metals. In 1970 the manufacture of machinery, electrical and transport equipment each contributed less than 1 percent of value-added in Nigeria but contributed respectively 7.35, 5.34 and 8.69 percent in Brazil; 4.08, 3.33 and 3.34 in India and 3.07, 4.81 and 6.66 percent in Mexico. A similar pattern exists in the case of the intermediate goods sector. The ratio of the share of consumer to producer oriented sectors output varies from 1.7 percent in Brazil to 3.2 percent in Mexico, and to 4.3, 5.2, 6.75 and 36.33 percent respectively in Korea, India, Turkey and Nigeria.

The use of the 1970 shares for Nigeria especially may be objected to since the other countries must have started their industrialisation programmes much earlier than Nigeria. What is more appropriate therefore is (a) a comparison of Nigeria's position in 1970 with that of other countries at an earlier date or (b) a comparison of these countries' position as at 1970 with that of Nigeria at a later date. We follow the latter option and present in column 2 the value-added shares achieved in 1978 and in column 9 the average

Table 3:23 Contribution of Major Manufacturing Sectors to Manufacturing Value-added : A comparison of 6 Developing Countries.

Sector	Country								
	Nigeria		Brazil	India	Mexico	Rep. of Korea	Turkey	Average	
	1	2	3	4	5	6	7	8	9
Food	11.73	14.40	13.32	8.31	18.24	14.13	15.94	13.61	14.1
Beverages	15.30	14.20	2.27	1.16	2.05	4.50	4.34	4.93	3.9
Tobacco)	8.67	2.60	1.41	4.27	1.02	3.80	13.02	5.36	4.3
Textiles	14.79	13.40	9.14	21.77	9.94	15.70	13.92	14.21	14.0
Apparel				n.a.					
Made-up texts.	0.51	0.30	1.68	3.79	8.09	6.70	2.32	3.85	3.8
Leather	0.51	0.60	0.63	1.63	1.43	0.33	0.40	0.82	0.8
Footwear	1.02	1.30	1.65	3.61	5.02	0.66	0.91	2.14	2.2
Wood	2.04	3.30	4.58	5.03	2.05	3.42	1.61	3.12	3.3
Paper	3.57	4.20	6.17	3.37	5.53	5.43	3.23	4.55	4.7
Chemicals)	0.51	0.90	5.83	4.03	2.56	6.45	0.81	3.36	3.4
Paints)									
Drugs)									
Soap)									
Other Chems.)	8.67	16.20	6.88	4.78	5.42	4.91	4.03	5.78	7.1
Rubber	2.53	6.20	3.81	1.67	1.74	3.17	2.52	2.57	3.2
Cement	3.06	5.80	5.94	5.39	5.02	5.60	5.04	5.00	5.5
Basic metals	0.51	3.50	4.01	1.34	1.33	0.34	1.81	1.56	6.6
Fab.metals	6.12	6.10	3.35	5.70	4.10	1.64	4.24	4.1	4.2
Machinery	0.51	3.20	7.35	4.08	3.07	1.93	2.62	3.26	3.7
Elect. equip.	0.51	2.20	5.34	3.33	4.81	4.17	1.82	3.33	3.6
Transp. equip.	0.51	3.40	8.69	3.34	6.66	5.44	3.33	4.66	5.2
Misc. products	1.02	0.30	1.90	5.68	2.15	3.66	1.30	2.71	2.6

Notes: n.a. =data not available.
cols 1,3-7:1970 shares of industry groups in value-added;col 2,1978 share of industry groups in value-added;cols 8 and 9 are,respectively, the arithmetic means of cols 1 & 3-7 and cols 2 & 3-7.

Sources: Federal Republic of Nigeria,<u>The Fourth Plan 1981-1985</u>,pp.172-173; FOS,<u>Industrial Survey of Nigeria,1975-1978</u>.

shares achieved by the six countries. The result does not however differ in anyway from the one earlier reported. The industrial branches in Nigeria which have a higher than average ratio are food processing, beverages, petroleum and coal products, cement and glass and fabricated metals. In comparison to these averages, the shares of producer goods sectors are small.

The above comparison must be interpreted with care given the enormous differences not only in terms of structures of national economies, but also in resource endowments, the relative importance assigned to industry in the development programmes, trade and industrialisation policies. However, the comparison still puts the Nigerian manufacturing sector in a proper perspective and indicates the extent to which its growth and characteristics are consistent with the pattern of the classical import substitution model which these countries pursued.

Another characteristic feature of the Nigerian manufacturing sector, which is also reflective of its relative underdevelopment, can be recognised from the scope and structure of input goods imported by industry and from the share of value-added in gross output. Both measures are indicative of the amount of realised linkages within the domestic economy and the potential linkages effects which could still be achieved in the future. For example, a high value-added-gross output ratio signifies an increasing transformation of domestic raw materials by local industry. It implies in other words, low material content in the value of output and hence a greater demand for primary factors. The 1963-78 average share of value-added in gross output amount to 43 percent. The share fell to 38.8 percent in 1965, from 40 percent in 1963 and had remained above 40 percent but less than 50 percent since then. The average shares realised by manufacturing sectors producing alcoholic beverages, non-alcoholic beverages, furniture and fixtures, paper products, industrial chemicals and cement, reached 50 percent and more; eight sectors, including machinery, drugs and medicines, textiles and paints realised shares of between 50 percent and the national average of 43 percent. Thus about 62 percent of the sectors realised an above average value-added gross output ratio. The result appears quite impressive but it must be remembered that the inclusion of excise taxes in the definition of value-added inflates the latter and therefore exaggerate the ratios.

Table 3:24 gives an idea of the imported input structure of the Nigerian manufacturing sector. The extent to which the sector is heavily dependent upon imported raw materials is immediately evident from these tables. It can be seen that more than half of Nigeria's industries had 40 percent and above of their raw materials imported. For about seven of these, the ratio of imported raw materials to total raw materials used was 85% and above; About half of the industries have a raw-material value-added ratio of at least 40 percent. The 1973/75 average ratios for industrial sectors manufacturing made-up textile goods, fabricated metal products, electrical machinery and cement and glass products reached 95 percent and above. The seriousness of the problem was echoed by the government in the most recent plan document.

> On the average about 60 percent of the total raw materials consumed in the manufacturing sector was imported.... and for every naira of value-added, the country spent about 60 Kobo on import of raw materials[17].

The lack of diversification and the general weakness of the

Table 3:24 Domestic Resource Content of Nigeria's Manufacturing Industries, 1971 - 1975.

		Sector	Ratio of Imported Raw Materials to: Total Raw Materials (%)			Value-added (%)	
			1971/72	1973/75	1975	1971/72	1975
6	3111/3122	Food	33.54	52.30	60.30	103.40	52.60
7	3131/3133	Alcoholic bev.	46.10	50.70	72.40	14.00	12.20
8	3134	Non-alcoh.bev.	45.55	20.90	1.90	24.50	11.20
9	3140	Tobacco	7.40	---	47.80	2.00	---
10	3212	Textiles	29.60	47.10	35.40	35.50	37.10
11	3212	Made-up text.	79.65	74.60	50.00	137.50	233.30
12	3220	Apparel	51.00	40.10	15.80	120.00	14.50
13	3231/3233	Leather	35.53	58.40	41.50	485.30	63.50
14	3240	Footwear	0.03	32.40	15.80	10.00	20.60
15	3311/3320	Wood	12.68	19.90	38.90	14.30	9.75
16	3412/3420	Paper	35.85	73.10	45.80	84.00	52.70
17	3511/3512	Chemicals	65.40	82.40	90.60	942.00	31.70
18	3521	Paints	28.85	67.80	67.00	26.00	47.10
19	3522	Drugs	45.45	84.10	97.10	42.00	21.60
20	3523	Soap	4.50	63.10	17.10	4.50	60.30
21	3529/3540	Other Chem.	58.05	83.90	93.00	82.50	13.90
22	3551/3560	Rubber	26.27	63.20	59.70	33.80	55.60
23	3610/3699	Cement	48.83	51.30	50.10	28.90	94.00
24	3710/3812	Basic Metals	20.93	54.10	65.80	23.50	47.50
25	3813/3819	Fab.Metals	75.50	80.60	68.20	116.50	133.00
26	3822/3829	Machinery	84.03	50.10	34.45	233.80	10.40
27	3832/3839	Elect.Machinery	50.30	79.40	86.80	249.50	130.90
28	3841/3843	Transport Equip	22.15	75.20	94.10	238.50	25.70
29	3851/3909	Misc.products	79.38	55.60	48.30	53.30	4.50

Source: Federal Republic of Nigeria, The Third Plan, 1975-1980, p.151 ;and ibid, The Fourth Plan, 1981-1985, p. 411

Table 3:25 Value of Nigeria's Imports by End-Use (1960 - 1977).

Year	Total (N,000) (1)	Consumer goods Total (N,000) (2)	% (3)	dr (N,000) (4)	% (5)	ndr (N,000) (6)	% (7)	Row materials & Capital goods Total (N,000) (8)	% (9)	capital (N,000) (10)	% (11)	raw matrials (N,000) (12)	% (13)	Misc. (N,000) (14)
1960	430.6	244.8	56.9					185.8	43.0	101.2	23.5	84.6	19.6	----
1964	507.0	219.0	43.2					28.8	56.8	160.2	31.6	127.8	25.2	----
1965	548.4	224.6	41.0	n.a	n.a	n.a	n.a	323.8	59.6	196.4	35.8	127.4	23.2	----
1966	511.2	196.8	38.5	n.a	n.a	n.a	n.a	314.4	61.5	212.4	41.5	102.0	20.0	----
1967	445.0	187.2	42.1	n.a	n.a	n.a	n.a	257.8	58.0	152.2	34.2	105.6	23.7	----
1968	376.8	131.0	34.8	n.a	n.a	n.a	n.a	245.8	65.0	133.2	35.3	112.6	29.9	----
1969	464.6	147.6	31.8	n.a	n.a	n.a	n.a	317.0	68.0	171.8	37.0	145.2	31.2	----
1970	756.4	218.2	28.8	44.4	5.8	173.8	23	519.6	68.7	285.2	37.7	234.4	31.0	18.6
1971	1078.9	338.6	31.4	68.4	6.3	270.2	25	725.0	67.2	422.0	39.1	303.0	28.1	15.3
1972	990.1	356.7	36.0	94.8	9.6	261.9	27	626.5	63.3	366.8	37.1	259.7	26.2	6.9
1973	1224.8	423.3	34.6	116.6	9.5	306.7	25	793.0	64.7	465.4	38.0	327.6	26.7	8.5
1974	1737.3	506.5	29.2	34.9	7.8	371.6	22	1220.2	70.2	646.5	37.2	573.7	33.0	10.6
1975	3724.5	1134.0	30.5	345.0	9.3	788.1	21	2576.0	69.2	1573.1	42.3	1002.9	26.9	11.5
1976	5148.5	1570.3	30.5	468.5	9.1	1101.8	21	3562.9	69.2	2249.9	43.7	1313.0	25.5	15.3
1977	7093.7	2086.0	28.5	594.2	8.4	1451.8	20	5050.6	71.4	3409.5	48.2	1641.1	23.2	7.1

Notes: n.a implies figures not available.
dr=consumer durables;ndr=consumer non durables.The percentages shown are in relation to Total imports.

Sources: 1960,1964-1969 figures from Schatzl,l(1973) Industrialisation in Nigeria:A Spatial Analysis,Weltforum Verlag,Table A8,p184. 1970-1977 from Central Bank of Nigeria,Economic and Financial Review,Lagos.

intermediate and producer goods sectors are also evident from the changing import structure of the economy. The value of imports rose more than 9 fold between 1970 and 1977 despite the efforts at import substitution. Even more significant are the changes in the import structure: although there has been a significant decline in the import of consumer goods, this is offset by a rise in the import of capital goods and raw materials. In otherwords, the industrialisation programme has not reduced the volume of imports into Nigeria. Rather what has occurred is a shift in the content of imports - from consumer goods to intermediate and capital goods, reflecting the weakness of the local producer oriented industries and hence, the lopsided nature of industrialisation.

An additional disturbing feature of the manufacturing sector is its relatively low employment base. Available evidence indicates that as at 1975, the Nigerian industrial sector absorbed only about 17 percent of the total labour force in the economy. Leading experts on the Nigerian economy believe that even this figure is

> somewhat exaggerated since a substantial part of the industrial labour designated as being in industry is in cottage and crafts ... (and) some of the people are only marginally employed in manufacturing and processing since they usually combine cottage industry and craft with agriculture[18].

The number of people employed in industries with 10 or more employees increased by 240 thousands between 1963 and 1978 with a modest rate of growth of about 11 percent. The total number of people employed in manufacturing in 1978 (= 305495) represents less than 1 percent of the estimated number of gainfully occupied persons in the economy.

The low employment base of the sector could perhaps be attributed to the infancy of the industrial production. However, there is evidence to show that the main reason lies with the increasing mechanisation of the manufacturing production processes. For example, although exceptionally high rates of growth of labour input were achieved by quite a few sectors, it is particularly worth noting that except for only seven sectors - viz. non-alcoholic beverages, tobacco, leather, paints, paper products, rubber and plastics and cement products - the rate of growth of the capital input exceeded that of labour. For the 24 industries the mean rate of growth of labour and capital amounted to 11 and 16 percent respectively. Moreover, whereas the minimum and maximum rates of growth of labour were - 5.3 percent (transport equipment) and 22 percent (electrical equipment), the corresponding rates for capital rose - 1.2 (leather products) and 37.5 percent (metal products). At the same time the industrial sector employees do not appear to have obtained a reasonably larger share of value-added as one would have thought. In column of Table 2:18 we see that wages per head increased at an annual average rate of about 2 percent between 1963 and 1978. The rate of increase fell by 11.2 percent in 1969 and 5.4 percent in 1969, increased by less than Ø.5 percent in 1971. The increase in 1973 was only temporary as it fell again in 1975 and 1976. The highest rate of increase was achieved in 1978. Some of the individual sectors no doubt experienced fairly high rates of growth of wages over the years in comparison to the national average rates of growth were for example, 5, 4.7, 4, 3.9 and 3.5 percent in electrical equipment, made-up textiles, fabricated metals, soft drinks and paper products respectively. However, for several other industries, the rates are fairly low and in five cases, even negative.

The industrial sector thus does not appear to have proven a dynamic source of growth for either employment or income of employees over the period. Further evidence and the reasons for the phenomena will be presented in Chapter 4.

3:5 Conclusion

The influx of external rent has enabled some degree of structural transformation of the Nigerian economy within a decade or two. The pattern of change is familiar: agricultural output as a proportion of GDP is declining rapidly in favour of industry - notably mining and manufacturing - with services retaining a fairly large and constant share; and primary exports have virtually stagnated, although the developmental process is still strongly oriented towards the foreign sector, with petroleum, rather than manufactures forming the bulk of the exports. In terms of growth, the mining and manufacturing sectors have taken over as the possible 'leading' sectors in the economic development of Nigeria. One would be tempted to construe this evolution as a sign of economic growth and development. However, such rapid changes in sectoral composition of GDP do not constitute a sufficient criterion for judging economic development. The more interesting issues pertain to the dynamism of the 'leading' sectors, their ability to lead the economy to a self-generating and self-sustaining growth, to fulfil several objectives of development as enunciated in Chapter 1. Here the role of the mining sector is severely limited. The important positive effects of the petroleum sector cannot be denied. It can in principle offset any inadequacies in investment resources and relax the foreign exchange constraint. But its employment, income and investment linkage effects are likely to be very minimal. The manufacturing sector then becomes the more (and perhaps the only) promising means of realising these objectives.

Although a post-independence phenomenon industrialisation has been rather rapid, at least by third world standards. Fairly impressive and in a way, respectable rates of growth were registered. However, measured in terms of its contribution to National income, its employment base, foreign exchange intensity and economic diversification, the conclusion is less sanguine. So far, industrialisation has not yet reduced dependence on imports or built up a strong diversified production structure. It merely changed the import structure from dependence on consumer goods to dependence on intermediate and capital goods. After two decades of import substitution, only a handful of sectors contribute the bulk of output and employment of the manufacturing sector.

These and other aspects of manufacturing sector development will be further examined in later chapters. Attempts will be made to answer questions such as: why is the structure of the sector as it is? What is the role of commercial policy adopted by the government in fostering the high rate of growth? What are the major implications for productivity and efficiency, for international competitiveness etc.?

NOTES

1. In 1960, for example, the share of industry in GDP in Nigeria exceeded that of only 4 of the 30 African countries for which data is available. See The World Bank (1981), Accelerated Development, Table 3, p145 and The World Bank, World Development Report, Tables, 2, p 183

2. The World Bank (1981), Accelerated Development, Table 5, p147.

3. Ibid, table 17, p159.

4. Ibid, table 3, p145.

5. Ibid, table 5, p147.

6. Ibid, table 4, p146.

7. Ibid, table 1, p143.

8. The Nigerian civil war began in July in 1967 and ended in January 1970.

9. For the role of agricultural exports in the economic development of Nigeria before and after independence, see Helleiner, G.K. (1966), Peasant Agriculture, Government and Economic Growth in Nigeria, Homewood, Illinois.

10. United Nations Economic Commission for Africa (UNECA), Surveys of African Economies, p141, 1973; The World Bank, Accelerated Development, Table 7, p149.

11. See Helleiner, G.K. (1966), op cit; and Ekundare R.O. (1973), An Economic History of Nigeria 1860-1960, Methuen and Co. Ltd., London.

12. The World Bank (1974), Nigeria: Options for long term Development, The John Hopkins University Press, Baltimore, p.130. See also Helleiner, G.K. (1966), op cit. and Helleiner, G.K. (1969). "The fiscal role of the Marketing Boards in Nigeria's economic development 1946-61". Economic Journal, 74, pp582-610.

13. In 1972, the Federal Government took over the operations of the Marketing Boards from the various state governments, introduced a unified 10% and valorem tax applicable to each export crop, and increased the price of some of the crops, notably groundnuts. The reforms had only a minimal and temporary effects if that. The value of agricultural exports increased by N78 million in 1973 after 3 years of stagnation, only to sharply decline a year later.

14. See for example, Liedholm, C., "The influence of colonial policy on the growth and development of Nigeria's industrial sector", in Growth and Development of the Nigerian Economy, (ed) C.K. Eicher and C. Liedholm, Michigan State University Press, 1970, pp52-61. A comprehensive review of the historical development

of the manufacturing sector can also be found in Kilby, P. (196), Industrialisation in an Open Economy: Nigeria 1945-1966), Cambridge University Press.

15. The concept of a 'normal' pattern was first due to Chenery (1960). According to him, a positive association exists between income per capita and the degree of industrialisation among countries. He fitted a regression equation of the following form to cross country data of 53 countries at various levels of development: $\log Q_i = \log \alpha_{i0} + \alpha_{i1} \log Q + \alpha_{i2} \log N$ where Q_i = value-added per capita in 1^{th} sector, and N = population. A 'normal pattern' was thus obtained any economy with a given population and National product can determine its expected share of industrial output in total production. See Chenery, H.B. (1960) "Patterns of industrial growth", American Economic Review, September.

16. The World Bank (1982) World Development Report.

17. Federal Republic of Nigeria (1981), Fourth Plan 1981-85, op cit., p139.

18. Adejugbe, A., "Manufacturing" in F.A. Okaloku et al. (1979), Structure of the Nigerian Economy, MacMillan, Chapter 3, p36.

CHAPTER 4

THEORETICAL AND EMPIRICAL ANALYSIS OF PROTECTION IN NIGERIA

4:1 Introduction

The process of industrialisation in Nigeria via Import Substitution has, over the years, called into play a wide range of promotional and regulatory instruments designed primarily to direct and/or guide the pattern and direction of industrial development and often to accelerate the process itself. Nigerian government interventionist policies have, over the years, taken a variety of different forms, the main ones of which are (1) Fiscal, Trade and exchange rate policies, including temporary exemptions from income and/or profit taxes for certain category of firms, capital consumption and accelerated depreciation allowances, custom tariffs and import controls, credit incentives in the form of provisions for long term and short-term credits through government owned industrial development banks[1] and other financial institutions in the capital and money markets: (2) Direct public investment in manufacturing either through the foundation of government enterprises or in partnership with private - indigenous and/or foreign - enterprises plus (3) Additional ancillary services such as the provision of infrastructure and services at industrial estates and prepared sites (such as cheap electricity and water supply, transport etc.), industrial manpower training programmes etc.

It is worthwhile emphasising with other authors that although the creation of "favourable investment climate" (which the provision and/or application of these measures entail) to promote local industry has been a major policy objective of the government, the tariff and import licencing systems have also been frequently employed in pursuit of other different policy goals. These have included at one time, the need to raise revenue via tariffs and on several occasions to stabilise short-term to medium-term fluctuations in external payments and/or internal price level. Admittedly, it is somewhat artificial to separate the balance of payments and the promotion of industry objectives since their interaction throughout time is evident. As the experience of many countries has shown, whether more emphasis has been put on one or another has essentially depended upon a combination of the very results of the industrialisation process via import substitution policy on one hand and short-run national and international circumstances on the other.

The objectives of this chapter are (a) to analyse the major policy and regulatory elements of the incentive system as they affect the manufacturing industry in Nigeria, (b) to quantify the effects of these policy instruments using the effective protection concept and (c) to empirically examine the relationship between sectoral growth of the manufacturing sub-sectors and import substitution on the one hand and the government's commercial policy as quantified by effective protective rates on the other; hence to determine the effectiveness of policy instruments in the general re-allocation of resources.

In section 4:2 a description of the historical evolution of the two principle technical instruments of protection viz tariffs and import controls as a function of the aforementioned objectives - revenue collection, balance of payments equilibrium internal price stabilisation and the promotion of industry - is provided. Our objective here is to understand how the structure of protection dictated largely by changes in these objectives, has evolved over the years. The discussion will be largely descriptive rather than analytical. A brief account is also given of the various incentive legislations but a discussion of the role of direct public investment is not provided as is outside the purview of this study. The effective rates of protection (erp) their definition, measurement as well as their interpretation are discussed in section 4:3; estimates of erp using Nigerian data for 1974 and 1977 are also presented and discussed in this section. In Section 4:4 we employ techniques of parametric as well as non-parametric tests of association to examine the relationship between the effective rates of protection on the one hand and import substitution and growth on the other. In section 4:5 a brief summary of the chapter is provided.

4:2 Trade and Exchange Rate Policies: Historical Evolution and Recent Trends

For analytical convenience, the historical evolution of the Nigerian tariff system is analysed in four stages, (i) the pre-independence period, from about 1950 to 1960, (ii) 1961 to the second half of the 1971/72 fiscal year, (iii) 1971/72 to 1975/76 and (iv) 1975/76 to the present. It must be emphasised that since the experience of the country with protectionist regime has often been one of sudden changes, making a precise delineation of 'phases' will be subject to a necessarily arbitrary selection of dates. As will be shown, sometimes the 'phases' overlap considerably but the four periods roughly correspond to phases of liberalisation (1st and 3rd periods) and of more restrictive (2nd and 4th) regimes.

4:2:1 1950 - 1960: 'The Pure Revenue Stage'

The protectionist policy - mainly tariff and import controls - during this period had the twin objectives of raising funds in order to finance governmental expenses and the protection of the trading position of the U.K. in the World market together with strengthening the international value of the sterling[2]. This is the period Oyejide (1975)[3] refers to as the 'pure revenue stage' in the history of the country's tariff making policy. The revenue objective was particularly crucial since the Federal government has had no reliable source of income: corporate income was extremely negligible since there were few manufacturing industries while personal income tax was essentially a regional source of revenue. The relative importance of foreign trade taxes in the total revenue of the Federal government is shown in Table 4:1 and 4:2. In each of the years 1954 - 1960, customs and excise duties contributed at least 70 percent of the total government revenue.

Table 4:1
Composition of the Nigerian Government Revenue
1950 - 1960

Year	Total Revenue	Customs & Excise		Direct Taxes		Other[1]	
	Nm	Nm	%	Nm	%	Nm	%
1950	61.53	34.39	55.89	9.66	15.70	15.48	26.16
1951	65.59	36.32	55.37	10.69	16.29	18.58	28.33
1952	100.65	64.21	63.80	13.55	13.46	22.89	22.74
1953	101.81	67.90	66.69	13.62	13.38	20.30	19.94
1954	118.51	84.21	71.06	11.38	9.60	22.92	19.34
1955	124.96	87.92	70.36	13.43	10.75	23.62	18.90
1956	119.90	89.51	74.65	13.51	11.27	16.88	14.08
1957	141.13	101.58	71.98	13.11	9.29	26.44	18.74
1958	141.89	103.39	72.87	13.33	9.39	25.17	17.74
1959	154.63	111.84	72.33	13.36	8.64	29.44	19.04
1960	177.65	126.12	70.99	12.58	7.08	38.95	21.93

SOURCE: Ekundare, R.O., (1973) op.cit., p233.

1. 'Other' revenue includes colonial development and welfare grants and unspecified revenue.

Few of the items subject to import duty included alcoholic liquors, cigarettes, bicycles, motor vehicles, building materials, cotton piece goods, petroleum oil and jewellery. Some of these attracted fairly high rates of import duties (up to 50 percent on tobacco products, and 75 percent on alcoholic liquors and jewellery) essentially because they would not contribute to economic development and welfare of the people and/or were thought to bring many social evils. Average tariff rates ranged between 15 and 20 percent with 10-15 percent and 25-30 percent applicable to intermediate and consumer goods respectively while items that could be roughly classified as 'capital goods' such as machinery and metal products carried no import duty[4].

The exchange and import control regime could also be described as extremely liberal and served only to regulate the sources of imports (and the destination of exports) rather than their volume or composition. For example, like other British colonies, Nigeria was a member of the sterling area and therefore subject to the general prescription of currency/exchange requirements of the area as a whole. Payments to and from other countries of the area were relatively liberal while payments to and from countries outside the area were subject to the sterling restrictions. The import licencing system was designed along similar lines. The Import Licencing authority (ILA) issued two types of licence. The Open General Import Licence (OGL), which covered most goods and permitted the importer to procure and bring into the country without the need to apply for permission, any of the goods covered by the licence from mainly the U.K. and colonies as well as from non-sterling area countries designated as 'easy currency' areas; and the specific licence by which the ILA must give authorisation before the goods specified in it are imported. The countries covered in the licence were mainly the 'hard currency' areas. Two additional OGL's were introduced in 1958: the OGL (Dollar Area) and the OGL (Japan) which permitted the importation without specific licences of a large proportion of goods from those areas[5].

One of the significant features of this period was the fairly comfortable position in which the country found itself with regards to foreign reserves. Although the country has consistently been running a deficit in the current account since 1955, she was able to finance these partly because of substantial past accumulation of foreign exchange reserves in the boom years of the Korean War and partly because of favourable capital accounts position. Thus neither the balance of payments objective nor that of the promotion of industry featured in the tariff making policy of Nigeria during this period.

4:2:2 **1960/61 - 1970/71**

During the decade of the 1960's the four government objectives interacted simultaneously to shape the protectionist policy in Nigeria. During the early part of the 1960's there was the pressing need to raise revenue for financing the post-independence ambitious development programmes and foreign trade taxes remained the most significant and reliable source, even though their relative

Table 4:2 Sources and Composition of Nigerian Government Revenue, 1965 - 1979.

Year	Total revenue	Tax revenue	Import duties	Excise duties	Export duties	Company tax	Petroleum profit tax
	N,000						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1961-1965	1602.5	1189.6	682.2	101.9	139.60	265.83	----
1966-1970	2274.2	1663.3	703.2	361.2	164.4	434.70	----
1971-1975	14586.7	10737.9	1525.2	833.3	133.4	1056.6	6889.70
1976-1979	33190.4	23278.9	3995.5	950.7	13.3	1801.6	16535.60

Percentage Distribution I

Year	(2)	(3)	(4)	(5)	(6)	(7) as proportion of Total Revenue.
1961-1965	74.23	42.57	6.36	8.70	16.58	---
1966-1970	73.14	30.92	15.88	7.20	19.12	---
1971-1975	73.61	10.46	5.71	0.90	7.20	47.23
1976-1979	70.14	12.04	2.80	0.04	5.40	47.82

Percentage Distribution II

Year	(3)	(4)	(5)	(6)	(7) as proportion of Tax Revenue.
1961-1965	57.34	8.57	11.74	22.35	---
1966-1970	42.27	21.71	9.88	26.13	---
1971-1975	14.20	7.76	1.24	9.84	64.16
1976-1979	17.16	4.08	0.06	7.74	71.03

Notes: figures may not add up (to 100%) due to non inclusion of revenue from other sources, such as mining rents and royalties, interest payments, posts and telegraphs etc.

Sources: Central Bank of Nigeria(1973), Economic and Financial Review, vol 11 No.2, p38; FOS, Annual Abstract of Statistics, 1981 Edition, p144.

contribution had began to decline. Between 1961 and 1965 revenue from custom duties contributed about 42 percent of total federally collected revenue and 57 percent of federally collected tax revenue compared to 17 percent and 22 percent from company taxes.

By 1961 too, the government made its intentions clear that the tariff structure was to be employed deliberately as an instrument of industrial policy. This was indicated by the Minister of Finance in his Sovereignty Budget speech[6], thus:

> the governments are all resolved to encourage the growth of local industry by providing newly established industries with a degree of protection, at least until they are strong enough to stand on their feet.

Tariff rates remained generally low (about 33.3 percent) and fairly stable. Consumer goods continued to attract highest duty rates (about 33.3 - 40 percent) while capital goods attracted an average rate of duty of 10 percent. The highest tariff rates were levied on alcoholic drinks (100 percent), jewellery and cosmetics (100 percent), not for reasons of protection but as in the previous period on 'moral' grounds[7]. In addition to the low rates of duty, import controls were further relaxed and the importation of commodities from the Eastern Block countries hitherto restricted by specific licencing was, in line with the country's non-aligned posture, considerably liberalised. Thus by the end of 1961, a position of almost complete liberalisation of imports into the Nigerian market was reached. Not withstanding the Minister's prouncement and inspite of the absence of general tariff increases, the basic objective of tariff policy was still income.

Table 4:3 Nigeria's External Reserves 1954-1978

Year	Amount (Nm)	Annual rate of change(%)
1954	406	--
1955	406	0.00
1956	402	-1.00
1957	414	2.30
1958	360	-13.00
1959	314	-12.80
1960	310	-1.30
1961	278	-10.00
1962	242	-13.00
1963	166	-31.40
1964	166	0.00
1965	176	6.00
1966	162	-8.00
1967	82	-42.90
1968	90	4.70
1969	96	6.70
1970	160	66.60
1971	284	77.50
1972	284	-10.60
1973	389	53.10
1974	3398	773.50
1975	3315	-2.50
1976	2991	-9.80
1977	2439	-18.50
June 1978	1161	-52.30

Source: Culled from Ekuerhare,B,U.(1980),"The impact and lessons of Nigeria's industrial policy under the military gover_ _nment 1966-1979". A paper presented at the Department of Economics Staff seminar,Ahmadu Bello University,Zaria Nigeria.

By the middle of the 1960's however, the scope and objective of the protectionist system has had to be broadened. The drawing down of external reserves previously accumulated accelerated and the level continued to decline, from over N400 million in 1954 to less than N200 million in 1963 and to the lowest ever level of slightly above N80 million in 1967 over the 1954-1978 period. The sharp deterioration during the period could be attributed to at least two factors. First, as a result of the political crisis which began in 1964, so much uncertainty was created with regards to foreign investment. There was thus a massive net outflow of capital in the private, especially non-oil sector. In addition, the civil war had necessitated an unprecedented rise in foreign exchange financed requirements of the armed forces. In order to face the deterioration in the balance of payments and prosecute the war, the government revised its commercial policy. With the outbreak of the civil war, the OGL (all countries) was amended and extensive import restrictions were imposed. The number of items subject to specific licencing was significantly increased[8]. For the first time in 1967, multiple tariff rates for a large number of items as well as concessionary rates for industrial users were introduced. The former implied that in the application of the tariff rates, descrimination is now introduced not only between industry groups but also within industry - differences being made in respect of raw materials, component parts and finished products. The significant increases in tariff rates are reflected in the new tariff structure: intermediate and capital goods continued to attract low rates of duty (0-15 percent), finished products 40-75 percent; 'luxury' times, mostly consumer durables such as cars and motor vehicles (50-150 percent) while their components and parts imported for processing in local assembly plants were subject to import duties in the range of 0 to 10 percent[9].

The second factor in the country's balance of payments crisis was perhaps the intensive industrialisation that took place before and during the war. Undoubtedly, the government measures and the war had an important stimulating effect upon the level of domestic production. Indeed, the war time restrictions could have resulted highly beneficial to local entrepreneurs. Domestic shortage of essential commodities, plus a rapidly growing effective demand provided an extraordinarily profitable conditions for local producers of consumption goods who expanded production within the severe limits imposed by the difficulty of obtaining key imports of raw materials, spare parts, machinery and equipment. Indeed prohibition of importing a wide range of durable consumption goods could not be extended to the greater part of the components and raw materials needed for the local production of a wide variety of locally produced consumer goods.

4:2:3 1971/72 - 1975/76: The Post-war 'oil boom' period

During the first half of 1971/72 fiscal year, the foreign exchange situation as well as the balance of payments problems remained critical. In addition, there was a substantial rise in the cost of living and an inflationary pressure that was aggravated by the war-time trade restrictions. The solutions to these problems became the central objective of the 1971/72 government budgetary proposals. To that end, import restrictions - especially the import policy of specific licencing - necessitated by the war were lifted except for a very few items such as rice, wheat, tobacco, beer stout and 'hot' drinks. However import tariffs were slightly increased in order to raise additional revenue and to provide adequate protection for locally produced equivalents. Import duty rates on items like dry cell batteries and components imported by approved manufacturers of record players and T.V. sets were increased while items like aluminium and aluminium alloys, unwrought wire rod, galvanised wire etc. which previously enjoyed duty free concessions were to bear 10 percent duty. The infant industry consideration in the tariff - setting process was temporarily set aside but with the promise that:

> in the interest of local industrial development and increased employment, specific licences may be reintroduced in the future to protect locally manufactured goods when such goods are being produced insufficient quantities[10].

There were therefore no radical modifications in either the objectives of government or in the protection policy itself concerning tariffs and import controls. The only difference was that while tariffs were elevated, less emphasis was being placed on physical controls.

The period beginning 1972 however, represented a significant turning point in the trade and exchange rate policy of Nigeria. As previously indicated, the first half of the 1970's can be crystallised as the decade that ushered in the ascendency of oil into the dominant position of the economy. Crude oil production peaked an average of about 2.5 million barrels per day between 1972 and 1974. With the tremendous increase in oil revenues, the government, indigenous as well as private investors rushed into every conceivable form of industrial activity: from ball point pens production to integrated steel mills and imports made for lavish orders. The nominal public capital programmes of the governments of the Federation during the Third National Development Plan (1975-1980) were projected at about

N30 billion, about 15 times the amount (N2 billion) provided for the public sector under the second plan[11]. The policy makers were so optimistic that they envisaged that "investment expenditure under the third plan could be financed entirely by national savings"; indeed, the level of saving was expected to be well in excess of investment expenditure in each of the plan years[12].

The affluence was so intoxicating that during the first half of 1975, on the recommendation of a salary review commission (The Udoji Commission), the wages of low income workers were more than doubled and the overall average salary of Nigeria's labour force was raised by more than 60 percent. It was estimated that a total amount of N859.3 million was spent on the payment of salary areas throughout the country with the public sector accounting for 66 percent of the amount[13].

The apparent abundance of foreign exchange and the erroneous assumption of continued increases in earnings arising from the export of crude petroleum led most government budgetary measures during the 1st half of the 1970's to considerably liberalise the exchange and trade restrictions. The increasing monetization of the economy resulting from the Udoji salary and wage awards inevitably resulted in an inflationary spiral which could only be contained by encouraging massive importation of commodities. The government, in addition, placed a ban on the exportation of several locally produced goods in an attempt to cure inflation.

On April 1st 1974, import duty relief on raw materials for local industries was reduced generally to a maximum of 10 percent advalorem while excise duties were reduced to a maximum of 5 percent thus making a maximum of about 15 percent tax on the products of the local industries, (with the exception of breweries and cigarette industries). Excise duty on 21 items was abolished. These included flour, cement, containers, towels and towelling, motor cycles and bicycle tyres and tubes; duties on building materials, food and transport vehicles and even on consumer luxuries such as TV and radio were significantly reduced "to ensure that they are available in the local market at reasonable prices"[14]. In addition, items like meat and food preparations, rice, fresh fruits, maize, motor and motorcycle tubes, stout beer, and spirits were removed from the list of imports banned or subject to specific licencing.[15] Thus during most of the period, the external economics condition and the need to raise revenue via tariff ceased to be major objectives of protection policy. The policy of import licencing not as extensive as in previous years was mainly aimed at easing the congestion at ports which was unprecedented as a result of the post civil war economic boom.

The liberalisation episode is clearly reflected in the country's trade statistics. While exports declined by about 15 per cent (from N5794.8 million in 1974 to N4922.5 million in 1975) due mainly to a fall in earnings from the non oil section, the value of imports in 1975 more than doubled the 1974 level, rising from N1737.3 to N3721.5 million. The importation of manufactured assorted goods went up by more than 100 per cent, machinery and equipment by more than 50 per cent; food imports increased by 92 per cent and beverages registered a growth of 433 per cent.[16] Above all, foreign exchange reserves which stood at N33.98 million in 1974 (the highest in the country's history) dropped to N2991 million by 1976.

4.2.4 1975/6 to the Present

The anti-inflationary drive which involved the liberalisation of imports between 1972 and 1974 continued during the second half of 1975, although on a reduced scale. This was reflected in the subsequent budgetary proposals. A few industries continued to benefit from a general reduction in import duties on imports. For example, in the 1975/76 fiscal year, duties on imports of building materials were reduced to 20 from 50 per cent; most food items and consumer goods attracted a duty rate of between 5 and 40 per cent while import duty relief was granted for few industries like soap and detergent, confectionary and sugar. Similar reductions were made in the 1976/77 and 1977/78 budgetary proposals. In the 1976/77 fiscal year the most significant changes made were the abolishing of duties on a number of food imports -- such as ground nuts, baby foods etc, the reductions on duty rates on imports of parts and components for the transport equipment sector, on imports of building materials, and materials for the manufacture of footwear. The electronic, metal fabrication and kitchen utensils and equipment manufacturing industries were exempt from duties on imported raw materials. Excise taxes were re-introduced, ranging generally from 2 - 5 per cent. Industries which benefited most from the 1977/78 tariff changes include wearing apparel, rubber, electrical equipment, footwear, textiles and spirit distillery and beer brewing, either because tariffs on competing imports were increased or concessionary duty rates on imported inputs were provided or both.[17]

In general however, the period saw the re-emergence of stringent tariff and quantitative import restrictions especially on durable consumer goods. In each of the fiscal years 1976/77 and 1977/78, the importation of more than 60 items, mainly consumer (durables and non-durables), goods were either banned or placed under specific licencing. With the significant reduction in duty on imported essential raw materials (to 10 percent and valorem and in a few cases down to 5 percent), the tariff measures served to further strengthen the effective protection enjoyed by Nigerian manufacturing industries.

Again the crucial element that determined the new posture was the external economic condition. By the end of the 1975/76 fiscal year, the economic slump had started to set in. The Military Administration called for 'belt-tightening' in public expenditure and the adoption of 'low profiles' i.e. curtailment of expensive private tastes. From the end of the last decade (to the present) many of the economic problems reminscence of the pre-oil days re-appeared and new ones began to emerge. The country's economic woes are manifest in balance of payments problems, drastic budget cuts and high internal prices of basically all commodities including foodstuff and other basic consumer goods. The production of crude oil further plummetted to 1.44 (1981), 1.29 (1982) and 1.23 (1983) million barrels per day, just a little more than half of 2.4 million b/d peak of 4 years ago; and from 1.5 million b/d in October 1982 to 400,000 b/d in April 1983, the lowest rate since the 1960's. In addition, the price fell from US$40 to US$30 a barrel[18]. Shortfalls in production and price saw earnings plummet from around US$22 billion in 1980 to under $10 billion in 1983. As a result imports had to be curtailed to the level of N60 million a month by the end of 1983 from a N1.5 billion monthly rate in 1981.

Such external sector developments necessitated the passing of The Finance Act (1981) and the Economic Stabilisation Act (1982)[19], both aimed at revamping the precarious economy. The main features of the new measures contained in the Acts include:

(a) An increase in the number of items banned from importation from 44 in 1977 to a total of 65 in 1981 and to 77 in 1982. Most of these were consumer goods such as cigarettes, sugar confectionary, towels, made-up textiles, bicycle tyres and tubes and footwear.

(b) The number of items placed under specific licence was increased from about 20 in 1977/78 to 78 in 1981 and to 103 in 1982. These included unmanufactured tobacco, packaging materials, manufactured articles of wood of all types, sewing machines, asbestos, musical instruments, lorries, trucks including tankers, tippers, pick-ups and four-wheel drive vehicles.

(c) The level of import duty was significantly increased for some 50 odd items and the level of excise duty on some 10 items altered. For items on which the duty was previously less than 100 percent import duty was increased by 5 percent; and for those goods where the duty was previously more than 100 percent, duty was increased by 10 percent. The new rates range between 0-5 percent and 500 percent with most machinery and equipment carrying duties of no more than 10 percent while consumer goods are heavily penalised.

(d) In August 1982, a new order which made it compulsory to pay advance deposit against imports was imposed to take effect from

21st April 1982. The percentage deposits relative to the value of imports ranged from 25 percent (raw materials and spare parts) through 50 percent (food, except rice, medicaments, building materials, capital goods, books) to 200 percent (motor vehicles and trucks) and 250 percent on motor cars and 'other' goods[20].

To sum up, the Nigerian tariff structure has evolved over a period in response to various, often contradictory, government objectives. The revenue objective, undoubtedly the most important before and immediately after political independence, began to lose importance in comparison to the emphasis placed upon BOP problems and to the protection granted to establish industries. More often than not, the latter objective was secondary to the balance of payments and price-stabilisation objectives. In other words, short-term 'fine-tuning' in response to external economic conditions appeared to be the main and most significant feature of the protectionist system in the country. As a result one would expect that several elements of instability and inconsistency are introduced into the tariff system with further adverse effects upon production and investment in the domestic manufacturing activities.

4:2:5 The Incentives Legislations

Over the years, the Nigerian Government has had also a number of legislations which offer special incentives to industrial enterprises "where such incentives are considered necessary in the overall economic interest of Nigeria"[21]. These have widely varied from the Aid to Pioneer Industries Act (1952), The Industrial Development

(Income Tax Relief) Act (1958) amended by Decree 22 of 1971, The Industrial Development (Import Duties Relief) Act of 1957, The Customs Duties (Dumped and Subsidised Goods) Act (1958) and The Customs (Drawback) Regulations of 1958.

One of the most important legislations has been the Aid to Pioneer Industries applied in conjunction with the Industrial Development (Income Tax Relief) Act. An activity and/or industry acquires a 'pioneer status' and is granted a "Pioneer Industries Certificate" if it is "not being carried out in Nigeria or on scale suitable to the economic requirements of Nigeria or at all" or if "there are favourable prospects of further development"[22] (of the industry and/or activity). A pioneer industries certificate then qualifies the industry to pay no company taxes during the first 3 years of its operation where fixed capital expenditure had not been less than N25,000 for indegenous controlled company and N150,000 for any other. The tax relief could be extended for a maximum period of 2 years depending on, among others:

(a) The rate of expansion, standard of efficiency and the level of development of the company.

(b) The implementation of any scheme -
(i) for the utilisation of local raw material in the processes of the company and
(ii) for the training and development of Nigerian personnel in the relevant industry.

(c) The relative importance of the industry in the economy of the country[23].

The schedule of pioneer industries now consists of about 39 manufacturing activities including the manufacture of basic and intermediate industrial chemicals, cement, articles of paper-pulp, paper and paper board, textile fabrics and man-made fibres, leather[24] etc.

In addition to the tax holiday under the Income Tax (Accelerated Depreciation) Act, enterprises are allowed to write off from their profits, for the purposes of computing taxable income, a large amount of their capital investment in fixed assets during the earlier years of trading. This is in addition to the annual capital depreciation allowance. The prevailing rates which are differentiated according to the type of asset on which the capital expenditure is incurred and the type of activity in which the asset is to be used, are as follows:

Qualifying Expenditure	Initial Allowance (%)	Annual Allowance (%)
1. Plant and machinery including furniture, fittings, motor vehicles.	20.00	12.50
2. Building		
a. Industrial	20.00	12.50
b. Non-Industrial	5.00	10.00
3. Plantation	25.00	15.00
4. Mining	20.00	12.50

SOURCE: Fed. Republic of Nigeria, <u>Incentives to Invest in Nigeria</u>, Lagos 1980, p.5

It is doubtful whether these concessions per se would provide as strong incentives as tariffs and other trade restrictions to the affected enterprises. For example, whether a firm benefits from PIS crucially depends upon how quickly it achieves profitability within the span of the three years the tax holiday is granted. The question is whether a period of 3 to 5 years is long enough to allow a newly established firm to stand on its feet and make substantial profits. It appears that the system is more likely to favour those companies whose investments have lower gestation periods and where the return on investment is high and quick yielding in the initial periods. In general however, manufacturing profitability may be expected to be lower especially in the initial years of a firm's operation and, in this eventuality, the incentive value of the tax concession is likely to be significantly reduced. In addition, although the initial as well as the normal depreciation allowances may appear to be generous, their value to the firm may be greatly reduced in an inflationary situation since the valuation of assets for the purposes of calculating the allowances is done at historic costs rather than at the real value or replacement costs.

Indeed, most empirical studies in this field tend to conclude that direct tax concessions have played only a minor role in motivating firms to invest in the Nigerian manufacturing sector. For example, it was shown that an estimated 60 percent of industrialists benefitting from tax relief would have invested anyway. Many of the firms considered market conditions and government attitudes as generally more important in determining their investment decisions[25].

However, it must be realised that these direct tax concessions are not provided in isolation from other investment incentives such as tariff and import controls and their effects may be far greater and more appropriately evaluated in conjunction with these other policies.

The application of the acts could in principle make further investment easier by allowing firms to amortise their capital quickly and to build up liquid reserves at an early date. Substantial benefits could therefore accrue to the economy, where such profits are re-invested. However, there are no guarantees that such will be the case. As such, the tax holiday may only work to increase the incentives provided through trade and licence restrictions and hence increase the 'excess' (i.e. above normal) profits accruing to the beneficiary firm. The latter may in turn further reduce competition (i.e give rise to monopolistic pricing policies) create a captive market for many products, thereby lessening pressures for increased efficiency. There is also the possibility that by increasing the returns to investment in fixed assets, the system of granting tax holidays and substantial depreciation allowances may act as an implicit subsidy to capital, could create relative price distortions in the economy and give rise to artificial incentives to promote capital intensity in production. This is the more so in an economy where capital intensity is already being encouraged by low import duties on capital equipment, low interest rates and over-valued currency.

The 'Approved User' Scheme (AUS)

Under this scheme, "approved users" of materials are granted partial (or full) exemptions with respect to import taxes on production goods needed for the manufacturing processes for a period of up to three years provided that the authorities are satisfied these imports are not being produced in Nigeria and/or that "it is impossible to provide the goods and services in question at prices low enough to compete with the imported equivalent" or that "the imported finished article bears a lower proportion of import duty than the materials imported to manufacture the same article in Nigeria"[26].

The scheme is intended to benefit/assist both new industries to become established in Nigeria and an already established industry to be developed on a scale suitable to the country's overall requirements.

It was estimated that between 1979 and 1982, the amount of subsidies provided to eight industries, through the AUS, was close to N1 billion. About 24 percent of this amount was granted to industries assembling air conditioners and refridgerators. Other beneficiaries and the percentages received include industries manufacturing gas, oil and plastics (20 percent), textiles (18 percent), pulp and paper (12 percent), feed mills (10 percent), building and metal materials (7.9 percent), chemical products (6.8 percent) and beverages (0.82 percent)[27].

Thus for a manufacturer with an approved user status, the scheme will often provide substantial economic benefits in the form of low import duty of inputs in addition to high rates of import duties on final output. Often the difference between the 'normal' tariffs on imported inputs and the rates paid by approved manufacturers can be enormous. For example, in 1977 'normal' duty on artificial resins was 10 percent, while importation was free of duty for an approved user; for synthetic rubber latex, while normal rate of duty is 30 percent the AUS rate was 10 percent; for sheets of unvulcanised synthetic rubber the rates were 66.2/3 percent and 33.1/3 percent respectively and for patent leather 66.2/3 percent and 20 percent[28], etc. In some cases, the differences are even larger. For example, in 1973 copper fittings and parts for boat construction carried an AUS duty rate of 5 percent as against a normal duty rate of 66.2/3 percent and the range is 5 percent and 66.2/3 percent for certain electrical materials[29].

The main disadvantage from the economy's point of view is that unlike the provisions of the income tax which are linked to objectives of industrial efficiency, profitability, manpower development and the maximisation of local value added, the approved user scheme remains largely legalistic, often making the interpretation of the provision vague. For example, many firms are highly critical of the protective effects of AUS because "raw material" is so loosely defined that many semi-finished products are being brought into the country at concessionary tariff rates[30]. The system could in reality therefore strongly discriminate against firms engaged in local production of intermediate and semi-finished products. As a corollary, it could provide a significant additional incentive for imported-input intensity in local production of consumer goods putting an additional strain on the country's balance of payments.

Any advantages conferred on a manufacturer by the application of this and other related incentive legislations must be weighed against the unquantifiable costs that result from excessive bureaucracy in handling matters related to industrial development in the country. As the government itself recognises

> unnecessary restriction and bottlenecks have frustrated a number of worthy projects, in particular, the multiplicity of

> authorities from whom various permits, licences, etc., have to be assembled... confuse the intending entrepreneur ... and create the possibility of abuse[31].

Consider, for example, a manufacturer who wishes to import an input that is not available in the Nigerian market. Typically, an approved user certificate must be obtained from the Federal Ministry of Industries to attest to his legitimacy as a bona fide manufacturer. (It could take a fairly long time for the Ministry to ascertain local non-availability of the product given the lack of up-to-date and statistical data on manufacturing production). He then must obtain an import licence from a special Cabinet Committee, a Form M confirming the approval of foreign exchange from the Central Bank, pay an advance deposit on his consignment and then obtain a clean report of findings as to the quality, quantity, price, comparison and legality from a government appointed inspection company. On arrival at Lagos, the manufacturer will be requested to supply further documents for customs clearance, etc. Thus even the most patient of industrial entrepreneurs could well be frustrated by the bottlenecks, and the cost to the economy, though not easily quantifiable, must be enormous.

4:2:6 Policies and Measures to Promote Manufactured Exports

While the process of tariff-setting typically reflects different government objectives, the incentive legislations were mainly aimed at the promotion of domestic industries under import-substitution programmes. Until fairly recently, there has been no clearly established goals for export expansion and hence there was the complete absence of government's effort to mobilise the immense potentials that do exist for export oriented industries. This could perhaps be attributed to the fact that the process of industrialisation is relatively recent and with a large domestic market the need to find an external outlet for some products might not be urgently felt.

Towards the end of the previous decade, there was a change of direction albeit a half-hearted one, towards the development of manufactured export industries. As was clearly stated in the 1975-1980 plan document, "the development of export industries will be an important objective of government policy during the plan period"[32].

Towards this end, the government proposed to operate incentive schemes which have included the following:[33]

1. The transfer of Commercial and Merchant Banks' credit allocations for exporting industries from the 'less preferred' to 'preferred' sector of the economy. This requires Commercial (Merchant) Banks to allocate <u>at least</u> 6% (4%) of total loans and advances to the export sector, in contrast to the previous arrangement where these percentages were considered as the maximum attainable credit allocation to the sector.

2. The provision of refinancing facilities through the redis-counting of short-term bills with respect to the export of manufactured and semi-manufactured products from Nigeria.

3. Full (or partial) exemption from the payment of duties on

imported inputs used up in the production of an export product, for a period of more than three years.

4. Liberalisation of conditions under which an industry is granted a pioneer status: industries with export potentials or the activities of which will enhance exporting but which do not, under the existing conditions, qualify for the pioneer status scheme can be considered for pioneer status.

5. In addition to the initial and annual accelerated depreciation allowances granted to manufacturers, manufacturing exporters are to be provided with an extra 5 percent annual allowance on their plant and machinery and could be extended to qualifying industrial building expenditure. The granting of the extra 5 percent is however not automatic but tied to the proportion of the value of total production that is exported from the country.

6. The granting of a generous tax relief on interest on foreign loans (previously only to the agricultural sector) as follows:

Repayment period including Moratorium	**Grace period**	**Tax exemption allowed**
Above 7 years	not less than 2 years	100
5 - 7 years	not less than 18 months	70
2 - 4 years	not less than 12 months	40
Below 2 years	not less than 12 months	Nil

SOURCE: Federal republic of Nigeria <u>Manual of Export incentives</u>, p8.

7. Finally, an Export-Development Fund was set up in order "to provide direct grants and offer financial assistance to Nigerian exporters to cover initial expenses in respect of:

(a) participation in training courses, symposia, seminars and workshops in all aspects of export promotion;

(b) advertising and publicity campaigns in foreign markets;

(c) export market research studies;

(d) provide design and consultancy;

(e) participation in Trade Missions, buyer-oriented activities, overseas Trade Fairs, exhibitions and stores promotion;

(f) cost of collecting trade information;

(g) organisation of joint export groups.

The Nigerian Export Promotion Council was set up by Decree 26 of 1976 to:

(a) ensure that Nigeria's export development goals are adequately defined and integrated into the National Development Plan so that there is a clear recognition of the priorities accepted by the Government with respect to the export sector;

(b) formulate policies and programmes through which the export goals established in the National Plan can be realised;

(c) supervise the implementation of these programmes and ensure an effective feed-back from experience which would improve the formulation of future plans for the export sector[34].

These are certainly welcome developments although it is perhaps a bit too early to judge the benefits that accrue to the country in terms of export expansion from the 'change' in direction. However, more often than not, in highly restrictive trade regimes the question is not so much that the export objective have been totally neglected as that it is impossible to work towards it within the particular pattern imposed by policy. This is especially so if the government policies remain more favourable to the domestically oriented producers. Thus, for example, in spite of the often high price and a generally low quality of locally made products intended for the domestic market vis-a-vis international quality standard of foreign-made equivalents, the profit margin may be more than satisfactory for domestic entrepreneurs to venture into exports. Moreover, although such promotional measures are crucial, one of the key elements - neglected by the Nigerian government - determining the success of export expansion is the ability to adopt a stable, realistic exchange rate[35]. With an over-valued currency, the development of exports could be penalised, since international competitiveness is drastically reduced. During the 'oil-boom' period (1973-1975) when Nigeria's position with regards to external reserves was comfortable, the government appreciated the Naira to reflect the strength of the currency in response to the country's economic performance. There were, however, no accompanying measures to depreciate (or devalue) the Naira in order to avoid the dangers of its over-valuation with the rapid decline in the level of reserves especially after 1975. It was estimated that the Naira appreciated by 80% in real terms between 1973 and 1980[36]. In these circumstances it is quite understandable that many firms would not feel compelled to venture into foreign markets with their complex characteristics and attendant high risk competitiveness.

Having examined the various devices employed by the government to promote industrialisation, we now move on to quantify and evaluate their likely effects. We would like to emphasise in advance that the full quantification of the various incentives examined in sections 4:2:5 and 4:2:6 is particularly troublesome given the lack of adequate and systematic information with regards to the operation of these schemes. Our discussion in the following sections will therefore be confined to the effects of the more easily quantifiable protective devices, namely tariffs on inputs and output.

4:3 Protection and Resource Allocation: The Effective Rate of Protection (ERP)

Theoretical and empirical studies[37] on protection have noted that the net effect of the various protective devices - mainly tariffs - is to distort the structure of domestic prices as well as lead to an (inefficient) inter-sectoral and inter-industrial allocation of resources. In the Nigerian case, this implies on the one hand that a tariff imposed on commodity imports with possibilities of substitution causes a divergence between the domestic prices and the world prices of the commodity with the former being maintained well above the latter. On the other hand, the imposition of an export tax and the maintenance of an over-valued exchange rate seriously hampers the development of exports since their international competitiveness is drastically reduced and/or eliminated. The domestic supply of exportables is thus increased while their prices are maintained below the international price level. The concept of the nominal rate of protection is devised to give an indication of the impact of the policy of protection on the domestic price of a commodity vis-a-vis the actual or international price.

The impact of import licencing requirements upon the domestic price level is similar to that of a tariff to the extent that the imposition of the former (i.e. import licence) restricts imports of the commodity below the level that would otherwise occur if only the latter (i.e. tariff) was applied. But while the impact of a tariff on the domestic price level can be measured by the nominal tariff concept (unless the tariff is prohibitive), the protection induced divergence between the international and internal prices resulting from quantitative restrictions are much harder to quantify precisely and can vary over time depending upon demand and supply elasticities for the commodity and the scope for substitution with similar commodities.

The divergence between the domestic price and the international price of a commodity is however only one dimension of the actual distortions generated by a commercial policy; and the nominal rates of protection on final product of an industry are inadequate and often misleading indicators of the extent of inefficiency in resource allocation. This is because in the real world, tariffs are also imposed on imported material inputs used in the production of the final product and since the cost of material inputs constitute a significant element of industrial costs, a tariff on these (which raises their costs to the producer) would obviously affect the cost structure and hence the output of domestic industries. The concept of Effective Rate of Protection is designed to measure these modifications of the production pattern of a country by specifying what effects nominal tariffs on outputs <u>and</u> on inputs have on the value-added or process of an industry rather than on the price of the protected industry's output.

The main objective of this section is to employ the standard neo-classical assumptions and tools of analysis to illustrate how the concept is measured deferring its empirical implementation to the next section.

4:3:1 **Algebraic formulation of erp**

The theoretical formulation of the erp within a partial equilibrium context is based upon a few basic assumptions about the economy. First, the economy is assumed to be 'small', that is, with or without protection, the quantities of any final good x and input i traded represent only a small fraction of the total international market movement of the commodities. Thus variations of volumes traded could hardly provoke changes in actual world prices. Technically this implies that the foreign elasticities of supply of imports of goods x and input i are both infinite. Second, the economy is perfectly competitive with all productive resources fully employed; in particular the factors of production - labour and capital - are mobile domestically and their prices, which reflect their opportunity costs, are flexible. Factors therefore move between activities in response to changes in their prices. They are however not internationally traded and therefore immobile. Third, the production process is assumed to be subject to fixed-input-output coefficients. There are no substitution possibilities between the primary inputs (labour and capital) on the one hand and material inputs on the other, and among the material inputs that are employed in the production of the final good x.

Now define the effective rate of protection (Zx) as the proportionate increment in value-added per unit of output made possible by the protective structure over the 'free-trade' value-added per unit of output:

$$V_x = (1 + Z_x)V^*_x$$

$$Z_x = \frac{V_x - V^*_x}{V^*_x} \qquad 4:1$$

where Z_x = effective rate of protection in activity x

and V_x and V^*_x = domestic value-added and 'free-trade' value-added respectively in activity x.

In the absence of tariffs and/or quantitative restrictions, value-added in activity x expressed in World market values is given by

$$\bar{V}_x = Y_x - \sum_{i=1}^{n} A_{ix} \qquad 4:2$$

where Y_x and A_{ix} are respectively gross output and value of intermediate inputs required in the production of x. Equivalently, value-added per unit of output is given by

$$V_x = 1 - \sum_{i=1}^{n} a_{ix} \qquad 4:3$$

Now let an import duty at rate tx on the finished product x and at rate ti on inputs be simultaneously imposed. (The former is assumed to be higher than the latter). Domestic industry will then operate with a value-added higher than under 'free-trade' and the inflated, post-tariff value-added is given by

$$\begin{aligned} V^1_x &= 1+t_x - \sum_{i=1}^{n} a_{ix}\ (1 + t_i) \\ &= 1 - \sum_{i=1}^{n} a_{ix} + t_x - \sum a_{ix} t_i \qquad 4:4 \\ &= V_x + t_x - \sum_{i=1} a_{ix} t_i\ , \text{ since } V_x = 1 - \sum_i a_{ix} \end{aligned}$$

Thus erp = Z_x can be equivalently expressed as

$$\frac{V_x + t_x - \sum_i a_{ix} t_i - V_x}{V_x} \qquad 4:5$$

$$= \frac{t_x - \sum_i a_{ix} t_i}{v_x} \qquad 4:6$$

Rewriting 4:6 as

$$\frac{t_x}{V_x} - \sum_i \frac{a_{ix} t_i}{v_x} = S_x - T_x$$

Permits one to decompose the effect of the tariff into the subsidy effect (Sx) and tax effect (Tx) on value-added. The former increases value-added, the latter decreases it.

The relationship between Z_x and the nominal rate of protection can be seen as follows: define $\bar{t}_x$ as the weighted average tariff rate on inputs entering the production process of x

$$\bar{t}_x = \frac{\sum_{i=1}^{n} a_{ix} t_i}{\sum_{i=1}^{n} a_{ix}}$$

then

$$Z_x = \frac{t_x - \bar{t}_x \sum_i a_{ix}}{1 - \sum_i a_{ix}}$$

or

$$t_x + \frac{(t_x - \bar{t}_x) \sum_i a_{ix}}{1 - \sum_i a_{ix}} \qquad 4:7$$

Thus the effective rate of protection is equal to, greater than or less than tx, the nominal tariff rate, according to whether t_x is equal to, less than or greater than the nominal rate of protection.

Considering equation 4:1, erp can be negative when either the numerator is negative while the denominator is positive or vice-versa. In the first case, the tariff structure is such that the weighted average of input tariff exceeds the nominal tariff on the output

($t_x < \sum a_{ix} t_i$). In the second case, the value of tradable inputs exceeds the value of output both measured at world prices. Thus value-added at world prices is negative. This implies that the finished good could be purchased abroad more cheaply than the sum of the importable inputs used up in its production[38].

The possibility of having a negative value-added at world prices makes the interpretation of erp rather difficult. If the denominator in expression 4:6 is negative, while the numerator is positive, a positive (nominal) protection accorded to an activity will lead to a negative effective protection. This must be distinguished from the case were erp is negative because protection is genuinely negative (i.e. $t_x < a_{ix} t_i$) or when domestic value-added is negative. To avoid this paradox of getting apparently negative erp when protection is indeed positive, Soligo and Stern (1965)[39] employed the so-called 'U-measure' of effective protection. This expresses the erp as the difference between value-added at domestic prices and world prices as a percentage of value-added at domestic prices, i.e.:

$$U_x = \frac{V_x - V_x^*}{V_x} \quad [40] \qquad 4:8$$

Since Vx must be positive or else the industry would not exist, the denominator here would always be positive. Negative rates of protection would reveal the existence of genuine negative protection.

The preceding analysis assumes that world market values are available in estimating the erp. However, if, as is normally the case, the data is expressed in domestic prices, adjustments have to be made to obtain value-added at 'free-trade' prices. This can be done by multiplying the value of production at domestic prices (Y_x) and the value of purchased inputs A_{ix} by the appropriate conversion factors or accounting ratios:

$$\bar{V}^*_x = Y_x\alpha_x - \sum_i A_{ix}\beta_x$$

$$= Y^*_x - \sum_i A^*_{ix}$$

where α_x and β_x give respectively the output and input conversion factors derived earlier in chapter 2. Thus expressions 4:1 and 4:8 become respectively:

$$Z_x = \frac{(Y_x - \sum_i A_{ix}) - (Y^*_x - \sum_i A^*_{ix})}{(Y^*_x - \sum_i A^*_{ix})} \qquad 4{:}9$$

and

$$U_x = \frac{(Y_x - \sum_i A_{ix}) - (Y^*_x - \sum_i A^*_{ix})}{(Y_x - \sum_i A_{ix})} \qquad 4{:}10$$

It is also important to introduce two important modifications to the above expressions. The first concerns the treatment of non-traded inputs such as electricity, domestic transport, etc. As was earlier pointed out, since these are not internationally traded, their domestic prices are not strictly equal to their 'free-trade' prices plus the tariff on inputs and as such the conversion factors previously derived cannot be applied to revalue these inputs. Two major proposals about the treatment of these inputs have been put forward:

(a) in a number of studies of protection it is often assumed that non-traded inputs are in infinitely elastic supply - i.e. supplied at constant costs. This is the so-called Balassa Method[41] and essentially implies that the price of non-tradeables does not rise with the rise in the price of output and therefore in the event of moving to a 'free-trade' situation the prices of these inputs remain unchanged. This is equivalent to saying that non-traded inputs are subject to zero nominal rate of protection and need not therefore be converted from domestic prices to 'free-trade' prices. Thus the value of material inputs is broken down into its traded, A^t_{ix} and non-traded A^N_{kx} parts and domestic value-added is thus expressed as:

$$\bar{V}_x = Y_x - \sum A^t_{ix} - A^N_{kx}$$

while value-added at free-trade prices becomes

$$\bar{V}^*_x = Y_x \alpha_x - \sum A^t_{ix} \beta_i - A^N_{kx}$$

The formula for the effective rate of protection is accordingly altered to read

$$Z^\beta_x = \frac{(Y_x - \sum_i A_{ix}) - (Y^*_x - \sum_i A^{*t}_{ix})}{(Y^*_x - \sum_i A^{*t}_{ix} - A^N_{kx})} \qquad 4:11$$

(b) The second approach, referred to as the "Corden Method" is to "lump together all the inputs which are protected by a tariff and treat them as one"[42]. In other words, no distinction needs to be made between the effects on value-added (i.e. prices of primary factors) on the one hand and those on traded inputs used in the protected industry. In this instance, the input conversion factor is sufficient for the revaluation of all inputs used up in a particular activity. Expression 4:9 is thus sufficient to obtain "Corden erp's".

The second important modification introduced in the analysis is with regards to the exchange rate. So far it has all along been assumed that the existing rate will remain in force even in the (unlikely) event that all tariffs and domestic distortions were to be eliminated. This assumption however is neither valid nor realistic as will be shortly shown. Observe first, that with the prevalence of tariffs and other international trade distortions, a country will be able to sustain the exchange rate at a much higher level than would be possible in their absence. Consider then the (hypothetical) elimination of all tariffs and quantitative restrictions while maintaining the existing (over-valued) exchange rate. Imports will increase since the demand for commodities whose prices are higher at home than abroad will tend to shift towards international suppliers. Exports however will remain unchanged and therefore there will be a relative worsening in the current account of the Balance of payments (BoP), which would be remedied partly by an adjustment (downward, i.e. a devaluation) of the exchange rate and partly by an increased inflow of capital. Looking at the problem the other way round, consider an initial equilibrium with no trade distortions (i.e. a 'free-trade' situation) and a subsequent application of tariffs and/or quantitative restrictions; the level of imports will fall and exports will still be less profitable and an upward revaluation of the exchange rate will be called for, to maintain equilibrium.

Thus in order to carry out a valid (and realistic) comparison between a 'free-trade' situation and a tariff ridden one, the exchange rate must be altered while holding the BoP constant rather than holding the former constant and implying changes in the latter. In other words, protection should be analysed relative to the exchange rate which would compensate for the removal of all tariffs, quantitative restrictions and subsidies in their effects on the BoP.

The change in the exchange rate needed to maintain a foreign balance with the elimination of protective devices can be obtained from the equation (in chapter 2) which is reproduced here for convenience: $\frac{SER}{OER} = \frac{R^1}{R} = \frac{1}{SCF}$ where $SER(R^1)$, $OER(R)$ and SCF are respectively the shadow exchange rate, the official exchange rate and the standard conversion factor. Once the magnitude of over-valuation is obtained, the nominal rates of protection on outputs and inputs can be accordingly altered to derive the net nominal rates of protection using equation below:

$$t_x^n = (1 - t_x)\,(R - R^1)/R^1$$ [43]

The conversion factors needed to revalue output and inputs of domestic prices are then reworked and employed, using previous methods, to get the net effective rates of protection (nerp), the main interpretations and defects of which we shall now turn to.

4:3:2 Interpretations of the erp

The various positive and normative interpretations given to the estimated rates of effective protection are well known and will only be briefly outlined here.

1. Effective rates of protection have been widely used as an *ex post* measure of the relative incentives provided by a system of protection. *Ceteris paribus*, the higher the rate of effective protection the greater the incentive offered to primary factors to move into protected activities; therefore the erp can be used to rank industries by the *relative incentive* provided.

2. In addition, the erp can be usefully employed to indicate the incidence of tariff policy, i.e. to "shed light on the direction of resource allocation effects of a protective structure"[44]. Sectors or activities can be ranked by the height of their erp's: the highest

sectors (i.e. those with high positive erp's) gaining resources and therefore expanding their output relative to the lowest (i.e. with low positive and/or negative erp's). More specifically:

(a) Industries with a (net) positive erp are drawing resources from the non-traded sector whilst those with negative rates are losing.

(b) Primary productive factors will be pushed to activities which enjoy higher protection than others and their remuneration will be higher.

3. Effective rates of protection are also employed to rank industries by comparative advantage or relative international efficiency. A high positive value of erp implies that the structure of protection allows a large domestic value-added in an industry that has a small value-added in the rest of the world and therefore implies lower comparative advantage for the country in that process.

4. Under certain assumptions, the erp's have been employed for such normative purposes as measuring the cost of protection[45] or as an investment criterion. This latter issue will be taken up in chapter 7 when we examine various other investment criteria. In the rest of the section meanwhile, the validity of the other interpretations and the conditions under which they hold will be examined.

The interpretations of erp as a measure of relative incentives offered to industries and as an exante indicator of resource flows are dependent upon the assumptions of zero general equilibrium repercussions of commercial policy and of fixed input-output coefficients. In a general equilibrium context[46] where more than 2 goods and 2 factors are assumed, it has been theoretically and emperically demonstrated that a ranking of industries or activities by the size of the erp's implies nothing about the direction of resource flows except perhaps for the most and least protected sectors. Moreover, in a multi-product model it cannot even be said that an activity with the highest erp will expand and the one with the lowest erp will contract. Indeed, as Corden (1974) theoretically demonstrated, by making suitable assumptions about the cross-elasticities of factor supplies and factor intensities, the reverse could occur: a highly protected industry could contract rather than expand.[47]

Interpretation 2b is, it is to be recalled, dependent upon the validity of the Stolper-Samuelson Theorem. This Theorem holds even in a multi-commodity world of say 4 goods. However, with more than 2 factors it cannot be applied and therefore the interpretation is not likely to be valid. Moreover, the interpretation assumes that factors are specific to an industry or activity. But it is possible in the real world that there are factors participating in many activities, some with positive erp's, others with negative erp's and therefore the uniformity of their prices is no longer ensured. But this is a condition not compatible with the assumption of perfect competition and of homogeneity of factors.

The possibilities of substitution between primary factors on the one hand, and material inputs on the other, or between imported inputs and primary factors, or among the various intermediate inputs will also lead to a bias in the estimation of erp. If the magnitude of the bias is not uniform, i.e. if it varies from industry to industry, it is very likely to render invalid the ranking of industries and could even lead to a perverse result[48]. Observe first, when substitution is allowed between inputs, a cost minimizing producer is no more restricted to the use of high cost inputs since he will rationally substitute the cheaper input (not subject to tariff or subject to a lower rate of protection) for the high cost one (subject to tariff). This implies that costs of production will be lower in the case of substitution possibilities and industries, irrespective of their rankings by erp's will be given the incentive to expand and/or will contract less than predicted. In other words, the no substitution assumption reduces the effective rate of protection and therefore the value obtained under this assumption cannot be the 'true' one.

Secondly, in a partial equilibrium context, if substitution between primary factors on the one hand and intermediate inputs on the other as well as among intermediates is allowed, then the input-coefficients based on 'free-trade' prices and those based on domestic prices are no longer equivalent and the effective rate of protection will be over- or under-estimated depending on whether these are calculated from the post-tariff or pre-tariff input-output coefficents. Since different activities will be affected differently, the ranking of industries by erp will be affected.

Finally, the conclusion of the general equilibrium theorists that the resource pull and push effects of erp are limited is further strengthened if the possibilities of substitution are allowed in a general equilibrium context. If substitution between imported inputs and various factors of production is allowed, the granting of positive effective protection to industry A with industry B unprotected may or may not lead to A's expansion, depending on the relative factor intensities of the two industries and the ease with which imported inputs substitute for the factor in which A is intensive. By making suitable assumptions along these lines, Corden (1974) shows that a bias-effect of substitution could arise and lead to the contraction of A despite its positive protection[49].

The general conclusion, therefore, is that the theoretical operational value of the concept of effective protection is greatly impaired when the assumptions under which its calculation is based are altered. Whether the interpretations are entirely invalid under the alternative assumptions and whether therefore the concept should be discarded would only be resolved within an empirical (rather than theoretical) context. How significant, for example, are substitution possibilities in the real world? To what extent are the rankings of industry altered when the assumptions of general equilibrium repercussions and of substitutability between inputs invoked? Empirical evidence does suggest that imported inputs quite generally substitute with domestic inputs. For example, in many less developed countries the import of capital goods quite generally substitutes for domestic labour. Moreover, there is normally a substitution possibility between intermediate inputs and primary factors. The study by Balassa and Associates concludes however, that the substitution issue, while theoretically significant, does not appear to be of any practical significance. For example, it is argued that if substitution possibilities are significant, one would expect the estimates of erp obtained using domestic input-output coefficients to be higher than estimates arrived at by the use of 'free-trade' coefficients. However, the reverse was found to be the case in the majority of the countries studied[50]. According to Corden (1971), "for practical work, it may be reasonable to assume that substitution effects are not significantly biased"[51].

There is also some empirical evidence that a consideration of general equilibrium repercussions of the effects of tariffs only slightly influences the rankings of industry. In a study of the

Australian tariff system, Evans (1971)[52] made a comparison of the classification of protected industries under the partial equilibrium effective protection and general equilibrium approaches - which produces the following results:

(a) Of the five industries classified as 'highly' protected (erp greater than 5Ø percent) under the partial equilibrium approach only one had a different classification under the general equilibrium case.

(b) None of the nine'low' protection industries (erp less than 25 percent) in the partial equilibrium erp approach has a different classification in the general equilibrium approach.

(c) The conflict in classification arises only in the case of medium protection (erp 254 - 5Ø percent) industries. Here, of the five industries considered, one had the same classification, two would have been re-classified under 'low' and the other two under 'high' protection on the basis of the general equilibrium approach.

It thus seems that even if the partial equilibrium model fails to produce the correct rankings of industries by the magnitude of the resource-pull and push of the system of protection one will still be able to make an inference, albeit an inconclusive one, since the most heavily and most neglected sectors will be correctly identified and this may be sufficient for policy-making purposes. We may thus conclude with Machealy (1977) that:

> If lesser demands are made on analysis, it could still be of very valuable service, specifically the inferences of the analyses would have to be interpreted as statements of probability, rather than certainty[53].

With these qualifications in mind, we move on in the next section to empirically implement the erp concept.

4:3:3 **The Empirical Implementation of the erp: Estimates for 1974 and 1977**

Using our estimated conversion factors of output and inputs we determined the value of gross output, intermediate inputs and hence value-added at border prices, shown, for the year 1977 in columns 1 to 3 of Table 4:4b. Combining the information in each of these columns with domestic value-added in column 1 of Table 4:4a, it is easy to calculate rates of effective protection using the specified equations. In Tables 4:5a and 4:5b estimates of erp by sector are presented. The main difference between the two tables (and between Tables 4:4a and 4:4b) pertains to the assumption employed in the treatment of non-traded inputs. Estimates of erp in Table 4:5a were arrived at by treating these inputs as part of value-added (i.e. the 'Corden Method') whereas the alternative assumption of treating non-traded inputs as ordinary inputs but with zero nominal tariffs (the 'Balassa Method') was employed in arriving at the estimates in table 4:5b. In general, the use of either method does not alter significantly the relative ranking of industries although the latter method produces higher erp estimates than the former. To avoid repetition in the following discussion of erp, attention will be confined to using the 'Corden' rates in Table 4:5a. Here the estimates differ according to whether adjustments are made for tariffs only (U_1 and Z_1) or for tariffs plus 'other' distortions using a 'premium' rate of 40 percent (U_2 and Z_2) and 60 percent (U_3 and Z_3). The main effect of using the premium rates is, as might be expected, to elevate the erp's in comparison to

Table 4:4a Sectoral Value-added at domestic and border prices(1977) - The 'Corden' method.

	Sector		Value-added (N,000) at:			
			domestic prices	border prices*		
			(1)	(2)	(3)	(4)
6	3111/3122	Food	209383	119500.0	99503.6	91387.3
7	3131/3133	Alcoholic bev.	132592	85452.4	68270.8	61988.8
8	3134	Non-alcoh.bev.	43215	38238.8	28340.4	24975.5
9	3140	Tobacco	63492	16828.3	37533.3	15987.3
10	3211	Textiles	226442	183533.0	83888.3	80009.4
11	3212	Made-up text.	21576	15029.8	16179.7	14169.0
12	3220	Apparel	6191	2314.0	2119.3	2012.6
13	3231/3233	Leather	6470	7953.2	5437.4	4683.6
14	3240	Footwear	16229	1889.5	2783.4	2947.4
15	3311/3320	Wood	66334	29941.7	25876.0	24151.3
16	3412/3420	Paper	121499	124944.0	89252.8	78019.8
17	3511/3512	Chemicals	5587	4286.9	3281.1	3803.2
18	3521	Paints	17883	12751.8	9971.7	6448.7
19	3522	Drugs	34783	15772.8	14040.7	13164.8
20	3523	Soap	158073	18973.6	27597.0	29045.1
21	3529/3540	Other Chem.	117493	117519.0	83961.3	73458.3
22	3551/3560	Rubber	109235	89181.7	67303.0	59939.6
23	3610/3699	Cement	102292	103535.0	69614.1	61278.9
24	3710/3812	Basic Metals	96586	37582.7	34131.5	32303.7
25	3813/3819	Fab.Metals	108700	81652.7	62928.5	56453.9
26	3822/3829	Machinery	71577	55954.0	42712.0	38113.0
27	3832/3829	Elect.Machinery	29093	13919.3	12340.9	11539.4
28	3841/3843	Transport Equip	86840	44451.5	39437.4	36750-8
29	3851/3909	Misc.products	4774	4133.1	3069.2	2720.5

*Notes:In cols 2,3 and 4, output and inputs are adjusted for norminal tariffs only(col2),for tariffs plus other distortions,using a premium rate of 40% (col3) and 60% (col4).

Table 4:4b Sectoral Value-added at Border prices, 1977 - The 'Balassa' method.

		Sector	Value-added (N,000)*		
			(1)	(2)	(3)
6	3111/3122	Food	155349	129355	118803
7	3131/3133	Alcoholic bev.	111088	88752.1	80585.4
8	3134	Non-alcoh.bev.	49710.0	36712.6	32468.1
9	3140	Tobacco	21876.8	48793.2	20783.5
10	3211	Textiles	238592.0	109055.0	104012.0
11	3212	Made-up text.	19538.7	21033.6	18419.7
12	3220	Apparel	3008.2	2755.1	2616.3
13	3231/3233	Leather	10339.1	7068.7	6088.7
14	3240	Footwear	2456.3	3618.5	3831.6
15	3311/3320	Wood	38924.3	33638.8	31396.7
16	3412/3420	Paper	162428.0	116029.0	101426.0
17	3511/3512	Chemicals	5572.9	4265.5	4944.1
18	3521	Paints	16577.3	12963.2	8383.3
19	3522	Drugs	20504.7	18252.9	17114.3
20	3523	Soap	24665.7	35876.5	37758.7
21	3529/3540	Other Chem.	152775.0	109152.0	95495.8
22	3551/3560	Rubber	115936.0	87493.9	77921.5
23	3610/3699	Cement	134595.0	90498.3	77662.5
24	3710/3812	Basic Metals	48857.5	44371.0	41994.8
25	3813/3819	Fab.Metals	106148.0	81807.1	73390.0
26	3822/3829	Machinery	72740.1	55525.6	49624.9
27	3832/3829	Elect.Machinery	18095.1	16043.2	15001.2
28	3841/3843	Transport Equip	57786.9	51268.6	4777.1
29	3851/3909	Misc.products	5373.0	3989.9	3536.7

*Notes: coll:output and inputs adjusted for tariffs only; cols 2 and 3, output and inputs adjusted for tariffs and plus a premium of 40% 60% respectively.

Table 4:5a Sectoral Effective Rates of Protection,1977.
(The 'Corden' method).

			(Tariff-adjusted)		[Tariff + Premium-adjusted]*			
		Sector	U_1	Z_1	U_2	Z_2	U_3	Z_3
6	3111/3122	Food	42.93	75.22	52.48	110.43	56.35	129.12
7	3131/3133	Alcoholic bev.	35.55	55.16	48.15	94.21	53.25	113.90
8	3134	Non-alcoh.bev.	11.52	13.01	34.65	53.03	42.21	73.03
9	3140	Tobacco	73.49	277.29	40.88	69.16	74.82	297.13
10	3211	Textiles	18.95	23.38	62.95	169.93	66.67	183.02
11	3212	Made-up text.	30.34	43.55	25.01	33.35	34.34	52.76
12	3220	Apparel	62.62	167.55	65.77	192.13	67.49	207.62
13	3231/3233	Leather	-22.92	-18.65	15.96	18.99	27.61	38.14
14	3240	Footwear	88.36	758.92	82.85	483.06	81.84	450.62
15	3311/3320	Wood	54.86	121.54	60.99	156.35	63.59	174.66
16	3412/3420	Paper	-2.84	-2.76	26.54	36.13	35.79	55.73
17	3511/3512	Chemicals	23.27	30.33	41.27	70.28	31.93	46.90
18	3521	Paints	28.69	40.24	44.24	79.34	63.94	177.31
19	3522	Drugs	54.65	120.83	59.63	147.73	62.15	164.21
20	3523	Soap	87.99	733.12	82.54	472.78	81.63	444.23
21	3529/3540	Other Chem.	-0.02	-0.02	28.54	39.94	37.48	59.95
22	3551/3560	Rubber	18.36	22.49	38.39	62.30	45.13	82.24
23	3610/3699	Cement	-1.22	-1.20	31.95	46.94	40.09	66.93
24	3710/3812	Basic Metals	61.09	157.02	64.67	183.01	66.56	199.03
25	3813/3819	Fab.Metals	24.88	33.12	42.11	72.74	48.06	92.55
26	3822/3829	Machinery	21.83	27.92	40.33	67.58	46.67	87.51
27	3832/3829	Elect.Machinery	52.16	109.01	57.58	135.75	60.34	152.12
28	3841/3843	Transport Equip	48.81	95.36	54.59	120.20	57.68	136.29
29	3851/3909	Misc.products	13.42	15.51	35.71	55.55	43.01	75.48
		Total manufac facturing Average	34.26	120.74	47.42	123.79	53.69	148.35

* Notes:cols 1 & 2,output and inputs adjusted for tariffs only; cols 3 & 4 and cols 5 & 6 output and inputs adjusted for tariffs and 'other' distortions using a premium of 40% and 60% respectively.

Table 4:5b Sectoral Effective Rates of Protection,1977
(The 'Balassa' method).

		Sector	(Tariff-adjusted) U_1	(Tariff-adjusted) Z_1	[Tariff + Premium-adjusted] U_2	Z_2	U_3	Z_3
6	3111/3122	Food	45.07	82.06	58.55	141.24	63.71	175.55
7	3131/3133	Alcoholic bev.	37.95	61.16	53.90	116.93	59.64	147.76
8	3134	Non-alcoh.bev.	12.55	14.35	38.24	61.91	46.62	87.33
9	3140	Tobacco	75.86	314.21	44.88	81.43	79.38	385.01
10	3212	Textiles	26.25	35.60	68.87	221.26	72.18	259.46
11	3212	Made-up text.	30.85	44.62	30.43	43.75	40.23	67.31
12	3220	Apparel	65.77	192.15	71.19	247.06	73.69	280.09
13	3231/3233	Leather	-19.11	-16.05	24.53	32.51	37.77	60.69
14	3240	Footwear	91.89	1131.48	90.77	983.69	91.23	1040.06
15	3311/3320	Wood	58.64	141.77	66.91	202.16	70.25	236.17
16	3412/3420	Paper	1.79	1.82	34.43	52.52	44.80	81.17
17	3511/3512	Chemicals	28.74	40.33	50.53	102.13	44.80	81.14
18	3521	Paints	40.83	69.01	59.01	143.96	75.90	315.01
19	3522	Drugs	57.11	133.16	67.74	209.98	72.09	258.31
20	3523	Soap	90.11	911.40	87.83	721.60	87.95	729.64
21	3529/3540	Other Chem.	0.05	0.05	31.62	46.26	41.38	70.58
22	3551/3560	Rubber	20.32	25.51	45.59	83.80	54.03	117.54
23	3610/3699	Cement	1.93	1.97	36.43	57.32	45.51	83.53
24	3710/3812	Basic Metals	62.53	166.88	68.12	213.71	70.69	241.13
25	3813/3819	Fab.Metals	28.85	40.54	52.43	110.23	60.48	153.05
26	3822/3829	Machinery	22.93	29.76	44.55	80.33	51.89	107.88
27	3832/3839	Elect.Machinery	54.24	118.51	65.21	187.43	69.76	230.69
28	3841/3843	Transport Equip	51.49	106.15	72.06	257.88	79.86	396.48
29	3851/3909	Misc.products	17.02	20.51	45.49	83.45	54.83	121.37
		Total manufac turing sector Average	37.65	152.79	54.55	186.77	62.03	238.62

Notes: Cols 1 and 2, output and inputs adjusted for tariffs only; Cols 3 and 4 and cols 5 and 6 output and inputs adjusted for tariffs and 'other' distortions using a premium of 40% and 60% respectively.

the tariff-only-adjusted estimates but the change in relative position of sectors is not particularly significant. (The rank order correlation coefficients are 0.82 between Z_1 and Z_2; 0.84 between Z_1 and Z_3 and 0.88 between Z_2 and Z_3). Thus the difference between say columns 6 and 2 gives an indication of non-tariff induced distortions in the economy.

The erp estimates for 1974 are displayed in Table 4:7a and 4:7b. In arriving at these, the same procedures were followed as in the previous section: erp's were computed initially taking into account the effects of nominal tariffs only on the domestic price. Given that there was considerable liberalisation of trade during this period it was not considered necessary to make adjustment for 'other' distortions. However for illustrative purposes we adjusted the c.i.f. plus tariff price by a premium of 35%. To ensure comparability with the 1977 rates, we will mainly consider the results based on the 'Corden' method in Table 4:7a.

One significant feature of the results is the high levels of protection accorded to the manufacturing sector as a whole as well as to the different sub-sectors. Average erp ranges between 120.74 percent (Z_1) to 148.35 percent (Z_3). In the first case, of the 24 sectors considered, about 29 percent have effective rates exceeding the unweighted average (of 120.7%). These include sectors manufacturing wearing apparel (167%), footwear (759%), basic metals (157%) and tobacco products (277%). In the second case, 42 percent of the sectors were accorded higher than average effective protection. These include, in addition to those above, textiles (183%), wood/ furniture (175%) and electrical equipment (152.12%).

In Table 4:8 we provide a summary of the number and percentage

Table 4:6 Sectoral Value-added at domestic and border Prices,1974.

SECTOR			Value-added at: domestic prices (	border prices N,000 (1)	(2)	(3)	(4))
6	3111/3122	Food	135155	135398	72849	131367	67429
7	3131/3133	Alcoholic bev.	79954	35285	28521	33736	26440
8	3134	Non-alcoh.bev.	8792	2876	2731	2659	2344
9	3140	Tobacco	44316	22535	19250	22069	18455
10	3212	Textiles	90210	62425	41447	60053	35834
11	3212	Made-up text.	9339	6416	3617	5964	3010
12	3220	Apparel	747	285	268	232	177
13	3231/3233	Leather	5224	5627	4121	5502	3886
14	3240	Footwear	12568	2930	3073	2367	2111
15	3311/3320	Wood	18797	7957	7161	7380	6176
16	3412/3420	Paper	40399	19330	16703	17376	13443
17	3511/3512	Chemicals	2321	1683	1348	1655	1253
18	3521	Paints	7167	3512	3111	3341	2526
19	3522	Drugs	5968	2322	2216	2162	1671
20	3523	Soap	45219	-17995	-9290	-18808	-12065
21	3529/3540	Other Chem.	5484	3095	2654	3034	2446
22	3551/3560	Rubber	38497	33255	22227	30995	19189
23	3610/3699	Cement	45745	40170	29508	39287	27865
24	3710/3812	Basic Metals	31214	32143	23659	31341	20923
25	3813/3819	Fab.Metals	39739	30861	22013	33219	15166
26	3822/3829	Machinery	1462	1175	918	1160	869
27	3832/3839	Elect.Machinery	13197	5016	4845	4787	4064
28	3841/3843	Transport Equip	21427	16083	12788	15845	11976
29	3851/3909	Misc.products	3679	2713	2163	2678	2044

Notes: cols 1 & 3 and cols 2 & 4 are derived by adjusting domestic output and inputs using respectively tariffs only and tariffs plus a premium of 35%.
cols 1 and 2 (3 and 4) derived using the Corden (Ballasa) method of treating inputs.

Table 4:7a Sectoral Effective Rates of Protection,1974
(The 'Corden' method).

			(Tariff-adjusted)		(Tariff + Premium-adjusted)*	
	Sector		U_1	Z_1	U_2	Z_2
6	3111/3122	Food	-0.18	-0.18	46.09	85.53
7	3131/3133	Alcoholic bev.	55.87	126.59	64.33	180.33
8	3134	Non-alcoh.bev.	67.29	205.74	69.14	224.03
9	3140	Tobacco	49.15	99.66	56.56	130.20
10	3212	Textiles	28.80	40.45	54.05	117.65
11	3212	Made-up text.	31.30	45.56	61.27	158.20
12	3220	Apparel	61.88	162.36	64.19	179.23
13	3231/3233	Leather	-7.72	-7.16	21.11	26.77
14	3240	Footwear	76.68	328.90	75.55	308.99
15	3311/3320	Wood	57.67	136.24	61.91	162.51
16	3412/3420	Paper	54.63	120.40	58.66	141.88
17	3511/3512	Chemicals	27.49	37.92	41.91	72.15
18	3521	Paints	51.00	140.09	56.59	130.40
19	3522	Drugs	61.10	157.04	62.87	169.30
20	3523	Soap	139.80	-351.29	120.54	-586.78
21	3529/3540	Other Chem.	43.57	77.20	51.60	106.62
22	3551/3560	Rubber	13.62	15.76	42.26	73.20
23	3610/3699	Cement	12.19	13.88	35.50	55.03
24	3710/3812	Basic Metals	-2.98	-2.89	24.20	31.93
25	3813/3819	Fab.Metals	9.99	11.10	53.89	116.87
26	3822/3829	Machinery	19.67	24.48	37.24	59.34
27	3832/3839	Elect.Machinery	61.99	163.13	63.29	172.38
28	3841/3843	Transport Equip	24.92	33.23	40.31	67.56
29	3851/3909	Misc.products	26.27	35.62	41.21	70.11
	Total manufac turing sector Average		40.17	65.62	54.35	93.89

* Notes: cols 1 and 2 ,output and inputs adjusted for tariffs only;cols 3 and 4 ,output and inputs adjusted for other distortions using a premium rate of 35%.

Table 4:7b Sectoral Effective Rates of Protection,1974
(The 'Balassa' method).

	Sector		(Tariff-adjusted) U_1	Z_1	(Tariff + Premium-adjusted)* U_2	Z_2
6	3111/3122	Food	28.03	2.88	50.11	100.44
7	3131/3133	Alcoholic bev.	57.81	136.99	66.93	202.40
8	3134	Non-alcoh.bev.	69.76	230.64	73.34	275.12
9	3140	Tobacco	50.20	100.81	58.36	140.13
10	3211	Textiles	33.43	50.22	60.28	151.75
11	3212	Made-up text.	36.14	56.59	67.77	210.31
12	3220	Apparel	68.99	222.48	76.32	322.20
13	3231/3233	Leather	-5.32	-5.05	25.61	34.42
14	3240	Footwear	81.17	431.02	83.20	493.31
15	3311/3320	Wood	60.74	154.72	67.15	204.37
16	3412/3420	Paper	56.99	132.51	66.72	200.52
17	3511/3512	Chemicals	28.69	40.24	46.01	85.23
18	3521	Paints	53.39	114.56	64.77	183.75
19	3522	Drugs	63.77	176.04	72.01	257.23
20	3523	Soap	141.59	-340.43	126.68	-474.81
21	3529/3540	Other Chem.	44.68	80.76	55.40	124.19
22	3551/3560	Rubber	19.49	24.20	50.16	100.62
23	3610/3699	Cement	14.12	16.44	39.09	64.17
24	3710/3812	Basic Metals	-0.41	-0.41	32.97	49.19
25	3813/3819	Fab.Metals	16.41	19.63	61.84	162.02
26	3822/3829	Machinery	20.65	26.03	40.59	68.32
27	3832/3829	Elect.Machinery	63.73	175.72	69.21	224.77
28	3841/3843	Transport Equip	26.05	35.23	44.11	78.92
29	3851/3909	Misc.products	27.22	37.39	44.46	80.04
	Total manufac turing sector Average		43.00	79.97	60.13	139.19

Notes: Cols 1 and 2, output and inputs adjusted for tariffs only; Cols 3 and 4, output and inputs adjusted for tariffs and other distortions using a premium rate of 35%.

Table 4:8 Summary Statistics for 1977 Sectoral Effective Rates of Protection

	Effective Rate Of Protection						Net Effective Rate Of Protection					
	U_1	Z_1	U_2	Z_2	U_3	Z_3	NU_1	NZ_1	NU_2	NZ_2	NU_3	NZ_3
Average (24 sectors)	34.30	120.74	47.40	123.80	53.70	148.40	14.80	69.80	31.70	72.20	39.80	91.00
No & (%) of sectors with:												
erp>average	11.00 (46)	7.00 (29)	11.00 (46)	8.00 (33)	12.00 (50)	10.00 (42)	12.00 (50)	6.00 (25)	11.00 (46)	8.00 (33)	12.00 (50)	10.00 (42)
erp<50%	16.00 (67)	14.00 (58)	14.00 (58)	4.00 (17)	11.00 (46)	2.00 (8)	19.00 (77)	16.00 (67)	19.00 (79)	14.00 (58)	16.00 (67)	11.00 (46)
erp=51-100%	8.00 (33)	3.00 (13)	10.00 (42)	10.00 (42)	13.00 (54)	11.00 (46)	5.00 (21)	4.00 (17)	5.00 (21)	5.00 (21)	8.00 (33)	4.00 (17)
erp=101-200%	0.00	4.00 (17)	0.00	8.00 (33)	0.00	8.00 (33)	0.00	2.00 (8)	0.00	3.00 (13)	0.00	6.00 (25)
erp>200%	0.00	3.00 (13)	0.00	2.00 (8)	0.00	3.00 (3)	0.00	2.00 (8)	0.00	2.00 (8)	0.00	3.00 (13)

Source:table 4:5a(col 6) and table 4:11 (col 6).

of sectors within particular ranges of erp. Thus, if only the tariff adjusted erp's are considered, we find a significant number (14 = 58%) with erp equal to or less than 50%; 3 (13%) within the range 51 - 100%; 4 (17%) within 101 - 200% range and the rest with erp's above 200%. Considering Z_3 however, only about 8% of the industries have a rate of effective protection below 50%; 38% have rates between 50-100%; 41% have their erp's within the rage 101-200% while the rest have rates above 200%.

More striking than the <u>level</u> of protection is perhaps the high degree of variations in relative erp's between the different sectors. The values of Z_1 range between -18.65% (leather products) to 758.92% (footwear industry) and those of Z_3 from 38% to 451% for the same sectors respectively. The high degree of variance is also to be expected <u>within</u> the broad sectoral groupings as presented above. This can be illustrated using a few sectors for which a more disaggregated information is available. Within the wood products sector, for example, the furniture-making sub-sector received an effective rate of protection amounting to 995.97 percent as against 58.58 percent for other wood products. In the building materials sector (cement, concrete products, glass, etc) the cement sub-sector was accorded negative protection while the glass sub-sector received very high effective protection. Similarly for the machinery sector. Thus a high level of aggregation will conceal the degree of protection or disprotection accorded to firms.

Table 4:9 Effective Rates of Protection Within Selected Industries

Sector	Tariff adjusted		Adjusted for tariff + 40% premium		Adjusted for tariff + 60% premium	
	U_1	Z_1	U_2	Z_2	U_3	Z_3
Wood products						
Furniture	90.88	995.97	84.59	548.99	83.27	497.70
'Other wood'	36.94	58.58	48.57	98.28	54.49	119.75
Cement & Glass Products						
Cement	-3.03	-2.94	27.01	36.99	36.29	56.98
Glass	60.89	115.69	63.45	173.58	65.26	187.83
Machinery						
Agricultural	-15.14	-13.15	20.65	26.03	31.39	45.77
Industrial	10.31	11.50	33.98	51.47	41.69	71.48

The bias of the tariff structure to import substitution is clearly greatest for consumer goods industries, less for capital goods and least for intermediate goods producing sectors. For the consumer goods producing sectors, the estimates of erp range between 52.76 percent (made-up textiles) to 450.6 percent (footwear); between 87.5 percent (machinery) to 152 percent (electrical equipment) for the capital goods sector and for the intermediates between 46 percent (Industrial chemicals) to 199 percent (basic metals). The unweighted averages for the three broad categories of sectors are summarised in Table 4:10. It should be realised that the classification of sectors which we have had to adopt because of the lack of more detailed information has resulted in lumping together sectors which are somewhat different in the sense of having very different types of goods - finished,

Table 4:10 Average Effective Rates of Protection by three broad categories of sectors.

measure	Sectors manufacturing: consumer goods	intermidiate goods	capital goods
Corden method			
1977 Z_1	188.08	27.54	77.43
Z_2	162.85	66.29	107.84
Z_3	195.62	80.18	125.31
1974 Z_1	83.68	33.27	73.61
Z_2	102.28	78.05	99.76
Balassa method			
1977 Z_1	242.42	32.64	84.81
Z_2	250.65	87.31	175.21
Z_3	315.62	111.11	242.02
Net effective rates			
Corden method			
NZ_1	121.60	-1.89	36.49
NZ_2	102.19	27.91	59.88
NZ_3	127.37	38.60	73.31
Balassa method			
NZ_1	111.31	57.34	161.37
NZ_2	57.34	6.33	-2.51
NZ_3	161.37	49.13	99.13

source:computed from tables 4:5a,4:5b,4:11,4:12,4:7a and 4:7b.

semi-finished, as well as raw materials - and which received very different levels of nominal protection on inputs and outputs. this is especially true of sectors such as basic metals, rubber and plastics, leather and wood products, which include bother intermediates and consumer non-durables and electrical and transport equipment sectors which include both capital and consumer durable goods. It will thus appear that the averages shown for the consumer goods sectors may have been grossly under-estimated while those for intermediate and capital goods sectors may have been over-estimated. Even then the trend is unmistakable. Majority of the sectors with an above average erp belong to the consumer goods category.

Another noticeable feature of the structure of protection is the bias against those sectors in which, one would have thought, the country would have a comparative advantage. These include domestic input-using sectors like petroleum and coal, cement, leather, and rubber and plastics, which apart from the latter received either negative (Z_1) or very low positive (Z_3) effective protection. In contrast, a few of the more highly protected sectors - drugs and medicines, soap and perfumery, basic metals, electrical machinery and transport equipment - appear to be those that are imported-input intensive. This would seem to be contrary to the government's priorities and objectives of, among other things, saving foreign exchange, as well as the diversification of the industrial base to include the production of intermediate capital goods.

The estimates of net effective rates of protection shown in Tables 4:11 and 4:12 are derived under the assumption of an exchange rate over-valuation of 30 per cent in 1977 (i.e. R'/R = 1/SCF = 1/0.769). As the tables reveal, the effect of the exchange rate adjustment is to lower the level of protection offered to different industries. We see, for example, that the mean nerp amounts to 69.8 and 91.02 per cent respectively for NZ_1 and NZ_3. The downward adjustment is further reflected in the increasing number of disprotected industries: from 4 in the case of Z_1 to 9 in the case of NZ_1. But in general, the main features of the tariff structure remain basically the same as in the previous case of no exchange rate adjustment. In particular, (a) the degree of variation in relative erp's between sectors is still fairly high; the range of effective protection in the 24 sectors becomes -37.42 per cent (leather products) to 560.7 per cent (footwear) in column 2 of Table 4:11 or 6.265 per cent to 324 per cent respectively for the same sectors in column 6; (b) the bias of the tariff structure is in favour of consumer goods producing sectors and against intermediate goods producing industries which are also domestic raw material based. It can be seen that all the negatively protected sectors with the exception of non-alcoholic beverages and textiles fall within the latter category.

Table 4:11 Net Effective Rates Of Protection(1977)
(The 'Corden' method)

		Sector	(Tariff-adjusted) NU_1	NZ_1	[Tariff + Premium-adjusted]* NU_2	NZ_2	NU_3	NZ_3
6	3111/3122	Food	25.81	34.78	38.22	61.87	43.26	76.24
7	3131/3133	Alcoholic bev.	16.22	19.35	33.06	49.39	39.22	64.54
8	3134	Non-alcoh.bev.	-15.03	-13.07	15.05	17.71	24.87	33.09
9	3140	Tobacco	65.54	190.22	23.15	30.12	67.27	205.49
10	3211	Textiles	-5.37	-5.09	51.84	107.64	54.07	117.71
11	3212	Made-up text.	9.44	10.43	2.51	2.58	14.63	17.14
12	3220	Apparel	51.41	105.80	55.49	124.72	57.74	136.63
13	3231/3233	Leather	-59.80	-37.42	-9.25	-8.47	5.89	6.26
14	3240	Footwear	84.86	560.71	77.70	348.50	76.39	323.56
15	3311/3320	Wood	41.32	70.42	49.29	97.19	52.67	111.28
16	3412/3420	Paper	-33.69	-25.19	4.50	4.71	16.52	19.79
17	3511/3512	Chemicals	0.25	0.25	23.65	30.98	11.51	13.00
18	3521	Paints	7.30	7.88	27.51	37.95	53.12	113.32
19	3522	Drugs	41.05	69.63	47.52	90.56	50.80	103.20
20	3523	Soap	84.39	540.89	77.30	340.60	76.11	318.64
21	3529/3540	Other Chem.	-30.03	-23.09	7.10	7.64	18.72	23.03
22	3551/3560	Rubber	-6.13	-5.78	19.90	24.85	28.67	40.19
23	3610/3699	Cement	-31.58	-24.00	11.53	13.03	22.12	28.41
24	3710/3812	Basic Metals	49.12	97.71	54.07	117.70	56.52	130.02
25	3813/3819	Fab.Metals	2.35	2.40	24.74	32.87	34.48	48.11
26	3822/3829	Machinery	-1.63	-1.60	22.43	28.91	30.67	44.24
27	3832/3829	Elect.Machinery	37.80	60.78	44.86	81.34	48.44	93.94
28	3841/3843	Transport Equip	33.46	50.28	40.96	69.38	44.98	81.76
29	3851/3909	Misc.products	-12.55	-11.15	16.42	19.65	25.92	34.99
		Total manufac turing sector Average	14.77	69.80	31.69	72.14	39.77	91.02

* Notes: Cols 1 and 2, output and inputs adjusted for tariffs only; Cols 3 and 4 and cols 5 and 6 output and inputs adjusted for tariffs and 'other' distortions using a premium of 40% and 60% respectively.

Table 4:12 Sectoral Net Effective Rates of Protection,1977
(The 'Balassa' method).

			(Tariff-adjusted)		(Tariff + Premium-adjusted)*.			
		Sector	NU_1	NZ_1	NU_2	NZ_2	NU_3	NZ_3
6	3111/3122	Food	23.42	30.58	13.50	15.62	47.64	90.99
7	3131/3133	Alcoholic bev.	15.02	17.68	26.39	35.86	43.22	76.11
8	3134	Non-alcoh.bev.	-16.81	-14.44	7.18	7.73	27.41	37.77
9	3140	Tobacco	65.78	192.24	17.92	21.83	90.36	237.40
10	3212	Textiles	-1.60	-1.57	31.67	46.34	58.11	138.73
11	3212	Made-up text.	6.89	7.40	-7.28	-6.78	19.08	23.58
12	3220	Apparel	51.63	106.72	40.55	68.21	61.92	162.61
13	3231/3233	Leather	-61.70	-38.16	-49.36	-33.05	12.24	13.96
14	3240	Footwear	83.10	491.89	67.93	211.82	82.26	463.65
15	3311/3320	Wood	42.22	73.07	37.68	60.46	57.32	134.30
16	3412/3420	Paper	-33.29	-24.98	-4.81	-4.59	22.62	29.24
17	3511/3512	Chemicals	0.80	0.80	7.44	8.04	21.67	27.67
18	3521	Paints	15.04	17.71	28.79	40.43	60.64	154.05
19	3522	Drugs	37.09	58.96	34.63	52.98	56.57	130.23
20	3523	Soap	82.78	480.66	66.08	194.81	79.96	399.06
21	3529/3540	Other Chem.	-32.26	-24.39	-15.80	-13.65	20.85	26.33
22	3551/3560	Rubber	-10.07	-9.15	9.51	10.51	33.75	50.95
23	3610/3699	Cement	-31.28	-23.83	3.32	3.43	25.37	34.00
24	3710/3812	Basic Metals	48.46	94.03	46.21	85.92	59.07	144.29
25	3813/3819	Fab.Metals	-1.12	1.11	6.30	-5.93	39.99	66.67
26	3822/3829	Machinery	-4.01	-3.86	12.71	14.57	33.64	50.69
27	3832/3839	Elect.Machinery	33.64	50.69	15.55	18.42	53.82	116.56
28	3841/3843	Transport Equip	20.05	25.08	-68.13	-40.52	56.92	132.15
29	3851/3909	Misc.products	-16.14	-13.90	-4.11	-3.94	33.01	49.27
		Total manufac turing sector Average	13.23	62.26	13.49	32.85	44.89	116.26

Notes: Cols 1 and 2, output and inputs adjusted for tariffs only; Cols 3 and 4 and cols 5 and 6 output and inputs adjusted for tariffs and 'other' distortions using a premium of 40% and 60% respectively.

<u>Changes in the level of protection: 1974 - 1977</u>

The erp estimates for 1974 show similar characteristics as those for 1977: the results are also characterised by considerable variations in rates of protection between sectors, with the highest rate recorded for the footwear industry (309%), closely followed by the nonalcoholic beverages industry (224%), while the lowest (-586%) was recorded for the soap and perfumery sector.

Nine of the 12 sectors with above average effective rates of protection belong to the consumer goods category: these include alcoholic beverages (180%), non-alcoholic beverages (224%), tobacco (130%), textiles 118%), made-up textiles (158%), wearing apparel (179%), footwear (309%), paints (130%), and drugs and medicines (169%).

There are a few sectors whose relative position of protection has changed between the two periods. For example, sectors manufcturing alcoholic beverages, non-alcoholic beverages, textiles, made-up textiles, paper and printing, and electrical equipment had more than overall average erp in 1974, but became less protected than overall average in 1977; while basic metals, fabricated metals, soap and perfumery sectors had less than average erp in 1974 but became more protected than the national average in 1977.

Despite the considerable switch over and fluctuations in rates between the two periods, the change in the structure of protection towards higher erp for sectors is clearly evident. For example, the percentage of those industries with erp less than 50 per cent dropped from 62 per cent in 1974 to about 50 per cent in 1977. The proportion of sectors within the range of protection 51 - 100 per cent doubled to 18 per cent in 1977 from 9 per cent in 1974. Finally 9 per cent of the sectors had erp greater than or equal to 200 per cent in 1974 compared with 15 per cent in 1977.

The consumer goods producing sectors as a group received an average erp of 102.28 per cent in 1974 compared with an average of 195.6 per cent in 1977; the average for intermediate and capital goods producing sectors are, 1974, 78.05 per cent and 99.76 per cent compared with 80.18 per cent and 125.31 per cent respectively in 1977.

A similar conclusion emerges if the erp's for earlier years are considered vis-a-vis the more recent estimates. In table 4"13 we show the average rate of protection accorded to the manufacturing sector as well as to the consumer intermediate and capital goods producing sectors from 1957 to 1977. Thus, effective rate of protection increased from slightly above 40 per cent in 1957 to about 150 per cent in 1977: an increase of about 255 per cent. It can be seen also that since 1957, the structure of erp has barely changed.

Table 4:13

Average Effective Protection in Nigeria, 1957 - 1977

	Total Manufacturing		Consumer goods		Intermediate goods		Capital goods	
Year	Average	Change	Average	Change	Average	change	Average	Change
1957	41.74	---	69.58	---	35.02	---	6.73	---
1962	43.68	1.94	72.49	2.91	25.55	-9.47	18.60	11.87
1965	147.0	103.32	181.00	108.51	76.00	50.45	---	---
1967	97.57	-49.43	120.61	-60.39	91.15	15.15	69.42	50.82
1970	299.0	201.43	315.00	194.39	85.00	-6.15	---	---
1974	93.89	-205.11	102.28	-212.7	78.05	-6.9	99.76	30.34
	65.62*	-233.4	83.67	-231.3	33.27	-51.7	732.61	4.19
1977	148.35	54.5	195.62	93.34	80.18	2.13	125.31	25.55
	120.74*	55.12	188.08	104.40	27.54	-5.73	77.43	3.82

*Nominal tariff-adjusted only.

SOURCE: Figures for 1957, 1962 and 1967 from Oyejide, T.A.. (1975) op cit, pp57-59; figures for 1965 and 1970 from Oyelabi, J.A. (1979), op cit, p30; and figures for 1974 and 1977 from table 4:10 of this chapter.

Available evidence indicates that in comparison to many other LDCs, the Nigerian manufacturing sector is highly protected. In table 4:14 we present estimates of average erp for a number of countries. Admittedly these are not easily comparable given that they were obtained for different time periods. Around the year 1962, Nigeria ranks above Mexico (27%) but well below Chile (182%) and India (313%). Around 1967, Nigeria ranks above Argentina (89%),Brazil (76%),

Table 4:14

Average Effective Rate of Protection in Selected LDCs

Country	Year	Average Effective Rate of Protection
Argentina	1958	162
	1969	89
	1977	39
Brazil	1966	181
	1967	76
	1973	47
Chile	1961	182
Columbia	1969	29
India	1961	313
Kenya	1968	48
Malaysia	1965	-6
Mexico	1960	27
Pakistan	1964	271
Phillipines	1965	51
	1974	125
Rep. of Korea	1968	-1
Taiwan	1965	33
Thailand	1969	50
	1971	40
Nigeria	1962	44
	1965	147
	1967	98
	1970	299
	1974	93
	1977	148

SOURCE: Balassa et al. (1971), p54; Little, I. et al. (1970), p174; Oyejide, T.A. (1975), p60; Oyelabi, J.A. (1979), p30; Tyler, W.G. (1976), Manufactured Export Expansion and Industrialisation in Brazil, Tubingen, J.G.B. Mohr.

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Kenya (48%), Malaysia (-6%), Phillipines (51%), Korea (-1%), Taiwan (33%) and Thailand and in 1977, Nigeria ranks below Brazil (39%). It is to be noted also that while the average erp in Brazil and Argentina has been declining that in Nigeria has substantially increased over the years.

It should be pointed out in conclusion that the 'height ' dispersal and 'cascading' of these tariffs over the years may (or may not be viewed as alarming by the policy makers, since their application is not seen as an end in itself, but as a means towards achieving stated developing objectives. Thus the benefits and costs of maintaining such effective tariffs can only be appropriately judged in terms of the policy goals. To this, we shall now turn.

4:4 Effective Protection, Import Substitution and Sectoral Growth Rates

One of the desired effects of the protectionist policy in many LDCs is the expansion of domestic manufacturing production at a rate that would not have been possible in a 'free trade' situation. The general presumption that industrial growth and trade policies are closely interrelated is widespread not only among policy makers in LDCs but among economists as well. The objective of this section is to examine, briefly, the progress being made in import substitution and relate this to the country's trade policy.

4.4.1 The scope and extent of import substitution in Nigeria

It was shown in chapter 3 that although the manufacturing sector is relatively small in terms of its contribution to national output, many of the industries have enjoyed a remarkably rapid rate of growth between 1963 and 1978. This rapid growth in output coupled with the reduction in level of certain categories of imports for some sectors indicate some progress being made in import substitution.

The broad scope and extent of import substitution in the country is shown in tables 4:15 and 4:16. As measures of import substitution we use the ratio of imports to total supply (MTS) shown for the year 1962, 1971/72, 1973/73, 1974 and 1977 in table 4:15, as well as the ratio of imports to domestic production (MDP) for the same years shown in table 4:16. The lower ratios are, the more the progress made in import-substitution. In these tables we also show the base year (1962) ratios relative to those of 1973/1975, 1974 and 1977. A high ratio indicates much import substitution; a low ratio indicates less. If these are accepted as measures of import substitution, then the only general statement one can make is that the process of substitution is still in its infancy and there is considerable scope for further substitution even in the earlier established consumer goods producing sectors.

The average MTS ratio ranges from 0.632 in 1962 to 0.540 in 1973/5, 0.456 in 1974 and 0.535 in 1977. In the latter year slightly

Table 4:15 The Scope of Import Substitution in Nigeria: Imports as a proportion of total supply, by sector (1962 - 1977).

		Sector	1962	1971/72	1973/75	1974	1977
6	3111/3122	Food	0.693	0.351	0.493	0.351	0.577
7	3131/3133	Alcoholic bev.	0.484	0.330	0.125	0.065	0.288
8	3134	Non-alcoh.bev.	0.312	0.010	0.437	0.016	0.390
9	3140	Tobacco	0.203	0.020	0.000	0.022	0.018
10	3211	Textiles	0.896	0.390	0.369	0.368	0.258
11	3212	Made-up text.	-----	0.250	0.500	0.256	0.379
12	3220	Apparel	0.841	0.640	0.889	0.893	0.886
13	3231/3233	Leather	0.029	0.360	0.333	0.212	0.539
14	3240	Footwear	0.844	0.240	0.250	0.137	0.448
15	3311/3320	Wood	0.124	-0.310	0.220	0.135	0.247
16	3412/3420	Paper	0.770	0.310	0.604	0.437	0.460
17	3511/3512	Chemicals	0.979	0.860	0.892	0.955	0.933
18	3521	Paints	0.471	0.350	0.583	0.514	0.521
19	3522	Drugs	-----	0.850	0.838	0.772	0.648
20	3523	Soap	0.551	0.090	0.161	0.089	0.151
21	3529/3540	Other Chem.	0.930	0.250	0.659	0.804	0.341
22	3551/3560	Rubber	0.578	0.315	0.476	0.411	0.488
23	3610/3699	Cement	0.647	0.554	0.686	0.473	0.633
24	3710/3812	Basic Metals	-----	-2.660	0.568	0.273	0.531
25	3813/3819	Fab.Metals	-----	0.130	0.284	0.267	0.656
26	3822/3829	Machinery	0.993	0.925	0.959	0.991	0.908
27	3832/3829	Elect.Machinery	0.998	0.840	0.933	0.772	0.899
28	3841/3843	Transport Equip	0.658	0.990	0.911	0.828	0.703
29	3851/3909	Misc.products	-----	0.940	0.825	0.903	0.954

Sources: 1962 figures from Oyejide,T,A,(1975),op cit,pp 16 ; 1971/72 from Federal Republic of Nigeria(1975),The Third Plan 1975-1980,op cit,p357 1973/75 figures from Federal Republic of Nigeria (1981),The Fourth Plan 1981-1985,op cit,p177;1974 and 1977,computed from FOS,Industrial Surveys and Trade Summary.

Table 4:16 The Scope of Import Substitution in Nigeria: Imports as a proportion of domestic production, (1962-1977).

		Sector	1963	1971/72	1973/75	1974	1977
6	3111/3122	Food	2.259	0.194	0.382	0.540	1.362
7	3131/3133	Alcoholic bev.	0.937	0.108	0.105	0.069	0.406
8	3134	Non-alcoh.bev.	0.454	0.157	0.268	0.016	0.638
9	3140	Tobacco	0.255	0.016	0.000	0.022	0.018
10	3211	Textiles	8.145	0.319	0.250	0.583	0.347
11	3212	Made-up text.	-----	0.499	0.375	0.344	0.609
12	3220	Apparel	5.197	0.399	7.616	8.357	7.729
13	3231/3233	Leather	0.030	0.285	0.205	0.269	1.169
14	3240	Footwear	5.406	0.042	0.182	0.158	0.810
15	3311/3320	Wood	0.142	0.072	0.156	0.775	0.852
16	3412/3420	Paper	3.342	0.243	0.782	0.775	0.852
17	3511/3512	Chemicals	49.132	0.199	1.162	21.153	13.882
18	3521	Paints	0.892	0.129	0.789	1.057	1.089
19	3522	Drugs	-----	0.205	2.868	3.038	1.837
20	3523	Soap	1.226	0.019	0.069	0.097	0.178
21	3529/3540	Other Chem.	13.278	0.354	0.957	4.094	0.516
22	3551/3560	Rubber	1.198	0.114	0.504	0.697	0.951
23	3610/3699	Cement	1.830	0.142	1.250	0.897	1.725
24	3710/3812	Basic Metals	----	0.040	0.626	0.376	1.129
25	3813/3819	Fab.Metals	-----	0.418	0.158	0.363	1.905
26	3822/3829	Machinery	136.981	0.552	24.950	111.316	9.818
27	3832/3829	Elect.Machinery	617.053	0.220	3.673	3.376	8.853
28	3841/3843	Transport Equip	1.925	0.261	4.289	4.816	2.367
29	3851/3909	Misc.products	-----	0.334	1.625	9.306	20.829

Sources: 1963:Oyejide,T.A(1975)op cit,p16;1971/72 and 1973/75:Federal Republic of Nigeria,Third Plan,p357 and Fourth plan,p177; 1974 and 1977:calculated from data in FOS,Industrial Survey (1975/78) and Nigeria Trade Summary (1974 and 1977).

Table 4:16 contd. (The scope of Import Substitution)

		Sector	1963 ratio of imports to domestic production relative to the ratio in: 1973/75	1974	1977
6	3111/3122	Food	5.911	1.976	1.658
7	3131/3133	Alcoholic bev.	8.924	7.486	2.317
8	3134	Non-alcoh.bev.	1.693	19.682	0.711
9	3140	Tobacco	%	9.320	14.173
10	3212	Textiles	32.582	2.433	23.472
11	3212	Made-up text.	1.331*	3.905*	0.919*
12	3220	Apparel	0.682	0.941	0.672
13	3231/3233	Leather	0.144	0.135	0.025
14	3240	Footwear	29.702	6.186	6.677
15	3311/3320	Wood	0.909	0.920	0.422
16	3412/3420	Paper	4.272	1.764	3.924
17	3511/3512	Chemicals	42.282	1.026	3.539
18	3521	Paints	1.130	0.917	0.819
19	3522	Drugs	0.072*	1.296*	0.112*
20	3523	Soap	17.761	6.203	0.688
21	3529/3540	Other Chem.	13.875	1.157	25.726
22	3551/3560	Rubber	2.377	1.407	1.260
23	3610/3699	Cement	1.243	1.368	1.061
24	3710/3812	Basic Metals	0.064*	3.662*	0.035*
25	3813/3819	Fab.Metals	2.656*	3.753*	0.219*
26	3822/3829	Machinery	5.490	1.002	13.952
27	3832/3839	Elect.Machinery	167.997	1.294	69.703
28	3841/3843	Transport Equip	0.449	0.795	0.813
29	3851/3909	Misc.products	0.206*	1.108*	0.016*

* the ratio for 1971/72 relative to that of the years shown.
source:computed from table 4:16

more than half of the 24 sectors considered had their MTS ratios within the range 51 - 100 per cent. As is to be expected, most of these are in the intermediate and capital producing sectors as well. This is however not to deny that progress -- substantial in some cases -- has been made. For exmaple the MTS ratio has been reduced to less than 25 per cent by 1873/75 in 8 (=33%) of the sectors. This is fairly significant because by 1962 only 3 (9%) of the sectors had achieved a similar ratio. Within the range 26-50 per cent there five sectors in 1962. This number was more than doubled by 1974. Import substitution was virtually complete in the tobacco industry and a lot has been achieved in sectors manufacturing alcoholic beverages, non alcoholic beverages, wood and furniture products and soap and perfumery.

The tremendous growth in manufacturing output and the achievement in import substitution are, however, confined to the domestic market only. Manufactured exports, very small to begin with, have virtually stagnated. In table 4:17 we show the trend in the value of Nigeria's manufactured exports for the years 1964 to 1978. The ratios of manufactured exports to gross output by sector are shown in Table 4:18. Table 4:17 shows that Nigeria's manufactured exports constituted only 7.1 per cent of total exports in 1964. The ratio fluctuated then increased by less than 1 per cent in 1969, 2 per cent in 1972 and to less than 1 per cent from 1974 to 1978.

Table 4:17 Trend in Nigeria's Manufactured Exports by major SITC sections (1964-1978).

[₦000]

SITC Year	(5)	(6)	(7)	(8)	(5-8)	(SITC 0-9)	**	++
1964	240.1	29477.4	----	83.60	29801.1	420924.9	7.10	8.3
1965	131.6	35425.2	----	138.80	35695.6	526491.5	6.80	8.0
1966	172.0	38221.6	----	100.00	38493.6	543716.3	7.10	10.1
1967	238.9	31774.8	----	222.90	32236.6	476192.9	6.80	7.4
1968	56.6	32715.8	----	209.00	32981.4	413009.6	8.00	6.6
1969	213.7	34295.2	----	383.20	34892.1	629262.8	5.50	5.5
1970	283.4	39061.5	----	209.30	39554.2	877059.5	4.50	4.7
1971	586.4	30734.6	----	202.80	31523.8	1280836.4	2.50	3.3
1972	600.4	27421.4	----	103.50	28125.3	1421770.5	2.00	2.6
1974	1239.8	36397.7	----	96.10	37733.6	8783883.0	0.70	2.5
1975	1240.9	27456.5	5.00	117.40	28819.8	4920185.2	0.60	1.1
1976	780.8	27030.7	----	122.70	27934.2	6743714.5	0.40	0.7
1977	1574.0	28420.0	706.00	247.00	30947.0	7621716.0	0.40	0.7
1978	699.0	27538.0	----	116.00	28353.0	6308490.0	0.40	0.6

Notes: the SITC sections are as follows: (5), chemicals; (6), manufactured goods (7), machinery and equipment; (8), miscellaneous manufactures; others not included here are

** ratio of manufactured exports to total exports;

++ ratio of manufactured exports to gross output.

Sources: Central Bank of Nigeria, Economic and Financial Review, 1964-1978; FOS, Industrial Survey of Nigeria, 1964-1978.

Table 4:18 Ratio of Manufactured Exports to Gross output in Nigerian Manufacturing Sectors (1974&1977)

	Sector		1974 (1)	1977 (2)	difference (2-1)
6	3111/3122	Food	--	--	---
7	3131/3133	Alcoholic bev.	--	*	---
8	3134	Non-alcoh.bev.	--	--	---
9	3140	Tobacco	*	--	---
10	3212	Textiles	0.0035	*	-0.0035
11	3212	Made-up text.	*	*	----
12	3220	Apparel	0.0012	0.0017	0.0005
13	3231/3233	Leather	0.4815	0.3279	-0.1536
14	3240	Footwear	*	0.0001	0.0001
15	3311/3320	Wood	0.0767	*	-0.0767
16	3412/3420	Paper	0.0012	0.0004	-0.0008
17	3511/3512	Chemicals	0.1944	0.0795	-0.1149
18	3521	Paints	0.0002	0.0012	0.0009
19	3522	Drugs	0.0131	0.0017	-0.0113
20	3523	Soap	0.0021	0.0010	-0.0012
21	3529/3540	Other Chem.	0.1032	0.0739	-0.0293
22	3551/3560	Rubber	0.0009	*	-0.0009
23	3610/3699	Cement	0.0021	*	-0.0021
24	3710/3812	Basic Metals	0.1267}	0.0418	-0.0849
25	3813/3819	Fab.Metals			
26	3822/3829	Machinery	--	--	----
27	3832/3839	Elect.Machinery	--	0.0085	0.0085
28	3841/3843	Transport Equip	--	--	---
29	3851/3909	Misc.products	0.0017	0.0092	0.0075

Notes: __ implies no exports for that sector
* implies a negligible ratio
} these figures are for both 3710/3812 and 3813/3819.

Source: Computed from FOS,<u>Nigeria Trade Summary,1974&1977,</u> and FOS,<u>Industrial Surveys 1974 and 1975-78.</u>

We can also observe two general trends. On the one hand, it can be seen that chemicals (SITC5) has had a fairly consistent, though unsystematic upward trend. The sharp drops in 1968, 1976 and 1978 are the exceptions. On the other hand, basic manufactures have, over the years, exhibited considerable short-term fluctuations but with a noticeable downward trend, especially toward the end of the 1960's. Overall, the picture which emerges from the table is the fact that manufactured exports since 1970 have not only declined steadily as a share of total exports hut have also shown a downward trend in absolute terms. That the growth in exports has been rather disappointing is further confirmed in table 4:18. Of the total number of sectors, less than 5 exported up to 5 per cent of their output in 1977. The share of exports in output has increased only in 3 of the 24 sectors between 1974 and 1977. It is thus fairly obvious that the rapid growth in manufacturing output has been exclusively for the protected domestic market.

4.4.2 Correlation Analysis

The simple hypothesis to be tested derives from the discussion in the previous sections. A protectionist policy is expected on the one hand, to promote the expansion of positively protected sectors and on the other, to discourage the growth of activities with negative erp's — including those with export potentials. The higher, therefore the rate of effective protection accorded to sectors, the more rapidly are imports substituted (i.e. the lower are the import ratios) and the higher is the sector's rate of output growth and the lower is its export growth. Simple parametric as well as non-parametric tests of association are employed to test the hypothesis.

Before presenting the details of the analysis we would like to briefly mention a few of the difficulties involved in establishing any firm relationship between erp and import substitution on one hand and between the former and the rate of output growth on the other.

First, as was previously noted at the beginning of the chapter, the partial equilibrium resources pull and push implication of the erp has been questioned on both theoretical and empirical grounds. There may be some problems in determining accurately the direction of resource flows where many goods/sectors are involved.

The second problem has to do with timing. During which period do the effects of trade policy on resource allocation and/or growth become operative? Do tariffs have instantaneous effects on the allocation of resources? Do producers take a long or short time to adjust production levels? An instantaneous adjustment may be highly unlikely though not inconceivable in an environment with forward looking investors or where investors fully anticipate changes in the tariff levels. Given that tariff changes are often sudden and unanticipated it may be more reasonable to allow for a short or long period of adjustment. Assuming that it is a short run phenomenon, then sectoral production levels will adjust themselves a short while after changes in the rates of effective protection. Thus, the effects of protection in growth can be discerned by simply comparing the rates of growth of output per sector with changes in the level of protection between any two time periods. However, it is also very likely that the impact of commercial policy only reveals itself in the long-run, in which case it will be desirable to relate erp's with the sectoral growth rates during a more or less ample period. However, it may be impossible for one to determine exactly the adjustment rates for all industries in the economy. That is, different industries are bound to differ considerably in their adjustment rates: some may be able to adjust in the short-run while others may take years to do so. It is thus possible to obtain different sets of results depending on the assumptions employed regarding the timing of the effects.

Third, the ratio of imports to total supply and the rate of output growth probably reflect the cumulative effects of several different types of complex, mutually interchanging factors -- technological, social, economic -- which cannot be captured by the erp measure.

Thus there may not appear to be any general pattern to the way in which protection of the individual sectors is related to, either import substitution, export development or output growth. There are, of course, quite outstanding cases as will be shown shortly, but it seems that each case has to be considered separately. The statistical results have therefore to be supplemented with fairly general comments.

The total number of industries considered is 24, each having a single observation from each of the relevant variables viz effective rates of protection (1974 and 1977), incremental erps (1974-1977), the rate of output growth (1975-1978), absolute as well as incremental import ratios (1974-1977) and absolute as well as incremental sectoral gross output. Each of the variables is then paired with erp's and divided into above average (or 'high') and below average (or 'low') categories. 2 x 2 contingency tables are then constructed for the tests. The statistics computed include Spearman's rank and Pearson correlation coefficients, as well as Chi-square and Fisher's Exact test. For purposes of the tests, 3 methods based on 3 different assumptions, are employed.

It is first of all assumed that no adjustment period is necessary; rates of effective protection by sector at time t are then correlated with the sectoral characteristics as of that year. That is, for example, net effective rates of protection for 1977 are correlated with the ratios of import to total supply for the same year. This will be referred to as Method 1. In Method 2 it is deemed more meaningful to compare the level of protection accorded to sectors at any particular time t with achieved import substitution at a later date (i.e. at time t + s, where s is any number of years for which data is available). This method incorporates the assumption that the influence of protection will be more exerted at a later date, without specifying the length of the adjustment period and assuming that all entrepreneurs adjust at the same rate. The effective rates of protection for say 1974 are then correlated with 1977 ratios of imports to total supply, ratios of imports to domestic production, the incremental ratios of imports to total supply (1974-1977) and the rate of growth of gross output (1975-1978). Finally, in Method 3 the rate of output growth as well as the incremental import ratios are simultaneously introduced into the analysis with the latter being used as a control variable and the former being correlated with the effective rates of protection.

Results

(i) Method 1:

The results obtained by applying Method 1 are summarised in contingency tables 4:19 and 4:2Ø. In table 4:19, we see that of the 14 industries with below average ratio of imports to total supply, 9 (or 65%) had above average erp and of the remaining ten industries with above average import/total supply ratios, 5Ø per cent had a below average erp. Similarly, in 1977, 7Ø per cent of the 'highly' protected sectors that achieved low import/total supply ratios, received below average protection. In both years, therefore, there are more sectors with 'high' erps which achieved low import/total supply ratios, than there are sectors with high erp but which still had high import/total supply ratios. The association between the variables remains however weak because, as can be seen, the proportion of those sectors which conformed to the hypothesis

Table 4:19 Effective Protection, Import Substitution and Sectoral Growth (1974).

	Effective Rate of Protection "low" (<93.89)	"high" (>93.89)	Statistic
low(<0.456)	Food processing Leather products Rubber&plastics Soap&perfumes Basic metals	Alcoholic beverages Non-alcoholic beverages Tobacco Textiles Made-up textiles Footwear Wood&furniture paper, printing&publishing Fabricated&structural metals	SR = -0.25 (0.12) P = -0.14 (0.25) X(a)= 0.08 (0.78) (b)= 0.49 (0.48)
high(>0.456)	Industrial chemicals Cement Machinery Electrical equipment Miscellaneous manufactures	Wearing apparel Paints Drugs&Medicines Petroleum&Coal products Transport equipment	
low(<7.176)	Food processing Leather products Soap&perfumes Rubber&Plastics Cement Basic Metals	Alcoholic beverages Non-alcoholic beverages Tobacco Textiles Made-up textiles Footwear Wood&Furniture Paints Drugs&Medicines Transport equipment	SR = -0.25 (0.12) P = -0.30 (0.08) X(a)=0.86 (0.35) (b)= 2.19 (0.14)
high(>7.176)	Industrial chemicals Machinery Miscelleous manufactures	Wearing apparel	

Notes: X =Corrected chi-square;
X =Raw chi-square;
SR= Spearman's Rank Correlation Coefficient;
P= Pearson's Correlation Coefficient;
The figures in parenthesis underneath each coefficient indicate significance levels(with 1 degree of freedom in the case of X).

Table 4:20 Effective Protection,Import Substitution and Sectoral growth (1977)

	Effective rate of protection(1977) "low"(<91.02)	Effective rate of protection(1977) "high"(>91.02)	Statistic
Import/total supply(1977) "low"(<0.54)	Alcoholic beverages Non-alcoholic beverages Wearing apparel Paper&printing Petroleum&Coal products Rubber&Plastics	Tobacco Textiles Footwear Wood/Furniture Paints Soap&Perfumery Basic Metals	SR =-0.28 (0.09) P =-0.27 (0.10) X(a)=0.81 (0.36) (b)=1.73 (0.19)
Import/total supply(1977) "high"(>0.54)	Food processing Leather products Industrial chemicals Cement&Related products Fabricated Metals Machinery Transport Equipment Miscellaneous products	Wearing apparel Drugs&Medicines Electrical Equipment	
import/domestic production(1977) "low"(<3.29)	Food processing Alcoholic beverages Non-alcoholic beverages Wearing apparel Leather products Paper&Printing Petroleum&Coal products Rubber&Plastics Cement&Related products Fabricated Metals Transport Equipment	Tobacco Textiles Footwear Wood/Furniture Paints Drugs&Medicines Soap&Perfumery Basic Metals	SR = -0.22 (0.15) P = -0.02 (0.46) X(a)= 0 (1.00) (b)=0.007 (0.93)
import/domestic production(1977) "high"(>3.29)	Industrial chemicals Machinery Miscellaneous products	Wearing apparel Electrical Equipment	

(high erp, low import ratios and low erp, high import ratios) is only slightly higher than that of sectors which did not. In 1974, the negative Pearson's coefficient of correlation is significant only at 25 per cent level. In 1977, however, although the x^2 is extremely small, both the rank correlation and Pearson's coefficients are statistically significant at the 10 per cent level. No significant relationship can be deduced between erp and the ratio of imports to domestic production in either 1974 or in 1977.

(ii) Method 2:

The assumption of a future adjustment rate incorporated in Method 2 does not seem to significantly alter the previous results. But it provides some interesting insight into the analysis. We shall interpret the results by considering two categories of sectors in relation to the protection received and import substitution achieved. Within the first category are those sectors whose import ratios have been reduced to less than the national average in 1977 and which enjoyed fairly high rates of protection at earlier dates. These include industrial sectors manufacturing alcoholic beverages, non-alcoholic beverages, tobacco, textiles, made-up textiles, footwear, wood and paper products. These together constituted 64 per cent of the highly protected sectors in 1974 and 60 per cent of the sectors with low import ratios. For some of these, the relationship between protection and substitution is not so obvious. For example, even by 1962, the tobacco industry had a very low MTS ratio which continued to decline (from 20 per cent in 1962 to 2 per cent in 1971/72) and by 1973/75 import substitution was complete. Despite this however, the sector had continued to enjoy effective protection well in excess of the national average (its erp rose from 91% in 1962 to 128% in 1967, 215% in 1970 and to almost 300% in 1977).[54] Similarly for wood products/furniture sector.

However, the majority of the sectors in this category started with fairly high MTs ratios and received over the *years fairly high* rates of effective protection. A notable example is provided by the footwear industry; its high import ratio in 1962 was significantly reduced to less than 15 per cent in 1974 and over the years, the sector's erp has also been progressively increased. It may well be that protection has had some influence.

A common characteristic of the industries in this category is that despite the progress made in domestic substitution and the high erp's received, their exports have been very negligible. The only exception is perhaps the sector manufacturing wood products/furniture which in 1974 exported about 8 per cent of its gross output. Even then, its exports in 1977 declined from the 1974 level. Another possible exception is the metal products sector (basic metals and fabricated metals) which exported 12 (4) per cent of this output in 1974 (1977).

At the other end of the scale are sectors which enjoyed low (or

Table 4:21 Effective Protection, Import Substitution and Sectoral Growth (1974 - 1977).

		Effective Protection(1974) "low"(<mean)	Effective Protection(1974) "high"(>mean)	Statistics
Import/total supply(1977)	"low"(<mean)	Soap&Perfumery Rubber&Plastics Basic Metals	Alcoholic beverages Non-alcoholic beverages Tobacco Textiles Made-up textiles Footwear Wood/Furniture Paper&Printing Paints Petroleum&Coal products	SR = -0.224 (0.146) P = -0.409 (0.023) X(a)= 2.54 (0.111) (b)= 4.03 (0.045)
	"high"(>mean)	Food processing Leather products Industrial chemicals Machinery Transport Equipment Miscellaneous products	Wearing apparel Drugs&Medicines Fabricated Metals Electrical Machinery	
incremental import/total supply(1974-78)	"low"(<mean)	Food processing Leather products Basic Metals Cement&Related products	Alcoholic beverages Non-alcoholic beverages Made-up textiles Footwear Wood/Furniture Fabricated Metals Electrical Equipment	SR = -0.105 (0.301) P = -0.099 (0.32) X(a)=0.005 (0.94) (b)=0.23 (0.64)
	"high"(>mean)	Industrial chemicals Rubber&Plastics Soap&Perfumery Machinery Transport Equipment Miscellaneous products	Tobacco Textiles Wearing apparel Paper&Printing Paints Drugs&Medicines Petroleum&Coal products	

Table 4:1 contd.

		Effective Protection(1974) "low"(<mean)	"high"(>mean)	
growth in gross output (1975-1978)	"low"(<mean)	Food processing Leather products Miscellaneous products	Alcoholic beverages Non-alcoholic beverages Tobacco Textiles Footwear Paper&Printing Petroleum&Coal products Fabricated Metals	SR = 0.122 (0.286) P = -0.269 (0.102) X(a)= 0.81 (0.36) (b)= 1.73 (0.18)
	"high"(>mean)	Industrial chemicals Soap&Perfumery Rubber&Plastics Cement&Related products Basic Metals Machinery Transport Equipment	Made-up textiles Wearing apparel Wood/Furniture Paints Drugs&Medicines	
change in gross output (1974-1977)	"low"(<mean)	Leather products Cement&Related products Industrial chemicals Basic Metals Miscellaneous products	Alcoholic beverages Non-alcoholic beverages Tobacco Made-up textiles Wearing apparel Footwear Wood/Furniture Paints Drugs&Medicines Electrical Equipment	SR = -0.256 (0.114) P = -0.22 (0.15) X(a)=0.14 (0.52) (b)=1.14 (0.29)
	high(>mean)	Transport Equipment Machinery Food products Soap&Perfumery Rubber&Plastics Machinery Transport Equipment	Fabricated Metals Petroleum&Coal products Textiles Paper&Printing Petroleum&Coal products Fabricated Metals	

negative) protection in 1974 and which had high import ratios in 1977. These constitute 70 per cent of the sectors with below average protection, and 64 per cent of the sectors with above average import ratios in 1977. They include sectors manufacturing paper, leather and petroleum and coal products, cement, machinery and industrial chemicals. For two of these sectors, despite the low protection, we find a little bit of progress being made in exporting. For example, the ratio of exports to gross output in the leather products sector was in 1974, 48 per cent and although the ratio declined in 1977 to 32 per cent, it remained the single most important manufacturing export sector in the economy. Industrial chemicals sector exported about 19 per cent of its output in 1974 and close to 8 per cent in 1977.

As can be seen, there are several cases which cannot fit neatly into our classification. For example there are sectors like wearing apparel and electrical equipment with very high levels of erp (1974) but in which not much progress has been made either in import substitution or exporting; and there are sectors -- soap and perfumery, rubber and plastics and basic metals -- which achieved considerable (i.e. below average) substitution despite the low level of protection they received.

The classification can be extended to other variables as well. Consider the relationship between erp and sectoral rates of growth. Here, our findings point to a paradox: there are more industrial sectors with an above average erp which achieved lower than average rate of growth than there are sectors with an average erp and above average rate of output growth. Moreover, the proportion of sectors with below average erp and above average rate of output growth is higher than that of sectors with below average erp and below average growth rate. This tends to suggest that higher rates of growth are associated with lower rates of protection.

The results, summarised in Table 4:21 are therefore mixed: on the one hand, the 1974 erp's are fairly associated with the 1977 ratio of imports to total supply. The Pearson's coefficient is negative (as expected) and statistically significant at 5% level; the raw x^2 is also significant at the 5 per cent level. On the other hand, the association between erps and growth rates is not only weak but negative: the Pearson's coefficient is -0.269. The Spearman's rank correlation coefficient is however positive — but extremely low and statistically insignificant even at the 10 per cent level.

(iii) Method 3:

Following Guisinger (1971)[55] we perform a third type of test by assuming that another factor other than the erp, exerts some influence on the rates of growth of sectors and that the explanatory power of erp could be increased by controlling for this factor. We therefore introduce the change in ratio of imports to total supply as the third variable and split the sample of 24 industries into two sub-samples of (11 and 23) industries with below average and above average ratios of imports to total supply. The rate of growth of industries (1975-78) was then correlated with (i) the erp for 1974 (ii) the erp for 1977 and (iii) the incremental erp's within each of the two sub-samples. Tables 4:22 and 4:23 provide a summary of the results. It is again surprising to note that the relationship between erp and growth rate of sectors within sub-sample 1 is not only weak but negative. For example, Spearman's rank correlation coefficient between sectoral growth rate and 1974 net effective rate of protection is -0.38, while the correlation of 1977 erp and sectoral growth produces a coefficient of -0.005. The results obtained for sub-sample 2 are mixed: on the one hand no significant relationship could be deduced between the 1974 net erp and sectoral growth rates, or between the latter and 1974-77 incremental erp's; on the other hand the 1977 net effective rates of protection seem to be closely associated with sectoral growth rates. The rank correlation coefficient is close to 0.80 and statistically significant at 1% level and so are the coefficients of other test. The introduction of the control variable thus alters significantly the previous results obtained and lends some support to the resource pull and push implication of the erp. The results from the two sub-samples imply that effective protection has more influence on the growth rates of these sectors which achieve more substitution than on the growth rates of those sectors in which less progress has been made. To our knowledge there is no theoretically intuitive explanation for this, and the result could easily have been the other way round, although similar empirical evidence was produced by Guisinger.[546]

Table 4:22 Effective Protection,Import Substitution and Sectoral growth.
Sub-sample I
(change in ratio of imports to total supply<average)

		Sectoral growth(1975-1978) "low"	Sectoral growth(1975-1978) "high"	Statistics
effective rate of protection(1974)	"low"	Food processing Leather products	Basic Metals Fabricated Metals Cement&Related products	F = 0.61 SR =-0.38 P =-0.10 (0.13)
	"high"	Footwear Alcoholic beverages Non-alcoholic beverages	Made-up textiles Wood/Furniture Electrical Equipment	
effective rate of protection(1977)	"low"	Food processing Alcoholic beverages Non-alcoholic beverages Leather products	Wood/Furniture Cement&Related products Fabricated Metals	F = 0.35 SR =-0.01 P = 0.31 (0.18)
	"high"	Footwear	Made-up textiles Basic Metals Electrical Equipment	
change in effective rate of protection (1974-1977)	"low"	Alcoholic beverages Non alcoholic beverages	Made-up textiles Fabricated Metals Electrical Equipment	F = 0.60 SR = 0.07 P =-0.10
	"high"	Fodd processing Food processing Leather products Footwear	Wood/Furniture Wood/furniture Cement&Related products Basic Metals	

Notes: F=Fisher's exact test,
SR=Spearman's rank correlation,
P=Pearsonean coefficient.

Table 4:23 Effective Protection,Import Substitution and Sectoral grwoth.
Sub-sample II
(change in ratio of imports to total supply>average)

		sectoral growth(1975-1978) "low"	sectoral growth(1975-1978) "high"	Statistic
effective rate of protection (1974)	"low"		Soap&Perfumery	F = 0.62 SR = 0.14 (0.32) P =-0.23 (0.23)
	"high"	Tobacco Textiles Paper&Printing Petroleum&Coal products Miscellaneous products	Wearing apparel Industrial chemicals Paints Drugs&Medicines Rubber&Plastics Machinery Electrical Equipment	
effective rate of protection (1977)	"low"	Tobacco Textiles Paints Miscellaneous products	Paper&Printing Industrial chemicals Rubber&Plastics Machinery	F = 0.09 SR = 0.79 (0.001) P = 0.53 (0.03)
	"high"		Wearing apparel Drugs&Medicines Soap&Perfumery Transport Equipment	
change in effective rate of protection (1974-1977)	"low"	Textiles Paints	Wearing apparel Industrial chemicals Drugs&Medicines Rubber&Plastics Machinery Transport Equipment Miscellaneous products	F = 0.64 SR = 0.03 P =-0.10 (0.31)
	"high"	Tobacco	Soap&Perfumery	

Whatever are the possible explanations, the close association between effective rates and growth rates of sectors does not necessarily imply any rationality in tariff making policy in Nigeria. Indeed, given that the instruments of protection are not applied with the principal criterion of industrial promotion (but rather with the objective of dealing with balance of payments problems), the association of growth and protection could have been purely accidental: the growth rates of some sectors could have been quite unrelated to the level of protection provided. Moreover, the rather low association between protection and import substitution which we have found emphasises the need to search for additional explanatory variables which perhaps play a more significant role in influencing import substitution than effective rates of protection. There is certainly no shortage of possible candidates: the size of the market for an industry's product, the nature of the competitive environment, the profitability of the ventures, the accessibility of the different industries to investible funds, etc, which may or may not be related to the system of protection in the economy. For example, for some of the Nigerian manufacturing sectors under review, the phenomena of growth without protection (or of protection without growth) could perhaps be partially explained by their access or otherwise to investible funds over the years.

One of the most significant features of the 'oil boom' era was the massive increase in public investment programmes concentrated mainly in intermediate and heavy goods industries -- iron and steel, cement and glass, industrial chemicals, refineries and petrochemicals etc. Thus in the Third National Plan, about 23 per cent of the total public investment expenditure was earmarked for the iron and steel (basic metals) industries, 5.18 per cent for cement and related products, and 8.25 per cent for industrial chemicals.[57] In addition, these sectors benefited immensely from foreign direct investments. The share of industrial chemicals sector in foreign investment rose from 8 per cent in 1970 to 12.3 per cent in 1975; that of basic metals sector from 1.6 per cent to 3.5 per cent; from 9.1 per cent to 10.10 per cent for cement and from 0.4 per cent to 2.1 per cent for the machinery sector.[58] This could have contributed to the above average rates of growth achieved by these sectors, in spite of their relative disprotection.

In contrast, few of the highly protected sectors may have been retarded from growing by the lack of the direct support either from the government or from the foreign private entrepreneurs. None of the highly protected sectors -- apart from petroleum and coal products, and paper products -- had a share in total public investment exceeding 0.5 per cent. The sectors manufacturing beverages were allocated 0.41 per cent, textiles, made-up textiles and wearing apparel, 0.53 etc.[59] In addition, there was a substantial reduction in the share of these sectors in foreign direct investment: from 8.7 per cent in 1970 to 4.6 per cent for beverages industries and from

12.7 per cent to 6.5 per cent for the tobacco industry.[60] Unfortunately, the lack of more detailed and adequate information does not permit a more elaborate analysis but it does seem that this is an important aspect of growth that cannot be easily assumed away.

How does our finding compare with those of other authors? Attempts to empirically verify the relationship between erps and sectoral growth and/or some measure of import substitution were made by, among others, Oyejide (for Nigeria), Humphrey (for Argentina), Grissinger (for Pakistan), Lewis (for Pakistan) and Adrian Tenkate (for Mexico).[61] The results obtained are mixed and differences of opinion as to the usefulness of erp as an accurate predictor of resource flows remain.

Oyejide produced successful regressions of (a) domestic production as a proportion of total supply (b) average growth of domestic production and (c) incremental import ratios, on estimates of net effective rates of protection for 1957, 1962 and 1967. Proxy measures of the size of the market - population size elasticity and per capita income elasticity - were included in the equations. In addition, the notion of delayed response on the part of producers when tariff changes are made, was introduced. Judged by the value of R^2, his equations performed quite well: the proportion of import substitution explained by one set of the equations was 75 percent (1975), 89 percent (1962) and 91 percent (1967).

In contrast, Humphrey and Lewis have correlated effective rates with index of growth and structural change finding little or no evidence that differential erps exert any significant influence on the allocation of resources. In a regression of output on erp, Humphrey found that the higher the incremental erp, the lower the change in real output. The value of R^2 was less than 0.1.

The analysis by Guisinger which we closely followed in this study, provided another example of mixed results - both successful and unsuccessful - in testing the predictive power of erp on resource allocation. Using a sample of 24 manufacturing industries, the rate of growth of output (1959/60 - 1956/66) as well as the 1963/64 share of imports in total supply (MZ) were each correlated with erp for 1963/64 using non-parametric techniques. MZ did not show any significant association with erp; a significant association was however found between erp and growth rates. He also found that erp exerts more influence on the growth of sectors which achieved more import substitution than on the growth of sectors in which less progress has been made - a result which we also found.

It thus appears that the empirical evidence on the relationship between erp, and growth and/or import substitution is still inconclusive and it can be claimed for our results that they seem at least as reasonable as any others and that they allow us to have an insight into the effects of trade policy or resource allocation which is much closer to the truth than could be achieved by ignoring the whole question. For, even though we could not form a <u>very clear</u> idea of the various positive influences on import substitution and/or growth, our analysis suggests that the policy of protection is one of such influences to reckon with and that it has had some success (albeit minimally, judging from its low, though significant association with import substitution) in promoting the expansion of certain industries. It remains to be seen, in later chapters, whether this allocation of resources carries any normative implications.

4:5 Summary and conclusion

The major objectives of this chapter are, first, to examine the theoretical and empirical aspects of the policy of protection in Nigeria and second, to relate the structure of effective protection to import substitution and/or sectoral growth rates achieved. We traced the evolution of the Nigerian tariff system, pointing out that the process of tariff setting has, over the years, been dictated by a multiplicity of changing objectives rather than by the sole objective of promoting industry. The lack of a clear objective would probably introduce some elements of instability and inconsistency in the application of tariff rates. In otherwords, the price signals which tariffs are expected to convey may not be properly perceived by the entrepreneurs, as a consequence of which, output and investment decisions could be highly distorted.

Effective rates of protection for 1974 and 1977 are found to be generally high in comparison not only to the available estimates for earlier years but also to those found in other LDCs. There is great inequality in the inter-industrial structure of protection with the consumer goods sectors receiving on average the highest support, followed by the capital- and intermediate goods producing sectors. A comparison of our estimates with those earlier obtained by Oyejide and Oyelabi shows considerable fluctuations, although the structure of protection has barely changed over the years since 1957.

To examine the possible benefits and costs of this structure of protection, we analysed the relationship between effective protection and import substitution and sectoral growth rates. We hypothesized that the structure of protection will tend to channel resources into the more highly protected sectors and to confine output to the domestic market. The evidence we found from our correlation analysis is only suggestive in nature. The analysis shows that the benefits, in terms of higher growth and much import substitution are rather minimal, while the costs, in terms of discriminating against exports could be enormous. For not only are manufactured exports negligible, they have also failed to develop.

In view of the many problems associated with the concept of erp, we would like to emphasize that our analysis in this chapter must be interpreted with caution. First, it is well-known that estimating erp implies several rather restrictive assumptions and approximations - fixed input coefficients, the absence of general equilibrium effects etc. - which may not be a reflection of the real world situation. Second, as we earlier pointed out, tariffs are by no means the only trade policy instruments employed by the government either to protect industry or to achieve other objectives. We have seen that complementing protection through tariffs are other fiscal incentives granted to industries under the PIS and AUS schemes. In addition to quantitative restrictions which are a noticeable feature of the Nigerian trade regime, there could be several distortionary trade and industrial policy aspects for which we have made no adjustments. As such, to arrive at a more definite conclusion, one must evaluate these other policies in conjunction with the application of tariffs.

Inspite of these and other shortcomings already pointed out, we hope that our results provide us with a picture of the level and structure of protection which is accurate enough for a general evaluation of trade policy such as the one presented in this and other chapters. As will be shown in the following chapters, the estimated rates of protection can be quite useful in the analysis of other aspects of industrial growth such as employment, productivity growth and investment efficiency.

Chapter 4 - Notes

1. The two main industrial development banks are The Nigerian Industrial Development Bank (NIDB) and the Nigerian Bank for Commerce and Industry (NBCI).

2. See Ekundare, R.O. op cit pp201-202; Asiodu, P.C. (1967). "Industrial policy and incentives in Nigeria". The Nigerian Journal of Economic and Social Studies IX, 2, July, and Fajana, O. (1977), "Import licencing in Nigeria" Development and change, 8, pp509-522.

3. Oyejide, T.A. (1975) Tariff policy and Industrialisation in Nigiera, Ibadan University Press, Ibadan, p.45.

4. Ibid, p44.

5. Fajana, O. (1977), op cit.

6. Federal Ministry of Information, "The Sovereignty Budget", April 1961, cited in Oyejide, T.A. op cit, p45.

7. Oyejide, T.A. op cit, p45.

8. These restrictions were said to be the "most extensive in the history of this country" see the Federal Ministry of Trade Annual report up to 31st March 1973, p36.

9. Oyejide, T.A. op cit, see also Oyelabi, J.A. "Tariffs, Domestic, prices, effective protection and the structure of foreign trade in Nigeria", Mimeo, Nigerian Institute of Social and Economic Research, University of Ibadan, pp6-8.

10. Federal Ministry of Information, Budget speech by the head of State of the Federal Military Government, 1st April 1971.

11. Federal Republic of Nigeria Third National Development Plan 1975-1980, op cit, p10.

12. Ibid, p46.

13. Falegan, S.B. (1978) "Trends in Nigeria's Balance of Payments and Policy Measures Needed for Self-Reliance", Central Bank of Nigeria Economic and Financial Review, 16, 2, December, p5-23.

14. Federal Ministry of Information "Press Statement on the 1974-75 Budget by Alhaji Shehin Shagari, Federal Commissioner for Finance", Lagos, April 1974.

15. Ibid.

16. See Federal Office of Statistics (1981), Annual abstract of Statistics, 1981 edition, Tables 8:1 - 8:3, pp107-109.

17. For more details, see Federal Republic of Nigeria Official Gazette (extraordinary), Vols. 62, 63 and 64, Nos. 16, 17, 18 of 1st April 1975, 1976 and 1977 respectively.

18. Holman, M. (1984) "Oil Production in Turmoil", The Financial Times, Monday, January 23, 1984.

19. See Federal Republic of Nigeria supplement to the Official Gazettes (extraordinary), Vol. 68 (no.15), 20th March 1981; Vol. 69 (No. 17) 20th April 1982; Vol. 69 (No. 40) 18th August 1982 and 10th September 1982.

20. Central Bank of Nigeria (1982), "Central Bank Credit Guidelines" Monetary Policy Circular No. 15, April.

21. Federal Republic of Nigeria Incentives to Invest in Nigeria, Federal Government Press, Lagos, p1.

22. Ibid, p1.

23. The issuance of a pioneer certificate is subject to the conditions that (a) the company shall not engage, during the tax relief period, in any enterprise except the Pioneer Industry in respect of which the Pioneer certificate is granted and (b) the company shall start to operate the factory or where a mining company is concerned, begin operations within one year of the date estimated by the company in its application, see ibid, p1-2.

24. Ibid, pp2-4.

25. World Bank (1974), Nigerian options for long term development, op cit, p84, see also Oyejide, T.A. (1975).

26. Federal Republic of Nigeria Incentives to invest in Nigeria, op cit, p4.

27. Federal Ministry of Industries "Text of Public Lecture" delivered by the Minister of State, Federal Ministry of Industries to Federal Public Officers" 3rd November 1982.

28. Federal Republic of Nigeria, Official Gazette (extraordinary) Vol. 64, No. 18, April 1977.

29. Federal Republic of Nigeria "Custom tariff (Consolidation) Decree, 1973" in Laws of the Federation of Nigeria 1973, Federal Ministry of Information, Lagos, ppA25-A417.

30. See the Report of a Survey of Nigerian Manufacturing firms discussed in the Guardian Newspaper of Monday, 14th November 1983, pp11-18.

31. Federal Republic of Nigeria, Third Development Plan, op cit, p152.

32. Ibid, p154.

33. Federal Republic of Nigeria (1979) Manual of Export Incentives, Nigerian Export Promotion Council, Lagos.

34. Nigerian Export Promotion Council (1977) Export Development and Promotion as a Vital Function of National Economic Planning in Nigeria, Export publication series EP/SEC/P.1, Federal Ministry of Trade, Lagos, p9.

35. For a detailed discussion of the central importance of a realistic exchange rate in the promotion of exports see Kessing, D. (1979), Trade plan for developing countries, World Bank Staff Working Paper No. 353, August; Krueger, A. (1978) Liberalisation Attempts and Consequences, Ballinger, Cambridge, Mass.

36.

37. See References in Chapter 1 for the empirical application of the concept. For a detailed theoretical exposition of the concept see also Corden, W. (1974), The theory of Effective Protection, Clarendon Press, Oxford. Michealy, M. (1977), Theory of Commercial policy, Philip Allan.

38. Negative value added at world prices could be due to a variety of reasons, the most frequently cited being (a) higher transport costs of parts/inputs than for the finished products (b) greater monopoly power by the foreign supplier of imported inputs and parts than for the foreign supplier of finished products (c) inaccurate information on tariff collections and on domestic values of intermediate inputs; the latter could result from over-invoicing by firms as an indirect way of repatriating profits, and finally, the phenomena could be just an indication of short-run losses, or sheer waste in the production process or inadequate recording of input stocks. For the theoretical possibility and factual evidence of the existence of negative value-added see Guisinger, S.E. (1969), "Negative Value Added and the Theory of Effective Protection", Quarterly Journal of Economics, August; Michealy, M. (1977) op cit; Kilby, P. (1969) op cit, p126.

39. Soligo, R. and Stern, J.J. (1965) "Tariff protection, import substitution and investment efficiency", Pakistan Development Review, 5, pp249-270.

40. The Z and U measures can be converted from one to another by a simple formula:

$$U_x = \frac{V_x - V_x^*}{V_x} = \frac{(V_x - V_x^*)V_x^*}{V_x V_x^*} = Z_x \frac{V_x^*}{V_x} = \frac{Z}{Z+1}$$

Similarly,

$$Z_x = \frac{V_x - V_x^*}{V_x^*} = \frac{(V_x - V_x^*)V_x}{V_x^* V_x} = U_x \frac{V_x}{V_x^*} = \frac{U}{1-U}$$

Zx = Ø to ∞ (and Ux = Ø to 1ØØ) if Vx* is positive but less than Vx; if Vx* is positive but greater than Vx, Zx will assume values between Ø and -1ØØ% and Ux between Ø and - ∞. If Vx* is negative, value of Zx will be between -1ØØ and - ∞ and of Ux between 1ØØ and ∞ . See Balassa, B. and Associates (1971) op cit, p318. Note that if Vx* is negative, then an increase in tx (or a decrease in ti) will lead to a lower rate of effective protection, showing thereby another paradox of a highly protected sector but with a low effective rate of protection. See Guisinger, S. (1969) op cit.

41. Balassa, B. and Associates (1971) op cit.

42. Corden, W.M. (1974) op cit, p157.

43. ibid.

44. Corden, W.M. p227.

45. See Balassa, B. and Associates (1971) op cit and Bergsman, (197Ø), op cit.

46. For a detailed exposition of the general equilibrium resource flow implications of the erp see Corden, W.M. (1974) ibid, chapter 4; Bhagwati, J.N. and Srinivasan, T.N. (1973) "The general equilibrium theory of effective protection and resource allocation", Journal of International Economics, 3, pp259-282; Bruno, M. (1973) "Protection and tariff change under general equilibrium", Journal of International Economics, 3, pp2Ø5-226; and Khang, C. (1973) "Factor substitution in theory of effective protection: A general equilibrium analysis", Journal of International Economics, 3, pp227-244.

47. Consider for example 4 activities: A, B, C and D ranked in that order by the height of their erp. Suppose A and B use labour and capital in roughly the same ratios which however differ greatly from those of C and D. Since A has the highest erp it is reasonable to assume that domestic production will shift to A from B; the demand for factors in which both A and B are intensive will rise relative to those in other activities. B's costs of production may thus be increased and in response, output will contract. Thus A expands, B contracts, as predicted. However, industry C having a lower erp than B may still enjoy the benefit of greater protection since it is complementary in factor use with lest protected D, and hence benefit from a protection induced decline in the prices of the primary factors it uses intensively. In other words, D looses resources to C (as predicted), C expands w, while B contracts (a paradox). See Corden, W.M. (1974) op cit, pp84-85.

48. See Balassa, B. and Associates (1971) op cit, chapter 1 and Appendix A. According to Ramaswami and Srinivasan, "there cannot exist any definition of an erp based on technical coefficients and prices of inputs and output alone, that can be used to predict domestic resource movement in response to a tariff". Ramaswami, V.K. and Srinivasan, T.N., "Tariff structure and resource allocation in the presence of factor substitution" in Bhagwati, J. (ed). Eassyas in Honour of Charles Kindleberger, aM.I.T. Press, Cambridge 19 , pp . See also Leith, J.C. (1968) "Substitution and supply elasticities in calculating the effective protective rate", Quarterly Journal of Economics, LXXXII, 4, November 1968, pp5488-601.

49. Corden, W,M. (1974) op cit, pp144-151.

50. Balassa, B. and Associates (1971) op cit, pp53-57.

51. Corden, W.M. (1971) "The substitution problem in the theory of effective protection", Journal of International economics, February, 19 , pp37-57.

52. Evans, H.D. (1971) "The empirical specification of a general equilibrium model of protection in australia", in Grubel, H.G. and Johnson, H.G. (eds)., Effective Protection, GATT and Graduate Institute of International Studies, Geneva.

53. Michealy, M. 91977) op cit.

54. See Oyejide, T.A. 91975) op cit, pp52-53; and Oyelabi, J.A. (1979) op cit.

55. Guisinger, S. (1971) "The characteristics of protected industries in Pakistan", in Grubel, H.G. and Johnson, H.G. (1971), Effective Protection, GATT and Graduate Institute of International Studies, Geneva, pp181-199.

56. ibid.

57. Federal Republic of Nigeria, Third Development Plan, table 11:4, pp158-160.

58. Central Bank of Nigeria (1979), Foreign Private Investment in Nigeria in 1975", Economic and Financial Review, Vol.17, No.1, June 19 , p14-15.

59. Federal Republic of Nigeria, Third Development Plan, op cit, pp158-160.

60. Central Bank of Nigeria, (1979) op cit.

61. Oyejide, T.A. (1975) op cit; Humphrey, D.B. (1969) "Changes in protection and inflation in Argentina, 1953-166", Oxford Economic Papers, 21,2, July 19 , pp196-219; Lewis, S.R.Jnr. (1969) Economics Policy and Industrial Growth in Pakistan, London, George Allen and Unwin; Guisinger, S. (1971) op cit; Kate, A.T. et al (1980) Protection and Economic Development in Mexico, Gower.

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CHAPTER 5

The Empirical Evaluation of Employment, Output and Income Potential of Sectors in Nigeria

5:1 Introduction

The objective of employment creation in Nigeria is perhaps second only to that of rapid growth of the industrial sector. The emphasis on the employment objective stems largely from the seriousness of the unemployment problem in the economy. Available evidence suggests that significant increases in the Nigerian labour force have occurred over the years: from 24 million in 1966/67 to 29.22 million in 1975 and 32.74 in 1980, implying an absolute increase of about 0.7 million per annum between 1975 and 1980. Over the years too, the rate of unemployment has gone up tremendously from 1.7% in 1966/67 to 4.5% in 1975 and only slightly down to 4.4% in 1980. The 1981-85 plan envisages an increase of 3.85 million in the country's labour force between 1980 and 1985, out of which 2.4 million will be gainfully employed, by the end of this year. Thus the rate of unemployment is expected to be down to 4%[1]. These estimates however, grossly underestimate the real unemployment problem since they refer only to open unemployment which by definition excludes underemployment. According to the fourth plan, "there is no doubt that our underemployment problem although difficult to quantify, is as serious as the unemployment problem, if not more"[2].

Although all the economic sectors will be expected to make a contribution in the alleviation of the unemployment problem, the manufacturing sector, the government asserts, "provides the greatest prospect for absorbing the manpower being turned out from our educational and training institutions"[3]. Is that a realistic assessment? is the expectation attainable? if not, why? and what can be done? The central objective of this chapter is to examine the employment potential of industries in Nigeria and determine the extent to which it is influenced by government's trade policy.

Of no less importance is the government's objective of fostering domestic linkages of sectors and hence of minimizing the 'import leakages' which, as we have previously indicated, (Chapter 3) have been quite serious in the Nigerian industrial sector. Thus, our second objective in this chapter is to determine which of the various sectors have the potential of promoting such linkages.

Although our emphasis is on the employment and industrial linkage objectives, an attempt will also be made to appraise the income and foreign exchange potential of the manufacturing sector.

The chapter is organised as follows: section 5:2 discusses the methodology employed in the analysis. In Section 5:3, we examine the employment (and other inputs), output and income potential of sectors. The implications for factor and output requirements, of an hypothetical export promotion strategy will be examined in section 5:4. In section 5:5 we shall examine the theoretical as well as the empirical relationship between policies of protection and the factor intensity of production. Then in section 5:6, the extent of inter-industrial linkages will be examined, to be followed in section 5:7 by a summary and conclusion of the chapter.

5:2 Methodology

The static Leontief input-output system provides an appropriate starting point for the quantitative evaluation of the incentives for complementary investment directly and indirectly caused by industrial net investment (i.e. interindustrial linkages) and for the appraisal of the employment and income implications of industrialisation. The empirical analysis proceeds as follows.

Let the input-output balance equations for the economy be expressed as

$$X = AX + Y \qquad 5:1$$

where

X = (nxl) vector of domestic production

A = (nxn) interindustrial coefficient matrix

Y = (nxl) vector of final demand, made up of public as well as private consumption expenditure, exports, imports etc.

Solving 5:1 gives

$$X = (1-A)^{-1}Y \qquad 5:2a$$

or in difference form

$$\Delta X = (1-A)^{-1}\Delta Y \qquad 5:2b$$

where

$(1-A)^{-1}$ = 'Leontief Inverse'.

A solution to equation 5:2a determines the gross output levels required to sustain a given vector of final demand y. Thus if ΔY in equation 5:2b is assumed to be a unit vector each element Aij of the Leontief inverse can be interpreted as <u>total</u> i.e. direct and indirect impact on the output level of sector i per unit increase in the final demand of sector j. The direct and indirect impact on the gross output levels of <u>all</u> sectors in the economy when the jth sectors final demand changes by unity is given by the sum of the column elements of the inverse

$$\sum_{i=1}^{n} A_{ij} = A_{.j} \qquad 5:3$$

Similarly, the sum of the row elements of $(1-A)^{-1}$, $\sum_{j=1}^{n}$ Aij = Ai.

captures the direct plus indirect impact on sector i's output per unit increase in the final demand of all sectors in the system.

(i) Employment potential of sectors:

To evaluate economic sectors in terms of direct plus indirect employment impact, let the Leontief technology assumption (fixed proportional relationship between inputs and output) be invoked: then if we let

$$l_j = \text{labour employed in the jth sector}$$

then

$$l_j^d = l_j/x_j \qquad 5{:}4$$

is the direct labour requirement per unit of gross output of sector j. In otherwords l_j^d measures the <u>initial</u> effects on employment which are confined to the effects of the industry whose output has increased. Let

$$l = \hat{l}^d x,$$

then the matrix of sectoral employment multipliers, l^* is given by the expression

$$l^* = \hat{l}^d x = \hat{l}^d (1-A)^{-1} \qquad 5{:}5$$

where $\hat{l}^d$ is a diagonalised matrix whose elements are defined by equation 5:4. For a given change in the final demand in sector j, each element of l^* (l^*_{ij}) denotes the employment created directly <u>and</u> indirectly in sector i, and the sum of the elements l^*_{ij} ($= \Sigma\, l^*_{ij}$) measures the <u>total</u> employment created throughout the economy when the final demand for the jth sector increased by unity.

More generally, the direct plus indirect effects on different types of labour or on other variables such factor incomes (wages, payments to capital) imports, capital etc can be calculated by again invoking the fixed coefficient assumption and using the general expression

$$V = Z(1-A)^{-1} Y \qquad 5:6$$

where Z is a matrix of type mxn, (m is the number of variables in the system and n is the number of sectors) with elements Z_{ij}.

Thus if each sector needs to be evaluated in terms of its direct plus indirect impact on factor incomes, Z will be interpreted as a matrix of factor payments per unit of gross output, so that Z_{ij} is part of the output of sector i paid to factor j etc. and V will be a vector of factor receipts whose elements represent the direct plus indirect increase in the payments to the ith factor when the final demand of the jth sector increases by one unit.

The indirect impact on employment of a unit increase in final demand can be isolated from the direct plus indirect effects:

$$l^1 = [l^* - \hat{l}^d] \qquad 5:7$$

and more generally

$$V^1 = (V - Z)Y \qquad 5:8$$

where

l^1 and V^1 are the indirect effects on employment and on other variables respectively; and l^*, l^d, y, V and Z are as defined previously.

Once equations 5:6–5:8 are solved, sectors can be ranked according to the size of the effects. Thus if $l_1^* > l_2^*$, we can conclude that sector 1 is more labour using relative to sector 2 etc.

Having determined the total input requirements and factor income generated in the system, it is often useful to examine the implications (for employment and factor incomes, capital and foreign exchange etc), of alternative trade regimes, such as export promotion and import substitution, and hence test, following Leontief, the H-O factor proportions theory of international trade. Given the relative abundance of labour and the scarcity of capital and/or foreign exchange in the LDCs, one would expect their exports to embody more of the former and their imports or importables to be more capital and/or foreign exchange intensive. To the extent that this is true for Nigeria, then one would expect an export promotion strategy to generate more employment and to be less capital and foreign exchange using, for a given level of investment as compared to an import substitution strategy.

The simplest way to test for the relationship is to assume a hypothetical change (increase) in total manufactured exports and (decrease) in total imports (or competitive imports) and then examine the associated shift in the demand for labour, capital and other inputs in the economy. For example, assume that total or competitive imports are decreased by one million ₦ and to be replaced by domestic production; assume further that the decrease and the subsequent domestic production are to be shared among sectors in proportion to each sector's demand for imports; then the total labour, say, required directly and indirectly for the replacement will be given by:

$$l^M = \hat{l}^d(1-A)^{-1}p^m = l^*p^m \qquad 5:9$$

where p^m is a vector of the share of sectoral imports in total or competitive imports. In a similar fashion, (assuming no domestic or external constraints to export expansion) we could derive the total labour generated in the economy when the quantity of manufactured exports is assumed to be expanded proportionately by 1 ₦ million. One needs only replace the vector p^m above with a vector p of sectoral export shares and thus obtain

$$l^e = \hat{l}^d(1-A)^{-1}p^e = l^*p^e \qquad 5:10$$

As will be shown, these expressions can be easily extended to incorporate other inputs and/or outputs in the system[4].

(ii) <u>Interindustrial Linkage Effects of Sectors</u>

The main idea behind the linkage effects theory is to trace out those processes and/or activities in the economy, the promotion of which could lead to the creation of an industrial structure that could enhance the structural interdependence of sectors within the domestic economy. Such are the activities or processes with high 'technological linkages', capable of not only inducing the expansion of other sectors, but also of initiating the establishment of new enterprises through their supply of output or demand for inputs.

Two types of technological linkage effects have been identified in the literature: the forward linkage effect which results when the increased availability of an industry's output induces or stimulates the setting up of firms or industries which use a substantial portion of its output as their inputs. Thus the development of an iron and steel industry or basic metal industry could, in principle, induce the growth of small firms manufacturing a wide variety of articles as cutlery, metal furniture etc. Then there is the backward linkage effect which results when the increase in the demand of a sector's output by other industries provides a stimulus for the expansion or initiation of production of the input providing industries. Thus for example, the demand of the food processing or tabacco industries for agricultural products could, in principle, create pressures and lead to increase in the production volume of the latter sector. It is possible of course to conceive of a process or industry that has both forward and backward linkage effects: the development of the iron and steel industry could, not only induce the development of firms manufacturing say, bicycle chains, metal containers, etc. (forward linkages) but could, also by demanding an ever larger supply of electricity lead to an induced investment in the latter (backward linkages); and the processes could be extended to cover activities and/or industries which may be unrelated to the activity originally set up[5].

Following Chenery and Watanabe (1958)[6], a rough idea of the scope of backward and forward linkage effects realised can be obtained from the input share of domestic economic sectors in the total output of an industry (backward linkage) and from the share of sales to processing industries in the economy related to the output of an industry (forward linkages). More formally, the degree of backward, (b_j) and forward (f_i) linkage effects are defined respectively by the following expressions:

$$b_j = \frac{\sum_{i=1}^{n} X_{ij}}{X_j} \qquad 5{:}11$$

$$f_i = \frac{\sum_{j=1}^{n} X_{ij}}{X_j} \qquad 5{:}12$$

where

$\sum_{i=1}^{n} X_{ij}$ = total purchased inputs

$\sum_{j=1}^{n} X_{ij}$ = total input sales

X_j = total production of sector j

The size of b_j and f_i will determine the importance of a sector as a buyer of the output of other sectors as its inputs or supplier of its output as inputs to other sectors. Thus, a large value of b_j implies that a sector draws heavily on its purchased input from industries in the system, while a large value of f_i would indicate that other industries draw heavily on their purchased inputs from the sector i. Once these are estimated, sectors can be classified in order of priority: sectors with high b_j and f_i being most important; those with low b_j and low f_i least important and second and third priority assigned to sectors that have high-b_j-low f_i and low-f_i-high-b_j output linkages respectively[7].

These measures, though simple to apply, once an input-output table is available, have nevertheless a certain drawback. First, observe that they capture only the direct backward and forward linkage effects of an exogenous increase in sectoral output, ignoring the indirect and/or spread effects. For example, one cannot distinguish between the b_j estimated for a sector which draws heavily on only one or two industries and that for another sector whose reliance on other sectors for its purchased inputs is more evenly dispersed. Similarly, certain sectors may have a highly skewed input deliveries pattern and would tend to have large f_i values which cannot be distinguished from those of sectors whose structural relationships might be more evenly characterised. Thus if the main consideration of economic policy is the maximisation of the <u>total</u> effects as well as the dispersal of these effects as widely as possible throughout the economy, the above measures will be of limited relevance.

As an alternative to these, one could consider the measures of technological linkages as suggested by Rasmussen (1957)[8]. These, which deal with the magnitudes contained in the Leontief inverse are defined simply as the average value of coefficients in a given row or column relative to the average value of all coefficients in the inverse matrix. More formally, the 'Index of power of dispersion' (the backward linkage effect) is defined by the expression

$$U_j = \frac{\frac{1}{n} A_{.j}}{\frac{1}{n^2} \sum_{j=1}^{n} A_{.j}} \qquad j = 1,2,\ldots,n \qquad 5:13$$

Similarly, the 'Index of sensitivity of dispersion' (the forward linkage effect) is expressed as

$$U_i = \frac{\frac{1}{n} A_{i.}}{\frac{1}{n^2} \sum_{i=1}^{n} A_{i.}} \qquad i = 1,2,\ldots,n \qquad 5:14$$

where $A_{.j}$ and $A_{i.}$ are as defined previously.

The denominator in both equations represent the overall averages i.e.

$$\frac{1}{n^2} \sum_{j=1}^{n} A_{.j} = \frac{1}{n^2} \sum_{i=1}^{n} A_{i.} = \frac{1}{n^2} \sum_{j=1}^{n} \sum_{i=1}^{n} A_{ij}$$

The interpretation of U_j and U_i is similar to that given to b_j and f_i - that is, U_j is a measure of the extent to which industry j uses as purchased raw material inputs, the final output of other industries in the economy. If $U_j > 1$, the industry in question draws heavily on the system of industries and the reverse holds for $U_j < 1$. In a similar fashion, the magnitude of U_i can be used to gauge the relative importance of an industry as a supplier of material inputs to other industries, rather than as a supplier of final goods. If $U_i > 1$, this implies that industry i is important as a supplier of materials and semi-finished goods. Thus by expanding capacity in that sector inducements are provided to using industries which now have an incentive to expand output due to the increased availability of output. A key sector is one with both U_j and $U_i > 1$. The indices U_j and U_i can be weighted according to the importance of each sector in say, the final demand, in order to overcome the possible errors arising from simple averaging. Accordingly, the weighted versions of the index of forward linkage will be

$$U_i^W = \frac{\dfrac{\sum_{j=1}^{n} A_{ij} Y_j}{\sum_{j=1}^{n} Y_j}}{\dfrac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} \dfrac{A_{ij} Y_j}{\sum^{n} A_{ij} Y_j}} \qquad 5:15$$

where y_j = jth element of the final demand vector y. Alternatively, sectoral measures of variability represented by the following indices of the coefficient of variation can be defined:

$$V_j = \frac{\sqrt{\dfrac{1}{n-1}\sum_{i=1}^{n}\left(A_{ij} - \dfrac{1}{n}\sum_{i=1}^{n} A_{ij}\right)^2}}{\dfrac{1}{n}\sum_{i=1}^{n} A_{ij}}, \quad j = 1,2,\ldots,n \qquad 5:16$$

$$V_i = \frac{\sqrt{\dfrac{1}{n-1}\sum_{j=1}^{n}\left(A_{ij} - \dfrac{1}{n}\sum_{j=1}^{n} A_{ij}\right)^2}}{\dfrac{1}{n}\sum_{j=1}^{n} A_{ij}}, \quad i = 1, 2, \ldots,n \qquad 5:17$$

A high V_j implies that a particular sector j draws heavily on only a few of the industries that it does affect, and a low V_j means that an industry draws relatively evenly from the affected sectors. Similar interpretation can be given to V_i. A key sector can then be redefined as one for which, not only are the U's above unity but the V's are low as well[9].

In a similar fashion, we can following Diamond (1975), identify 'Key' employment sectors in the economy. These are defined as sectors "which cause a disproportionately large increase in the employment of other sectors when the final demand for their products is increased. At the same time, the labour input of these 'key' industries must expand more than average to meet the final demand on other sectors"[10]

In equations 5:13 - 5:17 we simply replace the A's to substitute L, the elements of the direct plus indirect employment matrix. Thus the Index of employment backward linkage, U_j is given by

$$U_j^L = \frac{\frac{1}{n} L._j}{\frac{1}{n^2} \sum_{j=1}^{n} L._j} \qquad j = 1,2,\ldots,n \qquad 5:18$$

and the index of employment forward linkage U_I,

$$U_I^L = \frac{\frac{1}{n} L_i.}{\frac{1}{n^2} \sum_{i=1}^{n} L_i.} , \quad i = 1,2,\ldots,n \qquad 5:19$$

$U_j^L > 1$ implies that the system of industries as a whole will need a comparatively large increase in employment to cope with a unit increase in the final demand for sector jth product. Similarly if $U_I^L > 1$, this implies that sector i will have to increase its labour input relatively more than other sectors for a given increase in final demand.

The coefficients of variation analogous to 5:16 and 5:17 are given as

$$V_j^L = \frac{\sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (L_{ij} - \frac{1}{n} \sum_{i=1}^{n} L_{ij})^2}}{\frac{1}{n} \sum_{i=1}^{n} L_{ij}} \qquad 5:20$$

and

$$V_I^L = \frac{\sqrt{\frac{1}{n-1} \sum_{j=1}^{n} (L_{ij} - \frac{1}{n} \sum_{j=1}^{n} L_{ij})^2}}{\frac{1}{n} \sum_{j=1}^{n} L_{ij}} \qquad 5:21$$

The Data

The total, direct and indirect input requirements and factor incomes generated in production are estimated from an updated and disaggregated input-output matrix for the Nigerian economy for the year 1977. The inputs considered are labour, capital and raw material imports, the latter being a proxy for foreign exchange input. Factor incomes are represented by value-added, disaggregated into labour income (wages) and non-labour income, which can be roughly considered to represent payments to capital employed in the production process.

As we previously indicated in Chapter 1, the input-output matrix currently available for the Nigerian economy must be considered as out of date, being constructed using 1973 as a base. A number of methods have been suggested in the literature for updating input-output tables. The most commonly used is the RAS or biproportional method, the theoretical properties, practical usefulness and efficiency of which, have been examined in great detail by many authors[11]. In simple terms, the RAS method finds a 'new' matrix, having prescribed row and column sums, provided such a matrix exists. This matrix will, ordinarily, be 'near' to a given matrix which has been employed as the initial approximation. Thus, to apply the method, one needs only the input-output matrix estimated from the full data for a given (base) year and the row and column constraints for the current year[12]. The computer algorithm we used is due to Slater (1972)[13].

The disaggregation procedure we followed is not defined by any rigid mathematical formula and, on many occasions, we have had to employ our own value-judgements. The first step is to estimate the sectoral intermediate input sales and purchases, of the disaggregated sectors, which are used as 'control' rows and columns. The column controls can be easily obtained from the FOS industrial survey data, as the difference between gross-output (G*) and value-added (V*). The row controls are given by gross output less total final demand (FD*). The latter is not available to us, and the only category of final demand we can estimate with some degree of precision is the level of sectoral imports and exports. Thus, the row totals had to be approximated using available data from past industrial surveys, or from the input-output tables of other LDCs or from Clark's (1972)[14] disaggregated input-output table for the Nigerian economy.

The second step is to obtain estimates of the disaggregated input coefficients for each of the cells in the new matrix. These estimates can be obtained from different sources: either from the normally available statistics for other countries, or by using the methods of forecasting of the individual coefficients or a combination of the two. Here too, we have had to rely on 'borrowed' data to fill in the cells, and, in some cases, the distribution of the estimates is made in an ad hoc (but sensible) fashion. For example, where the borrowed data does not look 'sensible' enough, we employ the assumption that the disaggregated coefficient (a^*_{ij}) is proportional to the original, i.e. aggregated coefficient (a_{ij}), the factor of proportionality being the ratio of value added to gross output of the disaggregated sector - i.e.,

$$a^*_{ij} = \beta a_{ij}$$

$$\beta = V_j/G_j$$

The resulting matrix, (and the row and column 'controls' already obtained) is then used as the initial approximation in the RAS technique. (This procedure and its limitations are further examined in the Appendix)

5:3 The Main Results

5:3:1 Output, Factor Requirements and Factor Incomes in Production

For each objective (the generation of employment, labour, income, value-added and gross output) and constraint (capital and foreign exchange requirements), two sets of direct plus indirect coefficients are estimated. The first set takes into account the effects of the primary (sectors 1-5) and tertiary (sectors 30-35) sectors in the economy. In otherwords, the full 35 x 35 input-output table was used. These will be referred to as the global input, output and factor income coefficients. By this approach, one would be able to examine the interdependence of sectors not only within the manufacturing sector for which we are mainly concerned with, but also between the three main groups of sectors viz primary, modern manufacturing and tertiary or services. However, because of certain limitations imposed by the available data, a second set of estimates referring only to the input, output and income coefficients in manufacturing are also computed. For example, data related to employment, wages and capital in the non-manufacturing sectors are always difficult to come by and the available ones are not very reliable[15]. It is necessary therefore to map out a 24 x 24 input-output table that contains information on the manufacturing subsectors to estimate what will be referred to as the M-sector coefficients. As will be shown, the M-sector coefficients are often considerably lower than the global coefficients due to the omission of the linkage effects of the primary and tertiary sectors.

Tables 5:1 - 5:4 give a complete listing of the direct, indirect and the direct plus indirect (ie. total) output, value-added, factor income, employment, capital and foreign exchange effects of one unit

Table 5:1 The Direct Effects of Sectoral Expansion in Manufacturing Industries. (1977)

	Sector		labour	r	capital	r	imports	r	Value added	r
6	3111/3122	Food	0.092	20.000	0.882	16.000	0.108	17.000	0.387	31.000
7	3131/3133	Alcoholic bev.	0.038	32.000	0.509	18.000	0.167	12.000	0.609	14.000
8	3134	Non-alcoh.bev.	0.075	22.000	0.264	23.000	0.054	23.000	0.635	12.000
9	3140	Tobacco	0.058	25.000	1.661	4.000	0.023	27.000	0.652	11.000
10	3211	Textiles	0.127	13.000	0.909	15.000	0.082	19.000	0.442	27.000
11	3212	Made-up text.	0.160	11.000	0.207	24.000	0.055	22.000	0.494	23.000
12	3220	Apparel	0.166	10.000	1.560	6.000	0.197	9.000	0.461	24.000
13	3231/3233	Leather	0.100	17.000	0.022	31.000	0.125	15.000	0.278	34.000
14	3240	Footwear	0.135	12.000	1.710	3.000	0.181	11.000	0.514	20.000
15	3311/3320	Wood	0.212	9.000	1.459	9.000	0.069	20.000	0.488	24.000
16	3412/3420	Paper	0.082	21.000	1.709	2.000	0.186	10.000	0.502	21.000
17	3511/3512	Chemicals	0.051	27.000	1.189	12.000	0.345	4.000	0.405	29.000
18	3521	Paints	0.039	31.000	1.467	8.000	0.239	8.000	0.500	22.000
19	3522	Drugs	0.042	28.000	1.346	10.000	0.291	7.000	0.485	25.000
20	3523	Soap	0.039	29.000	1.890	1.000	0.291	6.000	0.536	18.000
21	3529/3540	Other Chem.	0.017	34.000	1.189	12.000	0.162	13.000	0.442	28.000
22	3551/3560	Rubber	0.113	15.000	0.207	24.000	0.107	18.000	0.532	19.000
23	3610/3699	Cement	0.120	14.000	1.562	5.000	0.053	25.000	0.604	15.000
24	3710/3812	Basic Metals	0.066	24.000	1.560	6.000	0.133	14.000	0.627	13.000
25	3813/3819	Fab.Metals	0.068	23.000	0.418	21.000	0.537	3.000	0.317	33.000
26	3822/3829	Machinery	0.039	30.000	0.441	20.000	0.319	5.000	0.590	16.000
27	3832/3829	Elect.Machinery	0.055	26.000	1.334	11.000	0.553	2.000	0.351	32.000
28	3841/3843	Transport Equip	0.018	33.000	0.990	14.000	0.746	1.000	0.141	35.000
29	3851/3909	Misc.products	0.103	16.000	0.661	17.000	0.016	8.000	0.390	30.000

contd.

r = rank

Table 5:1 contd. (The direct effects of sectoral expansion)

Sector	wages	r	non-labour income	r	gross output	r
6 3111/3122 Food	0.076	28.000	0.311	26.000	0.505	3.000
7 3131/3133 Alcoholic bev.	0.075	29.000	0.534	10.000	0.224	25.000
8 3134 Non-alcoh.bev.	0.128	19.000	0.507	12.000	0.311	16.000
9 3140 Tobacco	0.124	20.000	0.528	11.000	0.325	13.000
10 3211 Textiles	0.167	11.000	0.275	28.000	0.476	4.000
11 3212 Made-up text.	0.153	12.000	0.341	24.000	0.451	5.000
12 3220 Apparel	0.133	17.000	0.328	25.000	0.342	10.000
13 3231/3233 Leather	0.108	23.000	0.171	34.000	0.597	1.000
14 3240 Footwear	0.227	6.000	0.287	29.000	0.305	17.000
15 3311/3320 Wood	0.203	9.000	0.286	30.000	0.443	6.000
16 3412/3420 Paper	0.139	15.000	0.363	22.000	0.312	14.000
17 3511/3512 Chemicals	0.128	18.000	0.277	27.000	0.251	20.000
18 3521 Paints	0.112	22.000	0.388	20.000	0.263	19.000
19 3522 Drugs	0.079	27.000	0.407	17.000	0.224	22.000
20 3523 Soap	0.075	30.000	0.462	13.000	0.173	24.000
21 3529/3540 Other Chem.	0.035	32.000	0.406	18.000	0.396	7.000
22 3551/3560 Rubber	0.137	16.000	0.395	19.000	0.361	8.000
23 3610/3699 Cement	0.146	14.000	0.458	14.000	0.343	9.000
24 3710/3812 Basic Metals	0.079	26.000	0.547	8.000	0.241	20.000
25 3813/3819 Fab.Metals	0.120	21.000	0.197	32.000	0.145	26.000
26 3822/3829 Machinery	0.056	31.000	0.535	9.000	0.090	30.000
27 3832/3829 Elect.Machinery	0.099	25.000	0.252	31.000	0.095	29.000
28 3841/3843 Transport Equip	0.035	33.000	0.106	35.000	0.113	28.000
29 3851/3909 Misc.products	0.204	8.000	0.185	33.000	0.594	2.000

r = rank

(End of table 5:1).

Table 5:2 The Indirect Effects of Sectoral Expansion in Manufacturing Industries:global and m-sector Coeffients.

	SECTOR	Labour *	Labour r	Labour +	Labour r	Imported inputs *	Imported inputs r	Imported inputs +	Imported inputs r	Capital *	Capital r
6	3111/3122 Food	2.855	1.000	0.011	16.000	0.015	24.000	0.012	17.000	0.114	16.000
7	3131/3133 Alcoholic bev.	0.674	7.000	0.007	17.000	0.015	23.000	0.012	18.000	0.085	22.000
8	3134 Non-alcoh.bev.	1.669	4.000	0.005	19.000	0.009	28.000	0.006	22.000	0.061	26.000
9	3140 Tobacco	1.794	3.000	0.005	20.000	0.013	25.000	0.009	21.000	0.099	18.000
10	3211 Textiles	2.076	2.000	0.027	5.000	0.023	16.000	0.020	15.000	0.231	12.000
11	3212 Made-up text.	0.929	6.000	0.061	1.000	0.043	15.000	0.010	4.000	0.463	2.000
12	3220 Apparel	0.539	9.000	0.041	3.000	0.043	6.000	0.039	5.000	0.409	5.000
13	3231/3233 Leather	0.633	8.000	0.015	10.000	0.026	14.000	0.024	11.000	0.091	20.000
14	3240 Footwear	0.249	14.000	0.019	8.000	0.028	10.000	0.021	14.000	0.098	19.000
15	3311/3320 Wood	0.291	11.000	0.038	4.000	0.019	18.000	0.016	16.000	0.319	6.000
16	3412/3420 Paper	0.178	19.000	0.024	6.000	0.050	4.000	0.046	3.000	0.440	3.000
17	3511/3512 Chemicals	0.154	21.000	0.016	9.000	0.042	7.000	0.038	6.000	0.269	9.000
18	3521 Paints	0.162	20.000	0.011	14.000	0.039	8.000	0.034	7.000	0.267	10.000
19	3522 Drugs	0.113	23.000	0.012	13.000	0.033	9.000	0.027	8.000	0.241	11.000
20	3523 Soap	0.106	27.000	0.007	18.000	0.027	12.000	0.024	10.000	0.195	13.000
21	3529/3540 Other Chem.	0.100	28.000	0.011	15.000	0.089	1.000	0.087	1.000	0.655	1.000
22	3551/3560 Rubber	0.289	12.000	0.021	7.000	0.026	15.000	0.022	12.000	0.148	14.000
23	3610/3699 Cement	0.179	18.000	0.015	11.000	0.028	11.000	0.022	13.000	0.301	7.000
24	3710/3812 Basic Metals	0.107	25.000	0.012	12.000	0.027	13.000	0.025	9.000	0.290	8.000
25	3813/3819 Fab.Metals	0.082	31.000	0.004	22.000	0.017	21.000	0.011	19.000	0.073	25.000
26	3822/3829 Machinery	0.089	29.000	0.002	24.000	0.006	29.000	0.005	23.000	0.037	29.000
27	3832/3829 Elect.Machinery	0.084	30.000	0.002	23.000	0.006	30.000	0.004	24.000	0.036	30.000
28	3841/3843 Transport Equip.	0.108	24.000	0.004	21.000	0.012	26.000	0.014	20.000	0.051	27.000
29	3851/3909 Misc.products	1.210	5.000	0.053	2.000	0.054	3.000	0.049	2.000	0.427	4.000

* global coefficients; + m-sector coefficients; r=rank.

contd.

Table 5:2 contd. (The Indirect effects of sectoral expansion)

	SECTOR	Capital +	Capital r	Value-added *	Value-added r	Value-added +	Value-added r	Labour-income *	Labour-income r	Labour-income +	Labour-income r
6	3111/3122 Food	0.101	15.000	0.490	3.000	0.045	17.000	0.149	2.000	0.011	17.000
7	3131/3133 Alcoholic bev.	0.069	18.000	0.209	23.000	0.043	18.000	0.056	16.000	0.008	18.000
8	3134 Non-alcoh.bev.	0.046	20.000	0.302	15.000	0.024	20.000	0.096	9.000	0.006	20.000
9	3140 Tobacco	0.085	16.000	0.312	12.000	0.028	19.000	0.104	6.000	0.008	19.000
10	3211 Textiles	0.208	12.000	0.454	4.000	0.099	7.000	0.146	3.000	0.036	6.000
11	3212 Made-up text.	0.443	2.000	0.408	6.000	0.213	2.000	0.136	5.000	0.080	1.000
12	3220 Apparel	0.395	5.000	0.299	16.000	0.158	4.000	0.094	11.000	0.054	3.000
13	3231/3233 Leather	0.077	17.000	0.571	1.000	0.064	15.000	0.041	23.000	0.020	11.000
14	3240 Footwear	0.068	19.000	0.277	18.000	0.072	13.000	0.060	14.000	0.024	9.000
15	3311/3320 Wood	0.274	7.000	0.424	5.000	0.096	10.000	0.140	4.000	0.038	4.000
16	3412/3420 Paper	0.422	3.000	0.262	20.000	0.129	5.000	0.066	13.000	0.037	5.000
17	3511/3512 Chemicals	0.247	9.000	0.209	24.000	0.098	8.000	0.055	18.000	0.024	8.000
18	3521 Paints	0.243	10.000	0.223	21.000	0.083	12.000	0.057	15.000	0.019	13.000
19	3522 Drugs	0.215	11.000	0.191	25.000	0.070	14.000	0.056	17.000	0.018	14.000
20	3523 Soap	0.180	13.000	0.145	26.000	0.060	16.000	0.035	26.000	0.011	16.000
21	3529/3540 Other Chem.	0.646	1.000	0.307	14.000	0.240	1.000	0.038	25.000	0.022	10.000
22	3551/3560 Rubber	0.113	14.000	0.335	9.000	0.097	9.000	0.095	10.000	0.027	7.000
23	3610/3699 Cement	0.257	8.000	0.316	11.000	0.096	11.000	0.091	12.000	0.020	12.000
24	3710/3812 Basic Metals	0.274	6.000	0.213	22.000	0.110	6.000	0.046	20.000	0.016	15.000
25	3813/3819 Fab.Metals	0.042	21.000	0.129	27.000	0.017	21.000	0.033	27.000	0.005	21.000
26	3822/3829 Machinery	0.027	23.000	0.084	32.000	0.010	22.000	0.020	31.000	0.003	22.000
27	3832/3829 Elect.Machinery	0.023	24.000	0.089	31.000	0.009	23.000	0.023	29.000	0.003	24.000
28	3841/3843 Transport Equip	0.039	22.000	0.101	30.000	0.002	24.000	0.025	28.000	0.005	23.000
29	3851/3909 Misc.products	0.397	4.000	0.540	2.000	0.186	3.000	0.157	1.000	0.058	2.000

contd

* = global coefficients

\+ = M-sector coefficients

r = rank

Table 5:2 contd. (The Indirect effects of sectoral expansion)

	SECTORS	Non-labour income *	r	+	r	Gross Output *	r	+	r
6	3111/3122 Food	0.341	5.000	0.034	18.000	1.096	15.000	0.604	23.000
7	3131/3133 Alcoholic bev.	0.153	26.000	0.035	17.000	1.064	21.000	0.866	14.000
8	3134 Non-alcoh.bev.	0.206	18.000	0.018	20.000	1.059	22.000	0.742	20.000
9	3140 Tobacco	0.208	17.000	0.020	19.000	1.054	23.000	0.730	22.000
10	3211 Textiles	0.308	6.000	0.063	11.000	1.147	5.000	0.744	21.000
11	3212 Made-up text.	0.272	11.000	0.134	2.000	1.258	3.000	1.029	2.000
12	3220 Apparel	0.206	19.000	0.104	4.000	1.352	1.000	0.818	18.000
13	3231/3233 Leather	0.530	1.000	0.044	16.000	1.097	14.000	0.563	24.000
14	3240 Footwear	0.217	16.000	0.048	15.000	1.127	7.000	0.877	13.000
15	3311/3320 Wood	0.283	10.000	0.058	12.000	1.119	8.000	0.756	19.000
16	3412/3420 Paper	0.196	22.000	0.092	6.000	1.113	9.000	0.948	5.000
17	3511/3512 Chemicals	0.153	25.000	0.074	8.000	1.099	13.000	0.954	4.000
18	3521 Paints	0.166	24.000	0.064	10.000	1.092	16.000	0.909	11.000
19	3522 Drugs	0.135	27.000	0.051	13.000	1.079	17.000	0.915	10.000
20	3523 Soap	0.111	28.000	0.049	14.000	1.065	20.000	0.954	3.000
21	3529/3540 Other Chem.	0.270	12.000	0.218	1.000	1.227	4.000	1.143	1.000
22	3551/3560 Rubber	0.241	13.000	0.071	9.000	1.110	10.000	0.827	16.000
23	3610/3699 Cement	0.225	14.000	0.076	7.000	1.135	6.000	0.835	15.000
24	3710/3812 Basic Metals	0.167	23.000	0.094	5.000	1.077	18.000	0.940	6.000
25	3813/3819 Fab.Metals	0.097	32.000	0.012	21.000	1.041	27.000	0.894	11.000
26	3822/3829 Machinery	0.063	34.000	0.007	23.000	1.023	30.000	0.930	7.000
27	3832/3829 Elect.Machinery	0.066	33.000	0.006	24.000	1.026	29.000	0.923	9.000
28	3841/3843 Transport Equip	0.077	32.000	0.012	22.000	1.030	28.000	0.925	8.000
29	3851/3909 Misc.products	0.382	3.000	0.128	3.000	1.280	2.000	0.821	17.000

(End of table 5:2)

* = global coefficients
\+ = M-sector coefficients
r = rank

Table 5:3 Direct plus Indirect Effects of Sectoral Expansion in the Manufacturing Sectors:global and m-sector coefficients.

	SECTOR	Labour *	Labour r	Labour +	Labour r	Capital *	Capital r	Capital +	Capital r	Imported inputs *	Imported inputs r
6	3111/3122 Food	2.947	2.000	0.103	11.000	0.996	17.000	0.983	17.000	0.123	18.000
7	3131/3133 Alcoholic bev.	0.712	13.000	0.045	21.000	0.594	19.000	0.578	19.000	0.182	13.000
8	3134 Non-alcoh.bev.	1.744	6.000	0.080	12.000	0.325	26.000	0.310	23.000	0.063	26.000
9	3140 Tobacco	1.851	5.000	0.062	16.000	1.760	9.000	1.746	8.000	0.036	28.000
10	3211 Textiles	2.203	4.000	0.154	5.000	1.140	14.000	1.118	14.000	0.104	19.000
11	3212 Made-up text.	1.089	11.000	0.221	2.000	0.670	18.000	0.650	18.000	0.098	20.000
12	3220 Apparel	0.706	14.000	0.207	3.000	1.968	3.000	1.954	3.000	0.240	10.000
13	3231/3233 Leather	0.733	12.000	0.115	9.000	0.113	30.000	0.099	24.000	0.151	15.000
14	3240 Footwear	0.384	20.000	0.154	5.000	1.808	6.000	1.778	7.000	0.208	12.000
15	3311/3320 Wood	0.503	17.000	0.205	1.000	1.778	8.000	1.733	9.000	0.088	21.000
16	3412/3420 Paper	0.260	24.000	0.105	10.000	2.153	1.000	2.131	1.000	0.236	11.000
17	3511/3512 Chemicals	0.205	25.000	0.066	15.000	1.458	12.000	1.436	12.000	0.387	4.000
18	3521 Paints	0.200	26.000	0.050	19.000	1.734	10.000	1.710	10.000	0.277	8.000
19	3522 Drugs	0.155	28.000	0.053	18.000	1.587	11.000	1.561	11.000	0.324	6.000
20	3523 Soap	0.145	30.000	0.046	20.000	2.085	2.000	2.070	2.000	0.318	7.000
21	3529/3540 Other Chem.	0.117	34.000	0.028	23.000	1.844	5.000	1.835	4.000	0.251	9.000
22	3551/3560 Rubber	0.403	19.000	0.135	7.000	0.355	24.000	0.320	22.000	0.133	16.000
23	3610/3699 Cement	0.300	21.000	0.135	7.000	1.863	4.000	1.819	6.000	0.080	22.000
24	3710/3812 Basic Metals	0.173	27.000	0.075	13.000	1.850	7.000	1.834	5.000	0.160	14.000
25	3813/3819 Fab.Metals	0.150	29.000	0.071	14.000	0.491	20.000	0.460	21.000	0.554	3.000
26	3822/3829 Machinery	0.129	32.000	0.041	22.000	0.478	21.000	0.468	20.000	0.326	5.000
27	3832/3829 Elect.Machinery	0.139	31.000	0.057	17.000	1.380	13.000	1.367	13.000	0.560	2.000
28	3841/3843 Transport Equip	0.126	33.000	0.022	24.000	1.041	16.000	1.030	16.000	0.758	1.000
29	3851/3909 Misc.products	1.313	9.000	0.155	4.000	1.088	15.000	1.058	15.000	0.071	24.000

* global coefficients; + m-sector coefficients; r=rank.

contd

Table 5:3 contd. (Direct and Indirect effects of sectoral expansion).

	SECTOR	Imported inPuts		Value-added				Labour-income			
		+	r	*	r	+	r	*	r	+	r
6	3111/3122 Food	0 120	17.000	0.877	18.000	0.432	20.000	0.225	17.000	0.087	19.000
7	3131/3133 Alcoholic bev.	0.179	13.000	0.818	23.000	0.651	7.000	0.131	25.000	0.080	21.000
8	3134 Non-alcoh.bev.	0.060	23.000	0.937	11.000	0.659	6.000	0.223	18.000	0.134	11.000
9	3140 Tobacco	0.032	24.000	0.964	9.000	0.680	5.000	0.228	15.000	0.132	12.000
10	3211 Textiles	0.101	18.000	0.986	17.000	0.541	18.000	0.313	8.000	0.203	5.000
11	3212 Made-up text.	0.095	19.000	0.902	16.000	0.707	2.000	0.288	9.000	0.232	4.000
12	3220 Apparel	0.236	10.000	0.761	26.000	0.619	10.000	0.226	16.000	0.187	6.000
13	3231/3233 Leather	0.148	15.000	0.849	21.000	0.342	22.000	0.149	24.000	0.128	14.000
14	3240 Footwear	0.201	12.000	0.792	24.000	0.586	13.000	0.287	10.000	0.251	2.000
15	3311/3320 Wood	0.085	20.000	0.912	15.000	0.584	14.000	0.343	4.000	0.241	3.000
16	3412/3420 Paper	0.232	11.000	0.764	25.000	0.632	8.000	0.206	19.000	0.176	7.000
17	3511/3512 Chemicals	0.383	4.000	0.613	32.000	0.503	19.000	0.183	21.000	0.152	9.000
18	3521 Paints	0.272	8.000	0.723	28.000	0.582	15.000	0.169	22.000	0.131	13.000
19	3522 Drugs	0.317	6.000	0.676	30.000	0.555	17.000	0.135	25.000	0.097	17.000
20	3523 Soap	0.315	7.000	0.682	29.000	0.597	12.000	0.109	30.000	0.086	20.000
21	3529/3540 Other Chem.	0.250	9.000	0.749	27.000	0.681	4.000	0.073	31.000	0.057	23.000
22	3551/3560 Rubber	0.129	16.000	0.867	20.000	0.629	9.000	0.232	14.000	0.164	9.000
23	3610/3699 Cement	0.075	21.000	0.920	14.000	0.700	3.000	0.237	13.000	0.166	8.000
24	3710/3812 Basic Metals	0.157	14.000	0.840	22.000	0.739	1.000	0.126	27.000	0.095	18.000
25	3813/3819 Fab.Metals	0.548	3.000	0.446	33.000	0.335	23.000	0.153	23.000	0.126	15.000
26	3822/3829 Machinery	0.324	5.000	0.674	31.000	0.600	11.000	0.076	31.000	0.058	22.000
27	3832/3829 Elect.Machinery	0.557	2.000	0.442	34.000	0.360	21.000	0.122	28.000	0.102	16.000
28	3841/3843 Transport Equip	0.756	1.000	0.242	35.000	0.157	24.000	0.059	33.000	0.040	24.000
29	3851/3909 Misc.products	0.066	22.000	0.929	12.000	0.575	16.000	0.362	2.000	0.262	1.000

contd.

* = global coefficients

\+ = M-sector coefficients

r = rank

Table 5:3 contd. (Direct and Indirect effects of sectoral expansion)

	Code		Non-labour income				Gross Output			
			*	r	+	r	*	r	+	r
6	3111/3122	Food	0.652	15.000	0.345	16.000	1.601	6.000	1.108	17.000
7	3131/3133	Alcoholic bev.	0.687	10.000	0.568	3.000	1.288	23.000	1.089	18.000
8	3134	Non-alcoh.bev.	0.713	8.000	0.525	7.000	1.370	17.000	1.053	20.000
9	3140	Tobacco	0.736	6.000	0.548	4.000	1.379	16.000	1.055	19.000
10	3211	Textiles	0.583	22.000	0.338	18.000	1.623	4.000	1.221	6.000
11	3212	Made-up text.	0.613	18.000	0.475	9.000	1.709	2.000	1.480	2.000
12	3220	Apparel	0.534	30.000	0.432	14.000	1.516	8.000	1.344	4.000
13	3231/3233	Leather	0.700	9.000	0.214	22.000	1.694	3.000	1.160	14.000
14	3240	Footwear	0.504	31.000	0.335	19.000	1.433	12.000	1.182	10.000
15	3311/3320	Wood	0.568	24.000	0.343	17.000	1.561	7.000	1.199	8.000
16	3412/3420	Paper	0.559	27.000	0.455	12.000	1.425	13.000	1.259	5.000
17	3511/3512	Chemicals	0.530	32.000	0.351	15.000	1.349	20.000	1.204	7.000
18	3521	Paints	0.542	28.000	0.451	13.000	1.355	18.000	1.172	13.000
19	3522	Drugs	0.572	29.000	0.458	11.000	1.304	22.000	1.139	15.000
20	3523	Soap	0.676	23.000	0.511	8.000	1.238	24.000	1.127	16.000
21	3529/3540	Other Chem.	0.635	12.000	0.625	2.000	1.623	5.000	1.539	1.000
22	3551/3560	Rubber	0.682	17.000	0.465	10.000	1.417	10.000	1.190	9.000
23	3610/3699	Cement	0.714	11.000	0.534	6.000	1.478	9.000	1.179	12.000
24	3710/3812	Basic Metals	0.293	7.000	0.642	1.000	1.317	21.000	1.181	11.000
25	3813/3819	Fab.Metals	0.599	34.000	0.209	23.000	1.186	27.000	1.039	21.000
26	3822/3829	Machinery	0.318	20.000	0.541	5.000	1.114	30.000	1.020	23.000
27	3832/3829	Elect.Machinery	0.318	33.000	0.258	21.000	1.121	29.000	1.018	24.000
28	3841/3843	Transport Equip	0.182	35.000	0.118	24.000	1.143	28.000	1.039	22.000
29	3851/3909	Misc.products	0.568	25.000	0.313	20.000	1.873	1.000	1.415	3.000

(End of table 5:3)

* = global coefficients

+ = *M-sector coefficients*

r = rank

Table 5:4 Direct, Indirect and Direct plus Indirect Effects of Sectoral Expansion: The Primary and Tertiary Sectors.

Sector	Employment						Capital						Value-added						Labour income(wages)					
	(d)	r	(i)	r	(t)	r	(d)	r	(i)	r	(t)		(d)	r	(i)	r	(t)	r	(d)	r	(i)	r	(t)	r
1 Agriculture	7.35	1	0.389	10	7.74	1	0.00	35	0.034	31	0.034	34	0.929	4	0.067	33	0.997	3	0.327	2	0.022	30	0.348	3
2 Livestock	1.20	5	0.023	35	1.22	10	0.00	34	0.006	35	0.006	35	0.989	1	0.011	35	0.999	1	0.000	35	0.002	35	0.002	35
3 Forestry	0.59	6	0.045	33	0.63	16	0.10	27	0.012	34	0.113	30	0.960	2	0.039	7	0.998	2	0.333	1	0.007	34	0.340	5
4 Oil mining	0.01	35	0.025	34	0.03	35	0.44	19	0.015	33	0.459	23	0.905	5	0.039	8	0.944	10	0.012	34	0.011	33	0.023	34
5 Other mining	0.10	18	0.193	16	0.29	22	0.07	28	0.083	23	0.151	28	0.667	8	0.312	13	0.978	8	0.310	3	0.102	7	0.412	1
30 Electricity	0.44	7	0.271	13	0.71	15	0.37	22	0.079	24	0.445	22	0.653	9	0.328	10	0.982	6	0.205	7	0.045	21	0.250	12
31 Building &) Construction)	0.09	19	0.186	17	0.28	23	0.00	35	0.111	17	0.113	32	0.574	17	0.296	17	0.870	19	0.166	10	0.096	8	0.262	11
32 Transport & Communication	0.23	8	0.218	15	0.45	18	0.19	26	0.087	28	0.280	25	0.652	10	0.272	19	0.924	13	0.288	4	0.050	19	0.337	6
33 Trade	1.29	3	0.070	32	1.36	7	0.06	29	0.046	28	0.103	29	0.860	6	0.129	29	0.989	5	0.150	13	0.043	22	0.193	20
34 Finance & Insurance	2.51	2	0.121	22	2.63	3	0.05	30	0.137	15	0.185	27	0.839	7	0.141	28	0.980	7	0.288	4	0.038	24	0.326	7
35 'Other' Services	1.22	4	0.106	26	1.33	8	0.01	32	0.020	32	0.032	33	0.941	3	0.055	34	0.997	4	0.105	24	0.015	32	0.120	29

Notes: (d)=direct, (i)=indirect, (t)=total effects of sectoral expansion, and
r =rank of sectors.

contd.

Table 5:4 contd.(Direct,Indirect and Total effects of sectoral expansion- the primary sectors).

	Non-labour income						Gross output						Imported inputs					
	(d)	r	(i)	r	(t)	r	(d)	r	(i)	r	(t)	r	(d)	r	(i)	r	(t)	r
1 agriculture	0.603	6	0.469	2	0.649	16	0.071	31	1.014	33	1.085	31	0.000		0.003	32	0.003	33
2 Livestock	0.989	1	0.207	20	0.997	1	0.011	35	1.004	35	1.016	35	0.000		0.001	35	0.001	35
3 Forestry	0.627	5	0.295	8	0.658	13	0.041	34	1.008	34	1.049	34	0.000		0.002	34	0.002	34
4 Oil mining	0.894	2	0.301	7	0.921	2	0.042	33	1.013	32	1.054	33	0.053	24	0.003	33	0.056	27
5 Other mining	0.356	23	0.352	4	0.566	26	0.334	12	1.105	11	1.439	11	0.000		0.022	17	0.022	29
30 Electricity	0.448	15	0.283	9	0.737	5	0.342	11	1.049	26	1.391	15	0.005	26	0.066	2	0.071	24
31 Building & construction	0.408	16	0.200	21	0.608	19	0.312	14	1.104	12	1.416	14	0.115	16	0.016	22	0.130	17
32 Transport & communication	0.365	21	0.223	15	0.587	21	0.289	18	1.066	19	1.355	19	0.059	21	0.017	20	0.076	23
33 Trade	0.710	4	0.086	31	0.795	4	0.140	27	1.050	25	1.190	26	0.000		0.011	27	0.011	31
34 Finance & Insurance	0.552	7	0.103	29	0.655	14	0.160	25	1.053	24	1.217	25	0.001	29	0.019	19	0.019	30
35 Other Services	0.836	3	0.040	35	0.877	3	0.059	32	1.015	31	1.074	32	0.000		0.004	31	0.004	32

Notes:(d)=direct, (i)=indirect, (t)=total effects of sectoral expansion, and r=rank of sectors.

(End of Table 5:4).

of sectoral expansion in the Nigerian economy. The ranking of sectors by the size of these effects on the objectives and constraints are also shown in these tables. The direct coefficients displayed in tables 5:1 (for the manufacturing sectors) and 5:4 (for the primary and tertiary sectors) will be considered first.

It can be seen from the tables that in terms of total employment, the agricultural sector ranks highest, followed by Finance and Insurance, distributive trade and 'other' services. The ten most (direct) labour intensive sectors in 1977 were agriculture, finance and insurance, distributive trade, 'other' services, livestock, forestry and fishing, electricity and water, transport and communications, wood and furniture and wearing apparel. That eight of these are all non manufacturing sectors is indicative of the relative unimportance of the industrial sector in direct employment provision. Within the industrial sector, the most labour intensive sub-sectors include wearing apparel, footwear and textiles and the five least labour intensive were sectors manufacturing petroleum and coal products, transport equipment, alcoholic beverages, paints and machinery.

Not suprisingly, the most imported input dependent are sectors which can be described as the high technology industries, whose operations consist of no more than 'last-stage' production or assembly of manufactures. Given that most of the components they assemble are not domestically produced, their production process must be highly import intensive and thus highly dependent upon the availability of foreign exchange. These sectors include transport equipment, machinery, electrical machinery, fabricated metal products and industrial chemicals; others are paints, drugs and medicines etc. The direct import requirements for the primary sectors (Ø.Ø529) and the tertiary sectors (Ø.1791) are certainly negligible in comparison to that of the manufacturing sector (5.Ø36).

Industries manufacturing tobacco, footwear and basic metals, rank highest in terms of, respectively, value-added, wages and labour income, while the most capital using sector is soap and perfumery, closely followed by paper products and footwear. Other sectors with high capital-output ratios include tobacco, basic metals, and cement. The relatively low capital intensity of the 'capital-goods' sectors is highly suprising and could perhaps be due to the fact that, being engaged in the assembling and/or repair of equipment, less capital is required than would be the case if they were engaged in actual capital-goods production.

A feature of the tables worth emphasising is the wide range of variation of the employment, capital and income coefficients: compare for example, the direct labour requirements per one million N of gross output of 7332.92 (agriculture) workers and 16.83 (petroleum and coal products) workers. The direct manufacturing wage coefficient range from Ø.227 (footwear) to Ø.Ø346 (transport equipment); direct non-labour income from Ø.547 to Ø.1Ø6. Even wider variations are noticeable in the direct capital coefficients which range from Ø to 1.89Ø; direct value-added, Ø.988 to Ø.141 and direct imports, from Ø to Ø.746.

In general, the relative size of the indirect vis-a-vis the direct effects varies depending on which objective and/or constraint is being considered. In terms of labour requirements for instance, 22 of the 35 sectors have higher indirect than direct coefficients and all the 35 sectors have higher indirect than direct output coefficients. On the otherhand, only very few of the sectors have indirect wage, non-labour income, value-added and import coefficients larger than their respective direct coefficients. However, incorporating both direct and indirect effects leads to an entirely different result. It can be seen that the total, are substantially higher than either the direct or the indirect coefficients, in some instances by 100 percent or more. For the whole economy, the total labour requirement per one million N of gross output will be 32560 workers compared to a direct requirement of 16500 workers; Total wages (value-added) generated by a unit expansion of all sectors amounts to 7.2691 (28.9305) thousand, compared to 5.020 (20.3508) thousand directly generated etc. This implies that a consideration of these (indirect and total) effects cannot be assumed away for policy making purposes.

The rankings of sectors by the size of the effects of sectoral expansion on these variables have altered - some drastically - when the indirect and total effects are considered. For example, if we consider the global coefficients, by the indirect employment effects, sector 35 (other services) ranks 26th, 8th by the total effects and 4th when only the direct effects are considered; sector 33 (distributive trade) ranks 3rd by the direct, 32nd by the indirect and 7th by the total effects; in terms of value-added generated, sector 35 (other services) ranks 4th by the total effects, 3rd by the direct effects and 34th by the indirect effects; sector 33 (distributive trade) ranks 6th by the direct, 4th by the total and 29th by the indirect effects etc. It is important to realise also that the fact that one sector is <u>directly</u> more input using or more income generating relative to another carries no implication of whether it will be more input using or income generating directly and indirectly. The following will serve as examples:

$$\ell^d_{11} > \ell^d_6 \text{ but } \ell^T_6 > \ell^T_{11}$$
$$\ell^d_{15} > \ell^d_7 \text{ but } \ell^T_7 > \ell^T_{15}$$

The opposite could also occur such that

$$\ell^d_{13} > \ell^d_{14} \text{ but } \ell^T_{14} < \ell^T_{13}$$
$$\ell^d_{18} < \ell^d_{19} \text{ but } \ell^T_{19} < \ell^T_{18}$$

where ℓ^d and ℓ^T are respectively, direct and total labour requirements and the subscripts refer to the sectors. An inspection of the tables will reveal that the above holds true for all other coefficients as well.

Two other main features of the tables depicting indirect and total requirements can now be summarized.

1. The tables illustrate, as in the case of the direct coefficients, some dominance of the non-industrial sectors in terms of especially, employment, wage and value-added generation. In terms of the total employment coefficients for example, the agricultural sector's lead is maintained; and of the sectors within the top third ranking, five (about 42%) are non manufacturing. In terms of total value-added generated, the eight top ranking sectors comprise of the primary and tertiary sectors only; and finally in terms of total wages generated, only five of the twelve highest ranking sectors are industrial. Table 5:5 shows that the average direct value-added coefficient is Ø.892 for the primary, Ø.753 for the tertiary and Ø.474 for the manufacturing sectors; value-added directly and indirectly generated for the same broad category of sectors is respectively Ø.983, Ø.957 and Ø.761. Similar differences can be observed in terms of the employment and wage coefficients. The manufacturing sectors

clearly however, dominate in terms of the direct, indirect and total output generated, as well as capital requirements. This could imply some potential conflict between employment provision and output generation, since sectors with higher employment potential (i.e. the primary sectors) are not necessarily those with higher output potential. This will be further examined in later sections.

2. The results are however slightly different from the above as the same table shows, in terms of the indirect effects on employment, value-added and wages, though not in terms of indirect output. Here, the dominance of the manufacturing sectors is clearly visible. Average indirect value-added coefficient is only 0.091 for the primary sectors, 0.203 for the tertiary sectors, compared with about 0.30 for the manufacturing sectors. Similarly for the employment coefficients.

Table 5:5

Average direct, indirect and total coefficients by 3 broad categories of sectors

Coefficients of		Sectors: Primary (1-5)	Manufacturing (6-29)	Tertiary (30-35)
Output				
Direct	a	0.099	0.316	0.218
	b	0.372	1.179	0.812
Indirect	c	1.029	1.127	1.056
	d	0.935	1.024	0.960
Total	e	1.128	1.443	1.274
	f	0.824	1.054	0.931

Continued/....

Table 5:5 - Continued/...

Coefficients of		Sectors: Primary (1-5)	Manufacturing (6-29)	Tertiary (30-35)
<u>Value-added</u>				
Direct	a	0.892	0.474	0.753
	b	1.540	0.816	1.216
Indirect	c	0.091	0.287	0.204
	d	0.370	1.171	0.831
Total	e	0.983	0.761	0.957
	f	1.190	0.920	1.160
<u>Employment</u>				
Direct	a	1.840	0.083	0.960
	b	3.900	0.180	2.040
Indirect	c	0.140	0.600	0.150
	d	0.305	1.310	0.330
Total	e	1.980	0.688	1.120
	f	2.130	0.740	1.200
<u>Capital</u>				
Direct	a	0.122	1.048	0.113
	b	0.161	1.387	0.149
Indirect	c	0.030	0.204	0.080
	d	0.190	1.292	0.507
Total	e	0.152	1.250	0.193
	f	0.163	1.350	0.208
<u>Wages</u>				
Direct	a	0.245	0.118	0.200
	b	1.713	0.825	1.399
Indirect	c	0.029	0.076	0.048
	d	0.443	1.169	0.737
Total	e	0.225	0.194	0.248
	f	1.082	0.933	1.192

Notes: rows a, c and e are the averages of the variables achieved by the different sectors; rows b, d and f represent each sector's average as a proportion of the economy wide averages.
Source: Calculated from Tables 5:1 - 5:4.

Moreover, of the 12 highest ranking sectors in terms of indirect employment effects, only 3 (oil mining, forestry and fishing, and agriculture) are non-manufacturing, and only 2 (other mining, building and construction) of the 12 highest ranking sectors in terms of wages indirectly generated, are non-manufacturing.

5:3:2 <u>The evaluation of 'key' sectors:</u> (i)

Having determined the size of the impact of sectoral expansion on our variables, we now move on to evaluate 'key' sectors. The ranking of sectors by the size of the employment, value-added, output and labour income coefficients, can provide the basis on which such an evaluation can be made, sectors with higher coefficients being more preferred to those with lower coefficients. A simple rule of thumb will be to select those sectors falling into the top third ranking of all sectors in terms of each objective, for expansion, and to discourage the growth of those falling into the bottom third ranking of all sectors. One could also evaluate sectors on the basis of maximizing benefit from the scarcest factor of production in the economy. If the objective is to maximize immediate employment, and assuming that capital is the scarce factor, we may seek to choose those sectors for which the capital-labour and capital-output coefficients (direct and total), are lowest.

Table 5:6 Direct Plus Indirect Capital-output,Capital-Value-added and Capital-labour requirements in manufacturing and non-manufacturing sectors. (1977)

		Sector	capital/ output	r	capital/ labour	r	capital/ v-added	r
		Manufacturing						
6	3111/3122	Food	0.996	17	12.161	19	2.539	17
7	3131/3133	Alcoholic bev.	0.594	19	15.745	15	1.016	20
8	3134	Non-alcoh.bev.	0.325	26	5.916	25	0.544	24
9	3140	Tobacco	1.760	9	30.792	7	2.735	14
10	3212	Textiles	1.140	14	11.495	22	2.549	16
11	3212	Made-up text.	0.670	18	6.899	24	1.442	19
12	3220	Apparel	1.968	3	14.447	16	4.249	3
13	3231/3233	Leather	0.113	30	2.666	28	0.268	29
14	3240	Footwear	1.808	6	17.453	14	3.511	8
15	3311/3320	Wood	1.778	8	10.828	23	3.602	7
16	3412/3420	Paper	2.153	1	28.991	9	4.276	2
17	3511/3512	Chemicals	1.458	12	30.039	8	3.491	9
18	3521	Paints	1.734	10	44.317	5	3.475	10
19	3522	Drugs	1.587	11	36.743	6	3.241	11
20	3523	Soap	2.085	2	54.871	4	3.920	5
21	3529/3540	Other Chem.	1.844	5	107.024	2	4.157	4
22	3551/3560	Rubber	0.355	24	5.023	26	0.660	23
23	3610/3699	Cement	1.863	7	23.215	12	3.128	12
24	3710/3812	Basic Metals	1.850	7	28.795	10	2.961	13
25	3813/3819	Fab.Metals	0.491	20	11.813	21	1.448	18
26	3822/3829	Machinery	0.478	21	12.156	18	0.821	21
27	3832/3839	Elect.Machinery	1.380	13	25.618	11	3.892	6
28	3841/3843	Transport Equip	1.041	16	56.598	3	7.171	1
29	3851/3909	Misc.products	1.088	15	12.131	21	2.5891	29
		Primary						
		1 Agric.	0.034	34	0.517	33	0.062	33
		2 Livestock	0.006	35	0.074	35	0.014	35
		3 Forestry	0.113	30	2.188	31	0.124	32
		4 Oil Mining	0.459	23	159.255	1	0.515	25
		5 Other Mining	0.151	28	4.887	27	0.229	29
		Tertiary						
		30 Electricity	0.445	22	19.274	13	0.667	22
		31 Building	0.113	32	2.531	29	0.194	30
		32 Transp&Comm.	0.280	25	13.468	17	0.429	26
		33 Trade	0.103	29	2.168	32	0.143	31
		34 Finance	0.185	27	2.414	30	0.322	27
		35 Other Servs.	0.032	33	0.486	34	0.049	35

* r=rank

Table 5:6 provides a listing of these coefficients. Thus from the point of view of minimizing capital per unit of output and/or value-added, the most desirable are the primary and tertiary sectors plus a few manufacturing sub-sectors such as non-alcoholic drinks, leather and rubber & plastics; the least desirable are sectors manufacturing transport equipment, paper products, wearing apparel, petroleum products, soap and perfumery, electrical equipment, footwear, industrial chemicals, wood products, paints, drugs and cement products. Similarly, from the point of view of maximizing employment per unit of capital, eleven of the twelve least desirable sectors are all manufacturing, the only non-manufacturing sector being oil mining. It can be seen that within the manufacturing sector, the least desirable sectors belong to the intermediate and capital-goods category, although there are few of the consumer goods producing sectors as well.

This approach to the selection of key sectors is intuitively plausible; but it might also be correctly argued that in reality, for the country as for many LDCs, the key constraint will be the availability of foreign exchange with which to purchase these capital goods since they are not produced at home. Thus, sectors should be evaluated in terms of the size of their coefficients generated per unit of imports or foreign exchange. In otherwords, only those sectors which have potentially high labour/import or output/import coefficients, say, can then be defined as 'key' sectors[16]. This approach is followed here, the more so because as earlier indicated, the capital coefficients in the primary sectors can hardly be considered as reliable. In table 5:7 we show the <u>global</u> as well as the <u>M-sector</u> direct plus indirect labour, value-added, wages and

Table 5:7 Direct plus Indirect Output, Value-added, Employment and Wage Coefficients per unit of Foreign Exchange, 1977.
(I) The manufacturing sectors.

	Sector		Labour				Value-added			
			*	r	+	r	*	r	+	r
6	3111/3122	Food	24.03	9.00	0.85	9.00	7.15	18.00	3.60	11.00
7	3131/3133	Alcoholic bev.	3.90	18.00	0.25	15.00	4.48	23.00	3.63	10.00
8	3134	Non-alcoh.bev.	27.49	8.00	1.34	6.00	14.76	11.00	11.01	2.00
9	3140	Tobacco	51.74	7.00	1.94	3.00	26.95	9.00	21.18	1.00
10	3211	Textiles	21.17	10.00	1.52	5.00	8.61	17.00	5.36	7.00
11	3212	Made-up text.	11.07	13.00	2.32	2.00	9.16	16.00	7.41	5.00
12	3220	Apparel	2.95	21.00	0.88	8.00	3.18	26.00	2.63	15.00
13	3231/3233	Leather	4.85	17.00	0.78	10.00	5.63	21.00	2.30	16.00
14	3240	Footwear	1.84	23.00	0.77	11.00	3.80	24.00	2.91	12.00
15	3311/3320	Wood	5.71	16.00	0.29	14.00	10.35	15.00	6.85	6.00
16	3412/3420	Paper	1.10	24.00	0.46	13.00	3.24	25.00	2.73	13.00
17	3511/3512	Chemicals	0.53	27.00	0.17	17.00	1.58	32.00	1.31	21.00
18	3521	Paints	0.72	26.00	0.18	16.00	2.61	28.00	2.14	17.00
19	3522	Drugs	0.48	28.00	0.17	18.00	2.09	30.00	1.75	20.00
20	3523	Soap	0.46	30.00	0.15	19.00	2.14	29.00	1.89	18.00
21	3529/3540	Other Chem.	0.47	29.00	0.11	22.00	2.98	27.00	2.73	14.00
22	3551/3560	Rubber	3.30	20.00	1.05	7.00	6.52	20.00	4.89	8.00
23	3610/3699	Cement	3.73	19.00	1.81	4.00	11.43	14.00	9.38	3.00
24	3710/3812	Basic Metals	1.08	25.00	0.50	12.00	5.25	22.00	4.69	9.00
25	3813/3819	Fab.Metals	0.27	32.00	0.13	20.00	0.81	33.00	0.61	23.00
26	3822/3829	Machinery	0.40	31.00	0.13	21.00	2.07	31.00	1.85	19.00
27	3832/3829	Elect.Machinery	0.25	33.00	0.10	23.00	0.79	34.00	0.65	22.00
28	3841/3843	Transport Equip	0.17	35.00	0.03	24.00	0.32	35.00	0.21	24.00
29	3851/3909	Misc.products	18.61	11.00	2.37	1.00	13.18	12.00	0.88	4.00

contd.

* global coefficients

\+ M-sector coefficients

r rank

Table 5:7 Contd. (Total effects per unit of foreign exchange).

	Sector	Labour income *	r	+	r	Gross Output *	r	+	r
6	3111/3122 Food	1.84	18.00	0.72	13.00	13.05	18.00	9.22	9.00
7	3131/3133 Alcoholic bev.	0.72	25.00	0.46	16.00	7.06	22.00	6.08	13.00
8	3134 Non-alcoh.bev.	3.52	12.00	2.24	5.00	21.60	11.00	17.61	3.00
9	3140 Tobacco	6.37	8.00	4.11	1.00	38.54	9.00	32.86	1.00
10	3211 Textiles	3.00	14.00	2.01	7.00	15.59	17.00	12.08	7.00
11	3212 Made-up text.	2.93	16.00	2.43	4.00	17.37	16.00	15.51	5.00
12	3220 Apparel	0.95	22.00	0.79	11.00	6.33	26.00	5.70	15.00
13	3231/3233 Leather	0.99	21.00	0.86	10.00	11.22	19.00	7.81	10.00
14	3240 Footwear	1.38	20.00	1.25	9.00	6.87	24.00	5.87	14.00
15	3311/3320 Wood	3.90	11.00	2.83	3.00	17.71	15.00	14.04	6.00
16	3412/3420 Paper	0.87	23.00	0.76	12.00	6.05	27.00	5.44	16.00
17	3511/3512 Chemicals	0.47	27.00	0.40	17.00	3.49	31.00	3.14	21.00
18	3521 Paints	0.61	26.00	0.48	15.00	4.90	28.00	4.32	17.00
19	3522 Drugs	0.42	28.00	0.31	18.00	4.03	29.00	3.59	18.00
20	3523 Soap	0.34	30.00	0.27	19.00	3.89	30.00	3.58	19.00
21	3529/3540 Other Chem.	0.29	31.00	0.23	21.00	6.46	25.00	6.17	12.00
22	3551/3560 Rubber	1.75	19.00	1.28	8.00	11.06	20.00	9.24	8.00
23	3610/3699 Cement	2.95	15.00	2.23	6.00	18.38	13.00	15.80	4.00
24	3710/3812 Basic Metals	0.79	24.00	0.61	14.00	8.23	22.00	7.50	11.00
25	3813/3819 Fab.Metals	0.28	32.00	0.23	20.00	2.14	33.00	1.90	22.00
26	3822/3829 Machinery	0.23	33.00	0.18	23.00	3.42	32.00	3.15	20.00
27	3832/3829 Elect.Machinery	0.22	34.00	0.18	22.00	2.00	34.00	1.83	23.00
28	3841/3843 Transport Equip	0.78	35.00	0.05	24.00	1.51	35.00	1.37	24.00
29	3851/3909 Misc.products	5.13	9.00	4.00	2.00	25.90	10.00	21.58	2.00

* = global coefficients

+ = M-sector coefficients

r = rank

(End of table 5:7).

Table 5:7 contd. (II) The Primary and Tertiary Sectors.

SECTORS	Labour	r	Value-added	r	Labour income [wages]	r	Gross Output	r
Agric.	2268.14	1.00	292.09	3.00	102.00	2.00	317.89	3.00
Livestock	1793.57	2.00	1466.90	1.00	3.45	13.00	1490.69	1.00
Forestry	382.02	3.00	606.82	2.00	206.71	1.00	637.30	2.00
Oil Mining	0.51	34.00	16.92	10.00	0.41	29.00	18.89	12.00
Other Mining	13.50	12.00	45.12	8.00	19.01	4.00	66.35	7.00
Electricity	9.98	14.00	53.13	6.00	13.54	7.00	75.29	69.00
Building	2.16	22.00	6.68	19.00	2.01	17.00	10.88	21.00
Transp&Comm.	5.92	15.00	12.21	13.00	4.45	10.00	17.90	14.00
Trade	121.73	6.00	88.56	5.00	17.30	5.00	106.59	5.00
Finance	131.17	5.00	49.63	7.00	16.49	6.00	61.40	8.00
Other Servs.	363.07	4.00	272.79	4.00	32.77	3.00	294.07	4.00

(End of 5:7)

output requirements per unit of direct plus indirect imports. A comparison of this table with table 5:3 will reveal the modification in the ranking of sectors by the size of impact, when the coefficients are related to the import constraint.

Applying the 'top 3rd ranking' criterion, we can now choose our 'key' sectors. For convenience we present in the tables below, highest as well as lowest generators of employment, output, value-added and wages both in terms of the global and M-sector coefficients per unit of foreign exchange.

Table 5:8a

'Key' employment, output, value-added, and labour income sectors

Sector	Ranking of sectors in terms of:			
	Labour/import	Wages/import	Value-added/ imports	Output/imports
Agriculture	1	2	3	3
Forestry/Fishing	3	1	2	2
'Other' services	4	3	4	4
Distributive trade	6	5	5	5
Tobacco	7	8	9	9
Non-alcoholic bevg.	8	12	11	11
Miscellaneous	11	9	12	10
Other mining	12	4	8	12

Table 5:8b

Sectors generating lowest employment, output, value-added and labour income per unit of foreign exchange

Sector	Ranking of sectors in terms of:			
	Labour/import	Wages/import	Value-added/ imports	Output/imports
Paints	25	26	28	28
Indus. Chems.	27	27	32	31
Drugs & Medicines	28	28	30	29
Petroleum & coal	29	31	26	25
Soap	30	30	29	30
Machinery	31	33	31	32
Fabricated metals	32	32	33	33
Electrical equip.	33	34	34	34
Transport equip.	35	35	35	35

The worst sectors therefore, from the point of view of our objectives, given the foreign exchange constraint, are those that belong to the intermediate and capital goods category; while only a handful of the manufacturing sectors can qualify as 'key' sectors. Thus if the availability of foreign exchange is the only constraint, Nigeria would be better off promoting the more 'traditional' consumer goods producing sectors such as made-up textile goods, tobacco, cement, textiles, non-alcoholic beverages and rubber and plastic products; these are the sectors which conventional trade theory would argue, the country has comparative advantage in.

Table 5:8c

Sectors generating highest employment, output, value-added and labour income: M-sector coefficients per unit of foreign exchange

Sector	Ranking of sectors in terms of:			
	Labour/import	Wages/import	Value-added/ imports	Output/imports
Miscellaneous	1	2	4	2
Made-up textiles	2	4	5	5
Tobacco	3	1	1	1
Cement	4	6	3	3
Textiles	5	7	7	7
Non-alcoholic bevg.	6	5	2	3
Rubber & plastics	7	8	8	8

Table 5:8d

Sectors generating lowest employment, output, value-added and labour income: M-sector coefficients per unit of imports

Sector	Ranking of sectors in terms of:			
	Labour/import	Wages/import	Value-added/ imports	Output/imports
Fabricated metals	20	20	23	22
Electrical equip.	23	22	22	23
Transport equip.	24	24	24	24
Drugs & Medicines	18	18	20	18
Soap & perfumes	20	19	18	19
Machinery	21	23	19	20

5:3:3 Evaluation of 'Key' Employment Sectors (ii)

The total requirement measures have the defect, as was previously indicated, of ignoring the spread effects of sectoral expansion and of treating all sectors equally irrespective of their different sizes. An alternative approach to the evaluation of 'key' employment sectors is to consider the indices of (employment and output) linkages in the economy.

Applying equation 5:18-5:21 we obtain the sectoral employment backward and forward linkages and the sectoral coefficients of variation. Both the indirect and direct plus indirect global and M-sector coefficients are utilised. The resulting total and indirect employment linkage indices are depicted in Tables 5:9-5:10.

An inspection of the tables will reveal that the results obtained here are as disturbing, with regards to manufacturing employment, as the previous ones. The only sectors with both backward and forward employment linkage indices - viz agriculture, forestry and fishing, distributive trade, finance and insurance and other services - are all non-industrial. Of the eleven sectors with high backward employment linkage indices, slightly above 50 percent are industrial: food processing, non-alcoholic beverages, tobacco, textiles, made-up textiles and miscellaneous products; while none of the industrial sectors has a high forward linkage effect.

The 'spread effects' of sectoral expansion are also quite minimal. This can be seen by considering the number of sectors with backward and forward employment linkage indices above unity in terms of the indirect coefficients (table 5:9). High indirect forward linkages are recorded for agriculture, livestock, distributive trade, finance and 'other' services, and high indirect backward linkage indices are recorded for food processing, alcoholic beverages,

Table 5:9 Direct plus Indirect Inter-Industrial Employment Linkage Indices,(global coefficients). (1977)

		Sector	U_j^L	V_j^L	U_i^L	V_i^L
		Manufacturing				
6	3111/3122	Food	3.093	3.769	0.119	5.704
7	3131/3133	Alcoholic bev.	0.747	5.183	0.041	5.846
8	3134	Non-alcoh.bev.	1.830	5.566	0.079	5.811
9	3140	Tobacco	1.943	5.533	0.061	5.905
10	3212	Textiles	2.312	4.099	0.278	5.412
11	3212	Made-up text.	1.143	5.511	0.174	5.571
12	3220	Apparel	0.741	5.801	0.187	4.996
13	3231/3233	Leather	0.769	5.455	0.126	4.705
14	3240	Footwear	0.403	5.111	0.144	5.699
15	3311/3320	Wood	0.528	5.155	0.295	4.367
16	3412/3420	Paper	0.273	4.790	0.154	4.391
17	3511/3512	Chemicals	0.215	5.823	0.062	3.025
18	3521	Paints	0.210	5.332	0.044	3.264
19	3522	Drugs	0.163	5.529	0.045	5.909
20	3523	Soap	0.152	4.516	0.043	5.861
21	3529/3540	Other Chem.	0.123	5.368	0.030	5.342
22	3551/3560	Rubber	0.423	4.918	0.171	4.012
23	3610/3699	Cement	0.315	4.841	0.148	4.533
24	3710/3812	Basic Metals	0.182	5.586	0.087	4.544
25	3813/3819	Fab.Metals	0.157	4.607	0.073	5.876
26	3822/3829	Machinery	0.135	5.761	0.041	5.848
27	3832/3839	Elect.Machinery	0.146	5.808	0.057	5.849
28	3841/3843	Transport Equip	0.132	4.569	0.019	5.915
29	3851/3909	Misc.products	1.378	5.364	0.114	3.404
		Primary Sectors				
		1 Agric.	8.123	3.087	19.709	5.068
		2 Livestock	1.283	5.855	1.947	5.595
		3 Forestry	0.659	5.387	0.915	4.766
		4 Oil Mining	0.030	4.873	0.005	5.412
		5 Other Mining	0.307	4.863	0.138	3.846
		Tertiary Sectors				
		30 Electricity	0.739	5.555	0.578	2.911
		31 Building	0.295	2.171	0.131	5.713
		32 Transp&Comm.	0.471	3.996	0.613	3.139
		33 Trade	1.427	3.135	3.255	4.964
		34 Finance	2.761	5.416	3.270	3.942
		35 Other Servs.	1.392	4.987	1.849	5.024

Table 5:9 contd.
The indirect inter-industrial employment linkages.

		Sector	U_j^L	V_j^L	U_i^L	V_i^L
		Manufacturing				
6	3111/3122	Food	6.154	2.264	0.048	5.659
7	3131/3133	Alcoholic bev.	1.453	4.811	0.003	5.019
8	3134	Non-alcoh.bev.	3.597	4.397	0.001	5.665
9	3140	Tobacco	3.866	4.653	0.007	5.732
10	3212	Textiles	4.475	2.389	0.297	5.501
11	3212	Made-up text.	2.002	3.698	0.012	4.882
12	3220	Apparel	1.163	3.459	0.025	4.504
13	3231/3233	Leather	1.364	2.652	0.044	4.749
14	3240	Footwear	0.538	4.548	0.006	5.873
15	3311/3320	Wood	0.628	4.487	0.149	3.058
16	3412/3420	Paper	0.385	5.789	0.140	5.093
17	3511/3512	Chemicals	0.331	5.863	0.017	5.489
18	3521	Paints	0.348	4.229	0.006	5.832
19	3522	Drugs	0.243	5.891	0.002	5.885
20	3523	Soap	0.228	5.099	0.004	5.965
21	3529/3540	Other Chem.	0.216	5.511	0.025	4.863
22	3551/3560	Rubber	0.623	4.301	0.106	4.442
23	3610/3699	Cement	0.387	4.157	0.044	4.863
24	3710/3812	Basic Metals	0.230	3.123	0.035	4.229
25	3813/3819	Fab.Metals	0.175	4.513	0.003	5.225
26	3822/3829	Machinery	0.192	4.776	0.000	
27	3832/3839	Elect.Machinery	0.182	4.529	0.000	
28	3841/3843	Transport Equip	0.234	4.115	0.000	
29	3851/3909	Misc.products	2.607	4.536	0.011	4.229
		Primary				
1		Agric.	0.838	5.797	24.630	1.475
2		Livestock	0.015	4.037	1.414	2.879
3		Forestry	0.096	3.119	0.619	3.638
4		Oil Mining	0.054	4.649	0.003	5.835
5		Other Mining	0.417	2.981	0.691	3.987
		Tertiary				
30		Electricity	0.583	5.900	0.252	4.810
31		Building	0.401	5.130	0.066	5.009
32		Transp&Comm.	0.469	5.136	0.761	4.35
33		Trade	0.151	5.767	3.906	2.170
34		Finance	0.259	5.572	1.306	2.001
35		Other Servs.	0.229	5.264	1.167	2.206

Table 5:10 Direct plus Indirect and Indirect Employment Linkage Indices in the Nigerian Manufacturing Sector, 1977. (M-sector coefficients).

		sector	Direct plus Indirect				Indirect			
			U_j^L	V_j^L	U_i^L	V_i^L	U_j'	V_j'	U_i'	V_i'
6	3111/3122	Food	1.010	4.733	1.115	4.279	0.592	3.331	1.197	2.263
7	3131/3133	Alcoholic bev.	0.439	4.263	0.383	4.896	0.392	2.901	0.066	4.811
8	3134	Non-alcoh.bev.	0.791	4.596	0.745	4.896	0.298	2.371	0.026	4.397
9	3140	Tobacco	0.614	4.522	0.568	4.899	0.268	3.621	0.000	4.650
10	3211	Textiles	1.519	4.833	2.595	2.982	1.552	4.525	7.777	2.389
11	3212	Made-up text.	2.177	3.735	1.634	4.738	3.447	4.726	0.311	3.699
12	3220	Apparel	2.041	4.029	1.753	4.662	2.325	3.503	0.662	3.459
13	3231/3233	Leather	1.135	4.507	1.184	4.325	0.874	2.445	1.156	2.652
14	3240	Footwear	1.519	4.269	1.353	4.803	1.106	2.552	0.149	4.548
15	3311/3320	Wood	2.466	4.836	2.733	4.364	2.185	4.493	3.730	2.645
16	3412/3420	Paper	1.037	4.557	1.369	3.416	1.348	3.508	3.265	1.533
17	3511/3512	Chemicals	0.655	3.987	0.578	4.522	0.881	1.916	0.438	2.333
18	3521	Paints	0.492	3.817	0.406	4.627	0.643	2.357	0.146	1.772
19	3522	Drugs	0.526	3.958	0.422	4.898	0.649	3.691	0.051	4.863
20	3523	Soap	0.454	4.238	0.401	4.811	0.389	2.214	0.083	2.902
21	3529/3540	Other Chem.	0.276	4.454	0.281	4.371	0.636	3.806	0.666	3.638
22	3551/3560	Rubber	1.327	4.625	1.482	4.125	1.208	3.272	2.102	1.965
23	3610/3699	Cement	1.333	4.689	1.362	4.589	0.843	3.091	1.011	2.814
24	3710/3812	Basic Metals	0.781	4.730	0.799	4.619	0.736	3.885	0.839	3.377
25	3813/3819	Fab.Metals	0.702	4.711	0.681	4.862	0.192	1.993	0.070	2.943
26	3822/3829	Machinery	0.405	4.664	0.387	4.883	0.111	2.647	0.009	2.763
27	3832/3829	Elect.Machinery	0.558	4.722	0.539	4.889	0.116	2.555	0.001	2.873
28	3841/3843	Transport Equip	0.213	4.017	0.175	4.894	0.224	2.538	0.006	4.229
29	3851/3909	Misc.products	1.531	3.239	1.055	4.742	2.985	1.488	0.229	1.475

non-alcoholic beverages, tobacco, textiles, made-up textiles, wearing apparel, leather products and miscellaneous manufactured goods. But none of the sectors has both backward and forward linkage index above unity.

Turning to the indices obtained using the M-sector coefficients, we find that in terms of total employment linkage, eleven of the twenty four industrial sectors have both backward and forward linkage indices above unity and therefore qualify as key employment sectors. The largest backward linkage indices are registered for wood products, made-up textile goods and wearing apparel; while wood products and textiles have the largest forward linkage effects.

Thus if we rank sectors by the size of their linkage effects and apply the top and bottom third criterion to select key sectors we come up with the following, in tables 5:11a and 5:11b, as, respectively, the most labour intensive and least labour intensive sectors in the economy:

Table 5:11a

Key employment sectors: sectors within top third ranking in terms of both forward and backward employment linkages

Sector	Global Coefficients	
	Rank	
	Backward linkage	Forward linkage
Agriculture	1	1
Finance & Insurance	3	2
Textiles	4	10
Trade	7	3
Other services	8	5
Livestock	10	4
Made-up textiles	11	12

Table 5:11a - Continued/....

Sector	M-Sector Coefficients Rank	
	Backward linkage	Forward linkage
Wood	1	1
Textiles	5.5	2
Wearing apparel	3	3
Made-up textiles	2	4
Rubber products	8	5
Cement	7	7
Footwear	5.5	8

Table 5:11b

Least labour intensive sectors: sectors within the bottom third ranking in terms of both forward and backward linkages

Sector	Global Coefficients Rank	
	Backward linkage	Forward linkage
Industrial chemicals	28	25
Paints	26	29
Drugs	28	28
Soap	30	30
Petroleum & coal	34	33
Fabricated metals	29	24
Machinery	32	31
Electrical machinery	31	27
Transport equipment	33	24
Oil Mining	35	35

Sector	M-Sector Coefficients Rank	
	Backward linkage	Forward linkage
Alcoholic beverages	21	22
Petroleum & coal	23	23
Transport equipment	24	24

Thus the most labour intensive sectors are the non-traded (i.e. tertiary) and primary sectors with only two manufacturing sectors; while of the 10 least labour intensive sectors, only one was non-manufacturing.

The inevitable conclusion one would arrive at from these results is that, for Nigeria, it appears that the ability and/or capacity to generate employment (and income) via industrial promotion is severely limited, at least within the existing policy framework. The key to more rapid employment generation perhaps lies in the forward effects of expansion of the primary and the tertiary sectors, and especially the former. For example, it is possible, at least in principle, that by expanding those processing industries using raw materials from the primary sectors, considerable employment would be directly and indirectly generated. It is instructive to note that some of the few sectors with high backward linkage indices (indirect as well as total) involve the processing of agricultural products: food processing, tobacco, non-alcoholic beverages, textiles, made-up textiles, or of forest products: wood products and furniture, paper products and rubber products etc. In practice, whether the expansion of these sectors does lead to an increased utilisation of productive factors - labour - will crucially depend upon a multiplicity of factors, including government policy, which may or may not encourage industries to respond to the stimulus.

However, a direct assault on the problem would perhaps require not just the expansion of primary and tertiary sectors, but also a complementary change in actual policy and strategy of industrialisation. In the section which follows, we intend to briefly look at the factor content of the country's trade in manufactures, so as to gain some insight into the possible employment implications of alternative trade strategies. We shall attempt to explore the possible gains (or losses) in employment from the adoption of an export promotion (or the continuation of the import-subsitution) policy in the country. Will increases in the export of manufactures lead to better results with regards to the employment of labour or of capital?

5:4 Factor proportions in import substitution and export promotion in Nigeria

Although we are essentially concerned with the 'employment problem' we find it necessary also to consider the implications of alternative strategies on other crucial variables, such as value-added, output, wages, capital and foreign exchange. We follow the conventional approach as earlier described in section 1, and use the following general expressions to derive the input and output multipliers in import-substitution (ϕ) and export-promotion (λ)

$$\phi = \phi^{*} p^{m} \qquad 5:22a$$

$$\lambda = \phi^{*} p^{e} \qquad 5:22b$$

where ϕ^{*} is a matrix of type mxn, m is the number of sectors (=24) and n is the number of variables (=5), viz direct plus indirect labour, capital, foreign exchange, wages and value-added as earlier derived, and pm (pe) is a vector of sectoral shares in total imports (exports).

Note that one could use not only the direct plus indirect coefficients but also the direct and/or indirect coefficients in deriving the multipliers. Thus for example, the direct employment Multiplier in importing (exporting) will be given by the expressions:

$$\phi^{m}_{dL} = \ell^{d} p^{m} (\phi^{e}_{dL} = \ell^{d} p^{e}) \quad \text{etc.} \qquad 5:23$$

Once these expressions are estimated, we can calculate the net effect that foreign trade has on our variables. For example, let l^m and l^e be the direct plus indirect employment multipliers in import substitution and export promotion respectively. Then the net employment effect of foreign trade can be measured by

$$N^n = \ell^m/\ell^e \qquad 5:24$$

so that if $N^r < 1$, one can conclude that importables generate less employment vis-a-vis exporting and the opposite holds if $N^n > 1$. Applying the various expressions for the 1977 data gives the following results, summarised in tables 5:12 and 5:13.

Table 5:12

Direct, Indirect and Total Employment Capital, Foreign Exchange Wages and Value-added Generated in Import Substitution and Exporting in 1977

Replacement of Imports	Direct	Indirect	Total
Employment			
a	60.90	532.00	593.00
b	34.30	251.00	284.90
Capital			
a	0.914	0.119	1.033
b	0.914	0.121	1.035
Foreign exchange			
a	0.3743	0.0190	0.3935
b	0.3453	0.0145	0.3598
Wages			
a	0.0878	0.0560	0.1438
b	0.0543	0.0326	0.0869
Value-added			
a	0.3955	0.2108	0.6063
b	0.2326	0.1261	0.3587

Table 5:12 - Continued/...

Production of Exports	Direct	Indirect	Total
c Employment	51.970	181.000	232.900
d Capital	0.938	0.337	1.275
e Foreign exchange	0.238	0.049	0.287
f Wages	0.077	0.040	0.116
g Value-added	0.428	0.285	0.713

Notes: a: Sectoral shares in total manufactured imports;
b: sectoral shares in competitive imports.
* labour requirements are per one million N of gross output.

Table 5:13

Ratio of Requirements in Import Substitution to Requirements in Exporting

		Direct	Indirect	Total
Employment	a/c	1.17	2.94	2.54
	b/c	0.66	1.39	1.22
Capital	a/d	0.97	0.35	0.81
	b/d	0.97	0.356	0.81
Foreign exchange	a/e	1.58	0.39	1.37
	b/e	1.45	0.30	1.25
Wages	a/f	1.15	1.41	1.24
	b/f	0.71	0.82	0.75
Value-added	a/g	0.92	0.74	0.85
	b/g	0.54	0.44	0.50

Table 5:12 shows the total input requirements and the total income generated for hypothetical changes in exports and imports. For example to replace 1 N million worth of imports would require 593 workers (or 285 in the case of competitive imports), would generate wages and value-added amounting to, respectively, N143.8 and N606.3

thousand and would require expenditure on foreign exchange and capital to the tune of, respectively, N393.5 and N1Ø33 thousand. On the otherhand, to produce 1N million worth of exports would require about 233 workers and about N1,275 thousand worth of capital etc.

Table 5:13 shows the ratios of the direct, indirect and total requirements in import substitution to those in exporting. For convenience, we shall consider only the ratios relating to the total requirements (Col. 3).

It can be seen that with regards to employment, import substitutes paradoxically embody more labour than exports. This is true whether we consider total manufactured imports or competitive imports. The ratio of labour requirements in import substitution to that in exporting is 2.54 when total import shares are used and 1.22 when only competitive imports shares are used. Similarly, capital requirements are lower in importing and this is also regardless of whether total or competing import shares are used. In either case, the amount of capital needed to replace N1 million worth of imports could produce about N 1.2 million worth of exports in 1977. The total amount of wages generated would be N143.8 thousands in the replacement of total imports, N86.9 in the replacement of competitive imports and N116.3 thousand in the production of manufactured exports. However, import substitution is unambiguously more foreign exchange using than exporting: the ratio of foreign exchange needed to replace N 1 million worth of total imports to the foreign exchange needed to N 1 million worth of exports is 1.37; this implies that the foreign exchange needed to replace N 1 million worth of imports could, alternatively, be used to produce N 729.9 thousand worth of exports in 1977. Finally, it can also be seen that export production is unambiguously more value added generating than the production for imports.

Thus with regards to the employment of labour in the Nigerian economy, the result reached here to the effect that $N^n > 1$ does not support the H-O theorem and would, therefore, seem to confirm the paradoxical result obtained by Leontief with regards to U.S. trade.

From the point of view of the employment problem our results have important implications in the choice of trade policies. Given that importables embody more labour (and/or less capital per head) than exportables, a policy of import substitution (with exports held fixed) would generate a higher demand for labour than a policy of export expansion with imports held fixed. Thus with regards to the distribution of income between factors, if we assume less than full employment and a less than perfectly elastic supply of labour, the higher demand for labour would have an additional redistributive effect in favour of labour. This conclusion implies implicitly that the rate of labour absorption in the economy (which we found to be low) would be (even) lower under an export expansionary policy.

From the point of view of increasing value-added and foreign exchange earnings however, the attractiveness of the IS policy is limited. Given the acute shortage of foreign exchange and the urgent need to reduce the economy's dependence on earnings from oil exports, one would be inclined to conclude that a strategy based on the promotion of exports would place the country on a more sound footing than the existing strategy which emphasises the replacement of imports.

It must be emphasised that the above analysis is highly hypothetical and restrictive in its assumptions. In particular, our results depend crucially upon the technology and the structure of Nigeria's foreign trade as of 1977. Given that both variables are not invariant through time, it will be wrong to project these figures to other - previous or future - years.

In spite of this shortcoming however, the paradoxical result that Nigeria's manufactured exports embody less labour than imports requires some further explanation. More generally, one needs to explain why the rate of labour absorption within the Nigerian manufacturing sector is generally low. This will be discussed in the following section.

5:5 Factor Intensity and Protection: Theoretical explanations and empirical verification:

5:5:1 Theoretical Explanations

The inability of the industrial sector to generate sufficient employment opportunities is a phenomena that is widely observed in many LDCs. Inspite of the significant progress made in manufacturing, the growth of employment in the sector has been far slower than labour force or population growth and indeed some countries are said to have experienced absolute fall in the level of employment[17]. How is this poor performance explained in the literature?[18]

In explaining the factor intensity of production in the LDCs, one can identify a number of 'schools of thought' each placing different emphasis on the relative importance of the critical determinants of technology choice. The conventional or neo-classical school stresses the critical importance of relative factor prices in determining such a choice.

In many LDCs pursuing the IS strategy, it is asserted, credit, fiscal and exchange rate incentives have been liberally extended in order to promote rapid investment in the industrial sector, to the effect that the private price of capital is rendered cheap relative to its social opportunity cost. In addition, certain government measures have tended to substantially increase the market price of labour relative to its social opportunity costs. The net effect of the capital and labour market distortions has been to increase the relative price of labour and hence to induce cost minimizing entrepreneurs to utilise more of the cheaper input.

The neo-classical approach is, put simply, based on the premise that there exists a wide range of production techniques with varying input requirements from which private profit maximizing producers can choose. This approach is illustrated below:

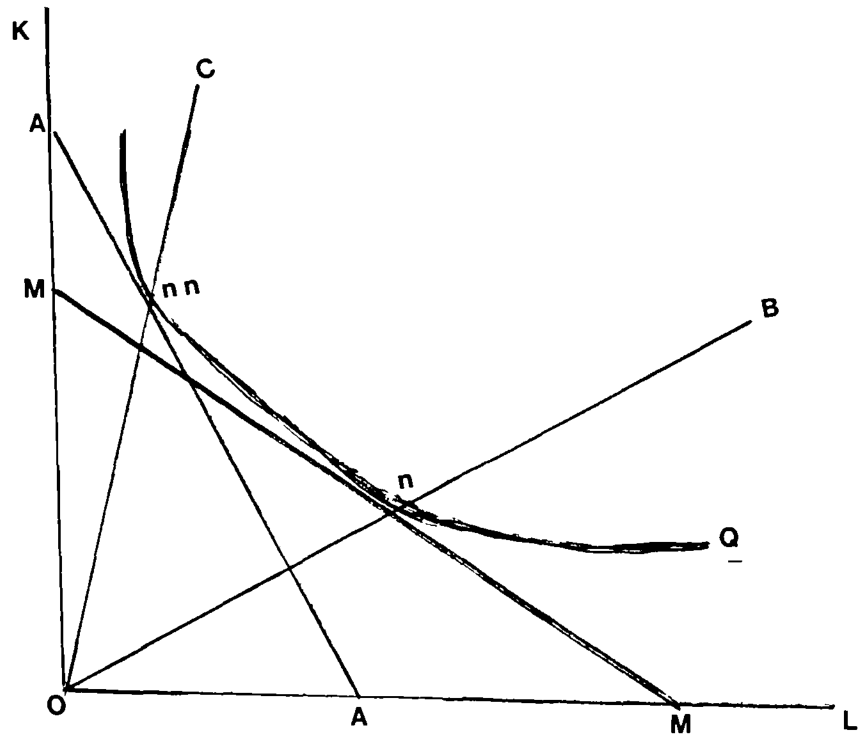

Figure 2

Two factors of production are assumed: homogeneous capital (K forming the y axis) and labour (homogeneous too, the quantity of which, L forms the X axis) to be used in different combinations to produce a given volume of production represented by the equal product curve Q. The slope of Q at any point is the marginal rate of technical substitution between K and L measured in physical units. Each technique of production - i.e. any possible combination of capital and labour - is represented by a straight line from the origin at an angle that is greater in proportion as the technique is capital-intensive or labour-saving. If the prices of the factors (or their rewards) are given and represented by AA & MM, the slope of which is the relative price of capital and labour, one can choose from among the different possible techniques the one which, with a given stock of factors of production, weighted in accordance with their relative prices, makes it possible to maximize immediate production. To see the response of private enterpreneurs whose goal is cost-minimisation to the variation in relative factor prices in choosing techniques, suppose first, that the flatter line MM represent the relative factor prise ratio facing entrepreneurs in the economy; the optimum K/L combination lies on the ray OB; point n being the point at which the marginal rate of substitution between K and L is equal to their relative prices, is thus the cheapest way of producing the level of output Q.

Suppose now the level of output is kept constant but that a subsidy in some form on capital is introduced or that a government wage legislation pushes up the price of labour such that it is available only at increasing costs. The relative price line AA will then represent this situation. Labour is now relatively more expensive and therefore the cost minimizing producer is induced to use the subsidized input relatively more intensively. The optimum input combination from the point of view of the producer, now lies on the ray OC and point nn, being the point at which MRS = P_x/P_y, is now the cheapest way of producing the level of output Q.

Given that the LDCs are characterised by cheap (because of plentiful) labour supplies, the relative price line MM more correctly represents their factor availability and the optimum allocation of resources therefore will be achieved by using a more labour intensive technique and by being at equilibrium point n. On the other hand, since these economies are often characterised by highly distorted product and factor markets, relative factor prices may bias the choice of technique and the actual equilibrium point at which producers using inappropriate techniques find themselves is represented by the point nn. Thus an appropriate change in the relative primary factor prices as a way of reducing capital deepening and/or increasing the rate of labour absorption in the economy is often recommended.

The neo-classical theorists' recommendation that LDC's should make use of capital-saving equipment since they are labour-surplus (or labour abundant), is considered even by its critics[19] as intuitively plausible. A fundamental objection to the approach, the critics argue, stems from the premise underlying the theory, about the range of techniques available and the critical determinants of their choice. With regards to the latter, it is argued that undue emphasis is placed upon the role of relative factor prices to the neglect of the basic structural features of the LDCs, a set of characteristics associated with different techniques of production, the nature of the environment in which industries operate as well as the differences in objectives between entrepreneurs, which are equally important and often more so in determining the possibility and/or desirability of adopting a particular technique in a particular country and the implications of so doing.

In explaining the nature of technological choice especially in less developed countries, critics of the neo-classical theory generally start from the premise that such a 'rational' choice of technology does not, in fact, exist or is at least "largely circumscribed by technological developments in the advanced countries"[20]. Since the under-developed countries are largely characterised by a structural incapacity to produce the capital goods that are required for 'enlarged reproduction', they will be forced to assimilate certain techniques of production embodied in a technology that is produced in the advanced countries. But the machines and technology produced in the developed countries, like any other goods, are often designed for and adapted to, the requirements of the markets in which they are produced and sold. Specifically they emerge as a natural response of the developed countries' own local factor endowment (i.e. their relative labour scarcities, the availability of complementary inputs such as skilled labour), vastly large markets as measured by the level and distribution of income, their competitive structures and other historical and economic circumstances, alien to or not shared by the LDCs. As such, these techniques need not be appropriate to the LDCs requirements. The LDCs are therefore described as 'technology dependent'[21] with the obvious consequences that the factor bias of imported technology, the types of industries that can be set up and even the range in the choice of products that is acceptable within the given structure of domestic demand are rigidly specified. For, as Stewart (1976) argues, to import a foreign technology, a country must also be ready to import the whole 'package' that goes with it, including "the nature and specification of the product, scale of production, skill and managerial requirements, marketing arrangements and brand names, raw materials processing, packaging, selling and marketing"[22] etc. This is particularly true in the case of import substitution strategy which more often than not, begins with the production at home, formally imported products, with the same or only slightly different product specification to ensure 'consumer satisfaction'. Under this circumstance the tendency to adopt capital intensity (and as will be argued in later chapters, the observed foreign exchange intensity) in production is really necessary irrespective of the prevailing factor prices.

Technological constraints of this nature are however only one factor in determining the capital intensity of industrial investment in the LDCs. Indeed, even barring the existence of these supply side constraints, the arguments are often advanced that the criteria of choice made among available technologies can vary widely depending on the type of investor making the selection, as well as the objectives of such a choice. First, where the government plays a dominant role in the choice of techniques, capital intensive methods may be preferred, because of certain dynamic considerations such as the development of a skilled workforce, the fostering of interindustrial linkages and other external economies which cannot be reaped from the application of labour intensive processes. Second, even private entrepreneurs it is argued,may be driven by certain competitive pressures to select capital intensive techniques, irrespective of the prevailing factor prices. For example, it is very likely that to produce internationally competitive products, a domestic producer in the LDCs must have recourse to the same methods and standard of efficiency in the production of export goods as in the developed countries against which he wishes to compete. This argument may be a weak one in so far as empirical evidence does suggest that manufactured exports from the newly industrialising countries to the developed countries have tended to be labour intensive. However, the clamour by unions in the developed countries for their governments to erect high tariff barriers to imports of labour intensive goods from the less developed countries could be cited as an example of why, in the real world, choice could not be so very different in the under-developed countries from what they are in the industrialised world.

Third, within the class of private profit seeking entrepreneurs operating in the economy, it is possible also to make a distinction in respect of the financing of investment in the sort of choice made by foreign firms and domestic firms. As a rule there is a wide gap in technological knowledge, availability of funds to finance investment etc. between a multinational enterprise and domestic firms. Possession and use of a superior technology is infact one of the distinctive features of multinational corporations. The foreign entrepreneur may want to maintain similar techniques to those used by the parent company in the more developed countries, either because he is less financially constrained, or because they are more factor productive or simply for the convenience of having the expertise and same maintenance team all over the world. For these reasons, even where domestically produced capital goods are available in the LDCs, foreign firms may not be willing to risk their operations by substituting domestic equipment which might appear to be cheaper (and inferior) for more modern imported machinery unless compelled by the government to do so. On their part, domestically based entrepreneurs may be inclined to copy such techniques existing in the developed countries and used by their foreign counterparts in order to achieve the same standard of efficiency and survive in the domestic competitive struggle.

It must be emphasised in conclusion that it is not so much that the neo-classical model is invalid and therefore should be rejected as that it only partially explains the choice of techniques in practice. It emphasises only two (capital and labour) of the manifold items contained in a technology package and concentrates in terms of the selection criteria on just one, the relative prices of factors. It thus leads to the conclusion that 'rationality' in behaviour dictates for the LDCs the policy of getting 'prices right' to promote what is considered an appropriate technology choice. On the other hand, critics argue that in so far as there exists no local capital goods sector able to facilitate the introduction of new machines designs and labour intensive technologies and processes more in line with the factor endowment of the LDCs, one cannot meaningfully talk of an 'optimum' or rational choice of techniques in these countries. They emphasise the existence of a multiplicity of objectives and of decision makers, the institutional and economic environment, the scale of output etc as significant determinants of choices to be made in techniques of production. Their arguments then lead to the conclusion that even in an environment which domestic market prices reflect relative factor scarcities, the interplay of these factors could necessitate the adoption of capital intensity in production.

The main threads of the argument can, of course, be offered as testable hypothesis subject to empirical verification. For example, whether ex poste choices of techniques exist and the possible role of factor prices can be examined by estimating sectoral elasticities of substitution. This will be undertaken in Chapter 6. Whether foreign firms are more capital intensive than domestic-owned firms can be examined by comparing their different factor proportions in production over a period of time[23]. This is not undertaken here for lack of a detailed data partaining to the operation of the two categories of firms. In what follows, a more general investigation of the relationship between factor proportions and effective rates of protection in Nigeria, will be undertaken.

5:5:2 Factor proportions and effective rates of protection: An emperical verification

Within a neo-classical framework, one would expect, ceteris paribus, sectoral effective rates of protection to be positively correlated with capital intensity in production if non optimal policies are pursued. The hypothesis follows from the H-O model of trade which predicts that to induce domestic production (use) of a good (factor) that would not be produced (used) in a free-trade situation, higher levels of protection must be granted the further away the production (use) of this good (factor) would be from its comparative advantage. In other words, the increasing use of a scarce factor of production - capital - in a 'surplus' labour economies like Nigeria can only be induced and/or maintained behind high tariff walls[24].

The relationship between erp and factor intensity in Nigeria is tested in a number of ways. First, we used the classification of sectors according to the height of effective rate of protection (see

Chapter 4, table 4:8) and then computed average factor intensity for each group of sectors falling into each of the four erp classes. If the above hypothesis is valid, we would expect sectors in the lower class of erp to exhibit higher levels of labour intensity than sectors in the upper class of erp. Conversely, the more highly protected sectors would be expected to have higher levels of capital intensity than the less protected ones.

As measures of labour intensity, we use direct, as well as the direct plus indirect labour requirements in domestic production, while capital intensity is measured by direct capital-labour, capital-output and capital-value added ratios. The results are displayed in table 5:14.

Our results suggest that the structure of effective protection does have some influence on factor requirements, although the relationship is not wholly unambiguous. It can be seen that for example, the most highly protected sectors (erp = 200%) have average direct labour requirements lower than the corresponding average for the least protected sectors (erp $\leq$ 50%) as predicted, but higher than that of sectors receiving low to moderate rate of protection (erp = 50-100%). Similarly, sectors which receive moderate to high rates of effective protection (101-200%) have, on average, higher capital-labour ratios than sectors which receive low to moderate erp.

However, with these few exceptions, the results can be used to confirm a point made earlier, that the effective rates of protection can be used to indicate resource movement at least for the least and most protected sectors in the economy. For example, sectors within the range of erp 51-100% have, on average, lower (higher) labor coefficients (capital-labour, capital-output ratios) than sectors receiving a lower rate of protection; similarly sectors with erp above 200% have on average, lower (higher) labour requirements (capital-labour, capital-output ratios) than those within the range 101-200%; and finally in all cases, the most highly protected sectors have lower average labour coefficients and higher average capital-labour and capital-output ratios.

Table 5:14

Factor intensity coefficients grouped by level of net effective rate of protection (1977)

Factor intensity measure	level of net effective rate of protection:			
	≤ 50% (low)	51-100% (low to mod.)	101-200% (mod. to high)	≥ 200% (high)
Direct labour requirements	0.084	0.051	0.109	0.077
Total labour requirements	0.105	0.056	0.132	0.088
Total labour requirement per unit of imports	0.969	0.308	0.592	0.951
Total capital requirements	0.962	0.990	1.652	1.865
Direct capital labour ratios	14.350	25.600	19.460	29.920
Total capital labour ratios	22.350	27.530	24.440	34.370

Source: Computed from tables 5:1 - 5:7.

As a further test, we obtained coefficients of rank and Pearsonean correlation between the various measures of factor intensity and effective protection. We also specified and estimated a regression equation of the form

$$\log FI = \alpha \ (+ -) \beta \log erp + u \qquad 5:25$$

where FI = factor intensity measure

erp = effective rate of protection.

(The sign of β is expected to be positive if FI is a measure of capital intensity and negative if FI is a measure of labour intensity). The various results are displayed in tables 5:15 and 5:16. From the former, it can be seen that although, as we hypothesized, labour intensity is negatively correlated with effective rates of protection, the coefficients are extremely low and not significant at any 'respectable' level of significance. The same applies to the import requirements: although positive, the correlation coefficients are insignificant. However, all the capital-intensity measures are positively (and significantly) correlated with erp's, a result which is confirmed by the regression results shown in table 5:16. Here we see that in all eight equations, the β coefficients have the expected signs and are significant in five. In addition, all equations - except 6, 7 and 8 - perform quite well: the proportion of variations in capital intensity which is explained by the protection granted to industries ranges from 0.27 to 0.63.

Our results do seem to support the neo-classical contention that high and differentiated structure of protection would tend to encourage the movement of resources into sectors which use intensively the country's scarcest factor of production. More specifically, the low labour absorption performance of Nigerian manufacturing could be

Table 5:15 Coefficients of Correlation between measures of capital intensity and/or labour intensity and net effective rates of protection 1977.

Measure of factor intensity correlated with net erp	Coefficients of corr.	
	Pearson	Rank
(1) Total labour requirements per unit of foreign exchange	-0.078	-0.065
(2) Total labour requirements		
a) global coefficients	-0.079	-0.005
b) m-sector coefficients	0.163	-0.053
(3) Capital requirements		
a) direct	0.620*	0.593*
b) direct plus indirect	0.510*	0.42**
(4) Capital Value-added (direct)	0.380**	0.450*
(5) Capital labour ratio (direct)	0.240	0.360
(6) Total import requirements	0.032	0.070

* coefficient significant at 1% level
** coefficient significant at 5% level.
Source:computed using data in tables 5:1-5:3,5:6-5:7,and 4:11.

Table 5:16 Factor Intensity and Effective Protection: a regression analysis.

equation no.	dependent variable	const. term	erp	R^2	$\bar{R}^2$	F
1	capital/labour (1974)	-1.82+ (-6.73)	1.541+ (6.79)	0.62	0.60	
2	capital/labour (1977)	-0.35 (-0.35)	0.680+ (2.830)	0.27	0.23	7.98
3	capital/value-added,(1974)	-5.09+ (-5.94)	1.089+ (5.963)	0.63	0.61	35.6
4	capital value-added(1977)	-1.89++ (-2.60)	0.595+ (3.430)	0.35	0.32	11.8
5	capital/output (1977)	-2.96+ (-4.21)	0.662+ (3.96)	0.42	0.39	15.6
6	direct labour requirements (1974)	1.01 (0.88)	-0.201 (-0.201)	0.03	---	0.7
7	total labour requirements	-0.81 (-1.05)	-0.026 (-0.144)	---	--	0.9
8	total import requirements (1977)	-1.83+ (-3.22)	0.03 (0.233)	-----	---	0.8

____ implies R^2 very negligible or negative.
t ratios in parenthesis.
+ significant at 1% level
++ significant at 10% level

explained to a fairly large extent by its import substitution policy. As we have seen in chapter 4, this policy has tended to extend liberally tax and tariff incentives which could favour the development of more capital-intensive activities and hence have a negative effect on employment. It can be concluded therefore that if the government is fully committed to the expansion of industrial employment, a change in the existing policy and strategy of industrialisation will be called for. The specific nature of this change and the likely magnitude of the employment opportunities to be created with the change will be outlined in a later chapter.

5:6 The Evaluation of 'Key' Sectors in Nigeria: Technological (Inter-industry) Linkage Indices

In this final section of the chapter, we shall consider the degree of industrial linkages realised in the economy and hence identify 'key' sectors - corresponding to those with the highest backward and forward linkages - for promotion. The relationship between sectoral linkages, income and employment, which has received alot of attention in the literature will also be considered.

Table 5:17 provides a complete listing of inter-industry linkage indices derived by the use of equations 5:13, 5:14, 5:16 and 5:17: From column 1 of table 5:17 it is observed that nineteen sectors have high backward linkage indices, 15 of which are manufacturing, 1 primary and the other three tertiary sectors. The high backward linkage indices of the manufacturing sectors reflect in large part the resource endowment of the economy. It can be seen that five of these, namely food processing, non-alcoholic beverages, textiles, made-up textiles and wearing apparel, involve the processing of agricultural products; the leather and footwear industries could be linked to the livestock sector and the wood/furniture and paper products sectors to the forestry sector. On the otherhand, the low backward linkage effects of the sectors manufacturing and/or assembling intermediate and capital goods reflects their import intensity of production. For example, the 1975 ratio of imported raw materials to total raw materials was above 90% for industrial chemicals, 68% for fabricated metals, 35% for machinery and 87% and 94% respectively for electrical and transport equipment sectors. (see table 3:24) More recent estimates (table 4:2) show that the ratio of raw material imports to output is up to 34% for industrial chemicals sector, 54% for fabricated metals, 32% for machinery, 55% and 75% respectively for electrical and transport equipment sectors.

The backward linkage effects of the Nigerian economic sectors can be compared to the corresponding effects found for a cross section of LDC's and DCs. The latter are reproduced in table 5:18. It can be observed from columns 1 and 3 of the table that the linkage effects of the primary and tertiary sectors are, as we have found, low. Secondly, most of the sectors we identified in Nigeria to have high backward linkage effects have also been identified in the case of the DCs and LDCs. What is very surprising is that Nigeria's backward linkage indices for some sectors appear to be superior to those in other countries. One must however be cautious in interpreting this result. First, the difference in the results could be due to the differences in the definition and classification of sectors. For example in table 5:18, 'food processing' is defined to include sectors which we classified separately as food processing, alcoholic beverages, non-alcoholic beverages and tobacco. The average backward linkage

Table 3:17 Inter-Industrial Linkage Indices in the Nigerian Economy(Global Coefficients). (1977)

			U_J	V_J	U_I	V_I	classification*
		Manufacturing sectors					
6	3111/3122	Food	1.182	4.155	0.915	5.129	III
7	3131/3133	Alcoholic bev.	0.951	4.721	0.964	5.889	IV
8	3134	Non-alcoh.bev.	1.012	4.399	0.744	5.904	III
9	3140	Tobacco	1.018	4.365	0.739	5.913	III
10	3211	Textiles	1.199	4.430	1.539	3.626	II
11	3212	Made-up text.	1.262	3.759	0.764	5.719	III
12	3220	Apparel	1.119	4.031	0.791	5.629	III
13	3231/3233	Leather	1.251	3.938	0.889	5.229	III
14	3240	Footwear	1.058	4.109	0.753	5.799	III
15	3311/3320	Wood	1.153	4.472	0.979	5.186	III
16	3412/3420	Paper	1.052	4.973	1.328	3.925	II
17	3511/3512	Chemicals	0.099	4.649	0.852	5.451	IV
18	3521	Paints	1.000	4.394	0.795	5.533	III
19	3522	Drugs	0.963	4.636	0.754	5.915	IV
20	3523	Soap	0.914	4.856	0.767	5.804	IV
21	3529/3540	Other Chem.	1.198	5.520	1.256	5.264	II
22	3551/3560	Rubber	1.086	4.499	1.057	4.617	II
23	3610/3699	Cement	1.091	4.296	0.865	5.428	III
24	3710/3812	Basic Metals	0.973	5.173	0.917	5.489	IV
25	3813/3819	Fab.Metals	0.876	5.024	0.752	5.872	IV
26	3822/3829	Machinery	0.822	5.310	0.742	5.897	IV
27	3832/3829	Elect.Machinery	0.828	5.275	0.741	5.905	IV
28	3841/3843	Transport Equip	0.844	5.194	0.745	5.910	IV
29	3851/3909	Misc.products	1.349	3.231	0.775	5.666	III
		Primary sectors					
		Agric.	0.801	5.733	1.886	2.666	I
		Livestock	0.749	5.824	1.144	4.099	I
		Forestry	0.774	5.636	1.102	4.042	I
		Oil Mining	0.778	5.633	1.135	3.838	I
		Other Mining	1.062	4.242	0.977	4.491	III
		Tertiary sectors					
		Electricity	1.027	4.302	0.937	4.657	III
		Building	1.045	4.356	0.976	4.639	III
		Transp&Comm.	1.000	4.523	1.864	2.421	II
		Trade	0.879	5.057	1.776	2.421	I
		Finance	0.895	4.935	0.916	4.503	IV
		Other Servs.	0.793	5.523	1.066	4.107	I

*The Classification Procedure used is: I=high forward,low backward index; II=high forward and backward index; III= high backward,low forward index and IV=low backward,low forward index.

Table 5:17 contd. Inter_Industrial Linkage Indices, M-sector coefficients.

		Sector	U_J	V_J	U_I	V_I	Classification
6	3111/3122	Food	0.936	4.753	1.037	4.279	I
7	3131/3133	Alcoholic bev.	0.920	4.625	0.871	4.896	IV
8	3134	Non-alcoh.bev.	0.890	4.667	0.849	4.896	IV
9	3140	Tobacco	0.891	4.638	0.845	4.899	IV
10	3212	Textiles	1.031	4.808	1.753	2.982	II
11	3212	Made-up text.	1.249	3.585	0.874	4.738	III
12	3220	Apparel	1.135	3.765	0.904	4.661	III
13	3231/3233	Leather	0.979	4.481	1.016	4.325	I
14	3240	Footwear	0.999	4.131	0.861	4.803	IV
15	3311/3320	Wood	1.013	4.761	1.106	4.346	II
16	3412/3420	Paper	1.064	4.667	1.438	3.476	II
17	3511/3512	Chemicals	1.107	4.317	0.972	4.522	III
18	3521	Paints	0.989	4.202	0.901	4.627	IV
19	3522	Drugs	0.962	4.390	0.863	4.898	IV
20	3523	Soap	0.952	4.418	0.876	4.811	IV
21	3529/3540	Other Chem.	1.300	4.824	1.431	4.371	II
22	3551/3560	Rubber	1.005	4.612	1.119	4.125	II
23	3610/3699	Cement	0.996	4.460	0.969	4.587	IV
24	3710/3812	Basic Metals	0.997	4.788	1.032	4.619	I
25	3813/3819	Fab.Metals	0.878	4.761	0.860	4.897	IV
26	3822/3829	Machinery	0.862	4.804	0.848	4.882	IV
27	3832/3839	Elect.Machinery	0.860	4.812	0.847	4.889	IV
28	3841/3843	Transport Equip	0.877	4.736	0.850	4.894	IV
29	3851/3909	Misc.products	1.196	3.447	0.878	4.741	III

index for these sectors amount to 1.04 compared to 1.178 and 1.141 respectively for DC's and LDCs. Similarly, the average index for industrial chemicals, paints, drugs and medicines, soap and petroleum products (classified under industrial chemicals in table 5:18) is only 0.834, compared to 1.071 and 1.068 for DCs and LDCs respectively. Second, even where such differences in classification do not exist, the higher backward linkage indices for Nigeria's industries need not imply a superior level of integration of the economy's sectors: they could for example be the result of sheer inefficient utilisation of inputs which would tend to inflate the input requirements per unit of output; or they could have come about because of heavier reliance on purchased input by these sectors from a few rather than many sectors. This latter is evident from the larger coefficients of variation found for Nigeria than for the LDCs and DCs.

Turning now to the forward linkage effects, we find eleven sectors with an index greater than 1. High forward linkages are associated with:

(a) The services sectors such as electricity and water, transport and communication and trade whose 'output' provide vital inputs to the manufacturing sector.

(b) The primary (i.e. natural resource based) sectors notably agriculture, livestock, forestry and fishing and mining, whose output as we have seen is utilised as inputs in several of the sectors with high backward linkage effects and

(c) A handful of manufacturing industries such as textiles, paper products, petroleum and coal products and rubber and plastic products.

If we apply the Chenery-Watanabe -Hirschman classification

Table 5:18 Inter-Industry Linkage Indices in Developed(DCs) and Less Developed(LDCs) Countries.

Sector			Developed Countries				Less Developed Countries			
			U_j	V_j	U_i	V_i	U_j	V_j	U_i	V_i
Manufacturing										
6/9	3111/3140	Food,Bev.&Tobacco	1.178	2.256	0.793	3.095	1.141	2.410	0.909	2.808
10/11	3211/3212	Textiles	1.111	2.724	1.169	2.278	1.186	2.787	1.182	2.693
12	3220	Apparel	1.137	2.110	0.571	3.902	1.137	2.064	0.524	4.177
13/14	3231/3240	Leather/F'wear	1.024	2.368	0.604	4.013	1.198	2.213	0.651	3.845
15	3311/3320	Wood	1.014	2.405	0.741	3.216	1.072	2.478	0.740	3.523
16	3412/3420	Paper	1.070	2.432	0.918	2.827	1.124	2.637	0.996	2.970
17/21	3511/3540	Chemicals	1.071	2.439	1.266	1.915	1.068	2.520	1.261	1.995
22	3551/3560	Rubber	0.963	2.254	0.571	3.725	0.959	2.439	0.594	3.922
23	3610/3699	Cement	0.913	2.479	0.676	3.304	0.948	2.464	0.687	3.378
24	3710/3812	Basic Metals	1.148	2.590	1.082	2.708	1.106	2.767	1.153	2.635
25/28	3813/3829	Metals&Machinery	1.041	2.525	1.156	2.160	1.058	2.767	0.949	2.628
29	3851/3909	Misc.products	0.975	2.251	0.592	3.661	0.965	2.346	0.597	3.748
Non-manufacturing										
1		Agriculture	0.861	2.921	1.354	1.918	0.827	3.149	1.557	1.711
4/5		Mining	0.828	2.730	0.969	2.247	0.753	3.054	1.045	2.135
30		Electricity & Water	0.936	2.641	0.860	2.828	0.759	3.014	0.765	2.954
31		Building & construction	1.011	2.091	0.666	3.160	1.028	2.096	0.586	3.695

Source:Boucher,M.(1976),"Some Further Results On the Linkage hypothesis", Quarterly Journal of Economics,XC,May,pp.316-317.

procedure, then the most important sectors are textiles, paper products, printing and publishing, petroleum and coal products, rubber and plastic products and transport and communications; the least important are nine manufacturing sectors (alcoholic beverages, industrial chemicals, drugs and medicines, soap and perfumes, basic metals, fabricated metals, machinery, electrical and transport equipment); and one tertiary sector (finance and insurance).

The low forward and linkage effects of intermediate and capital goods producing sectors and the general absence of 'key' industries is then clearly evident. The result may appear disturbing for a number of reasons: the industries which constitute these categories are often the largest and most important source of external economies - technological diffusion, creation of skills etc. They are also known historically to be very dynamic in the sense that they grow faster and more rapidly than most other industrial branches. Their absence here would imply that the Nigerian manufacturing industry is still far from being an autonomous, self-sustaining sector capable of generating the necessary inter-industry linkages for self-generating development. It can be argued that the absence of linkages is perhaps due to the relative recency of the intermediate and capital goods producing sectors in particular or even the manufacturing sectors in general and as such some time is needed for these to induce any significant linkages. To that extent therefore, it is not their realised linkages that will be evaluated but the potential backward and forward linkage effects which can still be achieved in the future. Assuming similar demand and/or industrial growth patterns in Nigeria and other developed countries, the differentials between the linkage indices for those sectors in Nigeria and the sectors abroad may be taken as a measure of the strength of the linkages yet to be induced (i.e. of potential linkages). Thus with time, and as income grows in Nigeria, those industries with higher absolute differences will develop faster than the others and the degree of inter-industry linkages enhanced. The assumption of a similarity in demand and/or growth patterns is however, very restrictive, and one should not be excessively confident that the potential linkages will indeed be translated into actual growth. Moreover, differences do exist in the policy of industrialisation and certain policies can indeed inhibit the realisation of these linkages. For example as a rule, the manufacturing process of several import substituting industries protected by high tariff walls is often restricted to final touches and or assembling of imported components. It is therefore, as we have seen, highly import intensive with the result that the different sectors carry out only minor domestic exchanges among themselves. No sector will therefore have any 'integrating' or 'mobilising' effects upon the rest of the economy. Nor will the profitable establishment of producer goods sectors be automatically induced - especially given the extremely narrow home market for luxury consumer goods, the lack of a widening impact of investment (since most of the income generated is spent on imports) and the high profitability of consumer goods industries, thanks to the high protective rates.

The desirability of having a high degree of sectoral inter-relatedness in the economy can, of course, be questioned especially when this does not satisfy or conflicts with other fundamental objectives of industrialisation. For example, the possibility of a trade-off between high industrial linkages on the one hand and employment and income-generation objectives of industrialisation has received some attention in the literature. In a study of inter-industry linkages for a cross section of countries in Asia, Panchamukhi (1975)[25] found an inverse relationship between income and output multipliers, a result which suggests that investments made on the basis of sectoral linkages (output) will actually work to hinder the generation of income. Since the latter is often associated with employment creation, the results suggest also that higher linkages will be anti-employment creation. Similarly, in another separate study of employment and output effects of sectors, Hazari and Krishnamurty (1970)[26] found that 'key' employment sectors are not necessarily those that perform best in terms of linkage effects. The possibility of this conflict arising can be easily seen in the following way. By definition, a sector j is said to have a high backward linkage effect say, when it makes an increasing use of domestic intermediate inputs; it thus substitutes these inputs for domestic primary factors, including labour, which is typically abundant in the LDCs; on the other hand, a labour intensive sector is by definition, one that has large direct plus indirect employment coefficient which can only be achieved if the sector not only substitutes labour for other primary factors but also makes smaller use of intermediate inputs in the economy. Such 'general conflicts of objectives' can be tidily summarised by calculating the coefficients of correlation between the various variables. We shall consider employment backward (U^L) and forward linkages (U^L), inter-industrial backward (U_j) and forward (U_I) linkages, direct plus indirect labour (LO), wage (WO), value-added (VO), capital (KO) and output (O) generated. The correlation coefficients are computed

Table 5:19 Coefficients of Correlation between the various Objectives and Constraints in the Economy.

	U_j^L	U_i^L	U_j	U_i	LO	WO	VO	KO	MO	O
U_j^L	1	0.67*	0.22+	0.24+	0.95*	0.52*	0.68*	-0.41*	-0.68*	0.21
U_i^L		1	0.04	0.55*	0.59*	0.58*	0.69*	-0.45*	-0.69*	0.02
U_j			1	-0.03	0.29+	0.44*	-0.06	0.36*	0.06	0.96*
U_i				1	0.18	0.21	0.54*	-0.37+	-0.54*	-0.05
LO					1	0.44*	0.56*	-0.33+	-0.56*	0.28+
WO						1	0.44*	-0.12	-0.44*	0.45*
VO							1	-0.61*	-1.00*	-0.115
KO								1	0.61*	0.39*
MO									1	0.12
O										1

Key : U_j^L U_i^L (employment) backward and forward linkage indices; U_j U_i inter-industrial backward and forward linkage indices; LO=total labour coefficients; WO=total wage coefficients; VO=total value-added coefficients; KO =total capital output ratio; MO total import/output ratio and O=direct plus indirect output(ie column sum of the Leontief Inverse).
All coefficients are global coefficients.
*significant at 1% level
Sources: tables 5:3 and 5:4.
+significant at 10% level
Source: Tables 5:3 and 5:4.

using the global coefficient and are displayed in table 5:19. These can be summarized as follows: the employment backward linkage index is positively correlated with both indices of inter-industrial linkages (U_J and U_I), although the correlation coefficients are low; the employment forward linkage index is not correlated with the backward, but highly correlated with the forward linkage index; employment requirements are, as one might expect, negatively correlated with capital intensity, and with foreign exchange intensity, as measured by direct plus indirect imports. As previously explained, this latter result could arise since, by definition, sectors with high backward linkages effects are making larger use of domestic intermediate inputs; and hence smaller of use of imported inputs. An employment based strategy may not necessarily be in conflict with an output-generation objective. It can be seen that the coefficient of correlation between direct plus indirect labour requirements and direct plus indirect output generated is fairly low (0.28), but significant (at 5% level) and not negative.

A strategy based on the promotion of investments on the basis of backward inter-industry linkages will not satisfy the value-added objective (correlation coefficient negative), will be capital intensive and will promote the output objective; on the other hand, sectors with high forward linkages will be pro-value added, anti capital intensity and output.

Thus it can be said that various policy options are open to the policy makers; but two main options can be clearly brought. The first is the promotion of labour intensive sectors, a strategy which might minimize expenditure on foreign exchange, as well as satisfying the labour income and value-added generation objectives. The strategy may or may not be favourable to the output objective. The second will be the promotion of sectors on the basis of backward linkage effects, a strategy which could also satisfy the foreign exchange-saving objective, since it would imply an increasing use of domestic intermediate inputs, but could be in conflict with the value-added objective and would be capital intensive. However, the fact that the strategy will be capital intensive makes it rather unattractive even for reasons other than employment creation. Observe that capital intensity is significantly related to imports intensity and will not satisfy the wages and value-added objectives. Thus the foreign-exchange saving capacity of the second strategy must be questioned, rather, it may well be foreign-exchange using through its effects on larger capital import requirements. The first strategy thus appears the more favourable especially since it can be used to achieve a multiple set of objectives (value-added, wages and foreign exchange saving objectives).

5:7 Summary and Conclusions

The preceding sections have evaluated in great detail the employment, output and foreign exchange implications of Nigeria's industrialisation using input-output analysis. Our main emphasis was on the employment implications. We also examined the extent of inter-industrial linkages in the economy. The results can be summarized as follows:

1. With regards to employment creation, most of the major or 'key' sectors are, unhappily, non-industrial. Thus the extent to which the manufacturing sector can play a leading role of integrating the additional labour force in the production process is severely

limited, given that its rate of labour absorption is characteristically low. This is extremely disturbing for the reason that the largest employment generators - i.e. the primary sectors - are also the most retarded sectors, registering especially in recent years, negative rates of output growth. Similarly, the sectors generating highest output and value-added per unit of imports consists mainly of the non- manufacturing sectors. Within manufacturing, the least desirable from the employment, output, value-added and labour income objectives, are sectors manufacturing chemical and related products and intermediate and 'capital goods'.

2. Even though an (hypothetical) export promotion strategy would have been less foreign-exchange using than the strategy of IS, we found it to be paradoxically, less employment generating. This, of course, does not imply the optimality of the existing trade regime with regards to employment creation. Indeed, one could explain variations in capital intensity of sectors by the policy of import-substitution as quantified by effective tariff rates. It was demonstrated that (a) the most highly protected sectors have tended to generate (require), on average, less (more) employment (capital) per unit of output than the least protected ones; (b) the coefficients of correlation/regression between capital intensity and effective protection are fairly high and statistically significant.

3. In the light of our findings, it was suggested that future increases in industrial employment would probably come from (i) the expansion of the primary and related sectors with substantial linkage effects and (ii) the change in policies which are presently biased in favour of capital intensive methods. Whether these changes can be effected will depend on a number of considerations. For example,

since the emphasis in Nigeria's industrialisation strategy is on growth rather than employment generation, the bias of policies in favour of capital intensity is likely to continue well into the future, with the consequence that (at least in the short-run) employment opportunities will not be created in larger numbers.

4. The degree of industrial linkages in the economy must also be rated as low. Only a handful of industries can be said to have any significant degree of integration with the rest of the economy. Again, this could be linked to the nature of the present IS regime which tends to encourage the development of industries with high import content.

5. The positive association between labour requirements and wages on the one hand and output on the other suggests that an output-based strategy need not conflict with the income or employment objectives. In otherwords, it suggests some degree of flexibility in policy choice among the various objectives. It remains true, however, that conflicts arise between objectives as suggested by the often low correlation coefficients. Specific examples can be provided: the tobacco processing, non-alcoholic beverage, distributive trade and livestock sectors have relatively high employment coefficients but their direct plus indirect output generated are relatively low; similarly, sectors like livestock, 'other' services, distributive trade, tobacco and non-alcoholic beverages with high value-added coefficients have low wage potential etc. This would therefore seem to indicate the necessity of carrying out a detailed analysis of the existing situation in each sector of the economy, in order to determine in which activities an appropriate mix of objectives can be attained.

6. In conclusion, we would like to point out at least two limitations of the analysis, in the light of which our findings should be read. First, it must be admitted that the problem of unemployment is a complex one, involving a large number of other variables, social and economic, which we have not been able to evaluate. Although as has been found in other studies, the nature of the industrialisation policy pursued is crucial in deciding the nature of changing employment patterns in many third world countries, our analysis should still be considered as partial. The second limitation has to do with our methodology. The use of input-output analysis can be very illuminating in that it allows one to, among other things, fully understand not only the direct but also the indirect and total consequences of economic policy. It takes into consideration the links between the different economic sectors and the degree to which they depend upon one another, rather than treat each sector separately. However, its use is based on a number of rather restrictive assumptions, the main one being the constancy of the input-output coefficients, an assumption which ignores the problem of the choice of techniques, and the role of factor prices and technical progress in affecting the economy's production function. In so far as these coefficients are known to change over time, our results should be interpreted with caution and should be regarded only as indicative of the 'true' state of affairs in the economy.

In the following chapter we shall relax the assumption of a 'Leontief technology' and employ other production relations to analyse more, the employment related issues in the Nigerian economy.

NOTES

1. Federal Republic of Nigeria (1981), Fourth Plan, p423.

2. Ibid, pp422-423.

3. Ibid, p144.

4. For similar analyses see, among others, Sheahan, J. (1971), "Trade and Employment: Industrial exports compared to import substitutes in Mexico", Research memo, No. 43, Williams College. Nishat, S. (1977) "Labour content and structure of Pakistan Manufactured exports", The Pakistan Development Review, XVI, 4, Winter, pp383-404; Reza, S. (1977), "Trade, Output and Employment: A Case Study of Bangledesh", The Bangledesh Development Studies.
   Krueger, A. O. (1982), Trade and Employment in Developing Countries, National Bureau of Economic Research, New York, Hazari, B.R. and Krishnamurty, J. (1970), "Employment Implications of India's Industrialisation: Analysis in an input-output framework", Review of Economics and Statistics, 52, pp181-6.

5. Observe that the concepts of indirect effects as well as that of inter-industrial linkages have no place in the neo-classical theory of production, with its assumptions of equilibrium in product and factor markets, nationally integrated and flexible economies as well as full employment of productive resources.

An exegenous increment in output demand therefore causes only marginal changes in factor or input use. Here however, we are dealing with an economy where these assumptions are not strictly applicable and which is, therefore characteristically in a disequilibrium. Thus some capacity can be assumed to be idle and can always be utilised through 'pressure and tension' created by changes in demand. For an elaboration of the concept see Hirschman, A.O., The Strategy of Economic Development, New haven, Yale University Press.

6. Chenery, H.B. and Watanabe, T. (1958), "International Comparisons of the Structure of Production", Econometrica, 26, pp487-521.

7. Ibid.

8. Rasmussen, P.N. (1957), Studies in Intersectoral Relations, Amsterdam: North Holland.

9. The Rasmussen measures are by no means the only measures put forward in the literature. Yotopoulos and Nugent (YN) (1973) suggested the use of the column sum of the leontief inverse and defined L_{Tj} as a measure of the direct plus indirect linkage effect:

$$L_{Tj} = \sum_i A_{ij}; \quad A_{ij} = (1-A)^{-1} \quad .$$

L_{Tj}, according to them, is a measure not only of the direct plus indirect backward linkage, but also "captures something in the way of forward linkage effects" (YN, 1973, footnote 8, pp161-162). Note, however, that the measure is an unweighted index, implying that all industries have the same degree of importance - say, size - in a system of industries. It can be easily seen that the problem of distinguishing between industries with highly skewed input demand or delivery and those with more evenly dispersed structural relations, will still arise. A sector which sells only a small proportion of its output to other sectors could still have a large f_i or U_i if that output constitutes a large proportion of the inputs of a small buying industry. Thus if capacity is expanded on the basis of the sector's forward linkage index, the impact on the overall rate of economy's growth will only be minimally felt, since the capacity created may be idle. Another suggestion put forward is that, one should consider the forward linkage index as the increase in output of all using industries rather than the increase in the output of the (one) supplying sector. The index so interpreted is given by the row sum of the "Output inverse" (Jones, L. P., 1976) as distinct from the traditional Leontief inverse. Most of these indices suggested in the literature are however, found to be highly correlated with the Rasmussen measures (YN, 1976). We feel therefore, that nothing is lost by concentrating on these latter measures. For a more detailed exposition see Yotopoulos, P.A. and Nugent, J.B. (1973) "A Balanced-Growth Version of the Linkage Hypothesis: A Test", The Quarterly Journal of Economics (QJE) Vol. LXXXVII, No. 2, May pp157-71. Boucher, M. (1976), "Some Further results on the Linkage Hypothesis" QJE, XC, May, pp313-18; Jones, L.P. (1976), "The Measurement of Hirschmarian Linkages", QJE, XC, May, pp323-33; Laumas, P.S. (1976), "The Weighting Problems in testing the Linkage Hypothesis" QJE, XC, May, pp308-12; Riedel, J. (1976), "A Balanced-Growth Version of the Linkage Hypothesis: A Comment", QJE, XC, May, pp319-22; and Yotopoulos, P.A. and Nugent, J.B. (1976), "In Defence of a Test of the Linkage Hypothesis", QJE, XC, May, pp335-343.

10. Diamond, J. (1975), "Inter-industry indicators of employment potential", Applied Economics, 7, p266.

11. For a brief survey and discussion of the various methods, see Bulmer-Thomas, V. (1982), Input-Output Analysis in Developing Countries, John Wiley, especially Chapters 8 and 10.

12. A more detailed treatment of this topic cannot, unfortunately, be provided here, as it is beyond our scope. Briefly, the method works as follows: in applying the method, it is assumed that each element a_{ij}, of the base year matrix, A_0, is simultaneoulsy subject to "substitution" and "fabrication" effects. The former is measured by the extent to which good i has been replaced by, or used as substitute for other commodities, and is expressed by the multipliers operating along the rows (r); the latter, (i.e. the fabrication effect), which is expressed by the column multipliers (s) measures the extent to which good j has come to absorb a greater or smaller ratio of the intermediate inputs. There are 2 crucial assumptions employed. First, both effects are assumed to be taking place in a uniform way; second, the rate of change in the use of the

input of a commodity is assumed to be identical in all industries. When each input coefficient in the original matrix A_0 has been subject to these two effects, the new matrix, A_1 can be expressed as

$$A_1 = r\, A_0\, S$$

13. Slater, L. J. (1972), More Fortran Programs for Economists, Cambridge University Press, Cambridge.

14. Clark, P.B. (1972), op cit.

15. For example, the authors of the National Accounts of Nigeria, from which the data for the primary sectors are obtained, emphasised that most of the figures are merely 'guess-estimates' since there are no systematic statistical records of information on all but the mining sector.

16. This follows the approach of Roe and Tyler (1977). The authors emphasise that, the approach is not strictly valid in cases where sectors export whole or part of their output since this would imply that the foreign exchange constraint can be relaxed by the expansion of exports. However, as was shown in Chapter 3, most of the economic sectors in Nigeria export only a neglible proportion of their output and the assumption is therefore not unrealistic. See Roe, A.R. and Tyler, G. (1979), Key Sector Identification with Multiple Objectives: Some Further Results, Warwick Economic Research papers, No. 118, November.

17. See UNIDO (1979), World Industry since 1960: Progress and Prospects, United Nations, New York.

18. For a survey of the literature see for example, Morawetz, D. (1974), "Employment implications of industrialisation in developing countries: A Survey", Economic Journal, 84, 335, September, pp491-542.

19. See for example, Merhav, M. (1969), Technological Dependence, Monopoly and Growth, Pergamon Press, Oxford. Stewart, F. (1976), "Capital goods in developing countries" in Cairncross, A. and Puri, M. (eds._ (1976), Employment, Income Distribution and Development Strategy: Problems of the Developing Countries, Macmillan, London. Stewart, F. (1977), Technology and Underdevelopment, Macmillan, London. Sutcliffe, R.B. (1971), Industry and Underdevelopment, Addison-Wesley, London, especially Chapter 5.

20. Stewart, F. (1977), op cit, p.58

21. Merhav, M. (1969), op cit,

22. Stewart, F. (1976), op cit, p132.

23. For an analysis along those lines see Agarwal, J.P. (1976), "Factor proportions in foreign and domestic firms in Indian Manufacturing", The Economic Journal, 86, September, pp589-594. See also, Mason, R.H. (1973), "Some Observations on the choice of Technology by Multinational firms in Developing Countries", Review of Economics and Statistics, 60, 3, pp349-55.

24. Similarly in the developed countries, it could be postulated that labour would be protected, since it is the scarce factor of production. Indeed, there is evidence to show that the American tariff system favours labour intensive industries. See Travis, W. P. (1968), "The effective rate of protection and the question of labour protection in the United States", The Journal of Political Economy, 76, pp443- . Ball, D. S. (1967), "United States Effective Tariffs and Labour's Share", Journal of Political Economy, 75, pp183-187. In another study however, Balassa (1965) found no definite relationship between effective protection and labour intensiveness of selected manufacturing industries in several developed countries. See Balassa, B. (1965), "Tariff protection in Industrial Countries: An Evaluation", Journal of Political Economy, LXXIII, December, pp.573-94.

25. Pauchamukhi, V.R., "Linkages in Industrialisation: A Study of Selected Developing Countries in Asia", Journal of Development Planning, 8, pp121-65.

26. Hazari, B.R. and Krishnamurty, J. (1970), op cit.

CHAPTER 6

An Analysis of the Effects of protection using Production Functions: substitution elasticity and productivity growth in the Nigerian Manufacturing Industry

6:1 Introduction

In the previous chapter it was noted that the 'maintained' hypothesis in the classical and neo-classical literature is that the phenomenon of capital intensity in production in the LDCs arises, by and large, from (trade and industrial) policies - differential tariff rates favouring capital goods imports, minimum wage legislation etc. - that have detrimental effect on the demand for labour and for other primary inputs, except capital. The policy of getting prices "right" is therefore recommended as a way of reducing capital deepening and/or increasing the rate of labour absorption in the economy. It is obvious that both the 'maintained' hypothesis and the policy prescription rest explicitly on the degree of technical substitution among primary inputs into the production process. Let us assume, for example, that the economy is characterised by rapid increases in labour in relation to capital. Then if the elasticity of substitution - which measures the ease with which labour and capital can be substituted for each other - is high, a decrease in the price of labour (the wage rate) and/or a rise in the price of capital will act as an inducement for profit maximizing firms to absorb the increases in labour input. Conversely, with a low degree of substitutability, increases in labour input can only be satisfactorily absorbed by huge decreases in wage rates and/or a huge increase in the price of capital.

To the extent therefore that substitution possibilities exist (and are high) the neo-classical hypothesis and recommendation will be vindicated and will contradict the technical-rigidity hypothesis which suggests the opposite and therefore sees the role of relative factor prices as being rather minimal. Estimates of the elasticity of substitution are therefore crucial in examining the various contentions and in determining among other things, an appropriate technology policy, income distribution between primary factor inputs etc. One of the main objectives of this chapter is to provide these estimates for the manufacturing industries in Nigeria and to examine the proper role of relative factor price changes in the choice of production techniques.

Studies on productivity growth have also acquired great significance in the context of economic growth in LDCs. The level and rate of productivity growth has come to be regarded as the most significant index of technical and economic efficiency, whether of a firm, industry or the country as a whole.

Until recently, exercises in productivity analysis have confined themselves to the estimation of 'partial' or 'specific' productivity, expressed as the ratio between output and a given measure of one productive factor - notably labour. No doubt this could be of major importance in economic analysis/planning, such as in forecasting output and employment as well as in the distribution of manpower and other resources between different sections of industries. However, labour is only one of the several inputs that are employed and the efficiency with which resources are used is better measured by relating output produced to the total of all inputs employed in the production process.

The total-factor productivity (TFP) measures are useful in many ways: First they can be employed to understand changes in the partial productivity measures. For example, if the growth rate in the total factor productivity measure is less than that of a (partial) labour productivity measure, we know that some of the increase in the latter is due mainly to the increase in the amount of other inputs; second, by estimating TFP growth, one would be able to monitor and study the sources of output growth other than those resulting from growth in inputs, including technical progress, managerial innovations, improved resource allocations etc. Third, and most important, the TFPG index can provide information to policy makers for determining the appropriateness of policies designed to promote 'infant' industries. Recall that one of the justifications for infant industry protection is that such infants cannot compete with imports until they 'grow up'; with time, they are expected to become internationally competitive and to expand the economy's production possibility frontier and both will depend on how efficiently resources have been utilised. Thus by estimating rates of TFPG one would be able to understand those industries which have 'grown up' as well as the appropriate duration of policies to promote the infants.

Thus the second main objective of this chapter is to examine the nature and to enquire into the sources of factor productivity growth in Nigeria. Our main emphasis will be on labour and total factor productivity growth. An attempt will be made also to explore the possible links between variation in productivity and protection.

The chapter is organised as follows: In section 6:2:1 we shall set out the methodology employed in estimating sectoral elasticities of substitution. The main results are discussed in section 6:2:2, and section 6:2:3 examines the main implications of the findings. Section 6:2:4 summarises the discussion. Section 6:3:2 examines the theoretical method of obtaining rates of productivity growth; the empirical findings are discussed in section 6:3:2; the possible sources of labour and total factor productivity growth are explored in section 6:3:3 and finally, section 6:3:4 summarises the main findings and discusses their implications.

6:2 The Elasticity of Substitution in Nigerian Manufacturing Industries: A Time Series Analysis (1963-1978)

6:2:1 Methodology[1]

The most frequently employed production function to estimate substitution elasticities between labour and capital is the constant elasticity of substitution (CES) production function, which includes the Cobb-Douglas (CD) and Leontief production functions as special cases. The CES production function can be expresses as

$$Q = \gamma[\delta L^{-\rho} + (1 - \delta)K^{-\rho}]^{-v/\rho} \qquad 6:1$$

where Q = output

L = labour input

K = capital input

γ = rate of Hicks Neutral technical progress

v = returns to scale parameter

ρ = substitution parameter

δ = distribution parameter

The CES function can be estimated directly using non-linear techniques or by linearising the function. Following the latter approach the following expression can be obtained by expanding the function around $\rho = \emptyset$[2]

$$\log(Q/L) = \log\gamma + v\delta\log l + V(1-\delta)\log K/L$$
$$-\tfrac{1}{2}\, V\rho\delta(1-\delta)(\log K/L^2) + U \qquad 6:2$$

If equation 6:2 is constrained to constant returns to scale (V=1) we get

$$\log(Q/L) + \log\gamma + (1-\delta)\log K/L$$
$$-\tfrac{1}{2}\rho\delta(1-\delta)(\log K/L^2) + \lambda t \quad + u \qquad 6:3$$

where λ = rate of technical change

t = time trend.

Both equations 6:2 and 6:3 can be estimated by ordinary least squares (OLSQ) to yield an estimate of ρ and hence of the elasticity of substitution (σ) since $\sigma = 1/1+\rho$ or $\rho = \frac{1}{\sigma} - 1$.

The reliance of the equations upon the availability of correct estimates of capital stock data which in many LDCs are either difficult to measure or unreliable make them less appealing. To avoid the use of capital stock data, other relations can be derived and estimated. Differentiating equation 6:1 with respect to the variable L and utilising the first order profit maximizing condition (i.e. equating the marginal productivity of labour with the wage rate) one can derive expressions 6:4 and 6:5 below:[3]

$$\log (Q/L) + \alpha_o + \alpha_1 \log W + \alpha_2 \log L \qquad 6:4$$

where $\alpha_o = 1$

$$\alpha_1 = \frac{V}{V+\rho}$$

$$\alpha_2 = -(1-\alpha_1)(1-V)$$

and $\alpha_1/(1-\alpha_2) = \sigma$

and

$$\log(Q/L) = \alpha_o + \frac{\sigma}{1-\sigma}\lambda t + b\log Q + \sigma \log W \qquad 6:5$$

In equation 6:4 and 6:5 indications of the existence of economies of scale are given by α_2 and b_2 respectively.

Expressions 6:4 and 6:5 identically collapse to expression 6:6 if we assume constant returns to scale:

$$\log(Q/L) = \alpha_o + (1-\sigma)\lambda t + \sigma \log W \qquad 6:6$$

where $\alpha_o = \sigma \log\{\gamma^{\rho}(1-\delta)^{-1}\}$

Under the special assumption that the wage rate (W) does not affect the efficiency of industry, σ, the coefficient of logW correctly corresponds to the elasticity of substitution. This will be referred to as the ACMS[4] equation.

Variants of equation 6:6 can also be considered. Equation 6:7 below is derived by assuming a non instantaneous adjustment of output per head to its desired value, $(Q/L)^*$. The long-run equilibrium relation between output per head and the marginal productivity of labour is

$$\log(Q/L)^* = \alpha + \sigma \log W + \lambda t + u_t$$

the estimating equation is thus

$$\log(Q/L) = \alpha + \alpha_1 \log W + \alpha_2 \log(Q/L)_{-1} + u_t \qquad 6:7$$

and the (long-run) estimate of σ is given by the ratio of the coefficient of log W to one minus the coefficient of the lagged output per head variable i.e.

$$\sigma_L = \alpha_1/1-\alpha_2$$

A slightly different relation can also be derived by making an assumption about the nature of the serial correlation of the residuals. Following Griliches (1967), assume a first-order serial correlation in the residuals "due to persistence of the various possible misspecifications"[5] so that

$$U_t = U_{t-1} + V_t, /\rho/ < 1 \quad .$$

Combining with the standard ACMS relation 6:6, implies the estimation of

$$\log(Q/L) = \alpha_0 + \sigma \log W + b\log(Q/L)_{-1} - \sigma b\log(W)_{-1} + \lambda t \qquad 6:8$$

Equation 6:8 thus collapses to 6:6 if the coefficient of the lagged wage rate term is equal to zero. Note also that according to this relation, the coefficient of the lagged wage rate term is negative and equal to the product of the coefficients of the other two terms.

Equations 6:5 - 6:8 have the common advantage that the data required for their estimation - output, labour input and wage rates - are easy to come by and their estimation is less likely to cause measurement errors than the estimation of equations 6:2 and 6:3. Moreover, the elasticity of substitution in equations 6:5 and 6:6, being a first order parameter, is likely to be estimated with more precision than when other equations are estimated.

They however suffer from certain obvious disadvantages which "come from specific assumptions required for this to be a valid estimating equation, some of which are unlikely to hold true, even approximately"[6]. The assumptions that the relationship between output per head and the wage rate is independent of the stock of capital and that σ is constant irrespective of variation in capital-labour ratios have been challenged in both the theoretical and empirical literature. And it is shown that to the extent that σ is affected by variations in capital-labour ratios, estimates obtained through the CES will be biased both upwards and downwards[7].

It is appropriate, therefore, to consider few of the variants of production functions which consider explicitly the role of variations in capital-labour ratios in estimating σ. From a variable elasticity of substitution (VES) production function of the form:[8]

$$(Q) = \gamma\,[\delta\,(K)^{-\rho} + (1-\rho)Z^{-c/1-\rho}L^{-\rho}]\;{}^{\gamma}\!/\!_{\rho} \qquad 6:9$$

the following relation can be derived and estimated, assuming as in ACMS the equivalence of marginal productivity of inputs and returns to the factors

$$\log(Q/L) = +\,\alpha + b\log W + c\log Z + u \qquad 6:10$$

where all the variables are as defined previously and $Z = K/L$. The elasticity of substitution, $\bar{\sigma}$ can be obtained as

$$\bar{\sigma} = b/1-C(1 + \frac{W^*}{\gamma^*})$$

where W^*, r^* are respectively the base year prices of labour and capital. In this study we define w^* as base year wage rate and r^* as

$$V^* - W^*/K^* \quad ,$$

where V^*, W^* and K^* are respectively value-added, wages and capital in the base year.

The extent to which σ differs from $\bar{\sigma}$ will depend on the coefficient of log Z; if it is equal to zero, the equation 6:10 reduces to the ACMS relation (6:6); if it is greater than 0 as found by Hildebrand and Lu (1960), the 'true' elasticity of substitution will be underestimated by b.

Using time series data (1963 - 1978) equations 6:5 - 6:8 and 6:10 were estimated for the manufacturing sector as a whole and for each of the twenty-four industries within the manufacturing sector, to obtain numerical values of σ. In this way, we shall be able to check the robustness of our results and also to examine the extent to which alternative assumptions underlying the equations affect the estimated values of σ.

6:2:2 <u>The Main Results</u>

(i) <u>An Overview of the Manufacturing Sector</u>

In Tables 6:1a and 6:1b we present least squares estimates of the various production relations shown in the previous section. Two types of measures of output per head (the dependent variable) are experimented with: gross output per head (Q/L) and value-added per head (V/L); and each equation is estimated with and without a trend variable. What is immediately evident from the table is the wide variations in the estimated values of the parameters and hence in the estimates of the elasticity of substitution. Such variations are no doubt due to the different assumptions underlying the different relations estimated. It can be seen that measured by their R^2 (and F ratios) all the equations show a fairly good fit. The value of R^2 ranges between 0.51 to 0.79.

Table 6:1a Estimates of Production Functions For the (Total) Manufacturing Industry (1963-1978).

Dependent Variable log(v/l)

Explanatory variables	Regression Equations									
	6:5		6:6		6:7		6:8		6:10	
constant	1.56	1.42	1.69	1.48	2.03	1.10	2.33	2.43	1.79	0.84
	(0.5)	(0.6)	(0.6)	(0.5)	(0.7)	(0.5)	(0.9)	(0.7)	(0.7)	(0.2)
log(w/l)	0.73	0.65	0.93	0.67	0.89	0.65	0.46	0.68	0.90	0.58
	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.4)	(0.3)	(0.3)	(0.3)
t		0.02		0.011		0.005	0.009			
		(0.1)		(0.008)		(0.008)	(0.008)			
log(v/l)	0.07	-0.06								
	(0.1)	(0.22)								
log(v/l)_1					-0.06	0.24	-0.21	-0.19		
					(0.07)	(0.2)	(0.2)	(0.12)		
log(w/l)_1							0.06	0.06		
							(0.05)	(0.05)		
log(k/l)									-0.01	0.043
									(0.04)	(0.05)
R^2	0.62	0.67	0.52	0.65	0.55	0.79	0.69	0.60	0.53	0.72
$\bar{R}^2$	0.55	0.58	0.48	0.59	0.48	0.74	0.56	0.50	0.45	0.64
F	9.60	6.20	18.40	11.20	7.20	11.70	4.40	4.60	6.70	7.70
DW	2.20	2.10	2.40	2.20	2.50	2.40	2.30	2.60	2.40	2.00
σ	0.73	0.65	0.93	0.67	0.84	0.86	0.46	0.86	0.35	0.70

standard error in parenthesis.

Equation 6:5 (CES,Variable returns) logv/l=a+blogw+clogv
6:6 (ACMS) logv/l=a+blogw
6:7 (Distributed lag)logv/l=a+blogw+clog(v/l)$_{-1}$
6:8 (Serial correlations) logv/l=a+blogw+clog(v/l)$_{-1}$+dlog(w)$_{-1}$
6:10 (VES) logv/l=a+blogw+clogk/l
Where v,l,w and k are respectively,value added,labour,wages and capital.

Table 6:1b Estimates of Production Functions for (Total) Manufacturing Industry (1963 - 1978).

Dependent Variable=log(q/l)

Explanatory variables	Regression Equations									
	6:5		6:6		6:7		6:8		6:10	
constant	3.18	3.18	3.12	3.20	3.06	3.18	2.95	3.72	2.72	2.69
	(0.42)	(0.49)	(0.42)	(0.44)	(0.54)	(0.58)	(0.72)	(0.67)	(0.51)	(0.74)
log(w/l)_1	0.82	0.80	0.67	0.81	0.67	0.81	0.70	0.31	0.78	0.87
	(0.24)	(0.26)	(0.18)	(0.25)	(0.19)	(0.26)	(0.30)	(0.25)	(0.20)	(0.26)
t		0.01		-0.01		-0.01	0.014			0.001
		(0.03)		(0.01)		(0.01)	(0.01)			(0.01)
log(q)	-0.05	-0.10								
	(0.05)	(0.17)								
log(v/l)_1					0.01	0.01	0.19	-0.12		
					(0.07)	(0.08)	(0.23)	(0.18)		
log(w/l)_1							0.04	0.07		
							(0.42)	(0.045)		
log(k/l)									0.03	0.34
									(0.03)	(0.41)
R^2	0.54	0.55	0.51	0.53	0.51	0.53	0.77	0.69	0.57	0.57
$\bar{R}^2$	0.46	0.42	0.47	0.45	0.42	0.41	0.68	0.61	0.50	0.45
F	7.00	3.59	13.30	6.79	6.13	3.00	7.00	7.00	8.00	4.00
DW	2.00	1.80	1.90	2.00	1.90	2.00	2.70	2.00	1.80	1.80
σ	0.82	0.80	0.67	0.81	0.68	0.81	0.70	0.31	0.75	0.82

Standard errors in parenthesis.

Equation 6:5 (CES,Variable returns) logq/l=a+blogw+clogq
6:6 (ACMS) logq/l=a+blogw
6:7 (Distributed lag)logq/l=a+blogw+clog$(q/l)_{-1}$
6:8 (Serial correlations) logq/l=a+blogw+clog$(q/l)_{-1}$+dlog$(w)_{-1}$
6:10 (VES) logq/l=a+blogw+clogk/l
Where q,l,w and k are respectively,gross output,labour,wages and capital.

For the ACMS model with constant returns to scale, (equation (6:6)) the elasticity of substitution is seen to be fairly high and statistically significant at the 1% level. The significant (and positive) coefficient of the time variable is an indication of some degree of technical progress achieved during the period. For the distributed lag model (without a time trend) the coefficient of log W is positive and statistically significant. With a value of -0.06 for the coefficient of $\log(V/L)_{-1}$ the long run elasticity of substitution is 0.840. Adding the trend variable to the equation reduces the size of the logW coefficient and increases that of the lagged term hence increasing slightly the value of σ, to 0.86. The rates of adjustment implied by the equations (1-coefficient of log(V/L)) are respectively 1.06 and 0.76. The serial correlation model is not a good fit. The coefficient of $\log(W)_{-1}$ is expected to be negative and equal to the product of the coefficients of logW and $\log(Q/L)_{-1}$. It can be seen that it neither has the expected sign nor is it statistically significant.

In equation 6:5 (in which variable returns to scale are assumed), the coefficient of the output term is statistically insignificant at the 10% level and this would seem to lend support to the assumption of constant returns to scale. Similarly, the introduction of the logK/L term does not invalidate the assumption that σ is constant. In equation 6:10 we see that the capital labour ratio coefficient is negative and statistically insignificant, although when the same equation is re-estimated with a trend variable, the coefficient becomes positive but still statistically insignificant.

Considering the relative poorness of the results from most of the equations, it seems that one should be more comfortable with the estimate of σ derived from the simple ACMS relation. Thus, at least for the total manufacturing sector and for the period under consideration, the assumption of the constant returns to scale cannot be invalidated and, more important, with such a high value of σ, which is not statistically different from unity, one can conclude that a high degree of technical substitution does exist in the sector. This conclusion holds whether the dependent variable in the equations is gross-output or value-added per head.

(ii) Sectoral Elasticities of Substitution

Table 6:2 provides a complete listing of estimated elasticities of substitution by sector. Estimating 5 equations for each of the 24 industries gives us a total of 120 estimates of σ.

As with the estimates obtained for the total manufacturing sector, the values of σ show considerable variations for each industry and across sectors. They range between the highest value of 3.85 (VES function fitted for the tobacco industry) to -1.63 (distributed lag model fitted for the drugs and medicines industry). To see the relationship between the various sectoral estimates of σ, we computed the Pearson's correlation coefficients presented in Table 6:3. It can be seen that a fairly high degree of association exists among the ACMS constant returns to scale estimates. The lowest degree of association is between the ACMS relation (6:6) and the serial correlations model (correlation coefficient = 0.53, significant at 1% level). Estimates

Table 6:2 Estimates of Sectoral Elasticities of Substitution in the Manufacturing Sector:(1963-1978).

		Sector	Regression Equations					
			C E S (v.r.s.) 6:5	ACMS 6:6	D-lag model 6:7	Serial corr 6:8	VES ($\bar{\sigma}$) 6:10	k/l coeff.
6	3111/3122	Food	1.89	2.15	2.66	2.48	2.33	0.286
7	3131/3133	Alcoholic bev.	0.30	0.27	0.46	0.45	1.90	0.793+
8	3134	Non-alcoh.bev.	-0.09+	-0.20+	0.05	0.13+	0.23	0.281
9	3140	Tobacco	2.05	0.69	0.44	1.08	3.85	0.387
10	3212	Textiles	0.15+	1.23	0.11	0.11+	1.24	0.041
11	3212	Made-up text.	-0.12	0.93	0.01	0.04+	-0.97	-0.682
12	3220	Apparel	1.32	2.31	3.13	1.63	1.91	-0.153+
13	3231/3233	Leather	0.19+	0.73	-0.05	0.23+	1.22	0.165
14	3240	Footwear	0.46	0.73	0.76	0.49	0.87	0.250
15	3311/3320	Wood	0.98	1.03	1.02	1.36	1.07	0.231
16	3412/3420	Paper	0.56	0.23+	0.30	2.69	-0.52	-0.038
17	3511/3512	Chemicals	0.98	0.93	1.42	1.16	0.90	0.280-
18	3521	Paints	-0.06+	0.36+	-0.55	0.12	0.24	-0.163
19	3522	Drugs	0.35	1.36	-1.63	-0.23+	-0.63	-0.774
20	3523	Soap	-0.10+	0.78	-0.27	-0.06+	2.03	0.247-
21	3529/3540	Other Chem.	0.34	1.22	1.02	1.90	1.49	0.539
22	3551/3560	Rubber	0.61	0.78	1.02	1.01	0.88	0.120
23	3610/3699	Cement	0.93	0.94	0.96	0.94	1.41	0.195
24	3710/3812	Basic Metals	0.97	1.05	0.99	1.44	1.12	0.275
25	3813/3819	Fab.Metals	-0.19+	-0.44	-0.37	-0.28	0.45	0.374
26	3822/3829	Machinery	0.18	0.48	0.63	1.18	0.34	-0.467
27	3832/3839	Elect.Machinery	1.45	1.71	1.58	2.37	0.74	-0.480
28	3841/3843	Transport Equip	-0.80	-0.003+	-1.10	-0.96	0.29	0.489
29	3851/3909	Misc.products	0.86	1.25	1.33	0.93	1.15	0.016

Notes: + not statistically different from zero. The level of Significance of values of σ reported in cols 4 and 5 is not considered as these are not directly estimated.

Equation 6:5 (CES,Variable returns) $\log v/l = a + b\log w + c\log v$

6:6 (ACMS) $\log v/l = a + b\log w$

6:7 (Distributed lag) $\log v/l = a + b\log w + c\log(v/l)_{-1}$

6:8 (Serial correlations) $\log v/l = a + b\log w + c\log(v/l)_{-1} + d\log(w)_{-}$

6:10 (VES) $\log v/l = a + b\log w + c\log k/l$

Where v,l,w and k are respectively,value added,labour,wages and capital.

Table 6:3 Coefficients of Correlation between sectoral estimates of the elasticity of substitution from the various production functions.

Regression Equation:

	6:5	6:6	6:7	6:8	6:10
6:5	1	0.65	0.73	0.74	0.60
6:6		1	0.53	0.65	0.31
6:7			1	0.75	0.46
6:8				1	0.25+
6:10					1

+ Not significant at 10% level.

Source:computed from table 6;2

of σ from the ACMS constant returns to scale relation (equation 6:6) are also positively correlated with estimates from fitting the CES with variable returns to scale (equations 6:5). The correlation between VES estimates and the ACMS estimates is weak, though the coefficient is statistically significant at the 10% level. The former are not correlated with the estimates from the serial correlation model but highly and significantly related to the CES, variable returns to scale model estimates.

To see further the differences between the estimates, we show in table 6:4 their means, maximum and minimum values and other related statistics. The table is self explanatory. For example, in the ACMS relation (col 2) we see that of the twenty four industries considered, 9 (38%) have a value of σ greater than unity, 3 have negative values, 12 (50%) have values of σ greater than the mean of 0.86. The highest value of σ was recorded for food processing and the lowest for fabricated metal industry.

From column 1 of table 6:4 it can be seen that introducing the variable returns to scale term (log V) to the ACMS equation, (i) reduces the average value of σ (to 0.55) (ii) increases the number of negative cases (from 3 to 6) (iii) reduces the number of cases with statistically significant values of σ and (iv) reduces the number of cases with σ above 1. It certainly does look as though the assumption of constant returns to scale has resulted in an upward bias of the estimates.

Considering the VES estimates, we find 12 industries with values of σ greater than unity, 3 with negative values and an average value of 0.98. Comparing estimates of σ from the VES with those from the ACMS (cols 5 and 2 respectively of table 6:2), we find that the former

TABLE 6:4 Summary Statistics for values of the elasticity of Substitution.

	Regression Equation 6:5	6:6	6:7	6:8	6:10
	(1)	(2)	(3)	(4)	(5)
Mean	0.55	0.86	0.58	0.84	0.98
Number(&%) of sectors with σ>mean	11.00 (46%)	12.00 (50%)	12.00 (50%)	13.00 (54%)	12.00 (50%)
Number(&%) of sectors with negative valuesof σ	6.00 (25%)	3.00 (3%)	6.00 (6%)	4.00 (4%)	3.00 (3%)
Number(&%) of sectors with σ>1	4.00 (17%)	9.00 (38%)	8.00 (33%)	11.00 (46%)	12.00 (50%)
Minimum value of σ	-0.80 (transport equip)	-0.44 fabricated metal)	-1.63 (drugs &medicines)	-0.96 (transport equip)	-0.97 (mutext)
Maximum value of σ	2.05 (tobacco)	2.15 (food)	3.13 (apparel)	2.69 (paper)	3.85 (tobacco)
Number of sectors with significant values of σ	16	19	-	17	-

Source:table 6:2.

Equation 6:5 (CES,Variable returns) logv/l=a+blogw+clogv

6:6 (ACMS) logv/l=a+blogw

6:7 (Distributed lag)logv/l=a+blogw+clog$(v/l)_{-1}$

6:8 (Serial correlations) logv/l=a+blogw+clog$(v/l)_{-1}$+dlog$(w)_{-1}$

6:10 (VES) logv/l=a+blogw+clogk/l

Where v,l,w and k are respectively,value added,labour,wages and capital.

are higher - often substantially - than the latter expect for industries manufacturing made-up textiles, wearing apparel, paper, industrial chemicals, paints, drugs & medicines, machinery and electrical equipment. It can be seen that the VES function produces the highest mean value of $\bar{\sigma}$ (0.98) with a fairly significant number of sectors having values of $\bar{\sigma}$ that exceed the average.

In column 6 of table 6:2 we show the coefficients of the capital intensity variable. The importance of variations of capital intensity cannot be easily assumed away in estimating substitution elasticities even though we found its effects to be minimal for the manufacturing sector as a whole. It must be noted, however, that not all of the industries with high substitution elasticities reported in column 5 of table 6:2 have had statistically significant regression estimates for the coefficient of the capital intensity variable. For example, while sectors manufacturing Alcoholic beverages, industrial chemicals, soap and perfumery and rubber and plastic products have fairly high values of $\bar{\sigma}$ (column 5, table 6:2), their capital intensity coefficients are not statistically different from zero. On the other hand, non-alcoholic beverages, made-up textiles, paints and transport equipment have statistically significant estimates of the capital intensity variable, although they have below average values of $\bar{\sigma}$. The results from the VES function have therefore to be interpreted with caution - the more so because, as we have repeatedly emphasised, the capital stock series should be considered as mere approximations and could be subject to substantial errors of measurement.

With these qualifications in mind, one could draw a general inference from the above analysis. Whether all or only a few of the equations are accepted it seems fairly obvious that a significant number of the Nigerian Manufacturing industries have a fairly high substitution possibilities between capital and labour inputs, although with the possibility of increasing returns to scale, this conclusion needs to be qualified. We cannot therefore easily dismiss the neo-classical hypothesis of the existence of a reasonable degree of substitutability between capital and labour.

It will be of interest to examine how these estimates (and our conclusion) compare with those obtained from other LDCs. In table 6:5 we compare the elasticities of substitution between capital and labour in various manufacturing sectors of Nigeria, Pakistan, Argentina and India.

In reviewing studies on substitution elasticites for certain LDCs, Bruton (1971)[9] found that

> The results do indicate that there is considerable substitutability between capital and labour. Only in isolated instances do the results indicate that the elasticity may be zero. Even the stronger statement that the elasticity of substitution in developing countries is at least 0.5 is defensible.

In another study of substitution possibilities in another less developed country, Sicat (1970) found that majority of the industries have values of σ greater than unity and the findings according to the author, 'appear to contradict the well known hypothesis in the economic development literature that less developed countries face smaller degrees of capital-labour substitution possibilities"[10].

These findings and conclusions contrast sharply with those of Kemal (1981)[11] in a study of 16 manufacturing sectors of Pakistan. The author estimated (directly and indirectly) both the CES and VES

Table 6:5 An International Comparison of Estimates of the Elasticity of Substitution between capital and labour.

		Sector	United States			Nigeria					Pakistan 59/60-69/70	
						ACMS	ACMS	ACMS	CES	VES	ACMS	VES
			1949-61	1947-58	1953-57	1965	1969	63-78	63-78	63-78		
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
6	3111/3122	Food				1.029	0.858	2.150	2.330	2.330	0.864	-0.011
9	3134	Tobacco	1.180	0.000	0.880	0.000	0.000	0.690	0.024	3.850	1.720	1.052
10	3211	Textiles	1.100	0.921	0.590	1.026	0.704	1.230	0.740	1.240	0.519	0.605
14	3240	Footwear	-----	0.162	-----	-----	-----	0.730	0.150	0.870	1.752	1.546
16	3412/3420)	Paper	1.020	0.090	0.550	-----	-----	-----	-----	0.000	-0.051	0.595
	)		1.150	0.840	0.180	1.026	1.024	0.230	0.310	-0.052	2.655	1.915
13	3231/3233	Leather	0.870	0.250	0.470	-----	-----	0.730	-0.033	1.220	0.563	0.420
22	3551/3560	Rubber	0.760	0.350	0.350	-----	0.780	0.930	0.880	0.788	0.324	
17	3511/3512	Chemicals	-----	-----	0.000	1.359	1.300	0.930	0.360	0.900	0.000	0.000
18	3521	Paints	-----	-----	-----	-----	-----	0.360	0.190	0.240	-----	-----
20	3523	Soap	-----	-----	-----	-----	-----	0.780	-0.070	2.030	-----	-----
19	3522	Drugs	-----	-----	-----	-----	-----	1.360	0.220	-0.630	-----	-----
23	3610/3699	Cement	*0.670*	*-1.120*	*0.890*	-----	-----	0.940	0.870	1.410	-----	-----
25	3813/3819	Fab. metals	0.930	0.330	0.780	0.263	0.254	-0.440	-0.100	0.450	0.210	0.545
26	3822/3829	Machinery	1.040	0.750	0.500	-----	-----	0.480	0.160	0.340	0.079	0.007
27	3832/3839	Elect. equip.	0.640	0.430	0.800	-----	-----	1.170	0.910	0.740	0.143	0.096
28	3841/3843	Transp. equip.	0.240	0.180	0.650	-----	-----	-0.003	-0.440	0.290	-0.168	-1.131
29	3851/3909	Misc.products	-----	-----	-----	-----	-----	1.150	0.710	1.150	1.372	1.845

				Argentina	India
			CES	ACMS	ACMS
			(V.r.s)	1954-61	
			(11)	(12)	(13)
6	3111/3122	Food	0.121	0.370	-----
9	3134	Tobacco	1.743	0.600	-----
10	3211	Textiles	0.252	0.340	-----
14	3240	Footwear	-0.080	-----	-----
16	3412/3420)	Paper	-0.728	0.480	0.940
	)		2.663	0.300	-----
13	3231/3233	Leather	-0.602	0.640	0.070
22	3551/3560	Rubber	0.557	0.360	-----
17	3511/3512	Chemicals	-----	0.320	0.190
18	3521	Paints	-----	0.000	0.260
20	3523	Soap	-----	-----	0.060
19	3522	Drugs	-----	-----	0.975
23	3610/3699	Cement	-----	-----	0.044
25	3813/3819	Fab. metals	0.530	0.610	*0.141*
26	3822/3829	Machinery	0.367	0.530	-----
27	3832/3839	Elect. equip.	0.557	0.000	-1.300
28	3841/3843	Transp. equip.	1.119	0.380	0.050
29	3851/3909	Misc.products	0.403	-----	-----

Notes: * not significant at 10% level.
_____ estimates not available.

Sources: *cols 1-3, Nerlove (1967), 'A review of CES and related functions', in Brown, M(ed), op cit; cols 4-5 Mayers, D.G(1981), Applications of Econometrics Prentice Hall, p100; cols 9-11 Kemal, A.R(1980), op cit, p .col 12, Katz, J, M(1969), op cit, p64. col 13, Kemal, A.R(1980), op cit.*

production functions, assuming constant and variable returns to scale. For the large scale manufacturing sector, the value of σ was not statistically different from unity; at the sectoral level however, he found that (i) assuming a VES function with constant returns to scale, only 31% of the industries have statistically significant values of σ, (ii) assuming a VES with variable returns to scale, estimates of σ are not significantly different from unity in 56% of the industries and finally, (iii) assuming CES with constant (variable) returns to scale, only 19% (44%) of the sectors have had significant estimates. The author thus concludes:

> the substitution elasticities remain generally low and insignificant whether we assume constant returns to scale or the variable returns to scale within the framework of both the CES production and the VES production function[12].

The conflicting conclusions could have arisen from many sources including differences in the method of estimation and the quality of data used. Bruton's and Sicat's estimates were based on cross-sectional, while Kemal's on time series, data. It is generally accepted that the use of the latter, especially when there are no adjustments to changes in the quality of labour and/or to cyclical fluctuations in output, will impart a downward bias in the estimates[13]. Given that no such adjustments have been made in Kemal's (and our) studies, the estimates reported in table 6:5 may have been downward biased.

In table 6:5 we find that in only 5 of the 13 industries for which comparable (CES, constant returns) estimates are available, our estimates (col. 6) are higher than Kemal's (col. 9). Sectors in which our estimates are higher include food processing, textiles, leather products, machinery and electrical machinery and equipment. However, the number of estimates which are not significantly different from unity is much higher in Nigeria than in Pakistan. Most of the estimates for Argentina are fairly low, although not statistically different unity. It can be seen that they compare favourably with Nigeria's estimates in column 6.

We have included estimates for the U.S., although admittedly, it is difficult to pass any meaningful judgement - given the differences in production structures and the possibility of obtaining data of better quality than in most LDCs. It can be seen that the estimates compare favourably with those of other LDCs.

The cross section estimates reported in cols. 4 and 5 confirm the conclusion of this study, at least assuming constant returns to scale, that elasticities of substitution in the case of individual industries are high and statistically significant. The high estimates reported in these columns, moreover, would tend to confirm the suspicion that the use of time-series data will impart a downward bias in the estimates of σ.

One can best summarise the findings and conclusions of empirical studies on substitutability between factors by saying that the arguments for a unitary and zero substitution elasticies are extreme positions and by concluding with Bruton that 'factor substitution is alive and well in developing countries... policies and models which assume otherwise are misleading"[14].

6:2:3 Employment, wage changes and substitution elasticities:

Interpretation and Policy Implications of the Results

As we indicated at the beginning of the chapter, the most obvious and frequently emphasised policy implication of the results to the effect that substitution possibilities exist and are high is that variations in relative factor prices are likely to result in shift in factor mix. The average value of σ which was 0.86 for the whole manufacturing sector implies that a 100% increase in wages per head, with capital prices constant, will induce entrepreneurs to increase capital use by about 89%. Thus, in a labour-abundant economy like Nigeria, and where production techniques tend to be capital intensive, high and statistically significant substitution elasticities, as we have found, imply that the elimination of policy induced factor market distortions would have the effect of increasing employment. How much more employment is generated with the elimination of the distortions will depend upon the magnitude of the latter and upon the size of the substitution elasticities.

We shall follow the approach of Menasian (1961)[15] and Tyler (1974)[16] to show how the sectoral estimates of the elasticity of substitution so derived can be usefully employed to give an indication of the employment effects of government policies that affect the prices of factors. For convenience, we shall make the simplifying assumption that only distortions in the labour market 'matter'. To show the effect of price variation on the quantity of labour demanded one needs to estimate a demand function for labour in the economy. Under certain assumptions[17], Menasian (1961) has shown that the demand curve for labour can be expressed as

$$\frac{L}{Q} = AW^{n} \qquad 6:11$$

which can be equivalently expressed in logarithmic form as

$$\log \left(\frac{Q}{L}\right) = -\log A - n\log W \qquad 6:12$$

where L, Q and W are respectively employment, output and wages, and $-n$ is the price elasticity of demand for labour, which can be equivalently interpreted as the elasticity of substitution between factor inputs, as derived from equation 6:6.[18]

Thus if we know the magnitude of the distortions in the price of labour we would be able to determine the amount of employment generated, through the removal of these distortions, given the elasticity of labour demand. Following Tyler (1974) the extent of distortions can be measured as the difference between the actual market wage (W_A) and the opportunity cost of labour or its shadow price (Ws), expressed either as a proportion of industry's output (Q), or as a proportion of industry's average wage (W)[19]. Formally, the extent of the distortions in labour market is measured by the following equations:

$$(W_A - W_S)/Q \qquad 6:13a$$

$$(W_A - W_S)/W_A \qquad 6:13b$$

In Chapter One, we made the simplifying assumption that the price of labour actually paid in Nigeria exceeds its shadow price by 20-25 percent. This assumption is retained here, and in columns 2 and 3 of table 6:6 we show estimates of equation 6:13a assuming labour is valued at 20 and 25 percent, respectively, less than its market price. The extent of the distortion thus varies from 15.7% in footwear industry to 1.2% in transport equipment. Multiplying these by σ in col. 2 of table 6:2 gives columns 4 and 5. And the actual increase in employment is obtained by multiplying these later columns by the sectoral employment levels (col. 1).

The increase in sectoral employment shown in column 7 ranges from 6748.60 (textiles) to 30.29 (paints) units of labour. Sectors

Table 6:6 Employment, Wages and Substitution Elasticities in Manfacturing: Results of a Simulation Exercise.

	Sector	Actual level of employment	Magnitude of distortions $(W_A - W_S / Q)$		σ X Col 2	Col 3	Increase in Employment	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
6	3111/3122 Food	49805.000	0.029	0.037	0.063	0.078	3119.930	3899.920
7	3131/3133 Alcoholic bev.	8217.000	0.030	0.037	0.008	0.010	66.140	82.670
8	3134 Non-alcoh.bev.	5114.000	0.044	0.055	-0.009	-0.011	-45.040	-56.300
9	3140 Tobacco	5610.000	0.072	0.090	0.050	0.062	279.640	349.550
10	3211 Textiles	64961.000	0.068	0.084	0.083	0.104	5398.870	6748.610
11	3212 Made-up text.	7006.000	0.055	0.069	0.051	0.064	359.840	449.800
12	3220 Apparel	2233.000	0.062	0.077	0.143	0.018	318.320	397.910
13	3231/3233 Leather	2324.000	0.036	0.045	0.026	0.033	60.590	75.740
14	3240 Footwear	4249.000	0.125	0.157	0.092	0.114	405.320	506.660
15	3311/3320 Wood	28780.000	0.094	0.117	0.096	0.121	2773.400	3466.750
16	3412/3420 Paper	19740.000	0.048	0.060	0.011	0.014	216.720	270.900
17	3511/3512 Chemicals	704.000	0.049	0.061	0.056	0.057	32.190	40.230
18	3521 Paints	1382.000	0.049	0.041	0.018	0.022	24.230	30.290
19	3522 Drugs	3006.000	0.033	0.061	0.044	0.055	133.060	166.320
20	3523 Soap	11567.000	0.041	0.052	0.032	0.040	373.890	467.370
21	3529/3540 Other Chem.	4477.000	0.021	0.015	0.014	0.018	64.140	78.930
22	3551/3560 Rubber	23300.000	0.048	0.061	0.038	0.047	880.680	1100.850
23	3610/3699 Cement	20413.000	0.050	0.062	0.047	0.058	953.350	1191.690
24	3710/3812 Basic Metals	10231.000	0.038	0.047	0.040	0.050	405.310	506.630
25	3813/3819 Fab.Metals	23261.000	0.044	0.054	-0.019	-0.024	-445.720	-557.150
26	3822/3829 Machinery	4743.000	0.020	0.025	0.010	0.012	45.960	57.450
27	3832/3829 Elect.Machinery	4522.000	0.038	0.048	0.065	0.081	294.050	367.560
28	3841/3843 Transport Equip.	10898.000	0.012	0.015	-0.001	-0.001	-0.390	-0.490
29	3851/3909 Misc.products	1262.000	0.072	0.090	0.090	0.112	112.540	140.680

Notes: W_A=Actual wages; W_S=Shadow wages; Q=Gross output; σ =elasticity of substitution estimated using the ACMS equation 6:6. The actual level of employment, wages and gross output are for the year 1977.

Sources: employment, wages and output from FOS, Industrial Survey 1975/78, elasticity of substitution from col2 of table 6:2 p346.

with large absolute increases include textiles (6748), food processing (3899), wood products (3466), rubber & plastics (1100) and cement products (1191). The percentage increases will thus range from 1 percent (alcoholic beverages) to 17 percent (wearing apparel). The total increase in employment for the whole sector (excluding sectors with negative values of σ) will thus be 20,396.49 units of labour, which represents about 6 percent of the total labour employed by the manufacturing sector in 1977.

Judging by the rather small percentage increase in employment for the manufacturing sector as a whole, our results imply that a massive reduction in wage rates will be necessary in order to obtain even larger increases in employment. However, our assumption that only labour market distortions 'matter' need not be a valid one and to the extent that distorted capital prices contribute to the choice of capital intensive techniques employment growth will be higher in Nigeria, when both distortions are corrected, than when only adjustments in the wage rates are made.

By how much wages are reduced and capital prices increased will crucially depend on a host of factors, including the extent of the distortions in each market and their relative influence on the choice of capital intensive techniques. Evidence produced from previous studies of employment and wage changes in Nigeria suggests that price distortions in the capital market were by far the more important determinants of the capital intensity of production than the price distortions in the labour market[20]. As argued by Fajana (1973)[21], the influence of wages on the choice of techniques in Nigeria would be minimal since wages constitute only a minute fraction of the individual industries total costs. Entrepreneurs will be expected to substitute labour for capital only to the extent that increases in the price of the former significantly affect their costs of production and hence reduce their profit levels. However, as will be shown in chapter 7, wages constitute only between 12% and 15% of total industrial costs. Thus even a 50% increase in wages will only cause about 10-13% increase in costs. This is negligible considering the high profitability of industries. Indeed, it can be seen from our analysis that the increases in capital intensity induced by the actual growth in wages are in no way spectacular. For example, the rate of growth of wages per head between 1963-78 was, for the whole manufacturing sector, 1.9%. With a value of elasticity of substitution of 0.89, this implies an increase in capital intensity of only about 1.69%. Similarly, for the individual sectors, if we multiply their substitution elasticities by the corresponding rates of growth of wages per head, we see that the induced capital intensity is only between 0.007 percent to 6 percent.

It must be emphasised that the above discussion does not seek to totally assume away the role of wage increases in the adoption of capital intensive technology. Indeed, as table 6:7 shows, sectors with above average rate of growth of wages are indeed experiencing above average increases in capital intensity, although the relationship is a weak one; similarly, sectors with above average wage levels tend to have an above average level of capital intensity. Moreover, regressing the rate of growth of the average level of employment on the rates of growth of average wages and output, we found that there is indeed a cost in terms of employment growth, of rising wages. Between 1963 and 1978, a rate of growth of employment of about 6 percent was forgone[23]. We notice, however, an even stronger association between capital intensity and prices of capital

Table 6:7 Coefficients of Correlation between factor prices and measures of capital intensity.

Factor prices	Measure of Factor intensity									
	capital/labour ratio				rate of growth of:...				capital output ratios	
	average*		growth rate		capital		labour		(1974)	(1977)
rate of growth of wages	0.021**	0.13**	0.24	0.27	0.17**	0.22	0.25	0.42		
average* wages	0.52	0.56								
wage/output ratio: (1977)										0.091**
(1974)									0.359	
rate of growth of capital pirces					-0.44	-0.52				
average capital prices+	-0.72	-0.76								

* all averages are computed by taking the 1963-1978 simple average of the observations on each of the relevant variable.
growth rates are obtainted by fitting a trend;
** not significant at 10% level.

inputs. For example, the correlation coefficient between the growth in K/L ratios and growth in capital prices is almost twice as high as the correlation between wages and capital intensity. Thus, policies which affect the price of capital inputs are more likely to lead to an inappropriate choice of techniques than those that affect the price of labour. To the extent this is so, one can argue that given the flexibility in the choice of techniques, employment growth will be higher, the larger the relative increases in the price of capital input.

We would like to emphasise that the decision to reduce wages and/or increase capital prices could have not only economic, but social and political consequences. Above 'normal' wages may be maintained for political or social (such as income distributional) considerations, and often, any attempt at reduction would be resisted by organised labour. No doubt too, the increase in capital prices will be resisted by entrepreneurs and could affect the long-run investment growth of the economy. But one of the hard realities policy makers must face is that if the manufacturing sector is to be an important source of employment in the economy, such adjustments will be necessary. An additional and/or complementary policy can also be suggested: the subsidization of labour employed by industries. This can be done by relating the fiscal incentives granted to entrepreneurs, under the PIS and AUS schemes, not to the amount of capital invested as is currently the practice, but to the number of productive workers employed. It has also been suggested, and shown, that a fair amount of employment could be generated in the industrial sector by adopting policies which encourage firms to increase their rates of capacity utilisation[24]. Such policies will of course include factor price adjustments and a comprehensive review of trade and commercial licencing with a view to eliminating unnecessary licences and supply bottlenecks.

We would like to emphasise with other authors that the mere existence of substitution possibilities and the adoption of the "right" factor prices are, by themselves not sufficient to lead to an appreciable reduction in the level of unemployment. For example, a World Bank Report concludes:

> Nigeria's employment problems will not respond easily to short or narrowly conceived remedies and, in the short- and medium-term, improvement in income and employment for most workers, particularly for new entrants to the labour force, will depend largely on developments in the agricultural, small industry and service sectors..[25]

This implies that the problem of unemployment and/or labour absorption in productive employment can only be tackled effectively within a (new) framework of a comprehensive and integrated strategy. That is, rather than seeking to absorb the labour force in modern manufacturing activities only, the strategy must place emphasis on the development and diversification of the primary sectors, on the promotion of small scale agro-based industrial activities and on the gradual modernisation of the urban informal sector. Improvement in rural infrastructure, the provision of inputs and extension services and a review of farm pricing policies would not only achieve significant increases in the incomes of agricultural workers, but would also generate increasing non-agricultural employment opportunities in the rural areas and thus reduce the drift towards the cities. Similarly a review of tariff and industrial policies to involve the small scale and informal urban sector, would probably reduce the burden on the modern, large-scale formal sector, that is unrealistically expected to absorb the bulk of the increases in labour force.

6:2:4 Conclusion and Summary

In the preceding section, we have focussed on major issues relating to the possibilities of substitution between factors of production in the Nigerian manufacturing sector. We have found that the elasticity of substitution between capital and labour in a significant number of industries is fairly high and statistically significant. Similarly, for the manufacturing sector as a whole, the elasticity is high and not statistically different from unity. We have also found that the value of the substitution elasticity is affected by increasing returns to scale, in the individual sectors, though not for the whole manufacturing sector. Similarly, although changes in capital-labour ratios do not seem to have much effect on the elasticity of substitution estimated for the whole manufacturing sector, their influence cannot be easily dismissed when it comes to the individual sectors.

The fairly high and significant estimates of the elasticity of substitution imply that changes in relative factor prices could result in a specialisation in labour-intensive activities, better suited to the factor endowments of Nigeria.

Using a short-run demand function for labour, we showed the gains in industrial employment, from a change in the existing level of wage rates. Such gains are, unfortunately, not very appreciable, especially when viewed in relation to the scale of the unemployment problem. However, since we made no similar adjustment in the price of capital inputs, which are no doubt also distorted, we cannot conclude that even larger increases in employment will not be obtained with the elimination of the present biases.

We share the view of other authors that, price policies, although a central and essential element in increasing the industrial sector's labour absorption rate, cannot by themselves, yield an appreciable and/or substantial reduction in the level of unemployment. Supplementary policies should include the subsidisation of modern industrial sector employment, the review of policies to increase capacity utilisation in manufacturing and an integrated development strategy that involves the rural, small-scale and informal sectors of the economy.

6:3 Partial and Total factor productivity growth in Nigerian Manufacturing industries: 1963-1978

6:3:1 Methodology[26]:

As commonly defined, the term partial productivity is the ratio of the physical amount of output achieved in a given period to the corresponding amount of an input expended. If the input in question is labour, the partial productivity of labour can then be expressed as

$$\frac{Q_{it}}{L_{it}} \qquad 6:14$$

where Q_{it} and L_{it} are, respectively, industry i^{th} output (gross output or value-added) and the input of labour expressed in terms of physical units of labour employed, at time t.

Over a period of time, the trend rate of growth of labour productivity can be obtained by estimating the equation

$$\log(Q/L) = \alpha + \beta t \qquad 6:15$$

and β, the coefficient of the time trend gives the growth rate. Correspondingly, total factor productivity can be broadly defined as the ratio of the physical amount of output achieved in a given period (or over a period of time) to the corresponding amount of all inputs expended. To obtain an index of total factor productivity growth (TFPG) one must specify the form of the production function. The various TFPG indexes suggested in the literature are based either on a linear production function (the Kendrick Index)[27], or the Cobb-Douglas type production function (the Solow Index)[28] or the CES function. All these indexes are based on the common assumptions of competitive equilibrium, constant returns to scale and Hicks-neutral technical change, and differ only from one another with regards to the assumption about the substitutability of inputs[29]. It has been shown in the empirical literature that the application of these methods leads to strikingly similar results, and as such, not much will be lost by considering only one of these[30]. In this study we shall be mainly considering the TFPG index based on the Solow Measure, to be described below - although for illustrative purposes, a CES function is also fitted.

The Solow Index of TFPG

It is assumed that the technology for each industry and/or activity in the economy is characterised by a (twice-differentiable, strictly quasi concave), Hicks-neutral production function of the following form:

$$Q(t) = A(t)\{K, L, M\}$$

where Q(t) is (homogeneous) output at time t, produced with the inputs of capital (K), labour (L) and raw materials (m) and A(t) is an index of Hicks neutral technical progress. We can write the above expression as

$$Q = A(t)K^{\alpha}L^{\beta}M^{\gamma} \qquad 6{:}16$$

where α, β and γ are respectively, the shares of capital, labour and raw materials in output. Under the assumptions of constant returns to scale, and perfectly competitive factor and commodity markets, these shares are to be interpreted as the elasticities of output with respect to the inputs and their sum will equal unity.

Differentiating equation (6:16), the rate of growth of output can be expressed as

$$\frac{dQ}{Q} = \frac{dA(t)}{A(t)} + \alpha \frac{dK}{K} + \beta \frac{dL}{L} + \gamma \frac{dM}{M}$$

or

$$\frac{d(Q/L)}{(Q/L)} = \frac{dA(t)}{A(t)} + \alpha \frac{d(K/L)}{(K/L)} + \gamma \frac{d(M/L)}{(M/L)} \qquad 6{:}17$$

and the index of total factor productivity growth is given by

$$\frac{dA(t)}{A(t)} = \frac{dQ}{Q} - \left\{\alpha \frac{dK}{K} + \beta \frac{dL}{L} + \gamma \frac{dM}{M}\right\} \qquad 6{:}18$$

That is, the rate of TFPG is given by the rate of growth of output less the rate of growth of weighted factor inputs, the weights being the respective factor shares of these inputs in output.

This widely used approach to estimating rates of TFPG suffers from a number of empirical problems. First, as derived in equation (6:18) the rate of TFPG, (dA(t)/A(t)) is a residual and thereby sensitive to errors of measurement in inputs, outputs and input shares. Indeed some economists have argued that the residual is best considered as the result of errors in the measurement of the weighted contribution of inputs rather than as a measure of total factor productivity growth; that if the weighted contribution of inputs were to be correctly measured (by taking into account, for example, both quality and quantity changes) then estimates of dA/A would be either substantially reduced or even eliminated[31]. Lack of adequate data will not permit any adjustment in the quality of inputs in this study; and is so far as these did occur and are important in influencing productivity growth, our estimates will be biased and must therefore be interpreted with care.

The second main limitation of this approach is that the Cobb-Douglas production function sets _a priori_ the elasticity of substitution between inputs equal to unity. It thus assumes away any interindustry differences in the relative ease or difficulty with which factor inputs can be substituted for each other in production. If this assumption is found to be incorrect, then the appropriateness of the Cobb-Douglas function in estimating total factor productivity will be in question and one has to specify a different model. However, as we found in the previous section, for most sectors, the elasticity of substitution is not significantly different from unity and therefore the Cobb-Douglas production function may be conceptually acceptable. However, for consistency checks, an additional use is made of the CES, ACMS relation:

$$\log V/L = \alpha + \beta \log W + \lambda t + u \qquad 6{:}19$$

where, as previously indicated, β is the elasticity of substitution, assumed constant but free to take any value between zero and infinity and the rate of technical progress is given by the ratio of the coefficient of the time trend (λ) to one minus the elasticity of substitution i.e.

$$TFPG = \lambda/1 - b \qquad 6:2\emptyset$$

The results of applying equations 6:18 and 6:19 to 24 manufacturing sectors in Nigeria will now be discussed.

6:3:2: The Main Results

Time series estimates of labour productivity - as measured by gross output per head are presented in table 6:8. A summary of the table is provided in table 6:9. Column 1 is obtained by taking a simple average of the first and last 3 years' gross output per head; Column 2 shows the sectoral averages as a proportion of the total manufacturing sectors average. It shows the extent to which each sector's average productivity exceeds (or falls short of) that of the manufacturing sector as a whole. Column 3 shows the change in labour productivity between 1963 and 1978 using the former year as a base. Finally, Column 4 shows trend rates of growth of labour productivity obtained by estimating equation 6:15 for each sector. The table reveals considerable intersectoral variations both in the average as well as in the rates of growth of labour productivity. Sectoral averages achieved range from 3Ø.955 (tobacco products) to 3.38 (wood products). With the exception of tobacco products and transport equipment sectors, all the sectors achieved average gross output per head that is exceeded by the average for the whole manufacturing sector. Sectors manufacturing paper products, industrial chemicals,

Table 6:8 Time Series Estimates of the level of Labour Productivity in Manufacturing, by sector. (1963 - 1978).

(Gross output per employee, 1975 prices)

	Sector		1963	1964	1965	1966	1967	1968	1969	1970
6	3111/3122	Food	12954.10	13952.90	8888.60	15285.00	18232.00	17623.00	17143.00	12177.10
7	3131/3133	Alcoholic bev.	18104.50	18037.00	19239.40	22636.70	23670.50	32656.00	34820.70	32911.60
8	3134	Non-alcoh.bev.	1157.20	4655.20	6633.90	7770.70	7186.30	7726.90	9349.30	10683.40
9	3140	Tobacco	56728.50	44737.00	49005.00	51806.00	57807.00	36822.00	38369.00	47038.00
10	3211	Textiles	3358.70	3933.40	6034.50	5525.50	6393.90	7862.60	8343.30	8129.10
11	3212	Made-up text.	5931.20	3481.60	5924.90	4759.20	4402.50	5324.90	5770.00	5743.50
12	3220	Apparel	1970.70	2369.00	5354.40	3921.60	1927.90	5915.00	5010.00	5181.00
13	3231/3233	Leather	3580.30	11018.50	10373.80	10480.00	9589.70	9396.70	9603.80	8060.20
14	3240	Footwear	3969.00	4966.50	5546.70	7556.90	7229.60	9233.20	9446.40	8649.80
15	3311/3320	Wood	2579.90	2992.60	3093.60	3174.70	3467.90	2201.60	2606.60	2848.30
16	3412/3420	Paper	2669.80	2400.40	3361.20	4135.00	4000.00	4778.50	5725.60	6541.70
17	3511/3512	Chemicals	14892.60	12305.78	15884.50	18320.50	19008.00	10728.80	15576.90	14899.50
18	3521	Paints	12856.70	16414.90	14711.90	15238.40	15147.90	14725.40	20191.40	17318.50
19	3522	Drugs	10788.60	12861.40	12992.20	3653.80	2693.40	4900.40	2997.00	3586.80
20	3523	Soap	10788.60	12861.60	12992.20	11888.90	13588.50	15761.70	15706.30	16691.60
21	3529/3540	Other Chem.	10788.60	12861.40	12992.20	20635.40	13354.50	30029.00	97451.80	79586.70
22	3551/3560	Rubber	3978.80	6112.90	6461.80	11259.90	9703.40	9450.90	9759.10	6675.90
23	3610/3699	Cement	8173.30	7785.90	8543.10	6102.90	6114.40	18243.10	8643.50	6634.70
24	3710/3812	Basic Metals	7381.00	6660.80	7864.30	1521.90	1512.70	2813.80	1914.20	1274.96
25	3813/3819	Fab.Metals	0.00	8411.50	8636.40	7961.40	8054.50	8209.70	9372.60	10021.40
26	3822/3829	Machinery	0.00	0.00	0.00	10375.90	8668.20	3679.00	5692.40	6569.70
27	3832/3829	Elect.Machinery	4070.40	6259.80	13505.40	12858.30	9281.50	10752.60	10835.10	13408.30
28	3841/3843	Transport Equip.	12278.50	15169.20	11578.70	12146.90	4026.60	18723.30	15284.00	3798.10
29	3851/3909	Misc.products	5878.00	6518.00	6668.00	4495.90	5450.40	4388.50	5628.60	8424.80
		Total manufacturing sector	8115.60	9178.90	8964.90	10425.90	10498.30	10964.40	10844.90	10443.70

contd

Table 6:8 contd. (Time series estimates of the level of labour productivity).

	Sector	1971	1972	1973	1974	1975	1976	1977	1978
6	3111/3122 Food	10573.90	9079.90	14152.60	16012.10	9935.40	9628.80	8293.70	11093.10
7	3131/3133 Alcoholic bev.	32839.00	29258.00	37610.00	39348.80	27048.00	20432.20	20258.00	27976.20
8	3134 Non-alcoh.bev.	16082.30	18132.00	13402.50	15866.00	13352.90	10398.60	10173.70	10575.50
9	3140 Tobacco	36052.50	36421.80	28195.50	12738.10	13352.90	12260.90	12768.10	10229.30
10	3211 Textiles	7121.30	5117.60	5405.00	6659.00	7524.90	6210.00	6020.70	5957.70
11	3212 Made-up text.	6414.30	6538.00	5154.60	8004.50	5634.00	5577.00	4763.10	5819.40
12	3220 Apparel	5074.60	8614.50	4344.90	3915.90	5148.00	2524.00	4594.00	5247.50
13	3231/3233 Leather	7161.70	8361.10	9424.60	9637.20	12293.60	10193.60	7648.30	8439.40
14	3240 Footwear	7435.40	6549.40	6786.00	7080.90	10565.40	5511.70	5671.80	7408.80
15	3311/3320 Wood	2348.90	2630.90	4095.10	3295.00	3338.60	3097.30	3566.90	4947.10
16	3412/3420 Paper	6246.20	5937.30	7865.20	4688.40	8645.90	8544.40	9013.60	10141.20
17	3511/3512 Chemicals	20426.00	13662.00	4544.40	11794.90	19405.90	13159.50	14984.80	16903.70
18	3521 Paints	17139.40	18487.40	14740.50	20681.50	30998.90	13159.50	19790.60	25966.30
19	3522 Drugs	6219.80	6292.50	9459.20	9237.50	19704.70	12773.10	18214.90	18379.40
20	3523 Soap	16417.60	16053.50	17143.10	18393.20	22222.60	19111.00	19461.80	27042.80
21	3529/3540 Other Chem.	53795.70	54996.60	56840.50	13827.00	49645.40	119362.00	45391.50	37803.20
22	3551/3560 Rubber	7267.50	6744.40	6458.90	6709.80	7364.90	7446.60	6732.90	9314.30
23	3610/3699 Cement	6116.70	7445.00	7803.60	10271.70	5845.20	8924.50	6340.00	8934.00
24	3710/3812 Basic Metals	945.70	956.90	1285.00	1818.00	733.00	1093.00	1151.00	1375.00
25	3813/3819 Fab.Metals	9635.80	10465.90	11235.80	12775.70	12517.40	11600.00	11250.00	12615.30
26	3822/3829 Machinery	747.40	4914.60	6310.90	8411.30	6878.50	11392.20	19531.80	16399.20
27	3832/3829 Elect.Machinery	12913.90	7619.20	10444.10	12238.50	14134.20	23067.80	13989.80	21400.90
28	3841/3843 Transport Equip.	2710.10	793.20	8176.80	25043.00	44769.00	28349.80	43322.00	60707.00
29	3851/3909 Misc.products	4708.10	4149.10	4470.30	4600.50	14124.90	11521.60	7414.80	10295.70
	Total manufacturing sector	9086.30	8650.40	9882.90	10953.70	10690.50	11400.60	10317.20	12003.70

(End of table 6:8).

Table 6:9 Average and Rate of Growth of Labour Productivity: in manufacturing,1963-1978.

		Sector	Average (N,000) (1)	Each sector's average as a proportion of economy-wide average (2)	Change in labour product'y (1963=100) (3)	Rate of growth (%) (4)
6	3111/3122	Food	10.802	0.487	-14	-2.3
7	3131/3133	Alcoholic bev.	20.674	0.933	55	2.1
8	3134	Non-alcoh.bev.	9.003	0.406	-8	4.3
9	3140	Tobacco	30.955	1.396	-82	-1.2
10	3212	Textiles	5.253	0.237	77	2.1
11	3212	Made-up text.	5.250	0.237	-2	1.3
12	3220	Apparel	3.677	0.166	88	0.1
13	3231/3233	Leather	8.542	0.385	135	1.3
14	3240	Footwear	5.512	0.249	87	1.6
15	3311/3320	Wood	3.380	0.152	92	2.2
16	3412/3420	Paper	17.322	0.781	280	8.5
17	3511/3512	Chemicals	14.688	0.663	14	-0.7
18	3521	Paints	17.150	0.774	102	2.9
19	3522	Drugs	14.335	0.647	589	23.8
20	3523	Soap	15.114	0.682	467	19.2
21	3529/3540	Other Chem.	21.962	0.991	252	10.1
22	3551/3560	Rubber	6.675	0.301	134	1.1
23	3610/3699	Cement	8.117	0.366	9	-0.35
24	3710/3812	Basic Metals	4.254	0.192	-82	-11.96
25	3813/3819	Fab.Metals	10.079	0.455	50	3.4
26	3822/3829	Machinery	11.674	0.525	5	2.8
27	3832/3839	Elect.Machinery	13.716	0.619	-63	-1.9
28	3841/3843	Transport Equip	28.568	1.289	394	8.6
29	3851/3909	Misc.products	8.049	0.363	24	0.3
		Total manufac turing sector	22.170	1.000	48	1.3 (2.6)*

Notes: col (1) is an average of the first and last three year's level of labour productivity as displayed in table 6:8;
col (3) is the difference between the 1963 and 1978 leve of labour productivity;
col (4) trend rate of growth.The no of observations for each sector (except machinery and fsbricated metals) is 16;

* rate of growth of value-added per head;

Source: computed from table 6:8.

paints, drugs and medicines and petroleum and coal products, have fairly high average labour productivity, compared to that of sectors manufacturing wearing apparel, wood products, textiles, made-up textiles, footwear and basic metals.

The 1963-78 rate of growth of labour productivity for the whole manufacturing sector amounted to 1.3% (2.6% if we use value-added per employee as a measure of labour productivity) and is exceeded by that of 15 out of the 24 sectors considered. It can be seen that 75% of the industries registered an upward i.e. positive rates of productivity growth. Industries with exceptionally high trend rates of labour productivity include drugs and medicine (23.8%), soap and perfumes (19.2%), petroleum and coal products (10.1%); while negative trend rates are recorded for basic metals (maximum rate of decline), food processing, tobacco, industrial chemicals, cement, and electrical equipment sectors. A comparison of Cols. 1 and 4 will reveal that the fact that a sector has a 'high' average labour productivity carries no implication as to whether it will have a positive trend rate of growth. Of relevance too, is the year to year changes in labour productivity, as displayed in table 6:10. For anyone sector considered, one can observe considerable variability in the average growth rates over the years. Consider for example, the food processing sector: labour productivity grew by about 8% in 1964, declined by 36% in 1965 and then rose again to 19% in 1967; it then declined again until 1973 when the highest annual compound rate of growth (56%) was achieved; the decline continued from 1975 until 1978. Similar fluctuations can be observed in the case of the total manufacturing sector's annual growth rates (col. 25). Annual growth rates were negative in 7 of the 16 years, less than 1% in 1967 and the

Table 6:10 Annual Percentage Change in Labour Productivity in Nigerian Manufacturing Sectors (1963-1978).

YEAR	(1) Food	(2) Alcoholic bev.	(3) Non-alc. bev.	(4) Tobacco	(5) Textiles	(6) Made-up texts.	(7) Apparel	(8) Leather	(9) Footwear	(10 Wood
1963	----	----	----	----	----	----	----	----	----	----
1964	7.70	-0.40	-59.80	-21.10	17.10	-41.30	20.20	207.80	25.10	16.00
1965	-36.30	6.70	42.50	9.50	53.40	70.20	126.00	-5.90	11.70	3.40
1966	71.60	17.70	20.20	5.70	-8.40	-19.70	-26.80	1.00	36.20	2.60
1967	19.30	4.60	-9.80	11.60	15.70	-7.40	-50.80	-8.40	-4.30	9.20
1968	-3.30	38.00	7.50	-36.30	23.00	20.90	206.80	-2.00	27.70	-36.50
1969	-2.70	6.60	21.00	4.20	6.10	8.40	-15.30	2.20	2.30	18.40
1970	-28.90	-5.50	14.30	22.60	-2.60	-0.40	3.40	-16.10	-8.40	9.30
1971	-13.20	-0.20	50.50	-23.40	-12.40	11.70	-2.10	-11.10	-14.10	-17.50
1972	-14.10	-10.90	12.70	1.00	-28.10	2.00	69.80	16.70	-11.90	12.00
1973	55.90	28.50	-26.10	-22.60	5.60	-21.20	-49.60	12.70	3.60	55.70
1974	13.10	4.60	18.40	-54.80	23.20	55.30	-9.90	2.30	4.30	-19.50
1975	-37.90	-31.30	-15.80	4.80	13.00	-29.60	31.50	27.60	49.20	1.30
1976	-3.10	-24.50	-22.10	-8.20	-17.50	-1.00	-50.90	-17.10	-47.80	-0.70
1977	-13.90	-0.90	-2.20	4.10	-3.00	-14.60	82.00	-25.00	2.90	15.20
1978	33.80	38.10	3.90	-19.90	-1.10	1.20	14.20	10.30	30.60	38.70

YEAR	(11) Paper	(12) Chemicals	(13) Paints	(14) Drugs	(15) Soap	(16) Other Other Chems.	(17) Rubber	(18) Cement	(19) Basic metals	(20) Fabr. metals
1963	----	----	----	----	----	----	----	----	----	----
1964	-10.10	-17.40	27.70	19.20	19.20	19.20	53.60	-407.00	-9.80	----
1965	40.00	29.10	-10.40	1.00	1.00	1.00	5.70	907.00	18.10	2.70
1966	23.00	15.30	3.60	-71.90	-8.40	58.80	74.30	-28.60	-80.60	-7.80
1967	-3.30	3.80	-0.60	-26.30	14.30	-35.30	-13.80	0.20	-0.60	1.20
1968	19.50	-43.60	-2.80	81.90	16.00	125.90	-2.60	198.40	86.00	1.90
1969	19.80	45.20	37.10	-38.80	-0.40	224.50	3.30	-52.60	-31.90	14.20
1970	14.30	-4.30	-14.20	19.80	6.30	-18.30	-31.60	-23.20	-33.40	6.90
1971	-4.50	37.10	-1.00	73.40	-1.60	-32.40	8.90	-7.80	-25.80	-3.80
1972	-4.90	-33.10	7.90	1.20	-2.20	2.20	-7.20	21.70	1.20	8.60
1973	32.50	-66.70	-20.30	50.30	6.80	3.40	-4.20	4.80	34.30	7.30
1974	-40.30	159.50	40.30	-2.30	7.30	-75.70	3.90	31.60	41.50	13.70
1975	84.40	64.50	49.90	113.30	20.80	259.90	9.80	-43.10	-60.00	-2.20
1976	-1.20	-32.20	-57.50	-35.20	-14.00	140.40	1.10	52.60	49.10	-7.30
1977	5.50	13.90	50.40	42.60	1.80	-61.90	-9.60	-29.00	5.30	-3.00
1978	12.50	12.80	31.20	0.90	38.90	-16.70	38.30	40.90	19.50	12.10

(continued)

Table 6:10 contd.(Percentage change in Labour Productivity).

	(21) Machinery	(22) Elect. equip.	(23) Transp. equip.	(24) Misc. products	(25) Total (all Sectors)
1963	----	----	----	----	----
1963	----	53.80	23.50	10.90	13.10
1965	----	115.70	-23.70	2.30	-2.30
1966	----	-4.80	4.90	-32.60	16.30
1967	-16.50	-27.80	-66.90	21.20	0.70
1968	-57.60	15.80	364.90	-19.50	4.40
1969	52.70	0.80	-18.40	28.30	-1.10
1970	15.40	23.70	-75.20	49.80	-3.70
1971	2.70	-3.70	-28.60	-44.10	-13.00
1972	-27.20	-41.00	-70.70	-11.90	-4.80
1973	28.40	37.00	930.90	7.70	14.30
1974	33.30	17.50	206.30	2.90	10.83
1975	-18.20	15.20	78.80	207.00	-2.40
1976	65.60	63.20	-36.70	-18.40	6.60
1977	71.40	-39.40	52.80	-35.60	-9.50
1978	-16.00	53.00	40.20	38.90	16.40

Source:Computed from table 6:8 pp.369-370

(End of table 6:10).

highest (lowest) achieved rates were 16.4% (-13.0). On the whole, the number or negative rates of growth of productivity varies from 9 in the food processing sector to 4 in the wood products seeector, and the highest and lowest rates of growth achieved amount to respectively -930% (transport equipment) and -80.6% (basic metals). These considerable fluctuations are no doubt concealed by the average rate of productivity growth for the period 1963-1978 as earlier presented.

Data required to estimate rates of TFPG include rates of growth of output, capital, labour and raw materials per sector and sectoral shares of inputs in outputs. The relevant information is provided in table 3:20 of chapter 3 and table 6:11 below. The former, which shows the average growth rates of factor inputs and output by sector will not be further examined here since it was discussed earlier on. The latter table shows the average share of factor inputs in the Nigerian Manufacturing sector. The first two columns show the average share in value-added, of labour and capital; columns 3 to 7 show the corresponding shares of gross output of labour, raw materials and capital. The share of capital in value-added and in gross output is derived as a residual, making it sensitive to errors in the measurement of other input shares (compare for example, columns 7 and 5). All shares are derived by taking a simple average of the 1963-78 annual shares.

Rates of TFPG are displayed in table 6:12. Columns 1 and 3 show annual rates of TFPG, derived as a residual (equation 6:18), and based respectively on gross output and on value added measures of output. It can be seen that the difference between the two columns can primarily be attributed to the effect of raw material inputs included in the first case while excluded from the second. More specifically,

Table 6:11 Average Shares of Labour, Capital and Raw Materials In Manufacturing Value-added and Gross output, by sector.

Share in value added of:		Share in gross output of:				
Labour	Capital	Labour	Purchased input+	Capital	Purchased input++	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0.250	0.750	0.080	0.476	0.474	0.656	0.234
0.118	0.882	0.085	0.249	0.666	0.266	0.649
0.247	0.753	0.150	0.305	0.545	0.382	0.468
0.103	0.897	0.060	0.290	0.650	0.338	0.602
0.412	0.588	0.183	0.488	0.329	0.559	0.258
0.407	0.593	0.150	0.626	0.224	0.661	0.189
0.425	0.575	0.107	0.514	0.379	0.675	0.218
0.476	0.524	0.134	0.681	0.185	0.702	0.164
0.492	0.508	0.183	0.562	0.255	0.585	0.232
0.065	0.935	0.033	0.418	0.549	0.483	0.484
0.410	0.590	0.201	0.476	0.353	0.501	0.298
0.269	0.731	0.139	0.066	0.795	0.471	0.390
0.282	0.718	0.134	0.427	0.439	0.510	0.356
0.803	0.197	0.337	0.322	0.341	0.495	0.168
0.197	0.803	0.090	0.499	0.411	0.532	0.378
0.158	0.842	0.076	0.129	0.715	0.463	0.461
0.333	0.667	0.014	0.514	0.472	0.536	0.450
0.238	0.762	0.131	0.418	0.451	0.442	0.427
0.328	0.672	0.126	0.000	0.000	0.636	0.238
0.402	0.598	0.137	0.267	0.596	0.591	0.272
0.540	0.460	0.217	0.525	0.258	0.541	0.242
0.327	0.673	0.155	0.490	0.355	0.658	0.187
0.335	0.665	0.157	0.289	0.554	0.726	0.117
0.335	0.665	0.026	0.510	0.464	0.567	0.407
0.230	0.770	0.090	0.480	0.430	0.569	0.341

+ Purchased inputs defined as raw materials costs.

++ Purchased inputs defined as raw materials costs plus costs of electricity, fuel, etc.

TABLE 6:12 Rate of Total Factor Productivity Growth (TFPG) in Nigerian Manufacturing Industries (1963-1978).

[%]

	Production Function Fitted					
	Cobb-Douglas				CES	
	Gross output based		Value-added based		Value-added based	
Sector	(1)	(2)	(3)	(4)	(5)	(6)
Food processing	-0.60	-0.18	-0.90	-0.42	0.50	0.15
Alcoholic beverages	-1.40	-0.42	2.00	0.44	2.50	0.76
Non-alcoholic beverages	3.60	1.09	5.40	1.20	-1.30	-0.39
Tobacco	-4.90	-1.48	-7.40	-1.64	-4.40	-1.33
Textiles	-0.20	-0.06	-0.30	-0.07	2.40	0.73
Made-up textiles	0.80	0.24	5.70	1.27	-4.60	-1.39
Wearing apparel	-3.90	1.18	-9.40	-2.08	-3.20	-0.97
Leather products	2.60	0.79	8.00	1.78	1.80	0.55
Footwear	1.90	0.58	3.80	0.84	6.30	1.91
Wood/Furniture	-6.40	-1.94	-12.40	-2.76	-0.40	-0.12
Paper,Printing&Publishing	5.60	1.70	10.90	2.42	10.20	3.09
Industrial chemicals	-6.10	-1.85	-11.60	-2.58	4.30	1.30
Paints	3.70	1.12	7.20	1.60	5.80	1.76
Drugs&Medicines	11.30	3.42	24.50	5.44	26.70	8.09
Soap&Perfumery	13.34	4.04	26.18	5.82	1.20	0.36
Petroleum&Coal products	0.20	0.06	6.95	1.54	3.90	1.18
Rubber&Plastics	4.30	1.30	7.60	1.69	-1.40	-0.42
Cement&Related products	0.10	0.03	0.70	0.16	-3.30	-1.00
Basic Metals	1.11	0.34	4.67	1.04	-10.20	-3.09
Fabricated&Struc'l Metals	-6.10	-1.85	-13.60	-3.02	0.20	0.06
Machinery	2.90	0.88	5.50	1.22	3.40	1.03
Electrical Machinery	0.20	0.06	%%%%	%%%	1.70	0.52
Transport Equipment	0.80	0.24	4.50	1.00	5.30	1.61
Miscellaneous products	-4.20	-1.27	-6.80	1.51	8.00	2.42
Total Manufacturing	3.30	1.00	4.50	1.00	3.00	1.00

Note:cols(2),(4) and (6) show each sector's rate of TFPG as proportion of that of the total Manufacturing sector.

the effect of excluding raw materials is to make the numerical values of TFPG higher (if positive) or lower (if negative) than when they are included. Finally column 4 shows rates of TFPG obtained by fitting the ACMS relation (equation 6:19).

The similarities and/or differences between the ACMS, value-added based rates and those obtained by fitting the CD function can be readily observed. The CD gross output and value-added based rates of TFPG are respectively 3.3% and 4.5% compared to 3.3% obtained from the ACMS relation for the manufacturing sector as a whole. There is much less similarity of the measures at the sectoral level. For example, six of the nine sectors with negative rates of TFPG reported in col. 1 have positive rates in col. 5; on the other hand five of the sectors with positive rates in col. 1 have negative rates in col. 5. Thus 10 (3) sectors have positive (negative) rates of TFPG from both equations. The Spearman's rank correlation (of Cols. 1 & 5) coefficient is low (0.25) and statistically significant at the 10% level, although the Pearsonean coefficient (0.42) is statistically significant at 2% level. Of more importance, however, are the extreme differences in rates of TFPG achieved by different sectors which ever method of estimation is used. Rates of TFPG range between 13.34% in the soap and perfumery sector to -6.4% in the wood products sector (col. 1) and between 26.70% in the drugs and medicine sector to -10.20% in the basic metals sector (col. 4). For the gross output based rates, only 25% of the industries have rates of TFPG above 3.3%, the rate registered for the manufacturing sector as a whole; for the rates in col. 4, a slightly higher proportion of sectors have rates of TFPG above that of the manufacturing sector.

In terms of total factor productivity growth therefore, the nine most important sectors are: paper products, paints, drugs and medicines, soap & perfumes, machinery, leather products, petroleum and coal products, electrical and transport equipment. (These have positive rates in both columns 1 and 4). The least important sectors will be tobacco products, wearing apparel and wood products having registered negative rates of growth of TFP in both columns.

It is worth noting that the gross output based rates of TFGP and the rates of growth of output per head reveal a strikingly similar pattern. Of the 18 sectors with positive rates of growth of output per head, 11 have positive rates of TFPG; and of the 6 sectors with negative rates of output per head, four have negative rates of TFPG. (The Pearsonean correlation coefficient = 0.65 and is significant at 1% level and the rank correlation coefficient = 0.46 also significant at 1% level). The positive association between the two would suggest that some technical progress would have occurred in the manufacturing sector. On the other hand, it can also be observed that the sectoral rates of TFPG are, with few exceptions much lower than the corresponding rates of labour productivity growth - an indication, perhaps, that the latter was achieved by simply increasing the amount of other inputs notably capital and raw materials. The only sectors with rates of TFPG higher than their labour productivity growth are leather, footwear, paints, rubber and plastics, cement, basic metals, machinery and electrical equipment. These issues will be further examined in later sections.

An attempt has been made to determine how well the Nigerian manufacturing industries, in the aggregate, as well as at the sectoral level, performed relative to the performance of industries in other countries. It should be realised that a comparison of TFPG rates across countries is bound to have a number of deficiencies. First, it is often difficult to have estimates of TFPG rates for many countries and a consideration of only a few countries could lead to erroneous conclusions. Second, even where such estimates are available, the analysis may be hampered since different authors may use different methods, concepts and,or techniques, consider different time periods and employ different industrial classification. Even though such conceptual and methodological differences may not be large or significant enough to cause large differences in intercountry rates of TFPG, any attempt to make comparisons must be considered as only indicative of the trend of events rather than a reflection of realistic perspectives.

Annual rates of manufacturing TFPG for Hong Kong, South-Korea and Taiwan (1960-1970), Philippines (1965-1969) and Greece (1958-1968) as reported in Krueger and Tuncer (1980)[32] were respectively 2.29%, 3.75%, 3.59%, 1.89% and 4%. Other rates reported are for Singapore (3.47%), Norway (3.5%), Japan (3.66%) and for Italy (3.75%). Between 1946 and 1954, the Argentine manufacturing sector registered rates of TFPG of 0.6% and of 3.2% and 1.3% respectively during the periods 1955-1961 and 1946 - 1961[33]. Highly impressive rates of TFPG were also reported for Pakistan by Kemal (1983)[34]. It can be seen that by the standard of these countries, the growth rate of 3.3% achieved in Nigeria must be considered as impressive, especially if the Nigerian performance is to be judged in relation to the fact that industrial development began in earnest only after independence in 1960. In table 6:13 below, we present rates of TFPG for selected industries from 4 different countries: Nigeria, Pakistan, Turkey and Argentina.

Table 6:13

Sectoral Rates of TFPG in Selected Countries

Industry	Rates of TFPG from:						
	Nigeria		Pakistan			Argentina	Turkey
	a	b	c	d	e	f	g
Food processing	-0.60	0.50	0.78	4.27	5.76	5.40	-0.09
Tobacco	-4.90	-4.40	4.61	25.56	-19.42	2.40	7.44
Textiles	-0.20	2.40	3.20	4.53	3.58	7.10	1.14
Paper prodts	5.60	10.20	2.41	-9.30	-7.01	10.10	0.59
Leather prodts	2.60	1.80	0.24	10.86	12.31	15.00	-1.17
Rubber prodts	4.30	-1.40	5.96	11.88	48.61	5.80	4.27
Petroleum & coal prodts	0.20	3.90	0.04	-	-	8.00	0.24
Metal prodts	-6.10	0.20	2.40	1.35	1.09	13.00	2.39
Machinery	2.90	3.40	0.84	2.55	1.49	17.10	1.02
Electrical equip	0.20	1.70	3.13	4.66	5.69		1.30
Transport equip	0.80	5.30	0.97	4.85	1.02	15.80	1.42
Miscellaneous	-4.2	8.00	1.35	9.74	-16.95	-	-

Notes:

Nigeria: cols a and b are respectively C-D and ACMS based rates. They are taken from cols 1 and 5 of Table 6:10. Pakistan: Col c, trend rates are based on gross output measure and are for the period 1959/60 - 1969/70. These are computed using the Kendrick measure. See Cheema, A. A., 'Productivity trends in the manufacturing industries" The Pakistan Development Review p.48. Cols d and e computed using similar equations (6:18, 6:19) respectively. These are for 1959/60 - 1969/70. See Kemal, A.R., op cit, p165. For Turkey and Argentina, rates were computed using respectively equations 6:18 and 6:19; See Krueger & Tuncer op cit p.31, J. M. Katz op cit, p64.

The performance of the Nigerian industrial sectors vis-a-vis that of the countries considered in the table, is not however particularly impressive. Consider for example cols a and g (both being derived using the C-D measure). Four of the ten industries for which comparable estimates are available registered negatives rates of TFPG in Nigeria, compared to only two in Turkey; and the lowest rate of -6.1% in the former compares rather unfavourably with the corresponding rate of -1.17% in the latter. Even larger differences in sectoral rates can be observed between columns b and f: only one industry in Nigeria (paper products) registered a rate of growth of TFP that is (marginally) higher than the corresponding rate registered by the same sector in Argentina. However, up to 50% of the Nigerian industries achieved rates of TFPG that are higher than the rates achieved by the corresponding industries in Pakistan.

6:3:3 Explaining Sectoral Differences in Productivity Growth in Nigeria

One of the most important issues in the analysis of industrialisation of LDCs is the determination of the factors which account for the changes in productivity of labour. As surveyed and discussed extensively by Nelson (1981)[35], the literature on productivity change offers a wide variety of possible determinants although without any clear concensus as to where one should focus most attention. The introduction of new techniques of production, the increase of market size for industrial products, the improvement in the quality of factors of production, the efficiency of management, the skill and effort of workers and even employer-employee relationship could in varying degrees be the bases of such changes. Unfortunately, the quantification of the relative importance of each of these factors in the explanation of the behaviour of productivity will not be undertaken here, first, given the absence of adequate data on all relevant variables and second, given the time constraint. We shall consider few of these that are directly relevant for policy making purposes in Nigeria.

(i) **Sources of Productivity Change: capital intensity and technical progress**

One of the crucial questions often asked in the empirical development literature is the extent to which productivity change ov r time can be attributed to changes in the use of other factor inputs, notably capital or to changes in the technique of production which would enable a larger volume of output to be obtained from a given combination of capital and labour (i.e to technical change). Such a distinction is important especially in the context of less developed countries since the former (i.e. capital deepening) represents merely a movement along the production function and denotes, in the classical economics sense, some form of 'distortion', while technical change/progress indicates more appropriately, the extent of the shift in production function and hence of efficiency in the utilisation of inputs in the production process. The relationship between capital deepening and labour productivity can be illustrated by the simple relation

$$K/L = Q/L * K/Q$$

where K, L and Q are respectively capital, labour inputs and output; the use of a more advanced technique characterised by a higher capital intensity (measured by K/L) will be accompanied by an increase in the productivity of labour. Under these conditions, two possible cases present themselves: (a) the improvement in labour productivity (i.e. the increase in output per man or its inverse, the decrease in labour requirement per unit of output) is, less than proportional to the growth in K/L. In this case, the productivity of capital declines: while in order to produce a physical unit of Q, it is possible to employ less labour, one must necessarily employ even more capital (b) the improvement in productivity of labour is more than proportional to the increase in capital intensity. In this case the productivity of capital is obviously improved as well. Technical progress will have played a role in one form or the other.

What is the relationship of these variables in our study? How much of the change in productivity can be attributed to capital deepening and to technical progress? Using the growth rates of output, capital and labour inputs already presented in table 3:20 we computed rates of capital productivity and capital-labour growth for the period 1963-1978. Comparing these to changes in labour productivity reveals the following first, in 9 out of 24 industries, the growth in labour productivity over these years, was accompanied by significant decreases in the growth of the productivity of capital. Thus while the labour input grows more slowly than output, the same cannot be said about the capital input; second, 6 (25%) of the industries considered registered negative rates of growth of both labour and capital productivity. However in 5 of these, it is found that the rate of decline in capital productivity is much lower than that of labour productivity. Thus though more of both labour and capital inputs are employed in these industries, the rate of increase of the latter is much higher; third, 9 (or 38%) of the sectors considered have both labour and capital productivities increasing (i.e. positive trend rates) which may seem to imply an efficient handling of both inputs. But of these, 5 have higher rates of growth of labour, than of capital productivity; so even here, the capital input tends to grow faster than the labour input. It can be observed that the maximum rate of increase of capital productivity is 18.5% while that of labour productivity is 23.8%.

To gain further insight into the role of capital formation in explaining productivity differences among industries we carry out an interindustry correlation study; using various measures of labour intensity and or capital intensity and average gross output per head as a measure of labour productivity, we computed the rank and Pearson correlation coefficients which are summarised in the table below.

Table 6:14

Relationship between capital intensity or labour intensity and labour productivity; Nigerian Manufacturing Industries 1963-1978

Average gross output per head, correlated with:	Coefficient of Correlation: Spearman's rank	Coefficient of Correlation: Pearson
Rate of growth of labour	-0.41*	-0.28***
Capital-labour ratio (average)	0.46*	0.32**
Average wage-value added ratio	-0.61*	-0.53*
Average value-added labour ratio	0.75*	0.63*
Ratio of non wage value-added to wage value-added	0.61*	0.59*

* significant at 1% level
** significant at 5% level
*** significant at 10% level

The positive (and significant) coefficients of correlation between our measures of capital intensity (capital-labour ratios, average value-added per employee and the ratio of non-wage to wage value-added) imply that above average increases in productivity are obtained in those sectors which, on average, have above average increases in capital inputs. In other words, those industries with an above average productivity growth must have substituted capital for labour. Similar interpretation can be given to the negative correlation coefficient between wage value-added ratio and average productivity: sectors which on average are more labour intensive by this measure, have tended to achieve lower than average gross output per head. Indeed, the growth rate in output per head is negatively correlated with the growth in employment indicating that increase in productivity could have been accompanied by reductions in employment.

Although the foregoing correlation analysis provides strong grounds for believing that capital intensity has played a prominent role in the increases, and in inter-industry differences, in labour productivity, there is nothing to suggest that technical progress was not present. Indeed as we have previously noted, some sectors have had positive rates of technical progress. This is further confirmed by the inter-industry correlation between the rates of technical progress and the growth in labour productivity over the five sub-periods.

Table 6:15

Rate of technical progress and growth in labour productivity in Nigerian Manufacturing Industries 1963-1978

Rates of technical progress	Rates of labour productivity growth: Rank coefficient	Pearson coefficient
1963-1978		
(C-D)	Ø.46*	Ø.65*
(CES)	Ø.5Ø*	Ø.72*
1963-1971		Ø.65*
1971-1975		Ø.95*
1975-1978		Ø.58*
1971-1978		Ø.34**

* Significant at 1% level

** Significant at 5% level

The positive and significant association between the two variables suggest that higher than average rates of technical progress tended to obtain in those sectors in which the productivity of labour also grew more than average; and conversely those industries with a lower than average labour productivity growth tended to have lower than average rate of technical progress.

Combining this with the previous results (of a positive association between capital intensity and labour productivity) would seem to suggest that by and large, the productivity differences of Nigeria's industries can be 'explained' by the joint impact of technical progress and capital intensity. The relative contribution of each (and of other variables), which is useful for policy making purposes, cannot however be determined easily from the coefficients of correlation as previously presented. This can be done by the application of the Johansen (1961)[36] Model which relates the rate of growth of labour productivity over a period to the increase in capital per employee and to technological changes (i.e. to shift in the production function). The regression equation estimated by Johansen is of the following type

$$\log \frac{a_{it1}}{a_{it0}} = \alpha_i \log Z + \log \frac{A_{it1}}{A_{it0}} \qquad 6{:}21$$

where a_{it_1} and a_{it_0} are industry i's labour productivities in two periods t_1 and t_0 respectively; A_{it_1} and A_{it_0} are the indices of technical progress or total factor productivities for industry i in periods t_1 and t_0 respectively; α_i is the elasticity of output with respect to capital for industry i and z is a measure of capital intensity, which, assuming constant inter-industrial pattern of wages and capital costs Johansen defines as

$$\frac{W_{i1}/W_{i0}}{R_{i0}/R_{i0}} \qquad 6{:}22$$

[37]

where W and R are (given) wages and capital costs in industry i respectively. Thus in the regression equation, a decrease in wages with relative prices of capital goods constant will give $z_i < 1$. For our purposes, equation (10) was modified slightly by introducing two different measures of capital intensity viz value-added per employee (V/L), and capital per worker (K/L).

Thus if say,

$$Z_i = \frac{K_{i1}}{K_{i0}} \bigg| \frac{K_{i1}}{K_{i0}} \qquad 6{:}23$$

TABLE 6:16 The Relative Contribution of Capital Intensity and Technical Progress to increases in Labour Productivity in Nigerian Manufacturing Industries.

Capital intensity measure(z)			measure of technical progress (E)		
variable	coefficient	contribution	coefficient	contribution	R^2
Period (1) 1971-1975/1963-1971					
log(v/l)	0.23 (2.68)	70%	0.026 (3.50)	6%	0.65
log(k/l)	0.13 (2.87)	35%	0.065 (1.75)	16%	0.46
Period (2) 1971-1978/1963-1971					
log(v/l)	1.16 (4.85)	%%%%	-0.018 (-0.48)	-4%	0.79
log(k/l)	0.05 (3.31)	12%	0.079 (1.92)	20%	0.62
Period (3) 1975-1978/1971-1975					
log(v/l)	0.09 (7.36)	22%	0.009 (0.38)	2%	0.90
log(k/l)	0.34 (5.35)	118%	0.017 (1.52)	4%	0.85

note: the contribution of capital intensity or technical progress is obtained by taking the anti-log of the value of the coeffient and subtracing 1;
t ratios in parentethes
* significant at 10% level.

in the regression equation, relative capital intensity has increased and vice versa. We arbitrarily divided the period 1963-1978 into 4 sub-periods: 1963-71, 1971-1975, 1971-1978 and 1975-1978 and for each of these, average observations on labour productivity and on measures of capital intensity are obtained to run three sets of regression equations: the first set considers labour productivity and measures of capital intensity for the period 1971-1975 relative to that of the period 1963-71; the second considers 1971-78 relative to 1963-71 and the third, the period 1975-78 relative to 1971-1975. Thus for example, in the first set of equations the following regression equation was estimated

$$\log \frac{a_{1971-75}}{a_{1963-71}} = \alpha_1 \log \frac{z_{1971-75}}{z_{1963-71}} + \varepsilon \qquad 6{:}24$$

where a = average labour productivity

z = average capital intensity measure defined as (K/L), (V/L)

and ε = is a measure of average technical progress achieved in one period relative to that of the other etc.

The results of the regressions are shown in table 6:16. Considering only the equations in which both the coefficients are statistically significant, the following interpretation can be given. Equation la shows that of the total growth of 80% (antilog (0.256 - 1)*100), capital intensity accounts for a growth in the productivity of labour of 70% and technical progress accounts for only 6% with difference of 4% being accounted for by the interaction between the two variables. Using capital labour ratio as a measure of capital intensity, on the other hand, equation 2c shows that of the total growth of (only) 34%, capital intensity contributed 12% technical progress 20% and the interaction between the two 2%. The role of capital intensity is therefore clearly evident, but whether it is more important than technical progress would seem to depend upon, among other things, the period in question. In period 1 capital intensity is more important than technical progress while the reverse is true in the second period.

This would then confirm an earlier statement that although both are important in explaining labour productivity differentials, the role of capital intensity is more strongly felt.

(ii) Labour productivity and gross output growth: the 'Verdoorn's law'

Another well known hypothesis in the productivity growth literature is the relationship between the growth in labour productivity and the growth in manufacturing output in the economy. This relationship has been called the 'Verdoorns law'[38], according to which, the expansion of output is positively associated with growth in labour productivity. According to Kaldor (1967), the phenomenon of increasing returns to scale is the fundamental explanation of the empirical relationship investigated by Verdoorn: the expansion of the market for an industry's output creates certain internal and external economies, leads to a further division of labour and hence to a higher labour productivity.

A wide variety of methods can be used to examine the phenomenon, depending on whether one views it as a static or dynamic relationship. In a static context, the levels of output and of labour productivity could be correlated; however, the 'law' is also regarded as a dynamic phenomenon which is concerned with rates of change of productivity and output in which case, cross-country, cross-industry and/or time series regression equations of the following type are often estimated:[39]

$$\log(G/L) = a + b\log G \qquad 6:25$$

or $$\log(G/L) = a + b\log G + c\log W + \lambda t + n \qquad 6:26$$

the latter being the labour productivity side-relation of the CES (variable returns to scale) production function previously postulated. (G/L) is gross output per head (labour productivity), b is the Verdoorn's coefficient, c, the elasticity of substitution and λt the time trend.

Table 6:17 shows Verdoorn coefficients obtained by estimating equation (6:26).

It can be seen that in almost all cases, the goodness-of-fit is fairly good; also with only few exceptions, strong and significant Verdoorn relation exists in the manufacturing sectors, although as was previously noticed such a relationship was weak and insignificant for the total manufacturing sector as a whole (see table 6:1a rows 3 and 4).

For the individual sectors, the estimates range from 0.212 (basic metals) to 1.46 (alcoholic beverages). The relation is high and most significant (at 1% level) in 16 industries including food processing, alcoholic beverages, tobacco, electrical equipment, transport equipment and miscellaneous products; it is rather weakly significant in 4 industries: non-alcoholic beverages, paper products, cement and machinery) and is not very good in 4: soap and perfumes, rubber and plastics and basic metals production.

The strong and significant association between productivity growth and output growth is further shown in tables 6:18a and 6:18b. Here we show cross-industry correlation coefficients for five

Table 6:17 Sectoral estimates of Verdoorn's coeffients, 1963-1978.

	Sector	Coeffient	R^2
6	Food processing	0.896+	0.97
7	Alcoholic beverages	1.456+	0.92
8	Non-alcoholic beverages	0.652*	0.55
9	Tobacco	0.867+	0.97
10	Textiles	0.743+	0.94
11	Made-up textiles	0.664+	0.90
12	Wearing apparel	0.825+	0.91
13	Leather products	1.084+	0.94
14	Footwear	0.678+	0.80
15	Wood/Furniture	0.536+	0.84
16	Paper,printing&Publishing	0.412*	0.96
17	Industrial chemicals	0.521*	0.76
18	Paints	0.851+	0.85
19	Drugs&Medicines	0.962+	0.98
20	Soap&Perfumery	0.396	0.98
21	Petroleum&Coal products	0.830+	0.67
22	Rubber&Plastics	0.128	0.66
23	Cement&Related products	0.293*	0.71
24	Basic Metals	0.212	0.68
25	Fabricated&Structural Metals	0.619+	0.77
26	Machinery	0.332*	0.81
27	Electrical Machinery	0.680+	0.91
28	Transport Equipment	0.466+	0.85
29	Miscellaneous products	0.539*	0.76

+ coefficient significant at 1% level
* coefficient significant at 10% level

different time periods. The relationship is strongest in the period 1971-1975, followed by that in the 1963-71 period. It can be seen that the only period in which no significant association could be deduced between total factor productivity and output growth is 1971-78. The significance of this finding will be examined later.

Table: 6:18a

Growth in output and in labour productivity: Nigerian Manufacturing Industries 1963 - 1978

Period	Correlation Coefficient (Pearson corr. coeff.)
1963 - 1978	Ø.57*
1971 - 1978	Ø.45*
1971 - 1975	Ø.89*
1975 - 1978	Ø.44*
1963 - 1971	Ø.64*

Table 6:18b

Growth in output and in total factor productivity: Nigerian Manufacturing Industries 1963 - 1978

1963 - 1978	Ø.63*
1971 - 1978	Ø.Ø9
1971 - 1975	Ø.85*
1975 - 1978	Ø.62*
1963 - 1971	Ø.82*

* significant at 1% level

** significant at 5% level

*** significant at 1Ø% level

(iii) Trade policy and productivity growth[40]

In the development literature, the crucial role of trade policy in growth and efficiency with which resources are used has long been emphasised. One of the arguments for a link between trade policy and productivity is that by opening up the economy to international trade and competition, a 'challenge-response' mechanism could be induced which could in principle, stimulate and pressurise domestic entrepreneurs to adopt methods and techniques that reduce 'x-inefficiency' and costs in order to meet the standards of foreign competitors. On the otherhand, anti-trade policies which confine output to the domestic market, reduce or even eliminate the 'threat' from foreign competition blunting thereby the incentives for cost-consciousness. A related trade-policy argument is based on the advantages from large-scale production (economies of scale) that will acrue to a country with trade liberalisation. It is asserted that the extent of the division of labour, and therefore the level of output attainable per worker (i.e. labour productivity) in any economy, are limited by the size of the domestic market. Thus while both strategies of import substitution and trade liberalisation (or export promotion) could lead to significant increases in the output of industrial products, further expansion in output under the former strategy is more likely to be constrained, given that most LDCs are poor and could offer only tiny markets for most of these products. Moreover, as is usually the case, most LDCs make use of imported technology which is built for optimum utilisation at scales which may not be immediately within their grasp (given the narrow home market), leading thereby to high unit costs and compounding the problems of excess capacity often faced by the manufacturers. Another argument in the literature is that the productivity performance of domestic industries could be significantly affected by the relative ease or difficulty of obtaining key inputs which may not be domestically produced (or which could be produced only at very high costs). This in turn would be determined by the availability of foreign exchange. Hence any policies which increase the availability of foreign exchange and therefore the country's ability to pay for these (better and cheapter) inputs, could increase productivity performance. In this view, under an export-promotion strategy, with its high foreign exchange generating capacity, domestic industries are less likely to be starved of important raw materials, are more likely to operate at full-capacity, and could therefore exhibit higher levels of productivity, than industries operating in highly restrictive regimes.

The relationship between productivity growth and/or technical progress and trade policy could be tested in several ways, depending on the availability of data. In a cross-country analysis, one would expect, if the above arguments are valid, countries with more liberalized trade regimes to achieve higher levels of productivity and/or technical progress than the more restrictive regimes. One could also examine the significance of economies of scale or the 'Verdoorn's law' separately for the output that is meant for domestic market and for that which is destined for export. The latter will be expected to show up higher Verdoorn coefficient than the former. This was the approach followed by Nishimizu and Robinson (1983)[41] in a cross-country study of the relationship between trade policy and total factor productivity. For a single country, one could examine productivity differences between, on the one hand, import-substituting industries and on the other, industries whose output is geared to exporting. The classification of sectors into import-substituting and exporting in Nigeria is, however, difficult in the absence of any long time series data of manufactured exports emanating from the different sectors. An alternative approach to the above is to consider, following Krueger and Tuncer (1980)[42], variations of labour and total factor productivity growth overtime and relate these to variations in the trade regime. One could then hypothesize that periods of highly restrictive trade and exchange controls would exhibit slower growth of factor productivity than periods of relative liberalisation. This approach is followed here.

It will be recalled that in Chapter 4, the trade regime was broadly classified into 4 phases with the period 1975-76 - 1978 having the highest degree of restrictiveness, followed by the period 1961-1971. The periods 1971-1975 and 1950-1960 were identified as corresponding to the liberalised phase. As no industrial statistics are available for the latter period (i.e. 1950-60) our analysis will be restricted to the first three periods. In tables 6:19 and 6:20 we present estimates of rates of total factor and labour productivity growth for these periods. The same method as in the previous section was employed in arriving at these estimates. If the productivity-growth-trade-policy hypothesis holds, then one would expect, other things being equal, the performance of industries to be poorer in the period 1975-78 than in the periods 1963-71 and 1971-75; one would also expect the latter period to show higher productivity growth than the former. Before examining the results, some comments should be raised. As we previously noted, the Nigerian economy has, admittedly, always been 'distorted' in the classical economics sense and therefore no clear-cut 'phases' or 'trade regimes' as such can be meaningfully

Table 6:19 Rate of Growth of Total Factor Productivity: A sub-period analysis.

		Sector	Period 1963-78	1963-71	1971-75	1975-78	1971-78
6	3111/3122	Food	-0.60	1.40	2.20	-3.40	29.60
7	3131/3133	Alcoholic bev.	-1.40	4.20	-7.20	-16.90	-13.80
8	3134	Non-alcoh.bev.	3.60	0.59	-2.50	6.90	1.60
9	3140	Tobacco	-4.90	1.87	-20.78	-7.60	-8.69
10	3211	Textiles	-0.20	4.90	0.50	-8.30	-2.80
11	3212	Made-up text.	0.80	4.20	-2.50	4.50	-0.60
12	3220	Apparel	-3.90	-1.20	-9.80	1.90	-3.90
13	3231/3233	Leather	2.60	-0.50	12.50	-6.90	3.10
14	3240	Footwear	1.90	-0.30	18.10	-12.70	5.20
15	3311/3320	Wood	-6.40	-3.90	6.00	-16.80	5.10
16	3412/3420	Paper	5.60	4.70	3.40	-23.90	0.12
17	3511/3512	Chemicals	-6.10	2.20	-4.10	-15.50	-2.10
18	3521	Paints	3.70	4.20	7.20	-15.10	-0.20
19	3522	Drugs	11.30	-16.73	23.96	0.16	13.90
20	3523	Soap	13.34	0.45	-5.75	5.25	1.15
21	3529/3540	Other Chem.	0.20	8.60	-9.80	-8.80	6.10
22	3551/3560	Rubber	4.30	3.40	-3.90	3.20	3.30
23	3610/3699	Cement	0.10	-0.90	-0.34	-3.80	9.80
24	3710/3812	Basic Metals	1.11	-3.75	3.42	10.90	7.36
25	3813/3819	Fab.Metals	-6.10	-15.10	0.10	-7.90	-4.30
26	3822/3829	Machinery	2.90	-3.96	18.17	22.79	22.83
27	3832/3829	Elect.Machinery	0.20	2.50	5.00	-25.70	-1.50
28	3841/3843	Transport Equip	0.80	-28.71	65.55	-9.46	-11.30
29	3851/3909	Misc.products	-4.20	-4.60	2.60	-13.90	-0.30
		Total manufac turing sector	3.30	2.60	-1.70	-5.80	4.10
			4.50*	6.20*	-3.50*	-12.60*	8.80*

* value-added based;
Due to the lack of relevant data for sector 3822/3829, the first and second periods begin 1966 and end respectively 1978 and 1971.

Table 6:20 Rate of Growth of Labour Productivity:
A sub-period analysis.

		Sector	1963-78	1963-71	1971-75	1975-78	1971-78
6	3111/3122	Food	2.30	0.39	4.40	1.80	-2.10
7	3131/3133	Alcoholic bev.	2.10	9.60	-0.90	0.90	6.10
8	3134	Non-alcoh.bev.	4.30	7.50	-5.10	-7.20	-8.10
9	3140	Tobacco	-1.20	-4.00	-30.40	-3.60	-19.70
10	3211	Textiles	2.10	10.30	3.70	-7.30	0.12
11	3212	Made-up text.	1.30	3.10	-0.60	-0.60	-2.80
12	3220	Apparel	0.11	9.30	-17.50	7.40	-9.00
13	3231/3233	Leather	1.30	2.60	12.00	-14.20	1.40
14	3240	Footwear	1.60	9.10	7.80	-10.30	-1.20
15	3311/3320	Wood	2.20	-2.10	9.30	13.20	7.10
16	3412/3420	Paper	8.50	12.70	4.20	5.30	7.50
17	3511/3512	Chemicals	-0.70	2.10	-2.50	-2.80	3.40
18	3521	Paints	2.90	3.20	12.90	-1.20	2.90
19	3522	Drugs	23.80	-14.50	26.90	1.50	17.30
20	3523	Soap	19.20	4.70	5.20	7.40	6.10
21	3529/3540	Other Chem.	10.10	27.20	-15.40	-17.80	0.09
22	3551/3560	Rubber	1.10	4.80	0.22	6.10	2.70
23	3610/3699	Cement	-0.35	-0.87	2.30	9.30	2.00
24	3710/3812	Basic Metals	-1.96	-25.60	1.30	19.40	2.60
25	3813/3819	Fab.Metals	3.40	2.50	7.20	-0.07	2.80
26	3822/3829	Machinery	2.80	-7.30	5.80	31.46	17.50
27	3832/3829	Elect.Machinery	-1.90	9.10	-3.30	-60.80	-12.30
28	3841/3843	Transport Equip	8.60	-15.40	90.61	13.30	4.30
29	3851/3909	Misc.products	0.30	-2.20	13.10	-13.00	10.70
		Total manufacturing	1.30	2.10	5.60	2.50	3.90
			2.60*	3.80*	5.20*	1.80*	2.90

Notes: for the Machinery Sector(3822/3829),the periods are 1966-78,1966-71,1971-75,1975-78 and 1971-78,due to the lack of relevant data for the period 1963-1966.
* value -added per head.

delineated. We have seen that even the so called liberalisation measures were not only half-heartedly applied but were also applied not with a clear cut objective of industrial promotion. So too, were the measures in other periods. Thus as in the case of output growth, productivity differences among industries could be quite unrelated to these economic policies. Moreover, our periods of analysis do not appear long enough to permit any meaningful analysis. For example, is the 'liberalisation' period of 2 or 3 years long enough for producers to respond to any liberalisation incentives to increase output per man? or are they so short as to frustrate the efforts of producers in increasing productivity? Such questions are no doubt important, although not within the purview of this study. They should be however kept in mind when interpreting our results.

From these tables, considerable variations in the numerical values of rates of productivity growth both between industries and sub-periods are quite evident. Consider first, rates of TFPG. For the total manufacturing sector as a whole, value-added (gross-output) based rates of TFPG registered were 6.2% (2.6%), 3.5% (-1.7%) and -12.6% (-5.8%) respectively for the periods 1963-1971, 1971-75, and 1975-78. Out of the 24 industries considered 11 (46%) registered negative rates of TFPG in the first period and 16 (67%) in the third. These figures compare rather unfavourably with the corresponding figure of 10 (42%) over the 1971-75 period. The simple arithmetic mean rates of TFPG for the three sub-periods amount to respectively -1.52%, 5.25% and -5.88%. Even when the transport equipment sector is excluded (because of its unusually high rate of TFPG in 1971-75) the mean rate of TFPG in the second period was much higher than that of the other two periods.

The finding that the productivity growth performance of these industries was poorest over the 1975/76 - 78 period is further reinforced by the figures presented in table 6:20. The manufacturing sector's rate of labour productivity growth were 3.8%, 5.2% and 1.8% for the periods 1963-71, 1971-75 and 1975-78 respectively; 50% of the industries had negative rates of labour productivity growth over the 1975-78 period compared with 33% over each of the periods 1963-71 and 1971-75; and moreover, not only was the rate of decline maximum (-60.8% electrical equipment) but the rate of increase was also lowest in the period 1975-78.

An additional, suggestive evidence can be found by relating the sectoral effective rates of protection for 1974 and 1977 to the sectoral rates of productivity growth around the two years. The erp for 1974 would be expected to exert some influence - if any - on the productivity performance around the years 1971-1975 or even beyond. Similarly, the effects of protection in 1977 may be expected to show up around the period 1975-1978. We have found that for the period 1971-1975, 70% of the sectors with negative rates of TFPG and 88% of sectors with negative rates of labour productivity growth, were accorded above average rates of effective protection in 1974; similarly, in the period 1975-78, 75% of sectors with negative rates of labour productivity growth, and 63% of sectors with negative TFPG rates, received an above average rates of protection in 1974. Finally, it can be seen also that of the 16 sectors with negative rate of TFPG in the period 1975-1978, 44% received above average rate of protection in 1977, and of the 12 sectors with negative rates of labour productivity growth, 42% had an above average effective rate of protection in 1977.

To sum up, the total factor productivity performance of the Nigerian manufacturing industries was, in general, poor over the years; given that their performance was poorest over the period that the economy was most distorted, it would appear that the observed variations in rates of TFPG and labour productivity, may well have been determined by the restrictiveness of the trade regime at least,to some extent. What implications do our findings carry?

6:3:4 Summary, Conclusion and Policy Implications

An attempt has been made in the preceeding section to draw attention to the crucial issue of productivity growth in Nigerian manufacturing industries over a period of 16 years. For the total manufacturing sector, labour productivity has grown, unimpressively, by slightly above 1%, on average, between 1963 and 1968. The performance of the individual industries has been more impressive judging by the number of industries with significantly higher rates of labour productivity growth than that for the whole sector. The result is the other way round in the case of total factor productivity growth or technical progress: the manufacturing sector as a whole registered a fairly impressive rate of growth which was surpassed only by that of a handful of industries. Between 1963 and 1978, 38% of the sectors had negative rates of TFPG and 25% of the sectors achieved rates of productivity growth which exceeded that of the manufacturing sector. Of the 15 sectors with positive rates, 33% achieved rates of TFPG below 1%. Thus about 58% of the sectors had either negative or less than 1% rates of growth of TFP. That the increases in overall productivity were not very impressive would cast some doubt upon the significance of the relatively higher rates of labour productivity growth.

Three possible determinants of labour productivity growth were examined. Increases in capital intensity were found to be significantly associated with the productivity of labour. One might be tempted to argue that given its influence on labour productivity growth, the bias in favour of capital-using techniques by Nigerian industries is beneficial to the economy. This might pose a delimma to the policy makers who would like to obtain increases not only in employment but also in productivity. However, the question should not be so much whether to sacrifice one objective for another, as to choose, through rational policies, a number of alternative paths which could lead to the realisation of an appropriate mix of both objectives. Moreover, the bias in favour of capital intensity need not be beneficial to the economy, especially since this bias is not necessarily total factor productive. We have shown that the relatively lower estimates of sectoral rates of TFPG could have resulted from the increases in the capital input. Although some measure of technical progress could also be used to explain labour productivity changes, its relative importance appears minimal. This is a discouraging result considering that a sound economic development rests more or less on the progress being made to shift a country's production frontier upwards.

The possible existence of economies of scale which has been used to explain the significant Verdoorn's relation which we have found for many industries, emphasises the importance of market size in determining productivity levels and carries the implication that if the Nigerian industrial and trade policy is geared towards the external market, certain benefits in the form of cost reductions and significant increases in productivity could accrue. The external market implication is important, for, even though the country is large in terms of population, the narrowness of the home market (given the low level of income and its skewed distribution) is likely to set limits to increases in effective demand. Reducing the high costs of production, by say, building larger plants in a few lines of production could be a first step towards venturing into exports at least to the less industrialised countries of West Africa.

The case for policy changes is further provided by our finding that the low productivity performance of industries was most noticeable during the most restrictive period of the trade regime. Moreover, the correlation between output growth on the one hand and labour productivity and total factor productivity growth on the other, was found to be highest over the 1971-1975 (the liberalised) period. Admittedly, our analysis of the relationship between trade policy and productivity growth is rather simplistic (and our evidence merely suggestive in nature) and a more rigorous examination is called for, in order to properly discuss alternative policy prescriptions. But it does appear to us that certain modifications to the existing regime are called for.

A final comment on the accuracy of our analysis in this chapter is in order here. It must be noted that the functional form used for the production function estimates (of substitution elasticities and TFPG) involve several highly restrictive assumptions which may not be tenable for the Nigerian situation. Some of the few fundamental problems which could impair though not necessarily invalidate our results include: the use of only two factors of production - labour and capital - their treatment as homogeneous inputs, our inability to consider possibilities of improvement in their quality, the lack of adjustments for capacity under utilisation, the assumption that a single production function exists for all industries and above all, the crucial assumption that the economy is characterised by perfect competition in product and factor markets. In spite of these limitations, it does seem to us that the magnitude of the substitution elasticities, and the broad pattern of productivity movements indicated by our results are not far from the actual productivity experience of the manufacturing sector, and we believe that the results can be usefully employed as a guide to policy making in areas such as employment provision and in overall infant industry promotion.

NOTES

1. For a survey of the literature see for example, Bruton, H.J. (1972), "The elasticity of substitution in Developing Countries" Research memo, No.45, Centre for Development Economics, William's College. Gande, J. (1975) "Capital-labour substitution possibilities: a review of emperical evidence" in Balla, A. S. (ed), Technology and Employment in Industry, ILO, Geneva.

2. Kmenta, J. (1967) "On the estimation of CES production function" International Economic Review, 8, 2, June, pp180-189. The function can be directly estimated using non-linear maximum likelihood methods, an interative procedure which seek to minimize the error sum of squares. However, it is pointed out that maximum likelihood estimates are sensitive to the choice of initial values of the parameters and pose certain computational difficulties.

3. Griliches, Z. and Ringstad, V. (1971), Economies of scale and the form of the production function, Amsterdam, North Holland.

4. Arrow, K.J., Chenery, H.B. and Minhas, B.S. and Solow, R.M. (1961), "Capital-labour substitution and economic efficiency", Review of Economics and Statistics, Vol. 43, No. 3, August, pp225-50.

5. Griliches, Z. (1967), "Production Functions in Manufacturing: Some preliminary results" in Brown, M. (1967), The Theory and Emperical Analysis of Production, NBER, Princeton University Press.

6. Griliches, Z. and Ringstand, V. (1971), op cit, p11.

7. Hildebrand, G. and Liu, T. (1960), Manufacturing production functions in the United States: 1957, Ithaca, N.Y. See also Liu, Y. and Fletcher, L. (1968), "A generalisation of the CES production function", Review of Economics and Statistics, November, pp449-52.

8. Ibid.

9. Bruton, H.J. (1972), op cit, p15.

10. Sicat, G.P. (1970) "Capital labour substitution in manufacturing in a developing economy: The Philippines", The Developing Economies, 8, p37.

11. Kemal, A.R. (1981), "Substitution Elasticities in Large-Scale Manufacturing Industries of Pakistan", The Pakistan Development Review, Vol. XX, No. 1, Spring pp1-35.

12. Ibid, p8.

13. See for example, Nerlove, M. (1967), "Recent emperical studies of the CES and related production functions" in Brown, M. (ed), The Theory and Emperical Analysis of Production, NBER, Princeton University Press especially p91. See also Griliches, Z. (1967), op cit, especially p285. It should be pointed out however, even in the cross-sectional analysis, one often finds conclusions such as: "the possibilities of substitution between labour and capital appear to be rather limited in most industries. Of the 55 industries, the majority can be said to have an elasticity of less than 1, for 17 the elasticity is greater than 1 and only for 3 is it approximately equal to 1" Hoffmann, L. and Weber, B. (1976), Economies of Scale, Factor Intensities and Substitution: Micro Estimates for Malysia's Manufacturing Industries", W. Archiv, 112, Heft 1, p131 and 133.

14. Bruton, H.J. (1972), op cit, p.17.

15. Minasian, J.R. (1961), "Elasticities of substitution and constant output demand curve for labour", Journal of Political Economy, 69, June, pp261-270.

16. Tyler, G. (1974), "Labour Absorption with Import-Substitution industrialisation: An examination of elasticities of substitution in Brazilian manufacturing sector", Oxford Economic Papers, Vol. 26, No. 1, March, pp93-103.

17. It is assumed that both output and price of capital are constant, input coefficients for materials are fixed and,

because both authors dealt with inter-state data, the equality of product prices and material input prices over states was also assumed.

18. Tyler, G. (1974), op cit, p100.

19. Ibid, p100.

20. Fajana, O. (1973), "Employment and wage changes in the Nigerian Manufacturing sector", Nigerian Journal of Economic and Social Studies, 15, 3, September, pp363-75. For a similar point of view see Aluko, S.A. (1971), "Prices, wages and costs" in Ayida, A.A. and Onitiri, H.M.A. (1971), Reconstruction and Development in Nigeria, Ibadan, Oxford University Press, Chapter 9.
For a different point of view see Economic Commission of Africa (ECA) (1968), A survey of Economic Conditions in Africa, United Nations, New York. It is asserted here that "increases in African wage rates which have taken place in recent years have induced the African entrepreneur to hedge against future rises in wage cost by employing capital intensive techniques and methods", ibid, p102.

21. Fajane, O. (1973), op cit, p369.

22. We multiply the rate of growth of wages per head reported in table 3:20 Chapter 3 by the elasticities of substitution reported in column 2 of table 6:2 of this chapter.

23. The regression equation estimated expresses the rate of growth of employment (L) as a function of the growth of wages (W) and the rate of growth of output, using data for 1963-78. We obtained the following:

$$\text{Log } L = -3.327 - 0.506 \log W + 0.752 \log Q$$

$$(-3.280)\quad(-1.028)\quad(4.950)$$

$$R^2 = 0.540$$

$$\bar{R}^2 = 0.497$$

$$F = 12.34$$

t ratios in parenthesis.

The coefficient of the wage rate is however not significant, although it has the expected sign. The average rate of growth of wages between 1963-1978 was about 13%. With a coefficient of the wage rate of 0.506, this implies a loss of 6.58% of employment growth.

24. The increases in employment from a higher utilisation of capacity are only modest. Winston, C. (1981) estimated that an increase in employment of only 10 to 16% will be induced if existing capacity could be raised to the maximum. He points out that even if full utilisation induces an increase of 100% in industrial employment "the addition would still involve 1 per cent of the total labour force and eliminate only 25 percent of the unemployment modestly estimated in the Third plan". Winston, G.C. (1981) "Increasing Manufacturing Employment through fuller utilisation of capacity in Nigeria", Industrial Capacity and Employment Promotion, GOWER (published for the ILO) Chapter 3, pp92-170.

25. World Bank (1974) Nigeria: Options for Long-term Development, The John Hopkins University Press, p.7. This pessimistic view about the ability of the manufacturing sector to absorb the bulk of the labour force in LDCs is widespread among economists. See for example, Morawetz, (1974) op cit, p491; see also UNIDO (1979) op cit, p233, where it is concluded that for the majority of the LDCs, their manufacturing sector alone "is incapable of providing a solution to the complex problems of unemployment, underemployment and the productive use of an expanding labour force".

26. For a review of the literature on productivity growth see Nadiri, M.I. (1970), "Some approaches to the theory and measurement of total factor productivity: A survey", Journal of Economic Literature, 8, 4; Ibid, "International Studies of Factor inputs and Total Factor Productivity: A brief survey", Review of Income and Wealth, 18, 2, 1972. Nelson, R. R. (1981), "Research on Productivity Growth and Differences", Journal of Economic Literature, XLX, 3.

27. Kendrick, J.W. (1961), Productivity Trends in the United States, National Bureau of Economic Research, New York, Princeton University Press. Ibid (1973), Postwar Productivity Trends in the United States, 1948-66, NBER, New York. The index is expressed as

$$Q_A = [V_t/(wL_t + rK_t)/V_o/(wL_o + rK_o)]$$

where V, w, L, r, and K are respectively, output, wage rates, labour, return to capital and capital stock. The subscript o refers to base year values of the variables.

28. Solow, R.M. (1957), "Tehcnical change and the aggregate production function", Review of Economics and Statistics, XXXIX, August, pp312-20.
For the application of the index to other countries see Nishimizu, K. and Hulten, C.R. (1978), "The sources of Japaneese Economic Growth: 1955-1971", The Review of Economics and Statistics, 60, August, Krueger, A.O. and Tuncer, B. (1980), Estimating Total Factor Productivity Growth in a Developing Country, World Bank Staff Working Paper No. 422, October. Kemal, A.R. (1983), "The Manufacturing industries of Pakistan: An Anlysis of Efficiency" in Kirkpatrick, C.H. and Nixon, F.I. (eds), (1983), The Industrialisation of Less Developed Countries, Manchester University Press.

29. The Kendrick index assumes infinite elasticity of substitution; In the Cobb-Douglas measure, the elasticity is assumed constant and equal to unity; while in the CES measure it is the elasticity is allowed to differ from 1 but assumed constant.

30. See for example, Banerjee, A. (1971), "Productivity growth and factor substitution", Indian Economic Review, Vol. VI (New series), No. 1, April, and Kemal, A.R. (1983) op cit.

31. See for example, Griliches, Z. (1963), "The sources of measured productivity growth: United States Agriculture 1940-1960", Journal of Political Economy.

32. Krueger, A.O. and Tuncer, B. (1980), op cit., pp24-25. The methods of estimation are not discussed by the authors.

33. Katz, J.M. (1969), Production Functions, Foreign Investment and Growth, Amsterdam, North Holland, p64.

34. Kemal, A.R. (1983), op cit, p165.

35. Nelson, R.R. (1981), op cit, see also Nadin, M.A., op cit.

36. Johansen, L. (1961), "A method for separating the effects of capital accumulation and shifts in production function upon growth in labour productivity", Economic Journal, 71, December. See also Massell, B.F. (1960) "Capital Formation and Technical Change in U.S. Manufacturing", Review of Economics and Statistics, XLII, May, pp182-88; Ibid, (1961), "A disaggregated view of technical change", Journal of Political Economy, LXIX, 6 December, pp547-557.

37. Johansen, L. (1961), op cit, pp776.

38. Kaldor, N. (1967), Strategic Factors in Economic Development, New York. See also Katz, J.M. (1969), op cit.

39. See Katz, J.K. (1969), ibid.

40. For a fuller discussion of the relationship between trade/industrialisation strategy and productivity growth see Bruton, H.J. (1967), "Productivity Growth in Latin America", American Economic Review, December; ibid, (1968), "Import

substitution and productivity growth", Journal of Development Studies, April; Krueger, A.O. and Tuncer, B. (1980), op cit; Balassa, B. and Associates (1971) op cit; Nishimizu, M. and Robinson, S. (1983), Trade Policies and Productivity Change in Semi-Industrialised Countries, The World Bank, Washington.

41. Nishimizu, M. and Robinson, S. (1983), op cit.

42. Krueger, A.O. and Tuncer, B. (1980), op cit.

CHAPTER 7

EFFECTIVE PROTECTION, INVESTMENT EFFICIENCY AND DOMESTIC RESOURCE COSTS; 1974 AND 1977

7.1 Introduction

> "The purpose of protection is not to provide undue profits for an indefinite period to the manufacturer at the expense of the consumer, nor will government allow a higher cost industrial economy to be built under the umbrella of excessive protection. Nigerian products must be reasonably competitive with imported goods, not merely so as to provide Nigerians with quality goods at fair prices, but also that Nigerian manufacturers may compete effectively in the markets of the world. We do not visualize Nigerian industry as catering for the domestic market, it will increasingly become the supplier of manufactured goods throughout Africa. This it can only achieve if it remains efficient and fully competitive."[1]

We saw in Chapter 4 that the Nigerian industry does indeed cater for the domestic market only, as exports have failed to develop. This, it was suggested, could have been the result of government restrictionist measures which alter the allocation of resources in favour of domestic production and penalise exporting by maintaining an over valued exchange rate. This chapter explores further the operation of Nigerian manufacturing industries with regards to efficiency and international competitiveness. It seeks to analyze the domestic vis-a-vis the 'free-trade' profitability of investment as well as the cost of import substitution in the economy. The chapter is in five sections. The following section (7:2) discusses briefly, the main efficiency criteria employed in the study, and includes a brief account of the methods and assumptions employed to estimate factor costs. The economic efficiency or inefficiency of manufacturing industries is determined and analysed in section (7:3). In section (7:4) the correspondence between economic efficiency of industries and the government's restrictionist measures as quantified by the effective protective rate is explored and finally in section (7:5) we provide the main conclusions.

7:2 Criteria for the evaluation of investment efficiency.

To evaluate the economic efficiency of the individual manufacturing industries in Nigeria, three criteria are employed: Net Social Profitability (NSP), Social Marginal Product of capital (SMP) or the Social Rate of Return (SRR) and the Domestic Resource Cost (DRC) of saving or earning a unit of foreign exchange. As Bruno (1972), Chenery (1961) and Pearson (1976) demonstrate,[2] each of the three criteria can be derived from the others. As a convenient theoretical and methodological stating point, we consider the NSP criterion expressed as:

$$\Pi_x = P_x - \sum_{i}^{n} P_i a_{ix} - \sum_{s}^{m} P_s f_{sx} \qquad (7:1)$$

where Π_x = social profitability in activity x

P_x = shadow price of output from activity x (i.e. the marginal social benefit of activity x)

P_i = shadow price of i^{th} material input per unit of commodity x

a_{ix} = input-output coefficient of the i^{th} good utilised in activity x

f_{sx} = primary factor input-output coefficient employed directly in activity x

P_s = shadow price of all other inputs (labour and capital) used directly in the activity x.

The social profitability of an activity is thus evaluated as the difference between the shadow price of the output of the activity (i.e. the social benefit attributed to the activity) and the sum of the direct intermediate inputs valued at their shadow prices and all other direct inputs of factors valued at their opportunity costs. Using this criterion, an activity is chosen for implementation (in an ex ante appraisal) or for expansion (in an ex post evaluation) if and only if $\pi x > 0$. Such an activity will be called socially profitable, efficient and/or viable since it represents an efficient utilisation of ventures from the point of view of society. On the other hand, those activities with $\pi x < 0$ are regarded as inefficient, and the resources employed (material inputs as well as primary factors) could be more efficiently used in their best alternative uses.

It is useful to go further and derive another important yardstick of investment efficiency: the rate of return to capital, which put simply, is the average social profit from an activity expressed as a percentage of the capital outlay. Formally, rewrite equation (7:1) as:

$$\Pi x = P_x - \sum_i^n a_{ix} P_i - \sum_{s=1}^{m-1} f_{sx} P_s - k_x r \qquad (7:2)$$

which in effect singles out the input of the capital stock (K) from the bundle of primary factor inputs employed in activity x. Then the criterion of efficiency and/or viability ($\pi x > 0$) can be equivalently expressed as:

$$\frac{P_x - \sum_i^n a_{ix} P_i - \sum_{s=1}^{m-1} f_{sx} P_s}{kx} > r \qquad (7:3)$$

The numerator is the difference between total value added in efficiency prices ($P_x - \sum_i a_{ix} P_i$) and the payments to other factors of production (notably labour in our case) and the denominator is the value of the capital stock employed in activity x. According to the criterion, an activity is accepted if it earns a rate of return at least equal to the shadow rate of return or accounting rate of interest r. In cases of a choice between alternative activities, the one with the highest rate of return can be selected for expansion and/or encouragement. If the capital stock can be appropriately measured, the criterion has the merit of being simple in application. Its main defect, however, is that it is static, since it does not take into consideration the whole life span of the activity in question but relies on one model period. Reliance upon the criterion for investment decision making could therefore be misleading unless one could determine appropriately what is considered to be a 'normal' year in an activity's life for assessing accurately the simple rate of return. This defect is shared by the two other criteria employed here.

In an ex ante appraisal of investment projects this problem can be remedied by the use of the Net Present Value method, defined as the sum of the discounted net benefits (i.e. gross benefits minus both investments and recurrent costs)

$$NPV = \sum_{t=1}^{n} \frac{NB}{(1+r)t}$$

where $\sum_{t=1}^{n}$ = sum total for the whole lifetime of the activity from the initial year 1 to year n

NB = Net (discounted) benefits

r = discount factor corresponding to a selected rate of discount.

An investment project is acceptable if NPV $\geq$ 0; and where there is more than one project to choose from, the one with the largest NPV is to be chosen for implementation. Although it has the merit that it takes into account the entire life of a project, its operational usefulness is limited especially in cases in which sufficiently detailed information for comprehensive analysis is not available, as in our case. Moreover, the evaluation of the economic efficiency of projects is done in this study in an <u>ex post</u> sense rather than <u>ex ante</u> sense for which the method is more suited.

An additional problem of the two efficiency criteria (expressions (7:1) and (7:3)) is that it is possible to obtain several variants, each usually giving different rate of return or rate of profit for the same activity. This is because of the several ambiguities inherent in the methods. For example, there is the problem of what profit figure one should use: profit before or after taxes, before or after depreciation, etc. If profit after depreciation is employed, should the depreciation be on a straight line basis? What concept of investment or capital should one employ? Should it be that of total investment (e.g. equity plus loans) or of equity capital only? It is obvious that any arbitrary selection of one method could lead to an incorrect ranking of activities and would be of no help at all in determining the cut-off point between 'desirable' and 'undesirable' activities.

Because of data limitations, we have not been able to take into account all of such defects and ambiguities. Two single time periods have been selected (1974 and 1977) for the study in the hope that at least one (and hopefully both) represent what may be regarded as a 'normal year'. Throughout the study, we have treated capital consumption as a cost to the industry and therefore the concept of capital used is that one of profit after depreciation. In the absence of any information with regards to sectoral profit tax rates in Nigeria, the before-tax profit concept is employed. The rate of profit and the yield on capital will therefore be upward biased with the size and magnitude of the bias depending upon the rate of profit tax.

However, the figures obtained may not be biased for inter-industry comparisons to the extent that the rate of profit tax is the same in all industries.

The efficiency with which resources are being employed to save (in the case of import substitutes), or earn (in the case of exports), foreign exchange in Nigeria's manufacturing industries is analysed using the Domestic Resource Costs criterion which may be formulated as follows:

$$DRC_x = \frac{\sum_x V_x A_{ix}}{P_x - \sum_x A_{ix}} \qquad (7:5)$$

or in matrix notation

$$\frac{C'(1-A)^{-1}}{P_x - P_o m'_o (1-A)^{-1}} \qquad (7:6)$$

where

V_x = value-added in activity x which represents payments to factors employed in the activity;

P_x = world market price of the commodity x;

m'_o = vector of imported input per unit output of x;

A_{ix} = the elements of $(1 - A)^{-1}$ the matrix of direct plus indirect input requirements;

C' = a row vector of domestic costs per unit of output by sector;

P_o = an index of imported input prices.

The opportunity costs of all domestic resources -- capital, labour and material inputs -- involved in producing a unit of commodity are represented by the numerator while the denominator represents the net foreign exchange gained per unit of production expressed as the difference between the gross foreign exchange savings (or earnings) and the direct and indirect foreign exchange costs involved in importing inputs or in the production of domestic inputs into the activity. The ratio thus represents the terms on which domestic resources are to be exchanged for foreign resources. Ranking of industries or activities in terms of their DRC ratios provides a measure of relative efficiency or relative comparative advantage and, according to Bruno (1972), "By comparing it with some measure of the economy's real or accounting exchange rate, it can be used as an investment criterion just as the internal rate of return is compared with some measure of the real rate of interest"[3]. An activity is to be considered inefficient if its DRC ratio exceeds this exchange rate since this implies that the opportunity costs of the resources used exceed the value of the foreign exchange saved or earned. It is well to bear in mind certain limitations of the DRC method of project evaluation.

First in common with other criteria mentioned above, the DRC ratio is essentially a static concept, although it seeks to measure comparative advantage which is more or less a dynamic phenomenon. The concept is static in at least two senses: first, it relies on only a single period's observation on output and inputs and makes no explicit allowance for future benefits and costs (i.e. outputs and inputs) and, second, it gives no explicit consideration to issues related to dynamic efficiency of investments such as 'learning by doing' economies of scale, etc. Thus to say that an activity is efficient because its DRC ratio is less than an equilibrium exchange rate is a comparatively static argument which could be justifiably offset by these dynamic considerations.

The second limitation of the concept is that some inconsistency in the measure of relative efficiency (or inefficiency) of industries could arise where certain industries being evaluated have negative value-added at border prices. This can be illustrated as follows: let industries A and B have value-added at international prices of respectively -$60 and -$120. Industry B will be less preferred to A if value-added is accepted as a proxy for national welfare since the operation of the former causes a twice as much reduction of national income or welfare as the operation of the latter. Assume, however, that the value of domestic primary inputs evaluated at their opportunity costs is the same in both industries and equal to say $40. Then the DRC ratios implied by the figures are respectively -0.67 and -0.33 for A and B. If the two are ranked and the minimum DRC criterion is employed, B will now be preferred, leading thereby to a perverse result. The problem does not however arise if the ratios are compared to an equilibrium exchange rate rather than ranked[4].

Finally, some biases may be introduced in the DRC estimates in the event that (i) foreign exchange costs are not properly counted, or (ii) domestic costs of factors are counted as foreign costs or vice versa. As Bruno (1967)[5] demonstrated, the DRC ratio is biased downward or upward if foreign factor costs are erroneously counted as domestic factor costs, depending on whether the 'true' DRC ratio is greater than or less than the shadow price of foreign exchange. Thus it is recommended to use the NSP criterion which does not depend on the separation of foreign and domestic factor costs in situations where the allocation of domestic and foreign costs is not so certain. Our use of both measures is useful for a consistency check of the results.

It is often asserted that the effective protective rate (erp) and the DRC ratio can serve similar objectives, i.e. that the erp can be usefully employed as a measure of the extent of inefficiency in the economy and/or as a measure of the domestic cost of saving a unit of foreign exchange[6]. Other things being equal, the 'height' of effective tariffs will be indicative of a country's comparative advantage in the activity in question: activities with lower effective rates being preferred to those with higher erp. However, as pointed out in the theoretical and empirical literature, the equivalence of the two measures rests upon the assumption, among others, of competitive market structures: specifically that all domestic - factor as well as product-markets are perfectly competitive, and factors are perfectly mobile within the domestic economy and their prices reflect their opportunity costs in alternative employment. Where a structural disequilibrium exists (as in a great many less developed countries) in the labour and capital markets, such as minimum wage legislations, subsidisation of capital goods imports and low interest rates on loans, and/or in product markets such as monopoly profits accruing to some highly protected domestic industries, market prices cannot be used to derive an efficiency criterion. The DRC, as we have defined it, gets around the problem by evaluating domestic factors at their shadow prices while in the usual erp computations, factors are evaluated at their distorted prices. The equivalence between the two as investment criteria therefore breaks down[7].

Balassa and Schydlowsky (1972)[8] suggested making adjustments between the market prices and true opportunity costs of factors in the event of imperfect factor markets and introduced the concept of social effective protective rate which reflects such adjustments. This has two implications: first, the erp loses its interpretation as an indicator of resource flows and second, it becomes indistinguishable from the DRC concept. Clearly, as Bhagwati and Srinivasan (1978)[9] stated,

> To derive DRC's by estimating.... the correct shadow factor prices... and then to rechristen them as 'social erps' is therefore likely to lead to confusion; and, in our judgement it is best therefore to drop the terminology and concept of erps altogether from cost-benefit analysis.[10]

No attempt is made therefore to estimate 'social erps' or to employ erps to measure economic efficiency although we relate the estimated erps to the three other economic efficiency measures.

7:3 The Main Results

7:3:1 Private Profitability in Nigerian Manufacturing Industries (1968 - 1978)

In this section we shall examine the behaviour of private profits - defined as industrial output less input costs at domestic market prices - for the manufacturing sector as a whole, and for a cross section of industries within the sector. We shall first examine the behaviour of production costs in the sector as it is the change in these that determines to a large extent an industry's profit or reinvestible surplus.

In table (7:1) we present the cost elements for the years 1968 - 1978. Total industrial costs consist of raw material costs, costs of fuel and electricity and other costs (repairs and maintenance, etc). These are shown in columns 1 to 5. In columns 6 and 7 we show two concepts of labour costs: wages and salaries <u>and</u> wages and salaries plus fringe benefits, bonuses, etc., referred to as Total Labour

Table 7:1 Profitablity in Manufacturing Industry:
Trend in Costs and Private Profitability, Total
Manufacturing Sector (1968 - 1978).

	Industrial Costs [₦,000] & as % of Output									
Year	1 Raw Materials		2 Fuel		3 Electricity		4 Other Costs		5 TOTAL (1-4)	
	₦	%	₦	%	₦	%	₦	%	₦	%
1968	441092.63	46.40	8752.40	0.92	12151.20	1.30	96351.60	10.13	558347.80	58.72
1969	529779.72	47.60	11134.20	1.00	7814.75	0.70	55830.75	5.02	604559.40	54.37
1970	609033.24	46.10	12844.88	0.97	16346.30	1.24	70523.50	5.30	708747.90	53.63
1972	644440.40	44.50	12166.21	0.84	19783.90	1.36	87315.78	6.03	763706.40	52.72
1974	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1008728.20	52.53
1976	1364832.90	44.10	22230.30	0.72	23804.50	0.77	2633441.40	8.50	1674209.20	54.11
1977	1498767.00	44.80	18445.40	0.55	209449.90	0.63	370375.13	11.06	1908532.50	57.02
1978	1465203.10	39.90	29632.10	0.81	23750.60	0.65	482781.50	13.17	2001367.20	54.50

	6 Wages & Salaries		7 Total labour costs		8 Rate of Capital consumption					
					10%		15%		20%	
	₦	%	₦	%	₦	%	₦	%	₦	%
1968	87455.58	9.20	92098.30	9.69	34811.20	3.66	52216.80	5.50	69622.40	7.30
1969	81842.66	8.30	101034.97	9.09	33371.50	3.00	50057.25	4.50	66743.00	6.00
1970	123731.30	9.40	133728.53	10.12	35305.90	2.67	52958.85	4.00	70611.80	5.34
1972	149155.12	10.29	161167.59	11.13	39867.10	2.75	59800.65	4.13	79734.20	5.50
1974	186852.09	9.70	0.00	0.00	47807.50	2.49	71711.25	3.70	95615.00	4.98
1976	286164.60	9.25	309824.80	10.01	50920.30	1.65	76380.50	2.50	101840.60	3.30
1977	336146.70	10.04	365417.88	10.92	88228.10	2.64	132342.20	3.95	176456.20	5.30
1978	371101.55	10.12	407771.89	11.12	144840.00	3.95	217260.00	5.90	289680.00	7.90

contd

Table 7:1 contd.
Trend in Private Profitability.

Year	Rate of Profitability(%): assuming rate of Capital Consumption of: (9) 10%				(10) 15%				(11) 20%			
	pp	change	prr	change	pp	change	prr	change	pp	change	prr	change
1968	28.40	----	77.60	----	26.60	----	72.70	----	24.80	----	67.70	----
1969	34.40	6.00	114.60	37.00	32.90	6.30	109.60	37.00	31.40	6.60	104.60	36.90
1970	34.30	0.10	128.40	13.80	33.00	0.10	123.50	13.90	31.80	0.40	119.00	14.40
1972	34.20	0.10	124.30	-4.10	32.90	-0.10	119.60	-3.90	31.50	-0.30	114.50	-4.50
1974	35.30	1.10	141.80	17.50	34.00	1.10	136.60	17.00	32.80	1.30	131.70	17.20
1976	35.00	0.30	212.70	70.90	34.20	0.20	207.80	71.20	33.40	0.60	202.90	71.20
1977	30.30	-4.70	114.90	-97.80	28.90	-5.30	109.60	-98.20	27.70	-5.70	105.10	-97.80
1978	31.40	1.10	79.50	-35.40	29.40	0.50	74.40	-35.20	27.40	-0.30	69.40	-35.70

pp=private profit; prr =private rate of return.

Costs. Not unexpectedly, raw material costs are the single most important cost element taking, over the years, no less than 40% of gross output. Fuel and electricity costs are more or less negligible when compared to either raw material costs or to 'other' costs. In sum, it can be seen that total industrial costs have consistently taken up more than 50% of gross output since 1968. The share of wages and salaries in gross output remained below 10% except in 1972, 1977 and 1978 when it went slightly above. The shares in output of wages and salaries and of total labour costs (which includes wages and salaries and other incidental labour costs) are strikingly similar. It can be seen that except in 1978, the percentage share of the latter had never exceeded the former by more than 1 percentage point. This obviously points to the insignificance of the so-called fringe benefits and bonuses in labour costs. In what follows, we shall use wages and salaries paid as a measure of labour costs.

In columns 9 to 12 we show the measures of market profitability: profit as a proportion of gross output and as a proportion of capital employed (i.e. the market rate of return to capital). The differences between the columns is due to the assumptions employed in estimating capital consumption. It can be seen that the rate of return is lower by between 9 and 10% when the rate of depreciation is set at 20% than when it is set at 10%. However, the choice of the depreciation rate does not affect the year to year changes in the measures.

The share of profit in gross output shows less fluctuation over the years than the rate of return. For example, the former changed by 6% in 1969, then remained fairly stable until 1977 when there was a sharp drop; on the other hand, the rate of return had a large increase (37%) between 1968 and 1969, a drop (-4.1%) in 1972, another increase, and then a big drop in 1977 (-97.8%). This could perhaps be due to the slight increase in wages between 1976 and 1977 which reduced profit and a slight increase in capital investment which would tend to reduce the profit/capital ratio. Despite the considerable fluctuations, however, it can be concluded that the Nigerian manufacturing sector is quite profitable by any standards.

Further evidence of market profitability is best shown in Tables 7:2a and 7:2b which provide estimates of the average rate of return as well as profit/output ratios in various industries operating in the country.

As the tables reveal, there are wide variations in the rate of profit before tax both between industries and over the years. For example, the rate of profit before tax as a percentage of net assets varied from -75.6% (fruit canning and preservation) to about 213% (food preparations and animal feeds) in 1971; from -58% (travel goods) to 246.6% (machinery) in 1972 and from 2% (machinery) to about 365% (non-alcoholic beverages) in 1977. We can also observe that, over the years, the fortune of many industries has considerably fluctuated. In the wearing apparel industry for example, rate of return fluctuated from -8% (1971) to 76% (1972), dropped to less than 1% in 1974 and then rose again to 92% in 1977. A fairly similar trend can be observed for most of the industries, so that, despite the fluctuations, one can conclude that the rate of private profitability has considerably increased over the years and there are clear opportunities for privately profitable investments in many industry groups.

In the absence of any market and other distortions the

Table 7:2a Profitability in Manufacturing Industry:
Profit before tax as percentage of net assets.

Sector	1971	1972
Meat products	178.70	29.10
Diary products	88.00	32.50
Fruit canning&preserving	-75.60	-42.50
Grain mill	23.40	7.10
Bakery	37.20	0.90
Suger&related prod.	-6.20	32.60
Miscellaneous food	213.30	20.60
Alcoholic bev.	49.40	14.90
Non-alcoh. bev.	36.10	87.60
Tobacco	25.10	22.60
Textiles	16.30	0.80
Made-up texts.	-----	----
Apparel	-8.50	76.30
Leather &	20.90	30.30
Travel goods	-60.00	-58.40
Footwear	-----	-----
Wood	10.90	47.50
Paper	20.70	9.70
Chemicals	98.30	38.50
Paints	3.30	36.00
Drugs	40.40	23.90
Soap	-----	-----
Other chems.	-----	-----
Rubber	14.60	6.70
Cement	22.20	11.20
Basic metals	52.20	31.80
Fabricated metals	38.60	44.00
Machinery	100.80	246.60
Electrical equip.	72.40	33.20
Transport equip.	-----	-----
Misc.products	-----	-----

Notes:______ implies data not available.

Source: Federal Republic of Nigeria(1975),The Third Plan (1975-1980),op cit,p. 356

Table 7:2B Profitability in Manufacturing Industry:
Private Profit per unit of output and Private Rate of Return by sector,1974 & 1977.

	Sector		Private Rate of Return(%)		Private profit (%)	
			1974	1977	1974	1977
6	3111/3122	Food	176.19	120.00	62.24	27.6
7	3131/3133	Alcoholic bev.	143.13	123.66	136.95	47.5
8	3134	Non-alcoh.bev.	88.27	364.52	115.96	48.6
9	3140	Tobacco	161.90	161.97	140.50	48.3
10	3211	Textiles	54.08	353.52	42.37	38.9
11	3212	Made-up text.	53.15	75.15	30.97	28.4
12	3220	Apparel	0.85	92.47	2.04	28.2
13	3231/3233	Leather	22.68	7.06	35.37	5.4
14	3240	Footwear	111.66	85.86	79.29	24.4
15	3311/3320	Wood	57.44	111.46	42.84	34.7
16	3412/3420	Paper	103.18	27.05	40.22	23.3
17	3511/3512	Chemicals	38.56	36.41	44.95	19.5
18	3521	Paints	163.32	193.54	68.54	35.9
19	3522	Drugs	67.98	216.18	43.20	38.0
20	3523	Soap	85.63	247.17	127.21	45.5
21	3529/3540	Other Chem.	4.58	56.05	15.71	21.7
22	3551/3560	Rubber	54.72	44.13	48.23	21.28
23	3610/3699	Cement	76.68	46.24	68.72	34.56
24	3710/3812	Basic Metals	133.25	301.79	38.29	52.15
25	3813/3819	Fab.Metals	121.12	77.84	34.30	16.52
26	3822/3829	Machinery	164.73	1.71	76.20	13.29
27	3832/3829	Elect.Machinery	240.73	113.55	51.10	22.26
28	3841/3843	Transport Equip	178.35	302.23	56.90	10.09
29	3851/3909	Misc.products	82.54	22.73	62.38	11.16

maximisation of profits which the operations of a private enterprise is geared towards, would result in an optimum resource allocation in the sense that no quantity of any good produced in the economy can be increased without reducing that of another good. In this ideal world, the rate of profitability would serve as an index of efficiency as well as a very perfect guide to investment decisions in the manufacturing sector.

However, as we argued in Chapter 4, the Nigerian economy is in fact riddled with market imperfections and distortions - import duties, export taxes and indirect taxes of all kinds. Thus market prices of goods, services and productive factors and hence the prices of costs and benefit items which were employed in estimating profits do not reflect their true social costs. Moreover, empirical evidence tends to suggest that many of the industrial sectors in the LDCs are often characterised by an oligopolistic market structure that permits a few firms to control prices. High levels of protection, as in the Nigerian economy, may have accompanied the establishment of domestic monopoly, making it possible for industries to achieve high profit levels by restricting output and charging higher prices. In such a case, the observed profit rates simply represent rent accruing to the industry as a result of their protection from the world market.

In these circumstances financial profitability may provide an inadequate guide for investment planning and project appraisal and the need for a consistent set of prices which reflect the resource costs and benefits of existing activities becomes apparent. We shall, therefore, devote the rest of this chapter to examining the rate of social profitability, which reflects such adjustments in prices in the Nigerian industries.

7:3:3 Social profitability in the manufacturing sector: 1974 and 1977

Table 7:3 presents estimates of the Social Rate of Return (SRR) and of Net Social Profit (NSP) for the years 1974 and 1977, based on the assumptions that (a) actual or market wages are equal to shadow wages and (b) the annual rate of capital consumption is 15%.

The most obvious thing about the table is the wide variation in both SRR and NSP and hence in the relative efficiency (or inefficiency) of industries. For example, in 1977 the lowest NSP was -0.5157 (footwear) while the highest was 0.4619 (agricultural and industrial machinery). The corresponding values of SRR in the same year are -0.5264 (footwear) and 1.59 (petroleum and coal products). In 1974, the lowest and highest NSP were respectively -0.842 (soap and perfumery) and 0.409 (agricultural and industrial machinery); while for SRR corresponding values are -0.472 (soap and perfumery) and 0.724 (transport equipment). In 1977, the five most socially efficient sectors are machinery, non-alcoholic beverages, petroleum and coal products, alcoholic beverages and basic metals; while footwear, wood products, textiles, miscellaneous manufactures and wearing apparel are the five least efficient industries.

Another significant aspect of the table is the change in the relative efficiency (or inefficiency) of industries between the two years. The SRR increased significantly from -0.108 to 1.59 in the petroleum and coal industry, from 0.0029 to 1.29 in the non-alcoholic beverages sector, and from -0.147 to 0.327 in the industry manufacturing drugs and medicines. On the other hand, industries manufacturing tobacco, leather products and miscellaneous goods, experienced significant drops in their SRR. In both years, industries manufacturing textiles, wearing apparel, footwear, wood products and

TABLE 7:3 Profitability in Manufacturing Industry:
Social Profit as a proportion of Gross output and
Social Rate of Return on Capital,1974 and 1977.

	Sector		Social Profit		Social Rate of Return	
			(1)	(2)	(3)	(4)
			1974	1977	1974	1977
	Code	Name				
6	3111/3122	Food	0.2540	0.0956	0.5993	0.1728
7	3131/3133	Alcoholic bev.	0.2480	0.2739	0.2159	0.2858
8	3134	Non-alcoh.bev.	0.0046	0.3682	0.0029	1.2813
9	3140	Tobacco	0.3772	-0.0465	0.3622	-0.0429
10	3212	Textiles	-0.0325	-0.1685	-0.0345	-0.1718
11	3212	Made-up text.	-0.0837	0.1826	-0.1197	0.2130
12	3220	Apparel	-0.4847	-0.0934	-0.1688	-0.1052
13	3231/3233	Leather	0.1002	-0.0850	0.0535	-0.0529
14	3240	Footwear	-0.2445	-0.5157	-0.2869	-0.5264
15	3311/3320	Wood	-0.2423	-0.2667	-0.2707	-0.1922
16	3412/3420	Paper	-0.0597	0.0369	-0.1276	0.0199
17	3511/3512	Chemicals	0.0053	0.0894	0.0038	0.0692
18	3521	Paints	0.1430	0.0729	0.2840	0.1435
19	3522	Drugs	-0.1119	0.1487	-0.1467	0.3274
20	3523	Soap	-0.8423	-0.0256	-0.4725	-0.0419
21	3529/3540	Other Chem.	-0.4459	0.3592	-0.1084	1.5969
22	3551/3560	Rubber	0.0845	0.1692	0.0799	0.2461
23	3610/3699	Cement	0.2804	0.1283	0.2607	0.0808
24	3710/3812	Basic Metals	0.2383	0.2336	0.6911	0.4533
25	3813/3819	Fab.Metals	0.0436	0.0085	0.1283	0.0176
26	3822/3829	Machinery	0.3646	0.4619	0.6568	0.4875
27	3832/3839	Elect.Machinery	0.0513	0.0065	0.2014	0.0137
28	3841/3843	Transport Equip	0.2770	0.0319	0.7235	0.4451
29	3851/3909	Misc.products	0.1501	-0.1304	0.1655	-0.1212
	Average		0.0330	0.0560	0.1130	0.1920

drugs and medicines are inefficient. On the whole, it can be observed that the rates of profitability are higher in 1974 than 1977: the SRR and NSP each declined in all but 9 of the 24 industrial sectors, even though the average NSP (.056) and SRR (.192) in 1977 exceeded the corresponding averages (.003 and .113) achieved in 1974.

It can be concluded from the table that the extent of inefficiency measured by negative rates of NSP and SRR was fairly moderate in both years. In 1974, 9 (=37%) and in 1977, 8 (=33%) of the industries can be classified as inefficient and/or socially unprofitable. However, although the number of inefficient industries appears small, it should be noted that in 1977 alone these inefficient sectors contributed about 30% to total industrial value-added. This was equivalent to about 20% of industrial output at world prices.

Assuming that the resources - materials, capital and labour - devoted to the inefficient parts of the manufacturing sector in Nigeria could have been employed more efficiently and productively in other more efficient industries, either within or outside the sector, it implies that the growth of, and the welfare in, the economy are lower than they would have been had incentives been structured to draw resources into the more productive and efficient activities.

The robustness of our results will be tested by making new estimates of the social yield of capital and net social profit on the basis of alternative assumptions about capital and labour costs. Such a sensitivity analysis is crucial since neither the true social cost of labour nor that of capital could be determined with any degree of precision. We thus experiment with different values in order to ascertain the extent to which these variations had a significant effect on net social profit level and the social rate of return.

For each of the assumed rates of capital consumption (10%, 15% and 20%), we re-estimated NSP and SRR by varying the assumed ratios of shadow to market (1, .80 and .75). Detailed results for 1977 are presented in Tables 7:3A - 7:3C.

In general, the main effect of assuming a lower opportunity cost of labour is to make marginally inefficient industries (or marginally efficient ones) slightly more efficient. For example, Net Social Profit in the tobacco industry increased from -0.046 to 0.023 and 0.044 when the ratio of actual market wages to shadow wages is varied from 1 to .8 and to .75. A similar change can be observed in the drugs and medicines industry. Variation in the opportunity cost of labour also affects the value of the yield on capital. A decrease in the former has the effect of increasing the latter since part of the wage bill is now counted as payment to capital. Similarly, the main effect of varying the rate of capital depreciation is to alter the level of the rate of return to capital and of net social profit without affecting the relative ranking of industries. Thus increasing the rate from 10 to 20% increases social costs and thereby causes some of the industries exhibiting relatively low unit social profit to be reclassified as inefficient.

Table 7:4 provides a summary of the results. Here we show the mean rates of profitability, the distribution of industries within given ranges and most importantly, the number and percentage of industries classified as inefficient. In general, the average SRR lies within the range 14.2 - 34.0% and the average NSP ranges from less than 2% to 15.7%; the number of inefficient industries varies from 3 (assuming rate of depreciation = 10% and shadow wage/market

Table 7:3A Profitability in Manufacturing:
Social Rate of Return on Capital and social
Profit per unit of output (1977).
(A sensitivity analysis)

			production costs based on: capital consumption allowance=10% Ratio of shadow wages to market wages=					
			1.00		0.80		0.75	
		Sector	SP	SRR	SP	SRR	SP	SRR
6	3111/3122	Food	0.123	0.223	0.161	0.273	0.160	0.289
7	3131/3133	Alcoholic bev.	0.322	0.336	0.367	0.366	0.359	0.375
8	3134	Non-alcoh.bev.	0.383	1.331	0.448	1.478	0.438	1.523
9	3140	Tobacco	0.008	0.007	0.423	0.071	0.098	0.090
10	3211	Textiles	-0.119	-0.122	-0.036	-0.056	-0.035	-0.036
11	3212	Made-up text.	0.225	0.263	0.322	0.325	0.294	0.344
12	3220	Apparel	-0.049	-0.056	0.026	0.011	0.028	0.032
13	3231/3233	Leather	-0.005	-0.003	0.073	0.018	0.040	0.025
14	3240	Footwear	-0.467	-0.476	-0.335	-0.354	-0.310	-0.317
15	3311/3320	Wood	-0.197	-0.142	-0.072	-0.078	-0.081	-0.058
16	3412/3420	Paper	0.130	0.070	0.226	0.095	0.190	0.102
17	3511/3512	Chemicals	0.154	0.119	0.115	0.156	0.215	0.167
18	3521	Paints	0.098	0.194	0.328	0.286	0.160	0.314
19	3522	Drugs	0.172	0.377	0.206	0.446	0.212	0.467
20	3523	Soap	0.005	0.008	0.029	0.073	0.057	0.093
21	3529/3540	Other Chem.	0.371	1.647	0.391	1.696	0.385	1.711
22	3551/3560	Rubber	0.204	0.296	0.278	0.364	0.264	0.384
23	3610/3699	Cement	0.208	0.131	0.299	0.161	0.270	0.170
24	3710/3812	Basic Metals	0.259	0.503	0.297	0.574	0.307	0.595
25	3813/3819	Fab.Metals	0.033	0.068	0.096	0.154	0.087	0.181
26	3822/3829	Machinery	0.463	0.538	0.488	0.772	0.488	0.844
27	3832/3829	Elect.Machinery	0.030	0.064	0.076	0.141	0.078	0.165
28	3841/3843	Transport Equip	0.036	0.495	0.049	0.653	0.051	0.703
29	3851/3909	Misc.products	-0.077	-0.071	0.037	-0.008	0.013	0.012
		Total manufac turing sector Average	0.090	0.242	0.179	0.317	0.157	0.340

SP=social profit per unit of output;SRR=social rate of return on capital.

Table 7:3b Profitability in Manufacturing:
Social Rate of Return on Capital and social
Profit per unit of output (1977)
(A sensitivity analysis contd)

			production costs based on: capital consumption allowance=15% Ratio of shadow wages to market wages=					
			1.00		0.80		0.75	
Sector			SP	SRR	SP	SRR	SP	SRR
	Code	Name						
6	3111/3122	Food	0.096	0.173	0.124	0.223	0.132	0.239
7	3131/3133	Alcoholic bev.	0.274	0.286	0.302	0.316	0.311	0.325
8	3134	Non-alcoh.bev.	0.368	1.281	0.410	1.428	0.423	1.473
9	3140	Tobacco	-0.047	-0.043	0.023	0.021	0.044	0.404
10	3212	Textiles	-0.169	-0.172	-0.104	-0.106	-0.084	-0.086
11	3212	Made-up text.	0.183	0.213	0.235	0.275	0.252	0.294
12	3220	Apparel	-0.094	-0.105	-0.034	-0.039	-0.016	-0.018
13	3231/3233	Leather	-0.085	-0.053	-0.051	-0.032	-0.041	-0.025
14	3240	Footwear	-0.516	-0.526	-0.396	-0.404	-0.359	-0.367
15	3311/3320	Wood	-0.267	-0.192	-0.177	-0.128	-0.150	-0.108
16	3412/3420	Paper	0.037	0.020	0.083	0.045	0.097	0.052
17	3511/3512	Chemicals	0.089	0.069	0.136	0.106	0.151	0.117
18	3521	Paints	0.073	0.144	0.120	0.236	0.134	0.264
19	3522	Drugs	0.149	0.327	0.180	0.396	0.189	0.417
20	3523	Soap	-0.026	-0.042	0.014	0.023	0.026	0.043
21	3529/3540	Other Chem.	0.359	1.597	0.370	1.646	0.374	1.661
22	3551/3560	Rubber	0.169	0.246	0.216	0.314	0.230	0.334
23	3610/3699	Cement	0.128	0.081	0.176	0.111	0.190	0.120
24	3710/3812	Basic Metals	0.234	0.453	0.270	0.524	0.281	0.545
25	3813/3819	Fab.Metals	0.009	0.018	0.050	0.105	0.063	0.131
26	3822/3829	Machinery	0.462	0.488	0.481	0.722	0.487	0.794
27	3832/3839	Elect.Machinery	0.007	0.014	0.043	0.091	0.054	0.115
28	3841/3843	Transport Equip	0.032	0.445	0.043	0.604	0.047	0.653
29	3851/3909	Misc.products	-0.131	-0.121	-0.062	-0.058	-0.041	-0.380
		Total manufac turing sector Average	0.056	0.191	0.102	0.267	0.116	0.286

Note: SP= Social Profit
SRR= Social Rate of Return

Table 7:3c Profitability in Manufacturing:
Social Rate of Return on Capital and social
Profit per unit of output (1977)
(A sensitivity analysis contd)

			production costs based on: capital consumption allowance=20% Ratio of shadow wages to market wages=					
			1.00		0.80		0.75	
	Sector		SP	SRR	SP	SRR	SP	SRR
6	3111/3122	Food	0.068	0.123	0.096	0.173	0.105	0.189
7	3131/3133	Alcoholic bev.	0.226	0.236	0.255	0.266	0.263	0.275
8	3134	Non-alcoh.bev.	0.354	1.231	0.396	1.378	0.409	1.423
9	3140	Tobacco	-0.101	-0.093	-0.032	-0.029	-0.011	-0.010
10	3211	Textiles	-0.218	-0.222	-0.153	-0.156	-0.133	-0.136
11	3212	Made-up text.	0.140	0.163	0.193	0.225	0.209	0.244
12	3220	Apparel	-0.138	-0.155	-0.079	-0.089	-0.061	-0.068
13	3231/3233	Leather	-0.165	-0.103	-0.131	-0.082	-0.121	-0.075
14	3240	Footwear	-0.565	-0.576	-0.445	-0.454	-0.408	-0.417
15	3311/3320	Wood	-0.336	-0.242	-0.247	-0.178	-0.219	-0.158
16	3412/3420	Paper	-0.056	-0.030	-0.010	-0.006	0.004	0.002
17	3511/3512	Chemicals	0.025	0.192	0.157	0.056	0.086	0.067
18	3521	Paints	0.045	0.094	0.094	0.185	0.109	0.214
19	3522	Drugs	0.126	0.277	0.157	0.346	0.167	0.367
20	3523	Soap	-0.056	-0.092	-0.016	-0.027	-0.004	-0.007
21	3529/3540	Other Chem.	0.348	1.547	0.359	1.596	0.363	1.611
22	3551/3560	Rubber	0.135	0.196	0.181	0.264	0.195	0.284
23	3610/3699	Cement	0.049	0.031	0.096	0.060	0.111	0.070
24	3710/3812	Basic Metals	0.208	0.403	0.244	0.474	0.255	0.495
25	3813/3819	Fab.Metals	-0.016	-0.032	0.026	0.055	0.039	0.081
26	3822/3829	Machinery	0.461	0.438	0.480	0.672	0.486	0.744
27	3832/3829	Elect.Machinery	-0.017	-0.036	0.019	0.041	0.031	0.065
28	3841/3843	Transport Equip	0.028	0.395	0.040	0.554	0.043	0.603
29	3851/3909	Misc.products	-0.184	-0.171	-0.116	-0.108	-0.095	-0.089
		Total manufac turing sector Average	0.015	0.142	0.062	0.213	0.076	0.240

Note: SP= Social Profit
SRR= Social Rate of Return

wage ratio = .75%) to 11 (assuming rate of depreciation = 20% and shadow wage/market wage = 1). There is, therefore, a fairly wide gap both in the averages and in the number of inefficient industries when factor prices are varied. If we consider, however, other aspects of the table - particularly the distribution of industries within certain ranges - we see that the relative position of sectors is quite stable with respect to variations in factor prices. Assuming that costs consist of actual wages paid and capital consumption rate set at 15% per annum, the number of inefficient industries is 8, and this appears quite modest and reasonable compared to the apparently low and high figures produced by a combination of other assumptions. Under our assumptions then, the average SRR in Nigerian industries should be somewhere around 19%.

Whichever assumptions are used to arrive at the estimates, it is quite obvious that government policy has channeled resources into some sectors which, though privately profitable, are from the view of the society, highly unprofitable. A comparison of the relevant columns in tables 7:2b and 7:3, will show this. Thus, in 1977, the most inefficient industry (SRR = -0.526) achieved a private rate of return above 86% and the 6 inefficient industries achieved a private rate of return between 7 and 247%. The divergence between private and social profitability can be seen by noting that the correlation coefficient though non-negative, is extremely small and statistically insignificant. In 1977, the coefficient of correlation between private rate of return and social rate of return is 0.138 and between social profit and private profit is 0.143. Similarly, in 1974, while the NSP achieved by the least efficient industry was -0.84, the rate of private profit for the same sector was 127%. Admittedly, the

Table 7:4 Summary of Results: Social Profit as a proportion of Gross output and Social Rate of Return in Nigerian Manufacturing Sectors (1977).

(SWR/MWR) =	1·00						0·80			
Depreciation rate :	10%		15 %		20%		10%		15%	
	sp	srr	sp	srr	sp	srr	sp	srr	sp	srr
Average (%)	0.10	24.20	5.60	19.20	1.50	14.20	14.30	31.80	10.20	26.70
No of sectors with > average.	13.00	9.00	12.00	9.00	13.00	9.00	13.00	9.00	13.00	9.00
(%)	54.00	38.00	50.00	38.00	54.00	38.00	54.00	38.00	54.00	38.00
No & % of sectors within the range:										
0<25%										
No.	14.00	9.00	12.00	9.00	10.00	5.00	12.00	9.00	13.00	10.00
%	58.00	38.00	50.00	38.00	42.00	21.00	50.00	38.00	54.00	42.00
26-50%										
No	4.00	6.00	4.00	5.00	3.00	5.00	6.00	6.00	5.00	3.00
%	17.00	25.00	17.00	21.00	13.00	21.00	25.00	25.00	21.00	13.00
51-100%										
No.	0.00	1.00	0.00	0.00	0.00	1.00	0.00	3.00	0.00	3.00
%	0.00	4.00	0.00	0.00	0.00	4.00	0.00	13.00	0.00	13.00
101-200%										
No.	0.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00
%	0.00	8.00	0.00	8.00	0.00	8.00	0.00	8.00	0.00	8.00
200%+										
No.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<0										
No.	6.00	6.00	8.00	8.00	11.00	11.00	4.00	4.00	6.00	6.00
%	25.00	25.00	33.00	33.00	46.00	46.00	17.00	17.00	25.00	25.00

contd;

Notes: SWR= Shadow wage rate; MWR= Market wage rate; SP= Social Profit; SRR= Social Rate of Return.
Source: Tables 7:3, 7:3A-7:3C.

Table 7:4 contd. (Summary of Results:Social Profitability in Manufacturing Industries).

(SWR/MWR) =	0.80		0.75					
Depreciation rate :	20%		10%		15 %		20%	
	sp	srr	sp	srr	sp	srr	sp	srr
Average (%)	6.20	21.30	15.70	34.00	11.60	28.60	7.60	24.00
No of sectors with > average.	12.00	9.00	14.00	9.00	12.00	9.00	11.00	9.00
(%)	50.00	38.00	58.00	38.00	50.00	38.00	46.00	38.00
No & % of sectors within the range:								
0<25% No.	12.00	6.00	13.00	10.00	13.00	7.00	12.00	8.00
%	50.00	25.00	54.00	42.00	54.00	29.00	50.00	33.00
26-50% No	3.00	4.00	8.00	6.00	5.00	5.00	4.00	3.00
%	13.00	17.00	33.00	25.00	21.00	21.00	17.00	13.00
51-100% No.	0.00	2.00	0.00	3.00	0.00	3.00	0.00	3.00
%	0.00	8.00	0.00	13.00	0.00	13.00	0.00	13.00
101-200% No.	0.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00
%	0.00	8.00	0.00	8.00	0.00	8.00	0.00	8.00
200%+ No.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<0 No.	9.00	10.00	3.00	3.00	6.00	7.00	8.00	8.00
%	38.00	42.00	13.00	13.00	25.00	29.00	33.00	33.00

(End of table 7: -).

Notes:SWR=Shadow wages; MWR=Market wages; SP=Social Profit and SRR=Social Rate of Return.
Source:Calculated from tables 7:3-7:3c.

divergence between social and private profitability is not so great in all industries. Indeed, quite a few industries are both socially and privately highly profitable although there is no socially profitable industry that is privately unprofitable. The point here, it must be emphasised, is not that privately (but not socially) profitable industries should not exist at all, but that policy could have been more rationalised in such a way that investment in some of these industries did not go as far as it should.

7:3:3 <u>The Domestic Resources Costs Criterion</u>

The criteria described above are used to assess the net financial economic result of activities without explicitly relating to other fundamental development objectives in the economy. As was previously indicated, the promotion of industry has been undertaken by the Nigerian government with the objectives of generating and/or conserving external economic surplus. It is therefore necessary to appraise the soundness of the manufacturing activities from the point of view of their foreign exchange effects and international competitiveness. Equation (7:5) is employed for this purpose.

The estimation of foreign exchange costs of an activity presents all sorts of methodological problems. Ideally the assessment of the foreign exchange effects of an activity would entail a careful and thorough analysis of <u>all</u> <u>inflows</u> and <u>outflows</u> which affect the activity <u>directly</u> and <u>indirectly</u>. The foreign exchange costs of an activity will typically include costs of import of capital goods, equipment, machinery and raw materials, components, parts and semi-finished goods,; wages and salaries payable in foreign exchange, repayment of foreign borrowing, royalty on know-how and patent rights, and repatriation of profits and capital, etc. However, precise estimates of these items are difficult to obtain, and, in what follows, we have had to make a lot of approximations and in some instances omit some items. For example, dividends, interest payments on loans and repatriated profits have had to be excluded from the calculations as we could not obtain the relevant information. As another example, for the years 1974 and 1977, on which our estimates are based, no estimates of wages and salaries paid to expatriate staff in the manufacturing industries, are available -- although we have data on the number of people employed by industry. We assume on the basis of previous wage payments (information was available on this between 1963 and 1972), that the average wage earned by an expatriate is N 15,000 ($23,241) per annum. This, multiplied by the number of people employed, gives us the total wages and salaries paid to foreign personnel. We then assume that 50% of this total is repatriated abroad as allowed by the government regulations.

Foreign capital costs are estimated by assuming that 75% of the capital stock is imported and only the rest is considered domestically produced capital. This can be easily justified since the structure of production in the Nigerian manufacturing sector is such that almost all capital goods have to be imported to produce mainly consumer goods. Thus foreign exchange costs of production include intermediate imports, a rate of return to foreign produced capital goods and repatriated payments to foreign labour employed; while domestic costs consist of payments to domestically employed labour plus an assumed rate of return to domestically produced capital used in the production process. As in the previous sections, alternative assumptions are made regarding the values of shadow wages and user costs of capital.

(i) Estimation based on direct costs

Tables 7:5 to 7:7 present nine DRC estimates by sector based on direct domestic and foreign costs. The difference between the tables is due to the assumptions employed in estimating employment and capital costs. As in the previous sections, we hold constant each of the assumed rates of capital consumption while allowing the opportunity cost of labour to vary. It can be seen that the ranking of sectors by the DRC ratios is quite stable, in spite of the different assumptions employed, although there are variations in the number of industries that can be classified as inefficient.

The various results indicate that some 54 - 80% of the industrial sectors had a DRC ratio below the official rate of exchange (N.647 to the $ in 1977)[9]; put differently, 20 -46% of the 24 industries are inefficient in the sense that their costs of production per $ of foreign exchange saved was so high that but for the policy of protection, they would not have competed against imports. In other words, if tariffs had been removed at that time, about 54 - 80% of the industries would have been competitive with imports at the official exchange rate. The total industrial value-added produced by the inefficient industries is in the range 17 - 43% which is equivalent to 13.5 - 37% at border prices. This appear quite modest but, as we shall shortly show, is considerably underestimated by the exclusion of indirect costs. The sectors with high DRC ratio include textiles,

TABLE 7:5 Domestic Resource Costs in Manufacturing Industry: Estimation based on direct costs of production(1977). (Nigerian Naira/$ U.S)

Sector			Production Costs based on: market wages and capital consumption of: 10%	15%	20%
6	3111/3122	Food	0.3762	0.4246	0.4817
7	3131/3133	Alcoholic bev.	0.2274	0.2624	0.3033
8	3134	Non-alcoh.bev.	0.2429	0.2513	0.2599
9	3140	Tobacco	0.6419	0.7415	0.8673
10	3212	Textiles	1.0661	1.3244	1.7129
11	3212	Made-up text.	0.3887	0.4307	0.4790
12	3220	Apparel	0.8099	0.9580	1.1561
13	3231/3233	Leather	0.6983	1.0853	2.0410
14	3240	Footwear	2.6420	3.5014	5.0998
15	3311/3320	Wood	1.1972	1.5329	2.0780
16	3412/3420	Paper	0.4495	0.5852	0.7906
17	3511/3512	Chemicals	0.4256	0.5088	0.6168
18	3521	Paints	0.4769	0.5169	0.5619
19	3522	Drugs	0.3344	0.3637	0.3964
20	3523	Soap	0.6477	0.7469	0.8721
21	3529/3540	Other Chem.	0.0951	0.1013	0.1078
22	3551/3560	Rubber	0.3699	0.4053	0.4452
23	3610/3699	Cement	0.3855	0.4701	0.5825
24	3710/3812	Basic Metals	0.2951	0.3184	0.3439
25	3813/3819	Fab.Metals	0.6039	0.6687	0.7446
26	3822/3829	Machinery	0.1162	0.1168	0.1173
27	3832/3839	Elect.Machinery	0.5844	0.6529	0.7344
28	3841/3843	Transport Equip	0.4237	0.4426	0.4627
29	3851/3909	Misc.products	0.8595	1.0337	1.2754
Average			0.5980	0.7270	0.9390

TABLE 7:6 Domestic Resource Costs in Manufacturing Industry:
Estimation based on direct costs of production(1977)
(Nigerian Naira/$ U.S)

Sector			Production Costs based on: ratio shadow wages to market wages=0.80,and capital consumption of: 10%	15%	20%
6	3111/3122	Food	0.3104	0.3535	0.4043
7	3131/3133	Alcoholic bev.	0.1899	0.2219	0.2594
8	3134	Non-alcoh.bev.	0.1979	0.2055	0.2133
9	3140	Tobacco	0.5277	0.6139	0.7229
10	3212	Textiles	0.8759	1.0959	1.4268
11	3212	Made-up text.	0.3197	0.3569	0.3997
12	3220	Apparel	0.6653	0.7925	0.9627
13	3231/3233	Leather	0.5892	0.9299	1.7716
14	3240	Footwear	2.1557	2.8687	4.1950
15	3311/3320	Wood	0.9839	1.2689	1.7318
16	3412/3420	Paper	0.3774	0.4984	0.6816
17	3511/3512	Chemicals	0.3537	0.4275	0.5234
18	3521	Paints	0.3902	0.4252	0.4645
19	3522	Drugs	0.2746	0.3007	0.3298
20	3523	Soap	0.5323	0.6183	0.7267
21	3529/3540	Other Chem.	0.0786	0.0844	0.0905
22	3551/3560	Rubber	0.3039	0.3352	0.3706
23	3610/3699	Cement	0.3219	0.3976	0.4980
24	3710/3812	Basic Metals	0.2422	0.2631	0.2861
25	3813/3819	Fab.Metals	0.4944	0.2631	0.2861
26	3822/3829	Machinery	0.0941	0.0946	0.0951
27	3832/3839	Elect.Machinery	0.4791	0.5387	0.6094
28	3841/3843	Transport Equip.	0.3449	0.3616	0.3792
29	3851/3909	Misc.products	0.7066	0.8560	1.0633
Average			0.4920	0.6020	0.7840

Table 7:7 Domestic Resource Costs in Manufacturing Industry:
Estimation based on direct costs of production(1977)
(Nigerian Naira/$ U.S)

Sector			Production Costs based on: ratio of shadow wages to market wages=0.75,and capital consumption of: 10%	15%	20%
6	3111/3122	Food	0.2904	0.3318	0.3806
7	3131/3133	Alcoholic bev.	0.1785	0.2096	0.2459
8	3134	Non-alcoh.bev.	0.1842	0.1915	0.1989
9	3140	Tobacco	0.4927	0.5749	0.6789
10	3211	Textiles	0.8178	1.0260	1.3393
11	3212	Made-up text.	0.2986	0.3343	0.3754
12	3220	Apparel	0.6211	0.7419	0.9036
13	3231/3233	Leather	0.5559	0.8825	1.6892
14	3240	Footwear	2.0069	0.6752	3.9183
15	3311/3320	Wood	0.9187	1.1883	1.6259
16	3412/3420	Paper	0.3554	0.4719	0.6483
17	3511/3512	Chemicals	0.3317	0.4026	0.4948
18	3521	Paints	0.3637	0.3972	0.4347
19	3522	Drugs	0.2563	0.2815	0.3095
20	3523	Soap	0.4970	0.5789	0.6822
21	3529/3540	Other Chem.	0.0735	0.0793	0.0853
22	3551/3560	Rubber	0.2837	0.3138	0.3478
23	3610/3699	Cement	0.3025	0.3754	0.4722
24	3710/3812	Basic Metals	0.2261	0.2462	0.2684
25	3813/3819	Fab.Metals	0.4609	0.5144	0.5771
26	3822/3829	Machinery	0.0874	0.0879	0.0884
27	3832/3829	Elect.Machinery	0.4469	0.5037	0.5712
28	3841/3843	Transport Equip	0.3209	0.3368	0.3537
29	3851/3909	Misc.products	0.6598	0.8017	0.9984
Average			0.4590	0.5640	0.7370

leather products, footwear, wood products and miscellaneous goods; internationally competitive activities include alcoholic beverages, non-alcoholic beverages, petroleum and coal products and transport equipment.

<u>(ii) DRC estimates based on direct plus indirect costs (1977)</u>

According to Bruno (1972)[11] DRC estimates can be obtained at any stage of fabrication so that, as shown in the previous section, use can be made of only the direct domestic and foreign costs in appraising the efficiency and competitiveness of industries. However, where the production of inputs needed in the domestic activities also requires imports both directly and indirectly, the concept of DRC should more appropriately be related to direct and indirect material, input and primary factor costs. Using similar assumptions about factor costs as in the previous sections, the ratios based on total costs are presented in tables 7:8 - 7:10.

One can observe from these estimates that the extent of inefficiency was considerably understated by the ratios based on direct cost estimates. Here the range of the number of inefficient sectors is from 11 to 14, (i.e. 46 - 58% of the industries are inefficient) compared to a range of 4 to 10 in the case of the Direct DRCs. This implies that the minimum number of inefficient industries when the direct and indirect factor costs are considered, is greater than the maximum number of inefficient sectors when only direct costs are used. Inefficient sectors in both cases include textiles, wearing apparel, footwear, wood/furniture, soap and perfumery, fabricated metal products and miscellaneous manufactured goods.

Table 7:8 Domestic Resource Costs in Manufacturing Industry: Estimation based on direct plus indirect costs of production(1977).
(Nigerian Naira/$ U.S)

Sector			Direct and Indirect production costs based on: market wages and capital consumption of: 10%	15%	20%
6	3111/3122	Food	0.2608	0.2828	0.3065
7	3131/3133	Alcoholic bev.	0.3692	0.4272	0.4958
8	3134	Non-alcoh.bev.	0.2779	0.2870	0.2964
9	3140	Tobacco	0.5092	0.5604	0.6182
10	3211	Textiles	0.7147	0.8032	0.9079
11	3212	Made-up text.	0.7456	0.8475	0.9707
12	3220	Apparel	1.6366	2.0953	2.8324
13	3231/3233	Leather	0.4229	0.5229	0.6536
14	3240	Footwear	3.0198	3.9466	5.5815
15	3311/3320	Wood	0.9219	1.0665	1.2488
16	3412/3420	Paper	0.8546	1.1617	1.6831
17	3511/3512	Chemicals	3.0549	7.1998	-34.0730
18	3521	Paints	1.1321	1.3079	1.5318
19	3522	Drugs	1.1353	1.7022	2.2337
20	3523	Soap	-3.3944	-2.5292	-2.0452
21	3529/3540	Other Chem.	0.2038	0.2199	0.2369
22	3551/3560	Rubber	0.4720	0.5154	0.5636
23	3610/3699	Cement	0.4519	0.5363	0.6410
24	3710/3812	Basic Metals	0.4937	0.5410	0.5941
25	3813/3819	Fab.Metals	-1.1339	-1.0625	-1.0027
26	3822/3829	Machinery	0.3406	0.3451	0.3496
27	3832/3829	Elect.Machinery	-0.6403	-0.6229	-0.6075
28	3841/3843	Transport Equip	-0.1319	-0.1404	-0.1482
29	3851/3909	Misc.products	0.7075	0.7994	0.9090
Average			0.5180	0.8670	-0.6340

Table 7:9 Domestic Resource Costs in Manufacturing Industry; Estimation based on direct plus indirect costs of production(1977).
(Nigerian Naira/$ U.S)

Sector			Direct and Indirect production Costs based on: ratio of shadow wages to market wages=0.80,and capital consumption of: 10%	15%	20%
6	3111/3122	Food	0.2155	0.2358	0.2577
7	3131/3133	Alcoholic bev.	0.3083	0.3613	0.4239
8	3134	Non-alcoh.bev.	0.2266	0.2349	0.2435
9	3140	Tobacco	0.4191	0.4648	0.5164
10	3211	Textiles	0.5879	0.6657	0.7577
11	3212	Made-up text.	0.6139	0.7034	0.8116
12	3220	Apparel	1.3476	1.1739	2.3679
13	3231/3233	Leather	0.3569	0.4483	0.5675
14	3240	Footwear	0.3569	0.4483	0.5675
15	3311/3320	Wood	0.7587	0.8845	1.043
16	3412/3420	Paper	0.7173	0.9889	1.4501
17	3511/3512	Chemicals	2.5407	6.0565	-28.9520
18	3521	Paints	0.9292	1.0807	1.2736
19	3522	Drugs	1.1161	1.4162	1.8729
20	3523	Soap	-2.7953	-2.0994	-1.7012
21	3529/3540	Other Chem.	0.1685	0.1835	0.1995
22	3551/3560	Rubber	0.3882	0.4271	0.4703
23	3610/3699	Cement	0.3779	0.4543	0.5491
24	3710/3812	Basic Metals	0.4062	0.4485	0.4959
25	3813/3819	Fab.Metals	-0.9295	-0.8763	-0.8318
26	3822/3829	Machinery	0.2763	0.2804	0.2846
27	3832/3829	Elect.Machinery	-0.5254	-0.5146	-0.5049
28	3841/3843	Transport Equip	-0.1123	-0.1216	-0.1302
29	3851/3909	Misc.products	0.5825	0.6633	0.7598
Average			0.4350	0.7000	-0.5490

Table 7:10 Domestic Resource Costs in Manufacturing Industry: Estimation based on direct plus indirect costs of production (1977).
(Nigerian Naira/$U S)

Sector			Direct and Indirect production costs based on: ratio of shadow wages to market wages=0.75 and capital consumption of : 10%	15%	20%
6	3111/3122	Food	0.2016	0.2214	0.2427
7	3131/3133	Alcoholic bev.	0.2897	0.3412	0.4019
8	3134	Non-alcoh.bev.	0.2109	0.2190	0.2273
9	3140	Tobacco	0.3915	0.4356	0.4853
10	3212	Textiles	0.5492	0.6236	0.7118
11	3212	Made-up text.	0.5737	0.6594	0.7629
12	3220	Apparel	1.2592	1.6300	2.2259
13	3231/3233	Leather	0.3367	0.4254	0.5412
14	3240	Footwear	0.6753	0.9362	1.3788
15	3311/3320	Wood	0.7088	0.8289	0.9802
16	3412/3420	Paper	0.6753	0.9362	1.3788
17	3511/3512	Chemicals	2.3845	5.7069	-27.3860
18	3521	Paints	0.8672	1.0112	1.1946
19	3522	Drugs	1.0436	1.3287	1.7626
20	3523	Soap	-2.6121	-1.9679	-1.6077
21	3529/3540	Other Chem.	0.1577	0.1724	0.1880
22	3551/3560	Rubber	0.3626	0.4000	0.4480
23	3610/3699	Cement	0.3552	0.4292	0.5209
24	3710/3812	Basic Metals	0.3794	0.4202	0.4659
25	3813/3819	Fab.Metals	-0.8669	-0.8194	-0.7795
26	3822/3829	Machinery	0.2566	0.2606	0.2647
27	3832/3839	Elect.Machinery	-0.4903	-0.4815	-0.4735
28	3841/3843	Transport Equip	-0.1063	-0.1159	-0.1246
29	3851/3909	Misc.products	0.5443	0.6217	0.7142
		Average	0.4070	0.6790	-0.5220

The percentage of industrial value-added that is inefficiently produced ranges between 35 - 50% at domestic prices and is equivalent to 32 - 45% at border prices. It can be seen that for some of the inefficient sectors, even with an exchange rate devaluation of 50% (i.e. assuming the rate of exchange is N 0.969 to the $), their cost of foreign exchange per $ saved will be too high to allow them to compete unprotected against imports. These include sectors like footwear (3.95), industrial chemicals (7.199), wearing apparel (2.095) and drugs and medicines (1.702); while for other industries like fabricated metal products, soap and perfumery and electrical equipment with negative DRC ratios, whatever the rate of exchange assumed, they cannot survive the competition from imports at all. Such sectors are so highly intensive in imported raw materials and/or capital that the cost of their inputs in foreign exchange exceeds the value of the output produced. This implies that it might be more economical to discontinue their operation and import the commodities hitherto produced by them.

The relationship between the criteria of efficiency as quantified by the NSP and SRR on the one hand and the DRC ratios can now be demonstrated. Only the DRC ratios based on direct cost estimates will be compared with estimates of NSP and SRR since the latter were also based on direct costs of factors.

A comparison of column 4 of Table 7:3 and column 2 of Table 7:5 will show that there is a high degree of correspondence between high social profitability and low domestic resource costs ratio per $ of foreign exchange saved. Indeed, all but one of the nine socially unprofitable industries, i.e. those industries with negative NSP and SRR have their DRC ratios above the official exchange rate, and the three most inefficient industries have equally the highest domestic resource cost ratios. Moreover, one can observe that the top eight sectors that could be classified as internationally competitive (in the sense that their DRC ratios are well below the official exchange rate) are equally the seven most highly socially profitable industries in the economy.

The strength of the direct relationship between high social profitability and low DRC ratios (or of the inverse relationship between high social profitability and high DRC ratios) can be more appropriately determined by computing the spearman's rank correlation coefficients for the industries' NSP and SRR on the one hand and direct DRC ratios on the other. These are summarised below:

Table 7:11 Relationship between social profitability and Domestic Resource Costs in Nigerian manufacturing industries.

	DRR	SRR	NSP
DRC	1	-0.97	-0.98
SRR		1	0.94
NSP			1

Note: DRC based on direct costs only; all parameters estimated assuming SWR/market wage = 1, and capital consumption allowance = 15% per annum. DRC estimates from column 2, table 7:5; Social rate of return and Net social profit from columns 4 and 2 respectively of table 7:3.

On the basis of the results, it can therefore be argued that the objectives of social profitability and international competitiveness are in fact not mutually exclusive. This implies that a policy which channels resources into more socially profitable industries will be equally optimal with regards to the promotion of internationally competitive and efficient industries.

7:4 Effective protection, economic efficiency and domestic resource costs

Perhaps what is most important is the determination of the extent to which, and how, the pattern of the efficiency parameters estimated and the classic import-substitution model correspond. In other words, the question that one should pose is to what extent are the inter-sectoral differences in efficiency related to the differentiated structure of effective rate of protection granted to the manufacturing industry? It is only when this relationship is understood that one can suggest alternative policy prescriptions for improving the economic performance of industry.

To empirically examine the relationship between private and social profitability and domestic resource costs on the one hand and effective rates of protection on the other, we shall employ the following statements, pointed out in the empirical literature, as our testable hypotheses. In a study of the efficiency of the timber industries in Ghana, the author asserts

> "import substitute firms which benefit from progressive increases in tariff and quota protection of the domestic market show higher levels of private than social profitability"[12]

and Little and Scott (1976) further stated

> "investment in industries with low zero or negative effective protection have been socially very profitable"[13]

It is not difficult to visualise the circumstances under which the first hypothesis will be valid in an environment in which industries develop behind high tariff walls. Since the intended effect of a tariff on competitive imports is to provide the local industry with a decisive cost advantage vis-a-vis foreign suppliers, the imposition of the tariff could establish the condition for a sharp contraction in product competition and create a captive market for few producers which in turn permits them to obtain higher levels of profit than would be the case in a more competitive environment. According to Balassa (1971),

> "protected industries tend to follow a policy of low turn-over and high profit rates and have little incentive for product improvement and technical change"[14]

The divergence between these high profit rates and what the society would consider as permissible was noted already.

The relationship between private profitability and effective protection can be analysed on the basis of columns 6 of table 4:8 in chapter 4, and columns 1 and 2 of table 7:2b. One could readily observe that the most highly protected sectors (nerp $\geq$ average) are equally those that have an above average private rate of return. The only exceptions are sectors manufacturing wearing apparel and footwear, whose private rate of return is lower than average despite the high protection. Similarly, with the exception of sectors manufacturing non-alcoholic beverages, all the less protected (nerp $\leq$ 50%) industries achieved considerably low rate of return. Thus there is no less protected sector (except the one mentioned) that had a rate of return as high as the corresponding rates achieved by the highly protected ones.

To formally test the hypothesis that higher rates of effective protection granted to industries lead to higher levels of rate of return and/or private profit, we fitted the following regression equations to 24 industries for which we have data:

$$\underset{1977}{PP} = \underset{(4.64)}{1.98} \quad \underset{(3.04)}{0.31}\ \underset{1977}{erp} \qquad R^2 = 0.29 \quad \bar{R}^2 = 0.26 \quad F = 9.22$$

$$\underset{1977}{PP} = \underset{(4.62)}{1.99} + \underset{(2.77)}{0.29}\ \underset{1977}{erp} + \underset{(0.68)}{0.061}\ CR \qquad R^2 = 0.31 \quad \bar{R}^2 = 0.24 \quad F = 4.73$$

$$PRR = \underset{(1.485)}{1.375} + \underset{(3.344)}{0.737}\ \underset{1977}{erp} \qquad R^2 = 0.34 \quad \bar{R}^2 = 0.31 \quad F = 11.19$$

where PP and PRR are, respectively, private profit per unit of output and private rate of return on capital, erp is net effective rate of protection and CR is the ratio of each sector's sales to total sales in 1977. (t ratios in parentheses).

It can be seen that in all four equations the coefficient of erp is positive as expected and statistically significant. the coefficient of CR though positive, is statistically significant in neither of the two equations. The goodness-of-fit, however, is not excellent: the ratio of explained variation to total variation ranges between only 29% to 37%. Still, the influence of protection can be clearly seen. The correlation coefficients (rank) of private profit and private rate of return on the one hand with effective protection on the other, are respectively 0.502 and 0.621. both being significant at 1% level.

The association of protection with private profitability was weaker for the period 1974. A comparison of column 4, table 4:7a (chapter 4), with columns 3 and 4 of table 7:2b reveals that only 50% of the highly protected sectors (erp $\geq$ average) had an above average private rate of return, and 40% of the sectors with a below average erp had an above average rate of return. Still, the results imply that the percentage of sectors with an above average erp and below average rate of return is less than the percentage of sectors with below average erp and above average rate of return. Thus highly protected sectors are more likely to achieve higher rate of return than less protected ones.

Thus while private profitability appears to be directly related to the effective protective tariff rates, the latter seem to be inversely related to net social profitability (and SRR) and domestic cost ratios, as the above hypotheses suggest. This can be seen in the following ways:

(a) First, all three industrial sectors (viz. tobacco, footwear, soap and perfumery) with nerp greater than 200% (1977) are inefficient and have high direct domestic resource cost ratios; two of these have also a direct and indirect DRC ratio above the official exchange rate. The footwear industry had the highest nerp (323%) and DRC (N 3.50 to \$) and is the most inefficient (SRR = -0.526). Moreover, of the six industries which received a nerp of 101 - 200%, 3 (textiles, wearing apparel and wood products) are inefficient and have high DRC ratios (both direct and direct + indirect). These imply that 6 of the 9 most highly protected sectors (nerp $\geq$ average or $\geq$ 100%) are inefficient and/or internationally uncompetitive. In other words, only 2 (leather products and miscellaneous manufactures) of the sectors classified as inefficient did not receive excessive effective protection.

(b) Second, with the exception of 3 (leather, metal and miscellaneous products), all the industries which were accorded low effective protection (nerp $\leq$ 50%) had direct DRC ratio below the official exchange rate and all are equally efficient with the exception of leather and miscellaneous products industries. In addition, 2 of the less protected sectors (non-alcoholic beverages and petroleum and coal products) are the most socially efficient (SRR = 1.28 and 1.59 respectively) and the latter sector has the lower DRC ratio.

(c) Finally, one can observe that the consumer goods producing sectors, which enjoy, as a group, higher than average erp, achieve a higher rate of private, and a lower rate of social profitability than either the intermediate or capital goods producing sectors. For example, the average rate of private profitability for consumer goods sectors is 32.81% compared with 29% and 15% for the intermediate and capital goods producing sectors respectively. On the other hand, the average rates of social profitability are, respectively, 0.59%, 10.71% and 12.72%. In addition, (i) about 50% of the consumer goods sectors are inefficient; (ii) 88% of the socially unprofitable sectors are in the consumer goods category and (iii) 70% of the sectors with a DRC ratio above the exchange rate belong to this category.

A similar relationship can be established between erp and efficiency parameter estimates for 1974. For example, all but one of the sectors with an above average erp are classified as inefficient; and 2 of the 3 sectors with erp less than 50% have a higher social rate of return (Net Social Profit) than all but 3 of the 12 sectors which received effective protection of between 101 - 200%. Here also we find differences between the more highly protected consumer goods sector on the one hand, and the less protected capital and intermediate goods sectors on the other. Average rates of private profitability are respectively 74%, 54% and 43% and the corresponding average rates of social profitability are -4.02%, 18.4% and -1.99%. Finally, we can observe that 56% of the socially unprofitable sectors belong to the consumer goods category.

Observe that not all of the less protected sectors achieve higher social profit than the more protected ones, or to put it the other way around, not all of the highly protected sectors will have relatively lower efficiency parameters than the less protected ones. For example, sectors producing drugs and medicines and basic metals which received higher than average erp, have higher social profit in 1977 than most of the less protected ones. This is reflected in the low, though significant correlation coefficients between the parameters, as summarised in the table below.

Table 7:12 Coefficients of correlation between effective rates of protection and measures of profitability and domestice resource costs.

	Rank	Pearson	Rank	Pearson
DRC (Direct)	----	----	0.355**	0.599*
DRC (Direct and Indirect)	----	----	----	----
Social Rate of Return	-0.38**		0.343**	-0.419**
	0[1](-0.58)*	[1](-0.59)*		
Net Social Profit	-0.38**		-.0.43*	-.0.551*
	[1](0.57)*	[1](-0.511)*		

Notes: [1]Coefficients computed by excluding soap and perfumery sector. erp for the sector (1974) was -586% and was considered an 'outlier' and hence excluded.

* sig. at 1%

** sig. at 5%.

The two hypotheses tested received additional support in studies of Turkish import-substitution industries by Krueger (1966) and of the Nigerian textile firms by Ekuerhare (1978). Similar conclusions also emerge from the work of Balassa and Associates (1971), Steel (1972) and Kemal (1983)[15].

In an attempt to explain the variations in the level of relative efficiency or inefficiency generated by the high and often differentiated tariff structure, attention is often focussed on the role of inappropriate choice of factor proportions, capacity, under-utilisation, economies of scale and technical or 'x-efficiency' differences among firms and/or industries. Thus, in a study of the economic performance of 39 industrial sectors in Ghana, William Steel (1972)[16] found a significant relationship between low efficiency (high DRC ratios) on the one hand and inappropriate choice of techniques of production (high capital intensity) and excess capacity on the other. The theoretical and empirical relationship between the choice of techniques, technical or 'x-efficiency' and economic performance of the timber industries in Ghana was also explored by Page (1982)[17], and his conclusions lend support to the findings by Steel. Ekuerhare (1978) found no significant relationship between economies of scale and efficiency among firms in the Nigerian textile industry, and more significantly, found that the firms which adopted relatively more capital intensive methods of production tended to be relatively efficient, whilst the firms which adopted relatively more labour-intensive methods of production tended to be relatively inefficient.

The findings by Steel and Page on the one hand and that by Ekuerhare on the other, therefore are contradictory and can be explained thus: the association of high efficiency (i.e. low DRCs) with high labour intensity (i.e. low K/L ratios) is consistent with the prediction of the neo-classical theory of trade, according to which comparative advantage is best exploited in a labour suprlus economy if labour intensive techniques of production are chosen. In so far as the choice between labour and capital intensive techniques is determined by relative prices of factors, a policy of protection (and of domestic investment and wages) which alters these prices in favour of the scarce factor, could only bias production towards those industries which are less competitive at world prices than those relatively intensive in low-cost labour. In other words, within the neo-classical formulation, it is to be expected that relatively more efficient industries would use a more appropriate mix of labour and capital in their production processes. On the other hand, the association of capital intensity with economic efficiency as found by Ekuerhare suggests the presence of factors other than relative factor prices in influencing the choice of techniques of production. In discussing the theoretical choice of techniques in chapter 5 the argument was advanced that irrespective of the prevailing factor price ratio, entrepreneuers could choose a more capital intensive technique either because of certain supply side constraints, and institutional rigidites or for the reason that it is more productive and efficient in the sense that it generates a higher investible surplus than a labour intensive technique. If the choice of capital-using technique is indeed determined by the latter consideration, one would expect relatively more efficient firms to have employed relatively more capital intensive methods of production.

Another possible determinant of the degree of efficiency or inefficiency of industries is the extent of capacity utilisation. Steel (1972) produced evidence to show that capacity under-utilisation was a significant source of high cost in industries operating behind tariff walls in the Ghanian economy. He showed that those "firms considered 'efficient' in 1967-68 utilised half of their total productive capacity, whereas the 'inefficient' firms only slightly exceeded one-third utilisation"[18].

The problem of excess capacity in LDCs is a complex one, arising from a variety of sources. In one major study of the problem in the Nigerian industries, Winston (1981) points out that "excess capacity.. is explained, in descending order of current importance, by shortages and quality of supervisory and technical maintenance personnel, by unreliable electric power supplies, by quality and availability of domestically supplied materials, by port congestion, by specific marketing problems working capital and, finally, by sundry difficulties including strikes, collusion and price-ceilings"[19]. Thus although it cannot be pinned down to only one cause, the single most emphasized factor is government's foreign exchange and other restrictive industrial policies, especially in the face of balance of payments crises, which cause long delays in the supply of essential raw materials[20]. Moreover, as earlier pointed out, the IS strategy often necessitate the use of capital intensive machinery that are actually built for optimum utilisation at scales not within the grasp of most LDC markets; given the non-existant or unexplored export markets - because investment in the export sector is discouraged - industries will necessarily have a very high level of production costs and in addition, the problem of excess capacity faced by the manufacturers will be compounded.

Whatever the proximate cause, the problem of excess capacity is shown to exist in Nigeria in two separate studies[21]. However, there is no adequate data (for example, sectoral utilisation rates) which would permit a systematic exploration of the relationship between our efficiency parameters and rate of capacity utilisation. We shall however, examine the relationship between choice of technique and economic efficiency in Nigerian manufacturing.

The strength and direction of the association between our measures of social efficiency and capital intensity is tested by computing coefficients of correlation, which are summarised in table 7:13. As measures of capital intensity, we use direct capital-output and capital-value-added ratios and direct plus indirect capital-output ratios. If the neo-classical prediction is valid, we would expect sectors with high DRC ratios (or low rates of social profitability) to be on average, capital intensive. Conversely, sectors which have above average rate of social profitability or DRC ratios, will be expected to exhibit relatively lower levels of capital intensity.

Table 7:13 Coefficients of rank correlation between measures of social efficiency and Domestic Resource Costs and measures of Capital Intensity.

Measures of Social Efficiency	Measures of Capital-output ratio	Capital Intensity Capital-value-added ratios	Direct plus indir capital-output-ra
Net social profitability (1977)	-0.355**	-0.403**	-0.282***
Net social profitability (1974)	-0.282***	-.0446*	----
Social Rate of Return (1977)	-0.32***	-0.259***	-0.265***
Social Rate of Return (1974)	-0.412**	-0.546*	----
Private Rate of Return (1977)	0.235	0.241	0.114
Private Rate of Return (1974)	-0.533*	-0.73*	----
Private Profit (1977)	0.392**	0.024	0.334**
Private Profit (1974)	-0.008	-0.295***	----
Domestic Resource Cost (Direct)	0.322***	0.310***	0.258
Domestic Resource Cost (Direct plus Indirect)	0.184	-0.008	0.180

* significant at 1% level
** significant at 5% level
*** significant at 10% level.

The number of industries considered is 24 in 1977 and 23 in 1974. The excluded se 1974 is soap and perfumery.

With few exceptions, our results tend to confirm the above predictions. As we hypothesised, the relationship between (high) DRC ratio and (high) capital intensity (as measured by capital-output and capital value-added ratios), is positive and the coefficients of correlation statistically significant at the 10% level. Smilarly, in both 1977 and 1974, social inefficiency tends to be associated with capital intensity as implied by the negative correlation coefficients between the variables.[22]

It can also be seen that, in 1977, the rank correlation coefficient between private profitability, though low, is positive and statistically significant at the 10% level. However, in 1974, private profitability seems to be negatively associated with measures of capital intensity.

Thus with the possible exceptions of this latter result, our findings suggest that sectors with an above average rate of social profitability tend to have a (below) average level of capital intensity, and those with an above average rate of private profitability, tend to have an above average level of capital intensity. Our results, therefore, lend some support to the findings by Steel and Page, and are consistent with the prediction of the comparative advantage theory of trade. More specifically, our results imply that Nigeria's comparative advantage lies, to some extent at least, in relatively labour-intensive production.

The present policies, which as we have seen in chapter 5, favour the application of capital-intensive techniques will only channel resources into sectors which are not competitive at world prices and/or which are, from the point of view of the society, not socially profitable.

7:5 SUMMARY...Conclusion and Policy Implications

Our first objective in this chapter was to evaluate the efficiency of investment in, and the international competitiveness and profitability of Nigerian manufacturing industries. Our second objective was to relate these efficiency parameters to the Nigerian trade regime. We have found that the extent of inefficiency as measured by social profitability and social rate of return is moderate, judging by the number of inefficient sectors. The loss in output (and therefor welfare) is however far from being moderate. We saw that up to 20% or more of output at international prices was being inefficiently produced. We also found that the cost of import substitution (in foreign exchange) has tended to be fairly high: not only in newly set up sectors but also in those that can be regarded as 'daddies' having been operated for many years. The latter include the textile, wearing apparel, furniture and footwear industries. Other costly -- in fact more costly -- sectors are those that appear to have very high import content and/or high foreign exchange costs: for example, industrial chemicals, paints, drugs and medicines, soaps and perfumery, fabricated metals, electrical equipment and transport equipment. Indeed, as was pointed out earlier, the encouragement and/or further expansion of sectors like fabricated metals, soap and perfumery and electrical equipment appears to have been a rather expensive exercise in import displacement.

The pattern of inefficiency and the high cost of import substitution could be easily explained, to some extent, by the nature of the trade regime and/or the import substitution strategy. We have shown that the strategy has enabled highly protected sectors to achieve signficantly high rates of private, but low rates of social profitability; on the other hand, the more socially efficient, internationally competitive sectors are not rewarded by the existing system of incentives. In other words, the present policy and/or strategy of granting high and differentiated levels of protection to different sectors is not consistent with the social efficiency and international competitiveness of Nigerian manufacturing industries.

Our results have some implications for the future growth and development of the Nigerian manufacturing sector. We have seen that one of the main objectives of the Nigerian government's strategy of industrialisation is a diversification of the economy in order to lay the necessary foundation for sustained economic development. But the diversification of the economy, via backward integration, will be a function not only of the efficiency of the existing structure of production, but also of the extent to which government policies shift the relative profitability of industries in favour of the intermediate and capital goods sectors. The evidence of our study indicates that the pattern of private profitability, like the structure of effective protection, is heavily biased in favour of consumer goods producing industries, and against those industries which are likely to have a more 'integrating' and/or 'diversifying' effect in the economy. Since it is highly unlikely that diversification will be automatically induced, the most rational thing to do will be a formulation of policy and strategy of industrialisation which seeks to neutralise and/or reverse the present biased pattern of profitability in the manufacturing sector. Similarly, whether the Nigerian industry "will increasingly become the supplier of manufactured goods throughout Africa" as envisaged by the government, will crucially depend upon measures to improve efficiency and to alter the bias of protection which favours production for the home market. Policy reforms needed to improve efficiency, diversification and competitiveness will be examined in the next chapter.

It must be emphasised that we make no pretence of having explained all possible sources and/or determinants of industrial inefficiency, nor can it be claimed that the pattern of inefficiency is necessarily representative of what obtains in other periods. But our results do imply that efficiency performance and international competitiveness of Nigeria's industries can be greatly improved if the tariff structure is more rationalised so that resources are channeled into more socially productive sectors rather than into those that are merely privately profitable.

__Notes__: Chapter 7.

1. Federal Ministry of Information, The Sovereign Budget, p2Ø, cited in Oyejide, T.A. 91975) op cit pp46-47.

2. Chenery (1961) first provided an analysis of the NSP concept in a programming context and related it to the concept of SMP. See Chenery, H.B. (1961) op cit. Bruno (1963, 1967 and 1972) provided a full discussion of the historical evolution of the DRC criterion of its use in a linear programming framework and of how it is related to other efficiency criteria. See Bruno, M. (1967) "The optimal selection of export-promoting and import substituting projects" in Planning the External Sector: Techniques, Problems and Policies (New York, United Nations). Bruno, M. (1972) "Domestic resource costs and effective protection: clarification and synthesis", Journal of Political Economy, Vol.LXXX, No.1. The concept of DRc has also been used by Krueger, A.O. to study the domestic cost of foreign exchange in Turkish Manufacturing. 'Economic Costs of Exchange Control: The Turkish Case", Journal of Political Economy, LXXIV, October. See also the various country economic reports prepared by the National Bureau of Economic Research (NBER) Foreign Trade Regimes and Economic Development, directed by Bhagwati, J. and Krueger, A.O. For the application of the NSP criteria to the Nigerian textile firms, see Ekuehare, B.U. (1978) An Economic appraisal of Import-substitution Industrialisation with special reference to the Nigerian Textile Industry, unpublished PhD Thesis, University of Manchester. For a comparison of three criteria of efficiency see also Pearson, S.R. (1976) "Net Social Profitability, Domestic Resource Costs and Effective Rate of Protection", Journal of Development Studies, Vol.12, July.

3. Bruno, M. (1972) op cit p16-19.

4. This example is due to Kirkpatrick, C.H. and Nixon, F.I. (1983), The Industrialisation of Less Developed Countries, Manchester University Press. Footnote 27, p63.

5. See Bruno, M. (1967) op cit p114.

6. Balassa, B. and Schydlowsky, D.M. (1968) op cit.

7. Other principal assumptions required to consider the ERP and DRC concepts as equivalent are that all commodities are traded, that there are no transport costs; that costs of production are constant and that output is homogeneous and its price is known; if these conditions are met; Krueger (1972) has shown that

$$DRC_i = \frac{q_i - \Sigma_i q_j a_{ji}}{1 + \Sigma_j a_{ji}}$$

$$= \frac{(1+t_i) - \Sigma_j (1+t_j) a_{ji}}{1 - \Sigma_j a_{ji}}$$

$$= E T_i + 1$$

where

DRC_i = domestic resource cost in activity i;

q_i = price of the i^{th} commodity;

t_i = tariff rate on ouput i;

t_j = tariff rate on input j;

ET_i = effective rate of protection on activity i.

It should be noted that even where some of the conditions are met, the erp and DRC concepts differ since the latter generally includes direct as well as indirect value-added of an activity whereas the former is usually measured with respect to direct value added only. If the direct plus indirect value-added concept is introduced in the erp computations, it can be shown that

$$DRC_i = 1 + \Sigma_j ET_j \frac{VT}{\Sigma_j VT}$$

so that DRCF is equal to unity plus a weighted average of erp, the weight being the direct and indirect value-added per unit of output $(V^T/_j V^T)$. For an elaboration of these points, see Balassa B. and Schydlowsky, D.M. (1968) op cit; Balassa, B. and Schydlowsky, D.M. (1972) "Domestic Resource Costs and Effective Protection Once Again", Journal of Political Economy, LXXXX, 1; Bruno, M<. (1972) op cit; Krueger, A.O. (1972), "Evaluating Restrictionist Trade Regimes: Theory and Measurement", Journal of Political Economy, LXXX, 1; Pearson, A.R. (1976) op cit. See also, for an empirical contribution, Kemal, A.R>. "The Manufacturing Industries of Pakistan: An Analysis of Efficiency" in Kirkpatrick, C.H. and Nixon, F.I. (eds) (1983), op cit, chapter 5.

8. Balassa, B. and Schydlowsky, D.M. (1972) op cit, p67.

9. Bhagwati, J. and Srinivasan, T. (1978) "Shadow prices for project selection in the presence of distortions", Journal of Political Economy, 86, pp97-116.

10. Ibid, p107-108.

11. Bruno, M. (1972) op cit, pp16-33.

12. Page, J.M. (1976) "The social efficiency of the Timber Industries of Ghana" in I.M.D. Little and M.F.G. Scott (eds) (1976) Using Shadow Prices, London, Heinemann, p114.

13. Little, I.M.D. and Scott, M.F.G. (eds) 1976 ibid, p8.

14. Balassa, B. and Associates (1971) op cit, p79.

15. Balassa, B. and Associates (1971) op cit; Ekuerhare, B.U. (1978) op cit; Steel, W.F. (1972) "Import-substitution and excess capacity in Ghana", Oxford Economic Papers, Vol.24, No.2. Krueger, A.O. (1966) op cit; Kemal, A.R. (1983) op cit

16. Steel, W.F. (1972) op cit

17. Page, J.M. (1980) "Technical Efficiency and Economic Performance: Some Evidence from Ghana" Oxford Economic Papers (New Series), 32, pp319-339.

18. Steel, W.F.. (1972) op cit p230.

19. Winston, G.C. (1981) op cit, p121.

20. See Steel, W.F. (1972) op cit, p230; Luth (1974) Foreign Trade Regimes and Economic Development: Ghana; NBER; in the case of Ghana. See also Fahahunsi, A. (1980) op cit, p45.

21. Winston, G.C. (19810) op cit p97, showed that "the average manufacturing plant in Nigeria is totally idle 4,950 hours a year (57% of the time). Rates of utilisation varied from 19% of the time to 100% in the 45 firms he interviewed. The average rate of capacity utilisation in all manufacturing establishments was found to be 75-80% in another study (Fahahunsi, Akir 1978). Average rates vary from about 8% in 1975 (vegetable oil industry) to 100% in the same year (beer industry). Fadahunsi, A. A Survey of Capacity Utilisation in Manufacturing Establishments; Research Report No. 3, Centre for Social and Economic Research, Ahmadu Bello University, Zaria, Nigeria.

22. We also fitted the following regression equations for the cross-section of our industries"

1. log PRR = 4.128 - 0.879 log K/V (1974)
(1974) (18.23) (-3.057)
R^2 = 0.308
F = 0.37

2. SP (1974) = 13.140 - 9.520K/V (1974)
(1.74 (-2.54)
R^2 = 0.235
F = 6.46

3. SRR (1977)= 41.66 - 21.46 KO 91977)
(2.18) (-1.34)
R^2 = 0.075
F = 1.79

4. SP (1977) = 16.77 - 4.74 KV (1977
(2.12) (-1.67)
R^2 = o.11
F = 2.79

5. logPP (1977)= 3.22 + O.373 logDKO (1977)
(31.35) (2.68)
R^2 = o.246
F = 7.18

6. logPRR(1977)= 4.086 + 0.559 logKV (1977)
(15.118) (2.323)
R^2 = 0.20
FD = 5.39

where

PRR = Private Rate of Return
PP = Private Profit;
SP = Social Profit;
SRR = Social Rate of Return
K/V = Capital-output ratio;
DKO = Direct plus indirect capital output ratio.

The coefficients of the capital intensity terms are expected to be positive if the dependent variable is private profit/private rate of return and negative if the dependent variable is social profitability measure. Although the goodness-of-fit is not excellent all the equations (except No.1) show that relatively socially efficient sectors have tended to use relative less capital per unit of output than the socially inefficient ones. the low values of R^2 are consistent with the low values of the correlation coefficients shown in the main text.

CHAPTER EIGHT

Summary and Conclusions

The Nigerian government has attempted since independence in 1960, to encourage the expansion of manufacturing activities with the objectives of promoting growth and diversification, reducing dependence on agricultural exports, earning foreign exchange and generating employment opportunities etc. The country has followed an import substitution strategy of industrial development, which has meant the use of tariffs and quantitative restrictions on imports and the provision of a variety of industrial tax incentives, to induce and encourage the establishment of domestic manufacturing industries.

The central objective of this study has been the quantitative appraisal of the policies and methods employed in the promotion of industries in the country over a period of 16 years from 1963. Specifically, an attempt has been made to estimate the repercussions and effects which resulted from the industrialisation of the country. The estimates consisted of taking into account repercussions in terms of growth and import substitution (Chapter 4), employment and inter-industrial linkages (Chapter 5), productivity growth (Chapter 6) and investment efficiency or profitability of industries (Chapter 7). The following paragraphs highlight the major findings and conclusions of the study. These conclusions are to be interpreted in the light of some conceptual and methodological limitations of our analysis which are also discussed here.

Our appraisal of almost two decades of industrialisation shows indeed a substantial growth and development of the manufacturing sector. The strategy of import substitution has enabled the country to produce a wide range of items from matches, candles and furniture to alcoholic, non-alcoholic beverages and tobacco; the country assembles a variety of goods, from watches to radios and TV sets; from commercial vehicles to agricultural tractors etc. The manufacturing sector has enjoyed fairly rapid rates of growth over the 1963-78 period. Gross output and value-added registered an average growth rate of about 14 percent and 12 percent per annum respectively within the period. At least 40 percent of the manufacturing sub-sectors registered rates of output growth higher than that of the manufacturing sector as a whole. Sub-sectoral rates of growth vary from - 3.9 percent (tobacco) to 34 percent (drugs and medicines). Although a considerable scope for further import substitution still exists, substantial progress has been made in some sectors, notably tobacco, alcoholic and non-alcoholic beverages, wood, soap and perfumery etc. The ratio of imports to total supply has been reduced from 0.63 in 1962 to 0.45 in 1974 and 0.54 in 1977. The higher ratio in 1977 than in 1974 reflects in part the increasing importation of _new_ goods rather than the importation of goods already being substituted.

Despite the rapid growth and the progress in import-substitution, however, the manufacturing sector is weak and underdeveloped contributing only a small amount to the GDP. The structural characteristics of the sector were found to be fairly consistent with the classic pattern of structural change associated with the early stages of import-substitution industrialisation in Latin America and Asia. Specifically (1) industrial expansion has been heavily biased in favour of consumer goods notably textiles, food, beverages and tobacco. The goal of proceeding to diversify and to industrialize downwards through the ultimate production of intermediate products and capital goods is still far from being realised. The consumer goods sectors accounted for about 65 percent of industrial value-added over the period 1963-1978. Although their share in output fell slightly between the two periods, the underdevelopment of the intermediate and capital goods sectors remains visible. Despite their high growth rates, the machinery and electrical equipment sectors are very limited in size and scope, performing only the final touches of assembling the almost finished industrial imports into final products, (11) Most of the increases in output were confined to the domestic market, and manufactured exports remain under-developed. The ratio of manufactured exports to total exports declined to less than 1 percent in 1977 from about 7 percent in 1964. The ratio of manufactured exports to gross output has similarly been on the decline. In 1974, only five sectors - leather products, wood products, industrial chemicals, petroleum and coal and metals - managed to export more than 5 percent of their gross output; and between 1974 and 1977, there was a decline in the ratio of manufactured exports to gross output in about 46 percent of the manufacturing sectors. The sector has thus failed to emerge as a source of foreign exchange earnings. To what extent are these structural characteristics related to Nigeria's trade regime?

Our analysis, in chapter 4, of the tariff structure reveals a considerably high and differentiated level of effective protection averaging 94 percent in 1974 and 149% in 1977. This shows an increase of 114 percent and 239 percent respectively from the level of 44% in 1962. The differences for effective rates of protection were great, ranging from a high of 450 percent for footwear, to a low of 52 percent for leather products in 1977 and from 309 percent (footwear) to -586.76 percent (soap and perfumery) in 1974. Net effective protection averaged 91 percent in 1977 and ranged from 323 percent to 6 percent for footwear and leather products respectively. We found 42 percent of the manufacturing sectors with an above average rate of net effective protection in 1977. We noted also a cascading in the levels of effective protection with the consumer goods producing sectors receiving the highest protection and intermediate goods receiving the lowest. Average rates for the former increased from 102 percent in 1974 to 196 percent in 1977, while the corresponding rates for the latter were 78 percent and 80 percent. In 1977, 54 percent of the consumer goods industries received above average net effective protection as against 29 percent and 25 percent respectively for the intermediate and capital goods industries. Put differently, 70 percent of the sectors with above average net effective rate of protection belong to the consumer goods producing sectors. A similar trend can be observed from our estimates for 1974 and from those in earlier years prepared by Oyejide and Oyelabi. Such a wide range in effective protection is not only inequitable but will have the effect of transmitting rewards to activities and products that do not necessarily encourage the development of backward integration via intermediate and capital goods production.

It must be emphasised that any generalisations and inferences to be drawn from our estimates of erp should be made only with extreme caution owing to the existence of several rather serious theoretical and practical problems. First, as we pointed out in chapter 4, many writers are critical of the assumptions of lack of substitutability between imported inputs and domestically produced intermediate goods and the absence of any general equilibrium effects; second, the level of aggregation which we had to adopt for lack of more detailed information, may be too great to allow making useful generalisations. It is well-known that tariffs and quantitative restrictions apply to products, whereas our industry categories often represent more than one product. Indeed, it was shown that the erp estimated for some sectors does not accurately reflect the level or degree of protection accorded to their sub-sectors. Third, there is the limitation which arises from our assumptions that price differentials are more or less accounted for by tariffs alone. However, it is well known that quantitative restrictions and other non-trade distortions such as indirect taxes, profit markups, transport charges etc, could be more crucial in explaining these price differentials and protection. Although an attempt was made to adjust for 'other' distortions, we consider as inadequate the use of a uniform premium rate since it implies that industries are subject to the same degree of, say, quantitative restrictions. Finally, given the assumption that domestic-international price differences are reflected in nominal tariff levels, any redundancy in tariffs renders the exercise to be of extremely limited usefulness. Whether or not it exists can only be resolved by making price comparisons which we could not do owing to the lack of adequate information. Given that such refinements have not been made in our study some bias in the estimates may be inevitable and this should be borne in mind.

Inspite of these limitations, estimates of erp for the individual industries are of interest for a number of reasons. First, comparing our estimates with those available for a variety of countries will enable us to examine whether a 'normal' pattern of erp exists and the extent to which Nigeria deviates from such a pattern; second, and perhaps more significant, these estimates can enable one to analyse the extent to which the structural characteristics of the manufacturing sector are influenced or shaped by the structure of effective protection, and hence determine the benefits and/or costs of maintaining a given structure of protection. To what extent for example, does the existing structure of protection enhance or hinder the achievement of the desired degree of industrialisation or of other objectives?

To test for the effectiveness of the tariff structure in the allocation of resources among the manufacturing industries, we examined the relationship between import substitution and industrial growth on the one hand, and effective tariff protection on the other, using various parametric and non-parametric tests of association. The general results of the correlation analysis suggest that the erp does play a role in stimulating industrial growth, although for various reasons, the evidence is only suggestive in nature. It is suggested that the predictive power of the erp would have been vastly strengthened but for a number of factors. First, in addition to the problems enumerated above, it was earlier argued in Chapter 4 that tariffs have tended to be indiscriminately provided to industries and have been subject to substantial short term fluctuations; as such, the price signals which they are expected to transmit might not come through clearly in terms that are understandable and on which entrepreneurs could depend and act. Second, one would expect that output and investment decisions are also affected by other factors such as government direct investment and credit allocations, other industrial tax incentives, access to investible funds from abroad etc which we could not quantify and incorporate in the usual erp calculations. The relative influence and/or importance of each of these needs to be further examined before any definite conclusion can be made. Third, the effective rates of protection used in the analysis were measures of protection at one point in time whereas it might be reasonably expected that the growth of industries and the extent of import-substitution reflect the cumulative influence of a multitude of factors over a relatively long period of time. Even in the absence of these limitations, two additional problems present themselves: (1) As we pointed out earlier, policy instruments in Nigeria were often applied mainly to cope with balance-of-payments difficulties and/or to stabilize the domestic price level. Thus their stimulation of domestic industrial activity because of their protective effects could have been simply a by-product and (2) there is the related difficulty of inferring a casual relationship from the measures of association which we computed. Given these limitations, it is perhaps premature to accept the neo-classical interpretation of the erp as an accurate indicator for resource measurements; rather, it appears more reasonable to argue that the foreign trade regime could be at least supportive of the general policy and/or process of the allocation of resources that has taken place within the manufacturing sector.

With regards to the failure of manufactured exports to develop, our conclusion is also only speculative in the absence of any systematic evaluation of the effects of tariff policies. The high protection offered to domestic industry implies a lower real exchange rate than would be the case in a 'free-trade' situation. This, coupled with the high profitability in domestic markets of Nigerian manufacturing industries, would tend to pull resources into the production for the protected domestic markets and impede exports. Indeed our estimates of erp show that industries for which the country would seem to have good prospects for exporting (natural resource based for example) are not encouraged with high effective protection. Admittedly, the difficulties faced by LDCs in exporting manufactures do not simply reflect the fact that at present exchange rates costs of production are higher at home than abroad. They may include the supply and institutional limitations we enumerated in Chapter 2. Moreover, we have shown that, owing perhaps to Nigeria's comfortable position with regards to foreign exchange and the existence of a large domestic market, no serious efforts were made by the government to promote exports of manufactures. Further research needs to be done to determine the various forces at work.

As was shown in Chapter 5, an evaluation of economic sectors in terms of capital, employment, output, factor payments and foreign exchange using input-output analysis reveals (i) a considerable divergence between, on the one hand, the <u>direct effects</u> and on the other, the <u>indirect</u> and <u>total effects</u> of sectoral expansion, emphasising the need to consider the latter in policy formulations; (ii) that economic sectors do vary considerably from the viewpoint of the effect of their expansion on different objectives; and hence (iii) the potential difficulties involved in the selection of 'key' sectors when there are multiple objectives and constraints; (iv) relatively few 'key' employment sectors within the manufacturing sector, (v) the superiority of import-substitution over export promotion strategy in the provision of employment and (vi) the virtual non-existence of high inter-industrial linkages.

On average, the direct and total employment multipliers in the primary and tertiary sectors far exceed those in the manufacturing sectors. On average however, the direct, indirect and total output generated per unit of final demand is higher in the latter than in the former. As one would expect, the manufacturing sectors have much higher foreign exchange and capital requirements than either the primary or tertiary sectors. Within the manufacturing sectors, higher than average capital-output and capital-value added (capital-labour) ratios can be observed in 70 percent (46 percent) of the sectors. Assuming the availability of foreign exchange to be main constraint, our analysis shows that over 70 percent of the selected 'key' sectors belong to the primary and tertiary group. The most important sectors (within manufacturing) include textiles, leather products, and wearing apparel. Thus the country's comparative advantage will seem to lie in the active promotion of these plus the primary sectors. The least important sectors, all manufacturing, include transport equipment, machinery, electrical equipment, paints and drugs and medicines.

Similarly, the employment linkage potential of the manufacturing sectors is quite minimal. Only 25 percent of the sectors have a high backward employment linkage potential and none has a high forward employment linkage potential. Thus none could qualify as a 'key' employment sector in the sense of having both a backward and forward linkage index greater than unity. The few manufacturing sectors with high backward employment linkage indices are food processing, non-alcoholic beverages, tobacco, textiles, made-up textiles and miscellaneous products. This general absence of 'key' employment industries suggests the severe constraints imposed on the creation of employment opportunities by the present structure of the Nigerian economy and casts serious doubts upon the ability of the manufacturing sector to provide the greatest source of employment opportunities in the economy.

It was also found in Chapter 5 that in 1977, Nigeria's manufactured exports embody less labour and more capital than its manufactured imports. In otherwords, in terms of the H-O model of trade, there was something of a paradoxical situation where Nigeria has not exported manufactured products in accordance with its presumed international comparative advantage. Given the relative Nigerian labour abundance, one would expect the country to exhibit a heavy concentration of labour intensive goods in its manufactured export basket. However, the opposite has been the case. On the other hand, it was noted that a strategy of export promotion would have been less foreign exchange using and more value-added generating than an import-substitution strategy. Our results imply that in order to realise an appropriate mix of objectives, the two strategies must be seen as complementary rather than a substitute for each other.

It must be pointed out that although our conclusions are fairly consistent with the results obtained by other authors in the context of other LDCs, they must be regarded as specific to the circumstances of the Nigerian economy and perhaps to the level of aggregation of industries which we have adopted. Specifically, the paradoxical situation which we found must be interpreted with caution especially in view of its dependence upon the structure of Nigeria's foreign trade in 1977, which is certainly not invariant through time. In addition, the analysis is based upon the existing trade and exchange rate policies which, in our view, are non-optimal. It is conceivable, therefore, that a more rational policy, leading to a greater resource allocational efficiency would lead to an entirely different set of results. It is also worthwhile emphasising some of the defects of the static input-output model and of the procedure followed in disaggregating the table, which could render our estimates doubtful indicators on which to base future economic policy formulations. Admittedly, the disaggregation method (described in the appendix) is rather simplistic and involves several erroneous assumptions; as such, it could have resulted in (disaggregated) coefficients which are not truely reflective of the actual structural interdependence of sectors in the Nigerian economy. The limitations of the static input-output model are rather well known to be repeated here in detail. In addition to the proportionality assumption, one has to assume that each industry produces only a single product and has a single input structure, that the technological coefficients remain constant over a fairly long period, that there are no external economies or diseconomies etc. We recognise that the homogeneity assumption is rather restrictive and ignores the issue of multicommodity sectors. The magnitude of the bias can be minimized by a further disaggregation of the table. But for many LDCs, the disaggregation of industries into completely homogeneous groups is almost impossible. One therefore has to contend with the aggregate input coefficients which are no more than averages over a spectrum of technologies and products. It is also well known that input coefficients may change either because of changes in technology or changes in relative prices which cause certain inputs to be substituted for others. It must however be realised that often, especially in the less developed countries, changes in technology (or technical progress) are very gradual. Indeed, even in the more advanced nations, consumer resistence to new products and/or producer resistance to new techniques of production could make the transmission of technical progress a slow process. As such, the magnitude of the 'distortions' introduced by technological changes is not likely to be great especially if the projections cover a relatively short-period. More sophisticated (e.g. dynamic) models which take account of many of the above defects of the static model do exist. However, given the rather shaky data base of the LDCs, one would be more comfortable with the present, simple but powerful and useful model, even if it is based on rather strong assumptions. Even though these assumptions are not easily empirically defensible, our simple approach is useful and interesting and provides a benchmark from which further research could be undertaken.

The hypothesis that capital intensity in production results from a rigidity in the choice of technical blue prints is not supported by our analysis of the estimates of substitution elasticities between capital and labour as reported in Chapter 6. High and statistically significant estimates are found to exist for the manufacturing sector as a whole. Moreover, of the 24 manufacturing industries analysed, between 17 and 50 percent (depending on the estimating equation) have values of substitution elasticities equal to, or greater than, unity and using the ACMS equation, 70 percent have estimates which are not statistically different from unity. Estimates of the elasticity of substitution are found to be affected by inter-industry variations in capital intensity and by increasing returns to scale. The flexibility in the choice of techniques is highest in sectors manufacturing food, textiles, wearing apparel, wood products, drugs and medicines, petroleum products, basic metals, electrical machinery and miscellaneous products and lowest in sectors manufacturing non-alcoholic drinks, fabricated metals and transport equipment. This is quite a significant result and also consistent with the study and findings in some other LDCs. Thus one of the implications of our analysis is that other things being equal, investments in those industries with relatively high substitution possibilities may increase employment.

Although capital intensity in production may well arise for a variety of other reasons as discussed in Chapter 5, our regression and correlation analysis in Chapter 6 give a strong indication that the decision to employ capital and labour are often made in the face of strong biases arising from the protection system. In general, the more highly protected sectors tend to be more capital intensive than the less protected ones. More specifically, evidence was found in the Nigerian economy in support of the neo-classical contention that changes in factor prices are decisively important in influencing the factor intensity of production. It follows, therefore, that the obstacles in the way of employment creation are liable to increase as the Nigerian authorities continue to pursue their industrialisation policy behind high and differentiated tariff walls.

It is important to bear in mind, however, that the mere existence of high substitution possibilities and/or the removal of factor-price distortions are not sufficient by themselves to generate sufficient employment opportunities for the presently large unemployed labour force. It was suggested that to effectively tackle the employment problem serious considerations should be given to the development of the hitherto neglected primary sectors, the small-scale industries and to policies that encourage firms to produce at full capacity and to the provision of employment subsidies.

As for the import/foreign exchange intensity of domestic industries, we found no strong relationship with the structure of effective protection. Under a rational tariff policy, one would expect the authorities to grant the less foreign-exchange intensive sectors more effective protection than the more foreign exchange using ones. The opposite seems to be the case however, as the effective rate of protection is found to be positively (but weakly) associated with the direct plus indirect import-output ratios of the sectors. Earlier in Chapter 3, we showed that the IS strategy has not reduced the level of imports into the country but merely changed the import structure from dependence on consumer goods to dependence on intermediate and capital goods.

Our analysis in Chapter 6 of the inter-industrial pattern of productivity growth has revealed a varied performance between industries and over time. The rate of labour productivity growth for the whole manufacturing sector in the period amounted to only 1.3 percent per annum. Sectoral differences are great, ranging from -12 percent (basic metals) to 23 (drugs and medicines). 75 percent of the manufacturing sectors achieved positive rates of labour productivity growth; 83 percent of these (or 63 percent of all sectors) achieved higher rates of growth of labour productivity than that achieved by the whole sector.

With regard to total factor productivity growth (TFPG), it was found that, in the aggregate, Nigeria compares favourably not only with the developing but also with the developed countries for which data is available. The inter-sectoral pattern of TFPG is however less encouraging. 63 percent of the sectors achieved positive rates of

TFPG during the period 1963-78, but only 42 percent achieved TFPG rates greater than 1 percent and only 40 percent of those sectors with positive TFPG rates (i.e. 25 percent of all sectors) went above the 3 percent mark obtained by the manufacturing sector as a whole. It has been shown that food processing, alcoholic beverages, tobacco, textiles, wearing apparel, wood products, chemicals, fabricated metals and miscellaneous products are the lowest ranked in terms of TFPG.

The rapid growth in labour productivity for most manufacturing industries was found to be a function of output growth and the application of capital intensive technology. Applying the Johansen model, we found in Chapter 6 that technical progress played only a minor role. As seen through our CES estimates almost all industries have displayed strong Verdoorn's coefficients. The existence of scale economies indicated by these coefficients implies that expanding the size of the market through export expansion for such industries can play an important role in increasing productive efficiency. The association between capital intensity and labour productivity is likely to pose a policy dilemma in the economy: increase in employment opportunities would require reduction in capital intensity which however will run counter to the desirable policy of increasing labour productivity. However, capital deepening need not be desirable as such, since as we have found, the slack in TFPG could have resulted from a disproportionate increase in the capital input.

The influence of protection on productivity growth is much less easy to determine. On the one hand, the conventional hypothesis that high and differentiated levels of protection could result in the persistence of productive inefficiency cannot be fully supported given the rapid growth of labour productivity for a majority of the sectors (although the same does not apply in terms of TFPG). On the other hand, we found considerable variations in TFPG and labour productivity growth which seem to be in line with variations in the trade regime. For example, during the most restrictive phase of the protectionist regime (1975-78), up to 50 percent of the sectors achieved negative rates of labour productivity growth and up to 67 percent had negative rates of TFPG, while during the more 'liberalised' phase, the corresponding percentages were respectively 29 percent and 42 percent. A precise delineation of phases is of course extremely difficult but the findings lend some support, albeit an inconclusive one, to the contention that variations over time in productivity growth can be explained by changes in the trade regimes. Additional evidence was also found. For example, in the period 1975-78 (1971-75), 83 (88) percent of the sectors with negative rates of labour productivity growth were accorded higher than average rate of effective protection in 1974; Similarly, in the same periods, at least 60 percent of the sectors with negative TFPG were accorded higher than average erp. Finally, of the 16 sectors with negative TFPG in 1975-78, 38 percent received above average net effective protection in 1977. These findings would prompt one to ask whether indeed the granting of high effective rates of protection is the best way to nurture Nigerian industrial 'infants'!

Let us hasten to add that we make no claims that our results are error free. It is well known that the estimation of TFPG and of the elasticity of substitution using production functions involves several highly restrictive assumptions especially regarding the nature of competition and the pricing of factor inputs, the nature of technical progress etc. which are hardly tenable for the Nigerian situation. By far, the most restrictive assumption under which our production functions are estimated is that product and factor markets are competitive and that there are constant returns to scale so that each factor of production is paid its marginal product. With increasing returns to scale, the assumption of equality of the marginal value product of factors and the payments they receive is not likely to be valid: all factors cannot receive their marginal value-product without exceeding the value-added. In this eventuality, the factors' shares we used as weights to derive the TFPG index are incorrect and as Krueger (1982) theoretically demonstrated, the resulting index is biased. Although the assumption of perfect competition is unrealistic in a country like Nigeria, we are unable to gauge the magnitude or the degree of imperfections and hence some biases in our results are inevitable.

The second major limitation of the analysis derives from the assumption that a single production function exists and that the same technological alternatives are available for all sectors. This would appear to be a particularly difficult and restrictive condition to satisfy especially in situations where the definition of sectors is too aggregative, as in our case. Here, one could expect to find so many different technologies being used simultaneously within a given sector that the correct specification and statistical interpretation of technical progress is difficult.

Third, there is a basic weakness in the data especially as it relates to the measurement of inputs. For lack of more detailed information, we have had to treat both labour and capital as homogeneous, malleable inputs, ignoring thereby the crucial differences in their longevity and productive qualities etc. By treating labour as one homogeneous input in the production process, the two-factor production function fitted will capture neither the changes in its quality over the business cycle nor the improvement in its quality over time. Ideally, one should consider a multi-factor production function which will permit an adequate treatment of the role of skill, education, entrepreneurship and labour mix or capital mix in the production process.Indeed,the Nigerian Policy makers may perhaps be more interested in the substitution possibilities between capital and unskilled labour rather than between the former and a homogeneous labour.

Finally, it is well known that in time-series analysis, the observed variation in output and hence in productivity may be attributed to inter-industrial differences in rates of capacity utilisation over a business cycle. We have earlier pointed out that, in general, empirical studies tend to suggest that the use of unadjusted time series data biases the elasticity of substitution downwards. We are aware of the wide fluctuations in output of the different industries over the period studied although no attempt is made to make any adjustments, especially in view of the lack of concise data on inter-sectoral rates of capacity utilisation.

In spite of these limitations, the analysis in Chapter 6 has made a number of important contributions which can be valuable for policy making purposes. First, we have called attention to the often neglected question of TFPG in the Nigerian manufacturing industries by presenting some disturbing evidence regarding productivity growth in the manufacturing industries of the country. Given that it is productivity increments that provide the main source of sound economic growth, the evidence presented here should be a matter of deep concern. We have identified the possible sources of productivity growth and, in particular, the suggestive evidence in support of the notion that restrictive trade policies may result in a slow down in TFPG is interesting and defines unambiguously the direction for future economic policy. We have also been able to identify where the flexibility in the choice of techniques lies, a result which is of some policy value in its own right.

An important dimension of the structure of protection in Nigeria concerns the social and private profitability and international competitiveness of manufacturing industries.

Our analysis in Chapter 7 reveals that the Nigerian manufacturing sector is, by any standards, highly (privately) profitabile, at least in the periods studied. There is however, a considerable divergence between the private and social profitability of the industries. Thus the rate of private profitability varies from 140 percent (tobacco) to about 2 percent (wearing apparel) in 1974 and from 49 percent (non-alcoholic beverages) to 5 percent (leather products) in 1977. On the other hand, net social profitability varies from 37 percent (tobacco) to -84 percent (soap and perfumery) in 1974 and from 46 percent (machinery) to -52 percent (footwear) in 1977. Finally, we showed that while all the industries considered achieved positive private rates of return in both years, quite a few recorded negative social rates of return. The divergence between private and social profitability which we found implies that the former is a very imperfect guide to socially efficient investment decisions in the Nigerian economy.

We tested and found evidence in support of the hypothesis that the resource pull of protection to the protected industries is accompanied by higher rates of private, but lower rates of social profitability for the more heavily protected sectors. The average rate of profitability is 55 percent higher for the consumer goods sectors than for the capital goods sectors in 1977, and 12 percent higher in the former than in the intermediate goods sectors. In 1974, consumer goods industries were 27 percent and 42 percent more privately profitable than, respectively, capital and intermediate goods industries. On the otherhand, in 1977, consumer goods sectors had an average rate of social profitability that is 2056 (1715) percent lower than the average rate for capital (intermediate) goods industries; similarly in 1974, the consumer goods sectors were 558 and 50 percent less socially efficient than respectively the capital and intermediate goods sectors. Finally in 1977, 7 out of 8 and in 1974, 5 out of 9 sectors that were socially unprofitable were the more highly protected consumer goods industries. Our findings confirm the statement made earlier that the structure of effective protection is so inequitable that it hinders rather than enhances the desired degree of diversification via intermediate and capital goods production. This implies that one of the immediate tasks of Nigeria's economic policy is, in order to foster diversification via backward integration, the gradual reversal of policy and strategy to neutralize the existing price and profit bias of the tariff structure. This will appear to be necessary in order to encourage entrepreneurs to undertake vigorously the necessary expansionary investment and production in the neglected sectors.

Our estimates, in Chapter 7, of DRCs show that about 2/5th of the Nigerian manufacturing industries, contributing more than 20 percent of total manufacturing value-added at international prices in

1977, were internationally uncompetitive. For these, survival was only ensured by the high rates of effective protection accorded to them by the authorities. As one might expect, the international competitiveness of the less protected sectors is much higher than that of the more protected industries. For example, of the 10 inefficient industries, 70 percent are consumer goods producing, 10 percent intermediate and 20 percent capital goods industries.

Although the social inefficiency of industries could have arisen from a variety of sources, we found that the choice of inappropriate techniques of production is a significant determinant. Our finding lends support to the contention that higher capital-intensity in production in the LDCs which implies a departure from an optimum choice of factors will lead to an irrational allocation of resources.

Here, too, it is worthwhile emphasising that any generalisations from these estimates must be approached with caution, in view of the many problems involved. First, accurate measures of social profitability and domestic resource costs require that domestic costs are correctly measured at their 'shadow-prices' if there are distortions in the economy. In Chapter 2, we pointed out the multiplicity of problems involved in obtaining accurate estimates of shadow prices; our conversion factors, shadow wage rates and accounting rate of interest, were mere approximations to the 'true' values. We do not, however, consider this to be a serious source of bias since, as the sensitivity analysis shows, our estimates are quite stable with respect to variations in the border prices of output and factor inputs. Second, there are reasons to believe that the extent of inefficiency might have been under-estimated given our inability to consider all relevant costs of production. For example, foreign costs would have included dividends and repatriated profits which are bound to be higher in those sectors with a high degree of foreign participation. Third, our level of aggregation may also have concealed the extent of intra-industrial efficiency or inefficiency. Thus a sector may be socially efficient in the aggregate while the individual firms are grossly inefficient (or less efficient) and vice-versa. Third, the estimates of profitability and DRCs must be regarded as strictly specific to the Nigerian economic environment in 1974 and 1977. If profit rates - and comparative advantage - vary over time, because costs of production are continuously changing, no simple generalisations or projections can be made from an analysis based on two years observations only. The problem can be easily illustrated. In 1974, industries manufacturing tobacco, footwear and miscellaneous products were classified as socially efficient in the sense of having a positive rate of net social profit, but all three were socially inefficient in 1977. On the other hand, at least four of the sectors classified as socially inefficient in 1974 achieved positive rates of net social profit in 1977. Other specific examples can be cited. The rate of net social profitability in the sector manufacturing non-alcoholic beverages was only 0.5 percent in 1974, but up to 37 percent in 1977. On the otherhand, in the tobacco industry, rate of social profitability was up to 37 percent in 1974 but negative in 1977. The fourth limitation arises from the fact that the DRC measure is static and virtually ignores the issues of externalities which could be regarded as primarily important in certain situations. Thus it cannot be categorically established that the Nigerian industries which are found to be socially inefficient involve a complete waste of resources: perhaps they have generated some external economies which could not be included in these measures. Finally, before any definate conclusions can be drawn, several important issues, especially those regarding the factors influencing the efficiency of industries, need to be fully explained. Are these industries inefficient because they are 'infants'? What is the relationship between the degree of efficiency or inefficiency and the size of the industries? Does the efficiency or inefficiency of industries vary with the type of ownership and control? Is the private sector more or less efficient than the public sector? etc. Although we ignored these and other important questions, it does seem that the system of very high effective protection is keeping certain industries in operation which from a social viewpoint ought never to have been started and probably might now disappear.

General Conclusion and Suggestions for Further Research

What general conclusions can one draw from this exercise? In particular, can we say whether the IS strategy has been unambiguously a success or a failure? The evidence in our study tentatively suggests that the form of industrialisation that has taken place in Nigeria is only partially successful. While it is true that industrial output has increased, it is also clear that the emphasis on import-substitution behind high tariff barriers has led to the establishment of some industries whose social benefits are extremely small; the progress that is being made is not accompanied by any appreciable improvement in the employment situation; the output that is being turned out is often inefficiently produced and the high and differentiated levels of protection afforded to these industries ensured their domestic profitability and offered no encouragement to entrepreneurs to venture into backward integration or the external market: thus the economy remains poorly diversified.While heavy reliance on the magnitude of our estimates is not warranted in view of (i) the conceptual and methodological problems enumerated here and in the main body of the study and (ii) the questionable nature of some data used especially with regards to the level of aggregation, our findings and conclusions are believed to reflect the underlying real state of affairs in the industries studied. Moreover, we can claim for our results that they helped us to bring into prominence certain issues of industrial development that have too long been neglected in the country. However, it is our view that the tentative conclusions of this study should stimulate further research and a great deal of refinement in the analysis in order to establish more facts about the structural characteristics and growth of our industries. Specific lines of enquiry which deserve high priority should include the following:

(1) In this study the focus is on industrialisation policy and process; we have therefore neglected several other aspects of Nigeria's development that could be equally decisive in determining success or failure. As studies in the context of other LDCs have suggested, the process of industrialisation often creates a number of imbalances not only of a sectoral but also of a regional nature. Future research should be directed at identifying some of the more prominent of these imbalances - such as the neglect of the primary sector, infrastructural inadequacy, increasing population pressure etc - and should examine the extent to which the imbalances have created or are creating bottlenecks which might impede the further growth of

industry. For example, the concept of erp should be more usefully reformulated and employed to analyse the movement of resources not only within the manufacturing sector but, more crucially, from the primary sector to industry.

(2) Secondly, it is our view that the utility of the analysis will be greatly enhanced if future empirical work is done on a much more disaggregated, single-product basis, rather than on sectoral or commodity-group basis. This requires a much more detailed and current input-output table of the Nigerian economy than is presently available.

(3) Of crucial importance also is the need to explicitly introduce dynamics into the analysis. In a world undergoing rapid economic transformation, parameter estimates could more easily become outdated and thus present a distorted view of the existing or future economic environment. Thus, since the use of dynamic models may not be feasible now in view of the shaky data base in the LDCs, it is crucial to have a <u>periodic</u> assessment of economic and industrial policy. For example, effective rates of protection, measures of productivity and of investment efficiency etc could be estimated every five years, say. In otherwords, our analysis and similar exercises in the future, should not be viewed as a once and for all exercise but should be seen as a continual process.

(4) Finally, for each particular issue to be analysed, it is crucial to consider more variables than we have been able to in this study. For example, the concept of erp should be considerably expanded to incorporate not only the effects of tariffs and quantitative restrictions but also of all other governmental and private monopolistic forces which distort product and factor prices from their

'normal' levels; similarly, in future research, one should try as much as possible to avoid what can be referred to as the "erp syndrome", that is, the erp in particular, and government commercial policy in general, should be viewed as part of the relevant factors, rather than as the factors that shape the structural characteristics and growth of industry.

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APPENDIX

The disaggregation of the 1973/74 input-output matrix for Nigeria and its updating to 1977/78.

The objective of this appendix is to elaborate on the procedure followed in disaggregating the 1973/74 input-output coefficient matrix of the Nigerian economy. Some limitations of the methods adopted are also emphasized.

Essentially,two crucial steps are involved in the disaggregation procedure. First,the total intermediate purchases of the disaggregated sectors are obtained.This vector(with 35 elements) can be used as a column "control" in the RAS method and is useful information in the disaggregation methods anyway. There is also the need to obtain the row "control" vector(also with 35 elements) given by the total intermediate sales from the disaggregated sectors. Secondly,the coefficients for the total input of materials have to be disaggregated according to sectors supplying (or demanding) the different kinds of inputs.Each of these steps will be discussed in turn.

Step 1. The estimation of total intermediate input purchases is fairly straight forward,being derived from various published sources.The most useful source of information is the 1975/78 Industrial Survey of Nigeria.In this source,detailed information is available on the level of gross output and value-added produced and of raw materials purchased by each of the disaggregated (manufacturing)sectors. The Third and Fourth National Development Plans also contain useful information regarding the average input coefficients of the disaggregated sectors. For the non-manufacturing sectors,useful sources of information include the National Accounts of Nigeria(1973/1974) from which the original input-output table is taken,The Gross domestic product of Nigeria and Allied Macro Aggregates and the Annual Abstract of Statistics. From these sources, the column totals are easily determined.

It is much less easy to determine the row totals ie the total intermediate sales from the disaggregated sectors and some simplifying assumptions had to be made. As a guide we first used the information given in past Industrial Surveys regarding the composition of rqw materials purchased by sectors. The information is fairly detailed.For example,for a few of the sectors,an analysis of materials used is provided as follows:

Sector: Footwear

Materials used	Cost(N,000)
Pvc compound	570
Textiles	122
Rubber	104
Packing materials	24
Chemicals	10
Other	184

Sector: Miscellaneous chemicals

Materials used	Cost(N,000)
Oils and fats	2376
Packing materials	1782
Chemicals	712
Essential Oils	676
Petroleum jelly	190
Others	772