The impact of foreign direct investment on the development of manufacturing industries in the Nigerian economy

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THE IMPACT OF FOREIGN DIRECT INVESTMENT ON THE DEVELOPMENT OF MANUFACTURING INDUSTRIES IN THE NIGERIAN ECONOMY

A thesis submitted to the
Graduate Society in candidacy
for the degree of
Doctor of Philosophy

by

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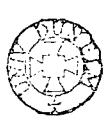
Durham, England

1984



To Rashidah, Blackie and David Manning

ACKNOWLEDGEMENTS

Thanks are due to a large number of people who have commented upon parts of this thesis at various stages. They were very encouraging. When they were not encouraging, they were most helpful. I would like to mention especially Dr. Rodney Wilson for his patience in reading through several drafts. Dr. Colin Kirkpatrick of the University of Manchester and Dr. Norman Gemmell have made very helpful comments on the definition and plan of the Study. I gained a great deal from discussion with Dr. Emmanuel Hansen, Professor John Creedy, Dr. Peter Johnson and Dr. David Manning. I am grateful to Dr. Williams and Jill Peters for computing assistance.

This thesis is the end product of many drafts and revisions, skillfully typed from a bulky manuscript by Miss Mary Imalingat, Mrs. Rashidah Hakeem, Mr. Larry Burney and Mrs. Connie Dowson.

The O.R.S. Awards Scheme and Bendel State Government have jointly financed my doctoral program. My deepest thanks are due to Professor Dennis O'Brien, Dr. Rodney Wilson and Professor John Creedy for recommending me for these awards. Blackie Iyare, Rashidah Hakeem, Mariam and Sidney Wilson, Pamela and Paul Idahosa and Steven Kawoya supplemented my maintenance allowance. The Graduate Society and Dr. Rodney Wilson recommended me for the Fawcus Trust Fund Awards. My deepest thanks to Dr. David Manning for making me aware of the Fawcus Trust Fund Awards. I am grateful to all these institutions and individuals for their contribution to making my study possible.

Finally, the thesis is mine, and I am responsible for whatever errors remain undiscovered.

Sunday Osaretin Iyare

Durham, England.

June, 1984.

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ABSTRACT

Iyare, Osaretin Sunday. "The Impact of Foreign Direct Investment on the Development of Manufacturing Industries in the Nigerian Economy".

The present study investigates the impact of foreign direct investment (FDI) on the development of manufacturing industries in Nigeria. The Study first reviews previous work on the developed countries (LDCs). Second, the study describes and analyses the changes in Nigeria's economic structure as a result of the establishment and growth of manufacturing industries between 1960 and 1974. Third, the study examines the comparative behaviour of foreign and local firms in Nigerian manufacturing industries, with respect of employment policy, technology choice, industrial concentration, output growth, technical efficiency and their balance of payments impact. This examination is undertaken through the testing of specific hypotheses to highlight the impact of ownership characteristics in the above areas. In brief, the conclusions are: Empirical results, based on discriminant analysis and non-parametric tests indicate that nationality of ownership is significantly related to the choice of technology, employment policy, industrial concentration and output growth. Further, the production function analysis shows that separate production functions do exist for both foreign and local firms. However, foreign firms are not seen to possess greater levels of technical efficiency than local firms. Second, this study has shown that the potential for technological flexibility does appear to be present and therefore policies that affect incentives and that can potentially affect foreign and local investors' behaviour are certainly important. These include policies affecting relative prices as well as the general competitive environment.

INTRODUCTION

Purpose of Study

Consonant with the growth of interest in the subject of foreign direct investment (FDI) in less developed countries during the past three decades, many theoretical studies have been published that discuss: (i) the role of FDI in the process of economic development in less developed countries (LDCs); (ii) factor proportions problems; and (iii) the choice of technologies by multi-national enterprises' FDI in LDCs. The subject of FDI and its role in the transfer of technology from developed countries (DCs) to LDCs "has figured prominently in the North-South debate as it has evolved since the mid-1970s".[1]

Yet empirical studies of these issues are exiguous. The Pearson Commission (1969, p.104) has reported that "in the absence of detailed empirical studies, it is difficult to pass a definite verdict on the precise size of the contribution which foreign investment has made to development".[2] Similarly, in a recent article, Forsyth and Solomon (1977, p.261) have argued that "the issue of the choice of technologies by (FDI) in developing countries has excited considerable interest but as yet, very little has been done in the way of reliable empirical research, and what research has been undertaken arrives at contradictory conclusions". In view of these criticisms, it is the purpose of this study to shed some empirical light on these issues, based upon an examination of micro data for manufacturing firms in Nigeria. In specific terms, the study will analyse the impact of FDI in the development of manufacturing industries in Nigeria's economy.

Statement of the problem

In this study, we intend to examine the comparative behaviour of foreign firms and local firms with respect to employment policy, technology choice, industrial concentration, output growth and balance of payments effects. This examination will be undertaken through the testing of specific hypotheses designed to highlight the impact of ownership characteristics in the above areas.

For the purpose of this study the hypotheses to be tested include the following:

(1) Chenery (1960) has shown that the importance of import substitution is greatest in the earliest stages of industrialization, and that its relative importance as a source of growth falls off steadily over time. The question we wish to address is to what extent does Nigerian production, import, export and domestic absorption data on various groups of consumer, intermediate and capital goods fit the above hypothesis.

(2) Foreign firms are relatively efficient as compared to local firms.

   (a) Foreign firms possess greater levels of technical efficiency than local firms when the output elasticities for both groups are constrained to be the same.

   (b) Foreign firms possess greater returns to scale than local firms because foreign firms have smaller output elasticities of employment.

   (c) Foreign firms display higher elasticities of factor substitution than local firms because foreign firms tend to be larger than local firms

and the capital - labour ratio may rise with the scale of production.

(3) Cost and employment characteristics in foreign firms differ systematically from those of local firms because similar firms do not have the same cost and employment characteristics.

(4) Foreign firms employ production techniques which are more capital using than those employed by local firms. Capital intensity is measured by output and value added per employee, the capital/labour ratio and the ratio of total wages in value added.

Methodology

The first hypothesis derives from the Nigerian industrialization policies of the 1960s and early 1970s which was a "strategy" of growth based upon policy-induced import substitution (IS) in industry.[3] One result of Nigeria's industrial policies was a strong association between sectoral rates of IS and growth. The method used to determine sources of industrial growth is based on Chenery's IS model. According to Chenery (1960), IS is defined with reference to the ratio of imports to total supply. Import substitution occurs with a decline in the ratio of imports to total supply. Put differently, if domestic production rises faster than imports, then IS is taking place. On the other hand, if imports rise more rapidly than domestic output, negative IS is occurring. Chenery apportions the growth in domestic output to (i) the growth in demand (on the assumption that a constant proportion of total supply is imported) and (ii) to the change in the ratio of imports to total supply, which he refers to as IS.[4]

Chenery's model has been the basis for a number of studies of problems similar to those addressed here, (Lewis and Soligo, 1965; Steuer and Voivados, 1965; Ahmad, 1968; and Huddle, 1969). However, one of the deficiencies of this technique for measuring IS has been pointed out by Morley and Smith (1970). They argued that:

> "the traditional definitions of imports and total supply usually miss a significant proportion of IS. They treat an import as a supplement to the gross production of a single domestic sector, whereas in reality it substitutes for the production of many domestic industries. To replace an import, production must rise, not only in the final processing industry, but also in the industries supplying its inputs and in their supplier industries, etc. Otherwise, there will be an induced rise in imported intermediates and/or a reduction in the supply of goods available for final demand in other sectors."
> (Morley and Smith, 1970, p.7)

Our estimates employ Chenery's basic approach with some modifications. However, the available data for Nigerian manufacturing are not adequate to allow separation of domestic final demand and intermediate demand. It should be made clear that ignoring this separation does not necessarily imply any bias for the estimated IS. As Morley and Smith (1969, p.14) have pointed out, "if few intermediates are actually produced in a country (as was the case in Nigeria during this period), the difference in results will not be great". Nevertheless, it is possible that a measure will tend to give a much more meaningful picture of IS if an accurate and fairly detailed input-output table is used.[5]

The technique used to examine the second hypothesis is production function estimation. Our purpose is to explain the production behaviour of foreign firms and local firms. In order to obtain an adequate model, three

different specifications of production functions are employed in this analysis, i.e. the Cobb-Douglas, the constant elasticity of substitution (CES) and a more generalized non-homothetic translog function. We have followed Tyler (1978) and Christensen, et al. (1973) in the application of these production functions to extract productive differences according to ownership characteristics with the use of dummy variables.[6] The method employed to estimate the production functions is single-equation ordinary least squares (OLS). Goldberger (1964) and Walters (1963) have pointed out some of the limitations and problems which arise in the use of ordinary least squares to estimate production functions. However, its application here may not appreciably distort the empirical results of the focus of the thesis, namely, ascertaining differential behaviour of foreign firms within industries.

Following Goldberger (1964), Dhrymes (1970), Johnston (1972), Riedel (1975), Forsyth and Solomon (1978), Oksanen and Williams (1978), and Iyare and Gemmell (1983), discriminant analysis is employed to test the third hypothesis. Discriminant analysis is employed because we want to compare foreign firms and local firms in a multi-variate context. Further, it is a technique "designed for cases where a variable is assumed to fall into one of a number of discrete categories".[7] Our objective is to determine how firms in our sample show an overall tendency to separate along nationality of ownership lines in terms of some cost variables; and to obtain a linear combination of the cost variables that will optimally classify observations into one or another group.[8]

Most of the tests used in the literature, where multiple regression is not involved, relate to binary-type classification of the data. In our context the categories are provided by the two ownership groups, i.e. foreign firms and local firms . We intend to test the hypothesis in pairs (Foreign/Local).

Non-parametric procedure has been adopted in the empirical analysis of the fourth hypothesis because of (i) the problems and limitations associated with ordinary least squares estimation; (ii) the four digit industries are too aggregative for present purposes; (iii) we are dealing with matched pairs; and (iv) we want to view the treatment as being different in ownership and management control. In this context, one sample is treated as being under foreign ownership and management control while the other is treated as being under local ownership and management control.[9] The Mann-Whitney U test, a non-parametric substitute for the T test, is used to examine systematic differences between foreign and local firms.[10]

(1) Data Collection

The data analysed in this study were obtained through responses to a questionnaire which was administered to all manufacturing establishments in Nigeria by the Federal Office of Statistics (FOS) in 1972. The questionnaire (see Appendix 1A) requests information on the following: (1) Form of Ownership, Paid up Capital by Source of Ownership; (2) Hours per week and Shifts; (3) Name of Establishment; (4) Actual Physical Location; (5) Employment and Wages and Salaries; (6) Kind of Activity; (7) Quantity of Goods Produced and Sold; (7) Value of Goods Sold; (8) Contract Work; (9) Resales,

and Miscellaneous Receipts; (10) Value of Inventories; (11) Cost and Quantity of Raw Materials and Cost of Fuels; (12) Electricity and Other Expenses; (13) Value of Fixed Assets; (14) Capital Expenditure, and Sales of Fixed Assets; and (15) Capacity of Power Equipment and Electricity Generated. The Survey takes the form of a postal questionnaire and according to the officials of the FOS, assistance is offered to firms in completing the form, thereby assuring reasonably accurate statistical returns.

(2) Sample

The sample of this study consists of establishments primarily engaged in manufacturing in Nigeria employing at least ten persons in 1972. The study concentrates on relatively large establishments for four reasons: (i) it is within these large establishments that FDI has been heavily concentrated;[11] (ii) the large firms' sample is more homogeneous and this, in turn, makes possible a better comparison between foreign and local firms than would be the case in relatively small-scale industrial organisations and handicrafts in the same analysis; (iii) smaller establishments do not usually attract foreign investment. As a result, their exclusion in this study would not appreciably diminish the empirical results; (iv) data on a consistent basis are available for large establishments. The size of employment is given in Table 1.1. As can be seen in Table 1.1, all establishments employ ten or more persons. However, 33 per cent of the establishments employ between 10 and 19 whilst 25 per cent of the establishments employ between 20 and 49 persons.

Questionnaires were mailed to the total population of 1,213 establishments, covering forty-eight 4-digit I.S.I.C.

TABLE 1.1 DISTRIBUTION OF ESTABLISHMENT IN EACh GROUP BY SIZE OF EMPLOYMENT - FEDERATION 1972

I. S. I. C CODE	INDUSTRIES	Number of Establishments	SIZE OF EMPLOYMENT							
			10-19	20-49	50-99	100-199	200-499	500-999	1,000-1,999	2,000 And Over	Total
3111	Meat Products	13	2	3	2	2	2	2	-	-	13
3112	Dairy Products	5	-	1	1	3	-	-	-	-	5
3113	Fruits Canning and Preserving	4	-	3	-	1	-	-	-	-	4
3115	Vegetable Oil Milling	48	21	4	1	4	13	2	3	-	48
3116	Grain Mill Products	7	1	5	-	-	-	-	1	-	7
3117	Bakery Products	173	102	50	14	5	2	-	-	-	173
3118,3119	Sugar and Sugar Confectionery	10	-	-	-	4	2	3	-	1	10
3121,3122	Miscellaneous Food Preparations and Animal Feeds	7	2	1	2	1	1	-	-	-	7
3131,3133	Spirit Distillery and Bee	9	1	-	-	1	4	1	2	-	9
3134	Soft Drinks	9	-	1	1	6	1	-	-	-	9
3140	Tobacco	5	-	-	1	-	-	3	1	-	5
3211	Spinning, Weaving and Finishing Textiles	69	9	19	6	9	9	6	6	5	69
3212	Made Up Textiles Goods (Except Wearing Apparel)	15	-	5	3	3	2	1	1	-	15
3213,3215	Knitted Goods, Carpages, Rope and Twines	16	2	4	2	1	3	4	-	-	16
3220	Wearing Apparel	31	10	14	2	3	1	1	-	-	31
3231	Tanning	6	-	3	-	-	3	-	-	-	6
3233	Travel Goods	6	1	1	-	3	1	-	-	-	6
3240	Leather Footwear	19	9	2	4	1	2	-	1	-	19
3311	Saw Milling	123	52	49	11	4	4	2	-	1	123
3320	Wooden Furniture and Fixtures	86	36	22	15	9	3	-	1	-	86
3412	Paper Containers, Paper Boxes and Paper Boards	9	-	1	2	4	2	-	-	-	9
3419	Other Paper Products	7	1	3	1	-	-	2	-	-	7
3420	Printing	77	24	16	13	10	8	6	-	-	77
3511,3512	Basic Industrial Chemicals Fertilizer and Pesticides	3	-	1	1	-	1	-	-	-	3
3521	Paints	6	-	2	1	2	1	-	-	-	6
3522	Drugs and Medicines	9	-	4	1	2	1	1	-	-	9
3523	Soaps, Perfumes, Cosmetics and other cleaning Preparations	17	2	4	3	2	3	1	2	-	17
3529	Other Chemical Products	10	1	1	2	4	1	1	-	-	10
3540	Products of Petroleum and Coal	5	2	-	2	-	1	-	-	-	5
3551	Tyre and Tube	12	1	4	2	1	2	1	1	-	12
3559	Other Rubber Products	23	-	6	6	4	5	2	-	-	23
3560	Plastic Products	24	1	4	5	8	4	2	-	-	24
3610	Pottery	5	1	3	-	-	1	-	-	-	5
3620	Glass Products	4	-	1	-	1	1	1	-	-	4
3691	Bricks and Tiles	12	5	3	1	3	-	-	-	-	12
3692	Cement	7	-	1	1	-	3	1	1	-	7
3699	Concrete Products	21	4	7	4	3	1	2	-	-	21
3720,3811	Basic Metal Cutlery Hand Tools and General Hardware	11	3	3	3	2	-	-	-	-	11
3812	Metal Furniture and Fixtures	24	4	1	5	8	3	3	-	-	24
3813	Structural Metal Products	32	5	3	8	8	6	2	-	-	32
3819	Fabricated Metal Products	23	2	1	3	5	5	4	2	-	23
3822,3824	Agricultural and Special Industrial Machinery	5	-	1	2	1	-	-	-	-	5
3829	Machinery and Equipment and (Except Electrical) not elsewhere classified	3	-	2	-	1	-	-	-	-	3
3832	Radio, Television and Communication Equipment and Apparatus	11	2	1	3	4	1	-	-	-	11
3833,3839	Household, Electrical Apparatus and other electrical supplies not elsewhere classified	7	2	2	-	1	1	1	-	-	7
3841	Motor Body Building	3	-	1	1	-	1	-	-	-	3
3843	Ship Building (Including Motorized Boats)	3	2	-	1	-	-	-	-	-	3
3901,3909	Manufacturing Industries not elsewhere classified	18	5	2	6	1	4	-	-	-	18
	TOTAL	1,052	317	265	142	135	109	55	22	7	1,052

Source: F.O.S. (1977, p.50).

codes. As shown in Table 1.2, fully completed responses were obtained from 1,052 establishments. Hence, the estimated coverage rate of response is 86.72 per cent.

(3) Distribution of sample of firms by nationality

Before proceeding with the distribution of sample by nationality, it is necessary to define what constitutes a foreign firm or industry and a local firm or industry. The FOS has not defined what is a foreign firm or a local firm in the Survey. However, as we have noted above, they have requested information on the paid up capital by source of ownership as of 31st December 1972. Five sources which include private Nigerian, private non-Nigerian, federal government, regional government and others were listed. Each establishment was asked to tick its source of paid up capital from the five categories. In this study, all establishments whose paid up capital by source of ownership as of 31st December 1972 is entirely private non-Nigerian, are classified as foreign firms. The summation of these firms in a given industry is referred to as foreign industry. On the other hand, local firms are defined as those establishments whose paid up capital by source of ownership as of 31st December 1972 is entirely private Nigerian. Similarly, the summation of these firms in a given industry is referred to as local industry. Those establishments whose paid up capital by source of ownership as of 31st December 1972 is either federal government, regional government or other, are excluded from this study. Foreign and private-local firms are therefore categorized in terms of 100% equity ownership.

The nationality samples thus comprise data on 487 firms in the foreign group and 482 in the local group. Table 1.3 shows the industrial composition of the samples. Bakery

TABLE 1.2

ESTIMATED COVERAGE 1972

I.S.I.C. (1968)	INDUSTRIES	NUMBER OF ESTABLISHMENTS CONTACTED	NUMBER OF RETURNS ACCEPTED	ESTIMATED COVERAGE RATE OF RESPONSE
3111	Meat Products	17	13	76.47
3112	Dairy Products	5	5	100.00
3113	Fruit Canning and Preserving	4	4	100.00
3115	Vegetable Oil Milling	60	48	80.00
3116	Grain Mill Products	10	7	70.00
3117	Bakery Products	180	173	96.11
3118, 3119	Sugar and Sugar Confectionery	16	10	62.50
3121, 3122	Miscellaneous Food Preparation and Animal Feeds	9	7	77.77
3131, 3133	Spirit Distillery of Beer	9	9	100.00
3134	Soft Drinks	10	9	90.00
3140	Tobacco	5	5	100.00
3211	Textiles	80	69	86.25
3212	Made Up Textile Goods (Except Wearing Apparel)	17	15	88.23
3213, 3215	Knitted Goods and Woven Carpet	17	16	94.11
3220	Wearing Apparel	40	31	77.50
3231	Tanning	8	6	75.00
3233	Travel Goods	6	6	100.00
3240	Footwear (Leather)	25	19	76.00
3311	Sawmilling	123	123	100.00
3320, 3319	Wooden Furniture and Fixtures and other and Cork Products not elsewhere classified	100	86	86.00
3412	Containers, Boxes of Paper and Paperboards	9	9	100.00
3419	Paper Products	7	7	100.00
3420	Printing	90	77	85.55
3511, 3512	Basic Industrial Chemicals, Fertilizers and Pesticide	4	3	75.00
3521	Paints	7	6	85.71
3522	Drugs and Medicines	9	9	100.00
3523	Soap, Perfumes, Cosmetics, and Other Cleaning Preparations	17	17	100.00
3529	Other Chemical Products	12	10	83.33
3540	Products of Petroleum and Coal	5	5	100.00
3551	Tyres and Tubes	17	12	70.58
3559	Other Rubber Products	30	23	76.66
3560	Plastic Products	26	24	92.30
3610, 3620	Pottery andn Glass Products	9	9	100.00
3691	Bricks and Tiles	15	12	80.00
3692	Cement	7	7	100.00
3699	Concrete Products	29	21	72.41
3720, 3811	Basic Metal, Cutlery, Hand Tools and General Hardware	16	11	68.75
3812	Metal Furniture and Fixtures	27	24	88.88
3813	Structural Metal Products	41	32	78.04
3819	Fabricated Metal Products	31	23	74.19
3822, 3824	Manufacture of Agriculture and Special Industrial Machinery	5	5	100.00
3829	Machinery and Equipment (except electrical) not elsewhere classified	3	3	100.00
3832	Manufacture of Radio, Television and Communication Equipment and Apparatus	14	11	78.57
3833, 3839	Manufacture of Household Electrical Apparatus and Other electrical supplies not elsewhere classified	7	7	100.00
3841, 3843	Transport Equipment, motor body and Shipbuilding	11	6	54.54
3853, 3901	Manufacture of Watches and Clocks, and Jewelleries	1	1	100.00
3909	Manufacturing Industry not elsewhere classified	23	17	73.91
	TOTAL	1,213	1,052	86.72

Source: F.O.S. (1977, p.56).

TABLE 1.3 DISTRIBUTION OF SAMPLE OF FIRMS BY INDUSTRY AND NATIONALITY OF OWNERSHIP

Industry	Total	Private Foreign	Private Nigerian
Meat Products	13	8	2
Dairy Products	5	4	1
Fruit Canning and Preserving	4	2	1
Vegetable Oil Milling	48	19	4
Grain Mill Products	7	1	6
Bakery Products	173	13	160
Sugar and Sugar Confectionery	10	8	2
Misc. Food Preparations and Animal Feeds	7	6	1
Spirit Distillery and Beer	9	7	2
Soft Drinks	9	6	3
Tobacco	5	4	1
Spinning, Weaving and Finishing Textiles	69	41	10
Made-up Textile Goods (except wearing apparel)	15	14	1
Knitted Goods, Cordages, Rope and Twine	16	10	6
Wearing Apparel	31	10	17
Tanning	6	4	2
Travel Goods	6	5	1
Leather Footwear	19	10	8
Saw Milling	123	16	104
Wooden Furniture and Fixtures	86	26	53
Paper Containers, Paper Boxed and Paper Boards	9	7	2
Other Paper Products	7	6	1
Printing	77	36	26
Basic Industrial Chems, Fertilizer and Pesticides	3	2	1
Paints	6	5	1
Drugs and Medicine	9	5	1
Soap, Perfumes, Cosmetics and other Cleaning Preps.	17	16	1
Other Chemical Products	10	7	3
Products of Petroleum and Coal	5	4	1
Tyres and Tubes	12	9	1
Other Rubber Products	23	17	4
Plastic Products	24	23	1
Pottery	5	1	3
Glass Products	4	1	3
Bricks and Tiles	12	6	6
Cement	7	2	4
Concrete Products	21	14	7
Basic Metal, Cutlery, Hand Tools and Gen. Hardware	11	8	3
Metal Furniture and Fixtures	24	16	7
Structural Metal Products	32	24	7
Fabricated Metal Products	23	20	2
Agricultural and Special Industrial Machinery	5	3	1
Machinery & Equipt. (exc. elec.)not elsewhere class.	3	2	1
Radio, TV and Communication Equipt. and Apparatus	11	10	1
Household Elec. App. and other Elec. supplies	7	5	2
Motor Body Building	3	1	1
Ship Building (including Motorized Boats)	3	-	3
Manufacturing Industries not elsewhere classified	18	12	3
TOTAL	1,052*	487	482

Source: F.O.S. (1977).

* Government Establishment = 34; Co-operatives = 24; Statutory Corporations = 25.

products, saw milling and wooden furniture and fixtures account for the bulk of the sample firms, followed by printing, spinning, weaving and finishing textiles, and vegetable oil milling. The local group is dominant in bakery products and saw milling. Local establishments account for 92 per cent of bakery products and 84 per cent of saw milling respectively. On the other hand, the foreign establishments are dominant in spinning, weaving and finishing textiles. They account for 59 per cent of the total establishment in that industry. Table 1.4 gives the source of paid-up capital by industry. In terms of total paid-up capital, foreign firms are five times larger than local firms. The respective average paid up capital per firm is N92,100 in the local group and N456,000 in the foreign group. Of the 45 industries in which information on paid up capital is available, foreign ownership is predominant in 39 industries while local ownership has a majority of paid up capital in six industries. The bulk of the paid up capital of the foreign firms is accounted for by tobacco, spinning, weaving and finishing textiles, and petroleum products and coal. These three industries have approximately 49 per cent of the foreign firms' total paid up capital. Similarly, 40 per cent of the paid up capital of the local firms is accounted for by cement, tobacco and spinning, weaving and finishing textiles.

From the published data it was not possible to construct disaggregated data measures for each variable. We have received some help through correspondence from the FOS in the construction of such variables as physical stock per firm, hours per week, sales and number employed. In other variables, we have used highly aggregated data which obviously

TABLE 1.4 SOURCE OF PAID-UP CAPITAL BY INDUSTRY - FEDERATION 1972

(in thousand Naira)

Industry	No. of Estabmnts	Private Nigerian	Private Foreign
Meat Products	13	315	622
Dairy Products	5	11	859
Fruit Canning and Preserving	4	-	1,500
Vegetable Oil Milling	48	1,727	1,632
Grain Mill Products	7	96	3,520
Bakery Products	173	629	333
Sugar and Sugar Confectionery	10	1,010	4,265
Misc. Food Preparations and Animal Feeds	7	315	1,646
Spirit Distillery and Beer	9	2,288	14,132
Soft Drinks	9	745	5,955
Tobacco	5	4,500	18,140
Spinning, Weaving and Finishing Textiles	69	9,110	53,182
Made-up Textile Goods (except wearing apparel)	15	606	8,834
Knitted Goods, Cordages, Rope and Twine	16	150	2,645
Wearing Apparel	31	321	1,519
tAnning	6	438	615
Travel Goods	6	625	728
Leather Footwear	19	146	960
Saw Milling	123	1,092	3,566
Wooden Furniture and Fixtures	86	1,632	1,518
Paper Containers, Paper Boxed and Paper Boards	9	723	1,792
Other Paper Products	7	428	388
Printing	77	2,563	2,355
Basic Industrial Chems, Fertilizer and Pesticides	3	9	301
Paints	6	276	1,838
Drugs and Medicine	9	40	854
Soap, Perfumes, Cosmetics and other Cleaning Preps.	17	245	6,995
Other Chemical Products	10	168	1,755
Products of Petroleum and Coal	5	8	36,818
Tyres and Tubes	12	1,120	2,970
Other Rubber Products	23	1,245	4,441
Plastic Products	24	287	3,554
Pottery	5	11	69
Glass Products	4	20	620
Bricks and Tiles	12	432	723
Cement	7	4,280	7,508
Concrete Products	21	1,351	4,625
Basic Metal, Cutlery, Hand Tools and Gen. Hardware	11	124	1,635
Metal Furniture and Fixtures	24	662	2,218
Structural Metal Products	32	850	3,072
Fabricated Metal Products	23	505	8,406
Agricultural and Special Industrial Machinery	5	10	142
Machinery & Equipt. (exc. elec.)not elsewhere class.	3	10	100
Radio, TV and Communication Equipt. and Apparatus	11	746	1,112
Household Elec. App. and other Elec. supplies	7	2,315	610
Motor Body Building	3	-	20
Ship Building (including Motorized Boats)	3	15	-
Manufacturing Industries not elsewhere classified	18	198	1,110
TOTAL	1,052	44,396	222,201

Note: 1N = $1.52 in 1972.

Source: F.O.S. (1977, p.42).

Details may not add up to total because of rounding.

entailed a "cost" in terms of measurement accuracy. Notwithstanding, it was felt that measurement error and its accompanying problems - lower levels of significance and bias - were less important than having a larger, more representative sample that was less likely to be sensitive to a few observations. But where disaggregated data were available, as in the case of the efficiency measurement in Chapter 6 of this study, we perform more precise tests based on firm level information. Finally, important aspects of the data and its statistical application, are discussed in greater detail in each chapter.

Limitation of Study

The inquiry is restricted to the relative impact of FDI in the development of the manufacturing industry. As we have pointed out above, the study concentrates on relatively large establishments. It is important to observe that even though the large establishments account for the major proportion of the economic activity in the industrial sector of Nigeria, the results may not hold for smaller establishments, or the non-industrial sector, such as agricultural services, and they may not be generalised over time or applied to other developing countries.

Need for Study

First, not enough work has been done on Nigeria, yet data to work on is available. Second, Nigeria, like most contemporary LDCs, has mainly been interested in having FDI contribute to its industrialization by (i) introducing production skills and factors which the country does not possess; (ii) increasing and improving existing local firms; (iii) substituting for imports in order to improve the balance of payments. Since foreign investment is still welcome, and

will for a long time be an important component in the country's economic development, a study of this kind may provide and/or enrich the understanding of the contributions FDI makes and in which areas. Third, it is necessary for the economic policy makers to have information on the contributions of FDI already operating within Nigeria's economy. As Forsyth and Solomon (1978) have observed, "unless policy formulation, vis-a-vis the foreign-owned sector can be, and is carried out with the benefit of detailed prior study of the impact of the intended legislation, the ultimate effects of decisions by policy makers may differ radically from those intended."

Finally it is hoped that this study will provide such information as will serve as a guide for policy formulations in Nigeria.

Definition of Terms

Given that all evidence to be examined relates to foreign direct investment and manufacturing firms, definitions of this form of investment and firms are required from the start. Other studies of the impact of foreign direct investment in manufacturing on the Nigerian economy such as Iyanda (1975, p.12) have defined a foreign firm "as any firm with at least 40 per cent of its voting stock owned by non-residents of Nigeria, or with not less than 25 per cent foreign ownership but under a contracted foreign partner management." In the case of a multinational enterprise in Nigeria, Iyanda and Below have suggested that

> "a multinational enterprise is...a subsidiary company with technological links with a foreign based multinational corporation. Such an enterprise could be 60 or 40 per cent foreign in capital ownership. The key factor is the evidence of a technological bond between a Nigerian company and a foreign one. Such a bond could take the form of technical partnership arrangement, expatriate management of a subsidiary firm, and the diverse operations of patents or direct licensing agreement." (1979, p.1)

However, our definition of foreign firms is slightly different from the above suggestion. As noted above, a foreign firm is defined as any firm in which foreign participation is 100 per cent of paid up capital. A local firm is defined as any firm in which local participation is 100 per cent of the paid up capital. Those firms with both foreign and local paid up capital are excluded. Foreign and private-local firms are therefore categorized in terms of 100 per cent equity ownership.

The term manufacturing firm is defined as those manufacturing firms with 10 or more paid employees engaged in processing raw materials into intermediate or final output. This definition excludes firms engaged in small-scale industrial organisation and handicrafts.

'Billion' is used in the American sense and is equal to 1000 million in the Nigerian (British) sense. All monetary and financial information for 1960-1970 was obtained in Nigerian pounds and was converted into Naira at 2 Naira to one pound.

Organization of Chapters

The rest of this study is organized into eight chapters. The second chapter discusses the economic structure of Nigeria. In Chapter 3 an attempt is made to review some existing literature relating to FDI, especially work on comparative behaviour. The fourth chapter considers the role of foreign investment and traces the evolution of government policy and attitudes towards foreign direct investment. A comparison is also made between two periods, namely the colonial period and the period after independence. Chapter 5 contains the analysis of the patterns and sources of growth in the manufacturing industries.

In Chapter 6 the effect of nationality of ownership in

manufacturing on technical efficiency is considered. Chapter 7 employs discriminant analysis to determine cost differences and employment characteristics in relation to nationality of ownership in manufacturing. Further evidence on the choice of technology in manufacturing is discussed in Chapter 8. A comparison of results from other studies and a summary and conclusions forms Chapter 9.

Chapter Two

THE ECONOMIC STRUCTURE OF NIGERIA

Although this study is principally concerned with foreign direct investment (FDI) in manufacturing industry, it is helpful to begin with an examination of the economic structure of Nigeria because the pattern of foreign direct investment ultimately depends on the economic structure of a country. The chapter begins with a discussion of natural resources.

Natural Resources

Denison (1967) has argued that natural resources play no explanatory role in developed country growth. Denison's argument rests on the observed "now man-made" environment in developed countries that suggests that "variations in natural resource endowment are more relevant in explaining the historical differences in level of income than in explaining current rates of growth."[1] On the contrary, Maddison (1970) noted that "in developing countries, where man-made capital is scarcer, natural resource endowment looms larger as an explanatory variable, particularly in countries with mineral wealth."

In Nigeria, natural resources are obviously important because the country has a large agricultural labour force and a relatively small non-agricultural sector. Land resources have also been a significant determinant of foreign direct investment in Nigeria. According to the Central Bank of Nigeria (1971) report, foreign owned companies accounted for 67.7% of the paid up capital in agriculture between 1966-1968. The evidence available suggests that export-orientated FDI has played a major role in marketing such products as cocoa, cotton, rubber, groundnuts, palm oil and kernel, hides and skins, and beniseed. Secondly, Nigeria depends on her mineral wealth for

foreign exchange earnings and state revenues. According to Turner (1976), the petroleum or oil sector accounted for approximately 90 per cent of Nigeria's foreign exchange earnings and about 95 per cent of state revenues in 1976.

Dependence on Agriculture

Despite the progress made in the past two decades by the government in establishing industries, the economy has not shifted from being agricultural in character to having a predominance of manufacturing industry. The percentage of the work force in agriculture accounts for some 70 to 80 per cent of the country's labour force. In 1978, the population was estimated to be nearly 80 million. This implies a population density of 85.5 persons per square kilometre. The ratio of land to labour in Nigeria is still favourable because settlement is becoming increasingly concentrated in the Urban centres which reduces population pressure on arable land. However, the general characteristics of the agricultural sector is its low technological level, i.e. labour intensive techniques of production. Some large scale forms of production employing modern technology have been established in recent years. But production still consists of subsistence output on several million individual small holdings relying on traditional techniques. Although the agricultural sector remains backward with traditional techniques, the economy as a whole continues to receive its principal stimulus to growth from this sector, which meets more than 90 per cent of the country's food needs.

During the 1960s, Nigeria's economy depended on the agricultural sector for foreign exchange earnings. The share of total exports accounted for by the three principal agricul-

tural commodities - cocoa, peanuts and palm produce - was 59.1 per cent between 1960-1965.[2] In recent years, the share of agricultural commodities as percentages of total exports has declined partly because of the low priority assigned to public investment in agriculture. As Karp (1980, p.310) has observed, "the share of agriculture in investment in directly productive activities - covering (1) agriculture; (2) livestock, forestry and fishing; (3) mining; and (4) manufacturing - was only 16 per cent, compared to 52 per cent for manufacturing." The export performance of agricultural commodities has also been affected by the oil sector which provides a new export opportunity. Hence, we turn to the development of the oil sector.

Development of the Oil Sector

The development of the oil sector is completely based on foreign direct investment. In 1963, the total book value of major oil corporations' assets in Nigeria was N31,900 million. The major oil corporations involved in the development of the oil sector were Standard Oil of New Jersey (U.S.) with 12% of the total assets, Royal Dutch/Shell (Dutch/British) with 10.3%,Gulf (U.S.) with 5%, Texaco (U.S.) with 5%, Socony-Mobil (U.S.) with 4.7%, Standard Oil of California (U.S. with 3.7%, British Petroleum (British) with 2.8%, Compagnie Francaise de Petrole (French) 2% and others with 4%.[3] Table 2.1 presents the yearly output of crude oil production in Nigeria between 1960 and 1981. Annual crude oil production in 1960 was 850 thousand metric tons. At the end of 1981, the annual crude oil production was 103.513 million metric tons.

While the development of the oil sector in Nigeria continues to make great progress, the question may be asked: Did the Development of the oil sector help or hinder the rest of the

economy? The discovery of oil in Nigeria and the rapid growth of this sector has brought a major element of change in the overall structure of the economy. The contributions to the government revenue by this sector were N236 million in 1970, N672 million in 1972 and N2,872 million in 1974.[4] Since 1970, earnings from petroleum exports have become the largest single major source of development funds in the public sector. In other words, there has been a linkage between the oil sector and the public sector through the use of foreign-exchange earnings derived from oil to finance development. The impact of Nigeria's oil sector on manufacturing has been substantial. It provides funds for indigenous investment in industry as well as government participation in industry.

On the other hand, the country's inflationary problem has worsened. At the end of 1974, inflation was running at 13.4 per cent compared with 5.4 per cent in 1973 and 2.8 per cent in 1972. It is argued in the official circles that the high rate of inflation in the economies of Nigeria's major trading partners exacerbated Nigeria's domestic inflationary pressures as a result of the rising cost of imports.[5] Nevertheless, much of the high inflationary rate is linked with petroleum.

The rapid development of the oil sector is also blamed for the export concentration in Nigeria. Karp (1980) has attempted to deal with export concentration problems in Nigeria through tests based on Hirchman coefficients and regression equations.[6] The Hirchman coefficients for Nigerian exports suggest that "export concentration was slowly but unmistakably decreasing between 1954 and 1969, notwithstanding some annual fluctuations. More precisely, the rate of decrease was approximately 2 per cent a year."[7] On the other hand, the Hirchman coefficients after

Table 2.1

Yearly Output of Crude Oil Production, 1960-1981

(thousand metric tons)

Year	Output
1960	850
1961	2,271
1962	3,328
1963	3,772
1964	5,953
1965	13,538
1966	21,000
1967	16,817
1968	7,127
1969	26,951
1970	53,095
1971	76,374
1972	90,918
1973	101,768
1974	111,578
1975	128,597
1976	103,479
1977	102,970
1978	137,781
1979	166,483
1980	151,492
1981	103,513

Source: United Nations (1967, p.202; 1970, p.212; 1973, p.180; 1977, p.178 and 1982, p.766) Statistical Year Books.

1970 show that the trend towards diversification of exports was abruptly reversed. The Hirschman coefficient in 1970 rose by 19 per cent over that recorded for the previous year. While an increase of about the same magnitude took place in 1971, the Hirschman coefficient exceeded .800 in 1972, a figure not attained in Nigerian export trade in any previous year for which coefficients could be computed.[8] Finally, the regression results support the hypothesis that while the expansion of oil exports was the chief factor behind the recent increase of commodity concentration in Nigeria, it is also the case that the decline of such major traditional exports as palm produce and peanuts played a far from negligible contributory role.[9]

From the foregoing evidence, there is no doubt that Nigeria's dependence on oil needs to be reduced. We must now ask what policies are most effective for the diversification of Nigerian exports? Certainly there are possibilities for increasing agriculture exports. For example, vegetable oil seeds and related products could be added to the export list with more public investment. But as Maddison (1970, p.130) has observed, for most commodities, agricultural export prospects have been poor. Because developed countries have followed extremely protectionist policies, their demand for food, tobacco and beverages is expanding slowly, and they have developed synthetic substitutes for natural fibres and rubber. In this respect, it would appear that only an "export-expanding industrial program" may contribute to export diversification, assuming there is less protectionism with regard to industrial products which are traded.

The Structure of Production

The changing level and sectorial distribution of Nigeria's Gross Domestic Product (GDP) between 1960 and 1977 is shown in Table 2.2. In 1960, the respective contributions made by agriculture, mining and quarrying, manufacturing and handicrafts, electricity and water supply, building and construction, distribution, and transport and communication were N1408.2, N26.6, N107.4, N6.4, N101, N278.8 and N107 millions. These contributions rose to N1,808.7, N943.8, N472.7, N44.2, N429.6, N575.4 and N226.2 in 1974 respectively as the table shows.

In order to facilitate easier comparison, the relative importance of each sector expressed in percentages is given in Table 2.3. The agricultural sector's contribution of 63.1 per cent in 1960 declined to 21 per cent in 1977. This relative decline is due largely to the rate of increase in the contributions of other sectors as a result of the oil boom. As mentioned above, some agricultural commodities have either been neglected or have not expanded. Further, the share of agricultural exports in relation to GDP has also declined from approximately 13 per cent in 1960 to about 2 per cent in 1974.[10] However, this is partly due to the expanding home demand for some agricultural commodities formerly exported, as well, of course, as the growing significance of petroleum.

A corollary of the relative fall in the contribution of the agricultural sector to GDP has been the importance of the mining sector. Petroleum is the main output of this sector. Taken as a whole, the mining sector made an increasingly significant contribution between 1960 and 1977. This contribution rose from 1.12 per cent in 1960 to about 15.5 per cent in 1977. The sector has become the prime mover of the economy due to

Table 2.2 Sectoral Distribution of Nigeria's Gross Domestic Product, 1959-1977 (₦ million)

	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977
1. Agriculture Forestry and Fishing	1342.0	1408.2	1597.8	1549.8	1605.8	1737.8	1731.4	1742.2	1581.8	1358.0	1338.0	1539.5	1890.1	1982.9	1852.1	1808.7	3634.8	3245.7	3110.1	3217.6
2. Mining, etc.	23.2	26.6	29.8	43.4	54.0	58.8	79.6	149.8	210.4	163.8	85.0	261.3	508.9	711.6	840.6	943.8	2246.9	1802.6	2279.6	2371.0
3. Manufacturing etc.	97.0	107.4	109.6	130.2	146.4	170.0	181.0	221.0	221.6	190.0	200.4	263.4	317.6	307.7	378.6	472.7	625.5	979.4	993.4	994.4
4. Elec. & Water	5.0	6.4	8.0	9.6	11.6	13.6	15.6	18.2	20.0	15.0	17.4	20.8	24.5	29.4	34.9	44.2	44.5	45.1	46.3	57.3
5. Bldg & Const.	88.0	101.0	100.0	105.4	112.8	118.4	128.4	162.2	160.2	135.8	117.0	167.6	266.2	354.7	426.1	429.6	1131.7	1129.6	1497.0	1748.4
6. Distribution	260.6	278.8	317.6	307.8	313.0	361.8	398.2	418.4	389.8	333.0	332.2	411.6	515.3	554.8	537.5	575.4	2375.4	2709.2	2903.9	3205.0
7. Transport and Communication	99.8	107.0	113.8	128.2	125.4	131.0	149.2	146.2	142.0	113.4	125.6	127.6	138.2	148.9	182.1	226.2	446.9	467.6	490.9	506.6
8. General Govt.	62.8	77.4	79.8	77.2	77.6	77.8	89.6	96.8	99.2	84.6	139.0	258.1	314.1	328.4	412.5	416.9				
9. Education	52.4	61.2	64.0	70.2	77.8	82.8	93.4	97.0	110.8	89.8	91.8	72.1	114.1	133.8	146.0	160.5				
10. Health	9.8	11.0	12.4	14.2	16.8	17.8	20.2	22.6	26.2	20.0	19.0	23.1	36.8	37.1	47.2	60.8	1769.0	2407.6	2483.7	2951.6
11. Other Services	43.6	45.4	50.6	56.2	56.4	55.8	61.4	72.4	82.8	68.8	78.8	89.4	116.2	132.2	150.5	171.2				
	2084.2	2230.4	2483.4	2492.2	2597.6	2825.6	2948.0	3146.8	3044.8	2572.2	2544.2	3234.5	4242.0	4721.5	5007.1	5310.0	12274.7	12787.0	13894.9	15051.9

Note: Figures for 1960 - 1973/4 are at 1962 factor cost, while those from 1974/75 onwards are at 1973/74 constant prices.
The former three Eastern States are not included in the estimates for 1966/67, 1967/68, 1968/79 and 1969/70.

Sources: Federal Office of Statistics, National Accounts of Nigeria (Lagos, 1976). Olaloku et al. 1979 (p.4).
Year Book of National Accounts Statistics, Vol1, Part 2, United Nations (1982, p.1096).

Table 2.3 Sectoral Distribution of Nigeria's Gross Domestic Product, 1959-1977 (percentages)

	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977
1. Agriculture, Forestry and Fishing	64.39	63.13	64.08	62.19	61.82	61.50	58.67	55.37	51.88	52.69	52.59	47.45	44.56	42.00	36.99	34.06	29.60	25.40	22.50	21.38
2. Mining, etc.	1.12	1.20	1.20	1.74	2.09	2.08	2.70	4.76	6.90	6.36	3.34	8.10	11.99	15.07	16.79	17.77	18.30	14.10	16.50	15.75
3. Manufacturing etc.	4.65	4.82	4.80	5.22	5.64	6.02	6.13	7.02	7.36	7.35	7.88	8.17	7.49	6.52	7.56	8.90	5.10	7.65	7.19	6.61
4. Elec. & Water	0.24	0.29	0.32	0.39	0.44	0.48	0.52	0.58	0.66	0,58	0.69	0.64	0.58	0.62	0.70	0.83	0.41	0.35	0.33	0.38
5. Bldg & Constr.	4.22	4.53	4.01	4.23	4.34	4.19	4.34	5.15	5.25	5.27	4.60	5.20	6.27	7.51	8.51	8.09	9.20	8.83	10.84	11.61
6. Distribution	12.50	12.50	12.74	12.35	12.05	12.80	13.50	13.30	12.79	12.92	13.06	12.76	12.15	11.75	10.73	10.84	19.35	21.19	21.10	21.29
7. Transport and Communication	4.79	4.79	4.56	5.14	4.83	4.64	5.07	4.64	4.65	4.40	4.94	3.95	3.26	3.15	3.64	4.26	3.64	3.65	3.55	3.37
8. General Govt.	3.01	3.47	3.20	3.10	2.99	2.75	3.04	3.08	3.35	3.57	5.46	8.00	7.40	6.95	8.24	7.85				
9. Education	2.52	2.74	2.56	2.81	2.99	2.93	3.17	3.08	3.62	3.47	3.61	2.24	2.69	2.83	2.90	3.02	14.41	18.83	17.99	19.61
10. Health	0.47	0.50	0.50	0.57	0.64	0.63	0.69	0.72	0.82	0.72	0.75	0.72	0.87	0.78	0.94	1.15				
11. Other Services	2.09	2.03	2.03	2.26	2.17	1.98	2.17	2.30	2.72	2.67	3.08	2.77	2.74	2.78	3.00	3.23				
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Notes and Sources as on Table 2.2.

the petroleum industry. Pearson (1970) has noted that apart from the sector being a source of foreign exchange, petroleum has for some time now made "export led growth" a distinct possibility in Nigeria.[11]

The growth of the petroleum sector as a percentage of GDP was gradual between 1960 and 1969. It was only after 1970 that the sector's contribution to GDP exceeded 10%. However, the development of other industries which will utilize petroleum will undoubtedly increase local production and may also lead to an addition of manufactures to the export list if petroleum products rather than merely crude oil are exported.

The manufacturing sector recorded a share of 4.6 per cent in 1960 and rose to approximately a 6.6 per cent contribution to GDP in 1977. From this result, it is clear that manufacturing was not a major contributor to Nigeria's GDP during this period under review. Further, it is difficult to determine the exact contribution of the modern industrial sector to GDP. This naturally would largely depend on what is included in the sector. The contribution of 6.6 per cent to the GDP made by the sector in 1977 included handicrafts.

In the electricity and water sector, the contribution to GDP has followed an upward trend. This increased from N6.4 million in 1960 to N57.3 million in 1977. In terms of percentages, this sector's contribution to GDP rose from 0.29 per cent to 0.38 per cent over the same period. The building and construction sector, like the electricity and water supply sector, has displayed a persistent upward trend. However, there was an interruption between 1967 and 1969 as a result of the civil war in Nigeria. Its contribution to GDP which stood

at N101 million in 1960, rose to N429.6 million in 1974. This represents a rise of a 4.53 per cent contribution in 1960 and 8.09 per cent in 1974. The percentage contribution in 1977 was 11.6 per cent.

Distribution remains one of the largest sectors of the economy. Its absolute contribution rose from N278.8 million in 1960 to N575.4 million in 1974 and N3,205 million in 1977. Its relative contribution to the GDP declined from 12.5 per cent in 1960 to 10.8 per cent in 1974. However, it rose to 21.29 per cent in 1977, largely due to the petroleum financed import boom. Finally, the transport and communication sector recorded a relative contribution of 4.79 per cent in 1960 and 4.26 per cent in 1974. This represents a loss of 0.52 percentage points between 1960 and 1974. In 1977, it contributed 3.3 per cent to GDP, indicating a continued downward trend.

Table 2.4 presents the growth rates of the major components of GDP between 1960 and 1974. Firstly, on a mean annual basis, the growth rate of GDP was 6.6 per cent. The average annual rate of growth of GDP was 4 per cent over the decade of 1960-1970 and approximately 6 per cent during the period 1960/61 to 1965/66. The average annual rate of growth of GDP for the period 1970-1974 was 16.3 per cent. On the other hand, the World Bank report (1974) showed that average annual rate of growth of real GDP was 6.4 per cent between 1958/59 and 1962/63, and 5.5 per cent during the period 1962/63 and 1966/67. Further, despite the civil war, the average annual growth rate of real GDP between 1967 and 1970 was 5.5 per cent.[12] In addition, the period 1975-1977 recorded an average annual rate of growth of 5.25 per cent.

Secondly, the mean annual growth rate of agricultural production was 2 per cent during the period. Clearly, the

Table 2.4

GROWTH RATES OF MAJOR COMPONENTS OF GDP (PERCENTAGES)

Year	Total GDP	Agri., Forestry & Fishing	Mining & Quarrying	Manufac-turing & Craft	Electricity & Water-Supply	Building & Cons-truction	Distri-bution	Transport & Communica-tion
1960	-	-	-	-	-	-	-	-
61	11.3	13.4	12.0	2.0	25.0	-0.9	13.9	6.3
62	.3	-3.0	45.6	18.8	20.0	5.4	-3.0	12.6
63	4.2	3.6	24.4	12.4	20.8	7.0	1.6	-2.2
64	8.7	8.2	8.8	16.1	17.2	4.9	15.6	4.4
65	4.3	-0.3	35.3	5.2	14.7	8.4	10.0	13.9
66	6.7	0.6	88.1	22.0	16.6	26.3	5.0	-2.0
67	-3.2	-9.2	40.4	.2	9.8	-1.2	-6.8	-2.8
68	-15.5	-14.1	-22.1	-14.2	-25.0	-15.2	-14.5	-20.1
69	1.0	-1.4	-48.1	5.4	16.0	13.8	-0.2	10.7
70	27.1	15.0	207.3	31.5	19.5	43.2	23.2	1.6
71	31.1	22.7	94.7	20.5	17.7	58.8	25.2	8.3
72	11.3	4.9	39.8	-3.1	20.0	33.2	7.6	7.7
73	6.0	-6.6	18.1	23.0	18.7	20.1	6.8	22.3
74	6.0	-2.4	12.2	24.8	26.6	0.8	7.0	24.2
Mean	6.6	2.0	37.0	10.9	14.5	11.8	6.1	5.6

Source: See Table 2.3

growth rate of this sector has not been impressive. This poor rate of growth poses a serious problem for the nation's economy in terms of foodstuffs for the rising population. Some of the major problems facing the agricultural sector have been identified in the Third National Development Plan 1974-1980 as: the shortage of qualified manpower in key areas; inadequate supplies of agricultural inputs; inadequate extension services; the poor condition of feeder roads and other transport facilities; inadequate or lack of effective supporting services such as farm credit; poor marketing facilities; the problem of land ownership imposed by the land tenure system in most parts of the country; the problem of diseases and pests; difficulties posed by the labour shortage in the rural areas in consequence of rural to urban migration; lack of appropriate technology for many food crops; drudgery of farm work and low returns from agriculture which forces rural youth to migrate to urban areas rather than go into farming; and labour shortages especially at peak periods of demand during the farming season.[13]

The rate of growth of the minerals sector has been remarkably impressive with a mean annual rate of growth of 37 per cent. In 1961 and 1962 mining grew by 12 per cent and 45.6 per cent respectively. The growth rate slowed down to 8.8 per cent in 1964 and as a result of the civil war it contracted by -48.1 per cent in 1969. From 1970-1974, the growth rate has been positive. This ranges from 12.2 per cent in 1974 to 207.3 per cent in 1970. The reason for the high growth rate of this sector is partly explained by the discovery of petroleum in substantial commercial quantities.[14] However, the slow-down in the growth rate in 1974 was due to the production cut-backs dictated by OPEC.

In the manufacturing sector a mean annual growth rate of approximately 11 per cent was recorded during the period. Separated from crafts, the growth rate of manufacturing alone is less than 11 per cent. Taken as a whole, the growth rate of 11 per cent seems impressive since the economy was affected by the civil war between 1967 and 1970. Comparing this sector with other sectors reveals that the manufacturing sector growth rate lagged behind mining, electricity, and building and construction. A comparison between three periods (i.e. 1960-1966; 1967-1970; and 1971-1974) reveals the following. In the period 1960-1966, the manufacturing annual growth rate was 12.6 per cent. This represents 1.7 per cent more than the mean annual growth rate of the entire period. However, the growth rate of 5.7 per cent during the war period (1967-1970) is lower than expected, since in some areas, especially the former Easter region, industrial production was affected. The period after the civil war (1971-1974) recorded a growth rate of 16.3 per cent (i.e. 5.4 percentage points more than the growth rate of the entire period).

The other sectors which include electricity and water supply, building and construction, distribution, transportation and communication, have all shown impressive growth rates, enjoying mean annual rates of 14.5 per cent, 11.8 per cent, 6.1 per cent and 5.6 per cent respectively.

The high growth rate recorded for electricity and water supply is accounted for by an increase in the rate of consumption. The average annual growth rate of consumption of electricity was 20.6 per cent between 1954 and 1967 and 20.92 per cent between 1971 and 1974.[15] However, there is no data to determine the level of demand for water by agriculture, industry and commerce.

The building and construction sector has experienced an impressive growth rate in the post independence years. Its growth rate has largely been influenced by petroleum exploitation which has resulted in a construction boom. The government policy to increase residential houses has been particularly important for the growth rate of building.

In recent years, the distribution sector growth rate has tended to decline. At 13.9 percent in 1960, the growth rate was surpassed only by the electricity and water supply sector (25 percent). But in 1974, it lagged behind all sectors except the agricultural sector in terms of mean annual growth rate.

As far as distribution is concerned, it is still within the framework of small-scale traditional units of operation. There is growing concern that a significant improvement in terms of efficient structure in this sector has not taken place even though it remains according to Olayide et al (1974) "the haven for the unemployed in terms of a large segment of the population."[16] Finally, the transport and communication annual mean rate of growth was less than the mean annual rate of growth of the GDP. During 1973 and 1974, the rates of growth were considerably improved. There is the suggestion that factors such as a lack of adequate executive capacity, intractable management constraints, capital restructuring bottlenecks, serious issues of institutional reforms, as well as poor and ineffective traffic regulations, were responsible for the decline in the rate of growth in this sector.[17]

International Trade, Balance of Payments and FDI

International Trade - Size and Growth

The foreign trade of Nigeria constitutes a significant proportion of the country's aggregate economic activity. Its exports are largely basic commodities, particularly oil, while imports consist of mainly manufactured goods, and capital equipment.[18] Regarding the size of a country's foreign sector, one measure that is commonly used is the ratio of imports and exports to the Gross Domestic Product (GDP). Olaloku et al (1979, p.224) noted that in 1970, 17 per cent of Nigeria's GDP was exported while imports amounted to 15 per cent of the country's GDP. The composite ratio, i.e. the measure of the size of the foreign sector in 1970 was 32 per cent. This ratio suggests that international transactions account for a large proportion of the economic activity in Nigeria. As compared to other forty-six African countries, they argued,

> "Of the forty;six African countries for which the relevant data are available for calculating the index of the size of the foreign sector, only seven had, in 1970, ratios lower than that of Nigeria. Among the fourteen West African countries included in the sample, Nigeria ranks eleventh in terms of the openness of the economy, her involvement in international trade being greater than that only of Niger, Upper Volta and Mali whose ratios amounted to 30, 26 and 15 per cent respectively. ... in value terms, Nigeria's foreign trade is not surpassed by that of any other country in ... Africa. That the country has a relatively low foreign sector index seems therefore to be due to the relatively large size of her GDP."
>
> Olaloku et al (1979, pp.224-225)

Table 2.5 presents the growth of merchandise trade during the period 1960-1980. In 1960, the merchandise imports were N431.8 million. This amount rose to N7,994 million in 1980 in current prices. During the same period, the growth of exports was remarkable. In 1960, merchandise exports were worth N339.4 million while they rose to N14,683.0 million in 1980 in current

Table 2.5 The Growth of Nigeria's Merchandise Trade 1960 - 1980

Year	Exports ₦000	Imports ₦000
1960	339,400	431,820
1961	347,000	444,800
1962	337,200	406,000
1963	379,400	413,800
1964	429,400	507,800
1965	536,538	550,788
1966	566,400	512,600
1967	465,600	447,200
1968	422,200	385,200
1969	636,300	497,400
1970	885,700	681,500
1971	1,293,400	1,079,000
1972	1,411,600	990,100
1973	2,209,200	1,232,900
1974	6,030,900	1,715,400
1975	4,791,000	3,722,000
1976	6,322,000	5,149,000
1977	7,594,000	7,160,000
1978	6,707,000	8,152,000
1979	10,719,000	6,165,000
1980	14,683,000	7,994,000

Source: International Monetary Fund (1964, p.220; 1975, p.288 and 1982, p.310). International Financial Statistics, Vols. XVIII, XXVIII & XXXV.

prices. The respective annual growth rate of imports and exports during the review period were 24.7 per cent and 18.4 per cent. Table 2.6 indicates that even though the secular trend in the trade was upwards, its growth has not been evenly spread over the period.

Table 2.7 shows the average annual growth rates of exports and imports in sub periods. Firstly, the growth rates for exports and imports were particularly high between 1970 and 1975. The respective growth rates were 50.5 per cent and 44.6 per cent. Secondly, the growth rates were particularly high for imports during the period 1975 to 1980 when the average annual growth rate was 35.5 per cent. On the other hand, the exports growth rate was only 19.4 per cent. Thirdly, exports grew more than imports between 1965 and 1970. The exports growth rate was 15.5 per cent while imports grew at 6.8 per cent. Fourthly, the period between 1960 and 1965 was marked by a relatively low growth rate of external trade. Nevertheless, exports grew faster than imports. The respective growth rates were 8.5 per cent and 4.5 per cent.

The Trade Balance

Aboyade (1966, p.145) has noted that Nigeria enjoyed a favourable trade balance during the first half of the 1950s which generated enough domestic savings to finance capital formation. On the other hand, negative balances were recorded during and after the second half of the 1950s. In fact, according to Olaloku et al (1979, p.243), 1955 was the first time the balance of trade turned against Nigeria since 1922. "The unfavourable trade balance in this period was due mainly to two basic factors: the fall in the world market prices of Nigeria's principal exports and the considerable increase in the volume of imports into the country."

Table 2.6 Growth Rates of Exports and Imports (percentages) Nigeria, 1960 - 1980

Year	Exports	Imports
1960		
1961	2.2	3.0
1962	-2.8	-8.7
1963	12.5	1.9
1964	13.1	22.7
1965	24.9	8.4
1966	-5.5	-6.9
1967	-14.2	-12.7
1968	-13.0	-13.8
1969	50.7	29.1
1970	39.1	37.0
1971	46.0	58.3
1972	9.1	-8.2
1973	56.5	24.5
1974	172.9	39.1
1975	-20.5	116.9
1976	31.9	38.3
1977	20.1	39.0
1978	-11.6	13.8
1979	59.8	-24.3
1980	36.9	29.6
Mean	24.7	18.4

Source: Same as Table 2.5.

Table 2.7 Average Annual Growth Rates of Exports and Imports (percentage) Nigeria, 1960-1980

Period	Exports	Imports
1960-1965	8.3	4.5
1965-1970	15.5	6.8
1970-1975	50.5	44.6
1975-1980	19.4	35.5

Source: Same as Table 2.5.

Table 2.8(1) presents the balance of trade of Nigeria between 1960 and 1980. Firstly, the sub period 1960-1965 was characterized by an unfavourable balance of trade. Nevertheless, the export coverage of imports, i.e. the ratio of exports to imports between 1960 and 1965, ranges from 77.5 per cent in 1962 to 99 per cent in 1965. In 1960, as reported in Table 2.8(4) the deficit on the trade account (i.e. visibles and invisibles) was N144.93 million, but this declined to N126.1 million in 1965. Secondly, in the period 1966-1970, Nigeria sustained a deficit in each year in her trade account. It rose from N201.8 million in 1966 to N307.8 million in 1970. However, Nigeria's merchandise trade balance was positive. The ratios of exports to imports between 1966 - 1970 ranges from 109 per cent in 1967 to 149.9 per cent in 1969, The sub period 1971-1975 shows a mixed trade balance. In 1971, the deficit on the trade account was N268.3 million, which declined to N206.5 million in 1972. The trade account was in surplus between 1973 and 1975. The respective surpluses for 1973, 1974 and 1975 were N59.6 million, N1601.9 million and N119.6 million. Similarly, the sub period 1976-1980 shows a mixed trade balance. While Nigeria sustained a deficit on its trade account between 1976;1978, it had a favourable balance of trade between 1979 and 1980.

As we have observed from the analysis of Table 2.8, Nigeria's merchandise trade balance has been positive since 1966. There are three main reasons for this.

(a) By 1966, a sizeable proportion of Nigeria's export trade was accounted for by petroleum exports which represented 32.5 per cent of the total value of exports. The addition of petroleum to Nigeria's exports list more than offset the depressive effects of the fall in the prices of traditional exports on Nigeria's export earnings.

(₦ million)

TABLE 2.8: NIGERIA'S BALANCE OF PAYMENTS, 1960-1980

Year	(1) Merchandise Trade Balance	(2) Merchandise		(3) Invisibles		(4) 2+3	(5) Unrequited Transfer (Official and Private)	(6) Current Account (4+5)	(7) Direct Investment	(8) Long-term Capital	(9) Short-term Capital	(10) 7+8+9
		Exports	Imports	Exports	Imports							
1960	-95.0	353.5	-448.5	36.64	-86.57	-144.93	-3.6	-148.53	40.7	12.6	-8.5	44.8
1961	-93.6	366.2	-459.8	48.64	-78.84	-123.80	-8.1	-131.90	53.6	7.3	--	60.9
1962	-95.0	328.0	-423.0	76.90	-93.40	-111.50	-1.5	-113.00	45.0	4.7	7.5	57.2
1963	-34.3	396.8	-431.1	49.90	-146.70	-131.10	-5.8	-136.9	81.2	11.8	7.7	100.7
1964	-77.8	450.4	-528.2	52.10	-114.40	-140.10	0.4	-139.7	135.0	9.0	1.9	145.9
1965	-5.4	567.8	-573.2	58.50	-179.20	-126.10	5.8	-120.3	118.3	31.3	15.4	165.0
1966	64.5	601.7	-537.2	62.20	-328.50	-201.80	4.5	-197.3	20.7	27.8	-2.6	45.9
1967	43.7	511.7	-468.0	61.10	-292.00	-187.2	16.5	-170.7	84.8	21.2	4.5	110.5
1968	38.5	448.0	-409.5	59.90	-315.30	-216.9	37.0	-179.7	99.4	30.8	39.4	169.6
1969	207.7	624.3	-416.4	57.10	-511.40	-246.4	20.7	-225.7	115.7	117.8	53.5	287.0
1970	237.9	891.4	-653.5	66.40	-612.10	-307.8	45.0	-262.8	146.4	146.4	96.4	389.2
1971	353.4	1242.8	-889.4	79.60	-701.30	-268.3	1.9	-266.4	187.5	187.5	-72.3	302.7
1972	564.5	1436.8	-872.3	86.10	-857.20	-206.5	-14.4	-220.9	201.9	242.7	2.6	447.2
1973	1106.5	2209.8	-1103.3	102.60	-1158.50	50.6	36.1	86.7	236.8	192.7	-27.6	401.9
1974	2513.7	3180.1	-666.4	96.20	-1008.00	1601.9	-26.9	1575.0	-394.7	-403.2	52.6	-745.3
1975	2087.3	6110.3	-4023.0	588.90	-2556.60	119.6	-193.1	36.5	306.6	-153.3	-16.1	137 2
1976	1945.8	7425.7	-5479.9	589.70	-2681.60	146.9	-114.3	-261.2	258.0	-268.9	-28.5	-39.4
1977	2142.8	9836.2	-7693.4	728.50	-3540.40	-669.1	-145.5	-814.6	349.7	-15.0	-144.0	190.7
1978	-992.9	8863.7	-0856.6	996.60	-2976.20	-2972.5	-229.4	-3201.9	179.6	1182.6	128.2	1490.4
1979	3644.7	12360.6	-8715.9	958.50	-3086.60	1516.6	-286.4	1230.2	224.4	752.4	6.6	983.4
1980	5136.8	16129.8	-10993.0	1372.90	-4111.80	2397.9	-397.9	2000.0	234.7	690.9	52.7	978.3

Notes: (1) Merchandise trade figures here include coverage and valuation adjustments, hence, they differ from the trade statistics in Table 2.4.

(2) A minus sign indicates debit.

(3) An exchange rate of ₦1 = $US 1.40 was used to convert the 1960-1971 figures into Naira; $US 1.52 for 1972-73; $US 1.59 for 1974; $US 1.36 for 1975-76; $US 1.26 for 1977; $US 1.85 for 1978; $US 1.35 for 1979 and $US 1.44 for 1980.

Sources: 1960 figures from Central Bank of Nigeria, Economic and Financial Review, December 1968, pp.80-88.
1961-68 figures from Central Bank of Nigeria, Economic and Financial Review, June 1971, p.77.
1976-80 figures from International Financial Statistics, 1975, p.291, Vol.XXVIII, 1982, p.286, Vol.XXXV.

(b) Nigeria has persued a policy of import substitution industrialisation which slowed down the imports of some goods. The aim of the government was to protect domestic infant industries and consequently a relatively high level of tariffs was imposed upon a number of consumer goods. As we shall see in Chapter 5, of this present study, the domestic supply of such goods has expanded greatly over the years.

(c) Some Nigerian economists have argued that "the change in Nigeria's trade balance into surplus in 1966 could be attributed to forces operating on both the country's exports and imports. The reversal of the trade balance coincided with the beginning of the period of grave political crisis for Nigeria 1966-70. As one would expect, the crisis had a depressive effect on the level of both imports and exports. During the period, however, Nigeria's trade balance remained in surplus largely because of the stringent controls imposed on the importation of goods."[19]

As far as the impact of import substitution industrialization on imports and the balance of payments is concerned, empirical evidence has been mixed. Robock (1970) has argued that while in general, the import ratio would be expected to fall, there may not be a reduction in either the total value or the total volume of imports. Table 2.8 lends some support to this argument. The total value of imports rose from N448.5 million in 1960 to N10,993.0 million in 1980. However, some reductions took place in 1962-1963, 1965-1968, 1972 and 1979. With regard to the wider impact of ISI on the balance of payments, Kirkpatrick and Nixson (1983, p.20) have argued that "there is no convincing evidence that it actually saves foreign exchange in practice.

Analytically, a number of different aspects of the relationship between ISI and the balance of payments can be singled out, but in reality, we must admit that such factors interact in a complex way and are not likely to be individually definable." The question of import substitution will be discussed in Chapter 5. However, what many studies have observed regarding the impact of ISI on imports and balance of payments is that "if the sequence gets stuck at the consumer goods stage, the balance of payments constraint will not be alleviated. ISI may successfully create income and, to a lesser extent, employment, but its apparent inability to save foreign exchange will force the economy to become increasingly dependent on inflows of private capital."[20] With regard to inflows of foreign private capital, Nigeria as noted below has had to rely on foreign sources for financing a large part of the development plans.

Invisible transactions

Table 2.8(3) shows the characteristics of the invisible transactions. The figures show persistent deficits in the invisible account during the entire period under review. Clearly, the deficit in the invisible transactions has been rising over the last 20 years. Between 1960 and 1980 it rose from N49.93 million to N2,738.9 million but it declined to N2,811.9 million in 1977. The size of deficit in relation to total invisible imports rose from 57.7% in 1960 to 66.6% in 1980. The view that has been taken by many researchers regarding the existence of a deficit in the invisible transactions account is that payments will always exceed receipts for a developing country because of the items which are included in the account - transportation, investment income,

travel and insurance. However, the reasons for the high deficit in Nigeria's invisible transaction accounts over the period are thought generally to be:

(a) lower interest earnings from reduced overseas assets;

(b) higher interest payments abroad resulting from the growth of the external public debt;

(c) expansion of government expenditures abroad for embassies, missions, etc; and

(d) increased earnings of foreign-owned enterprises in Nigeria, reflecting growth in foreign investment.[21]

These reasons are usually mentioned in the literature. However, the significance of these different causes will vary greatly from year to year. But, Olaloku et al (1979, p.246) without supporting evidence, argued that the last mentioned reason "has been particularly potent in the last few years, the large increase in the deficit on the services account in 1972-74 being due mainly to a sharp rise in the repatriation of profits and dividends, encouraged by the post-civil war liberation of foreign exchanges." Onimode (1980, p.159) has reported the dividends of three major oil corporations - Shell-BP, Gulf and Mobil - operating in Nigeria in 1973. The declared dividends were N614.1 million, N38.0 million and N25.7 million respectively. Onimode claimed that, "these dividends, together with those made by the other foreign oil firms were exported." In Chapter 8 of the present study we compared foreign and local firms in terms of profit, interest paid and dividends declared. Dividends and interest paid were found to be higher among foreign firms while profit shows no significant difference between the two groups. It may be true that foreign firms export dividends, but we do not have

enough information on how the interest, profit and dividends reported performed over time as well as their relationship to investment flows. What seems clear is that the deficit in the invisible accounts has accounted for the country's current account being in persistent deficit. As we have already noted, Nigeria has a favourable balance of trade between 1966-1977. During the 12 year period, positive balances in the current account were recorded in only three instances (1973, 1974 and 1975) while negative balances were recorded in 9 years. The current account was negative in the 9 years because the surplus in the trade account was not sufficient to offset the large deficit on the invisible transactions account.

Capital transations (Direct investment, Long-term Capital and Short-term Capital)

Table 2.8(7-9) throws some light on another important characteristic of Nigeria's international transactions - the capital account. In 1960, the respective amounts of direct investment, long-term capital and short-term capital were N40.7 million, N12.6 million and -N8.5 million. They rose to N234.7 million, N690.9 million and N52.7 million in 1980 respectively. As reported in Table 2.8(10), Nigeria's capital account has always been surplus. However, only in two instances (1974 1976) was the account negative. The strong position of the country's capital account during this period, seems to suggest that the persistent deficit on the country's current account hardly posed any acute balance of payments problem. Several reasons have been suggested why capital inflows have, for most of the years exceeded outflows. Some have argued that, foreign investors are attracted to Nigeria because of the country's potentially large market and abundant natural resources. Others have pointed to the fact that the Nigerian government, especially

after 1960, actively encouraged foreign investment by providing fiscal and other incentives. The first argument seems to be supported by the size of the inflow of foreign capital into the development of Nigeria's petroleum resources. "In 1968, the oil sector inflow accounted for 90 per cent of the total net foreign direct investment."[22] With respect to fiscal and other incentives provided by the Nigerian government, expirical evidence seems to suggest (for example Phillips, 1969) that fiscal and other incentives are not of crucial importance in the investment decisions of the grantees. We shall return to this issue in Chapter 4. Finally, while not accepting that foreign investors responded to fiscal and other incentives in their decisions to invest in Nigeria, there is no doubt that the country has relied on capital inflows for avoidance of balance of payments crises during the period under review.

Summary

Among factors which explain current rates of growth in Nigeria, natural resources (land and mineral wealth) evidently played a decisive part. Agriculture in the Nigerian economy is significant not only for its role in export trade but also for employing the major part of the labour force and for providing the main source of food for the country's increasing population.[23]

On the other hand, mineral wealth (oil) is the principal source of foreign exchange earnings. The oil sector accounted for about 90 per cent of Nigeria's foreign exchange and about 95% of state revenues in 1976. Further, the development of the sector is entirely based on foreign investment.

The structure of production indicates that there was a

relative decline in agriculture. Although manufacturing still accounts for only a small portion of Nigeria's GDP, (6.6% in 1977), it is certainly the sector with the fastest and most stable rate of growth, excluding the oil sector. The value of oil exports accounted for 90% of the Nigerian total exports in 1974. This seems to suggest that the sector's export will continue to determine the level of foreign exchange earnings which will accrue to the economy from visible exports. While the availability of adequate resources from oil provides great opportunity to invest in the declining agricultural sector as well as import substitution industrialization; the development of oil has increased export concentration in Nigeria.

The foreign trade sector was subject to unfavourable balances between 1960-1965. In the last 12 years, due mainly to the fast growth of petroleum exports, there has been a considerable increase in the volume of Nigeria's international trade. Since 1966 also due to oil, Nigeria's trade balance has been positive. By 1980, the trade surplus amounted to N5,136.8 million. On the other hand, there has been a worsening deficit on the services account. It amounted to N2,738.8 million in 1980. To a very large extent it is argued that "the worsening of the deficit on the country's invisibles account in recent years can be attributed to the relatively large out-payments on the oil sector's service accounts. A by-product of the large amount of foreign investment in this sector has been a big rise in the dividends and profits accruing to foreigners."[23]

Finally, Nigeria has relied on capital inflows during the reviewed period for avoidance of balance of payments crises. The major component of the credit balance on the capital account has been direct investment which contributed N234.7 million to

the balance of payments in 1980. Some Nigerian economists have expressed the view that the growth of the visible trade surplus due to oil and the scaling down of the invisible trade deficit, stemming mainly from increasing indigenisation and self-reliance of the economy, will reduce or eliminate Nigeria's reliance on capital inflows for avoidance of balance of payments crises. Again, in practice, this may not be possible if Nigeria wants to enjoy the benefits of knowledge, capital, entrepreneurship, management skills and economies of scale which are provided through foreign direct investment. Given that the unique problems of foreign direct investment are not easily separated from its advantages, in the next chapter, we shall survey work on comparative behaviour of foreign firms and local firms in less developed countries.

Chapter Three

FOREIGN DIRECT INVESTMENT (FDI) IN LESS DEVELOPED COUNTRIES (LDC): A SURVEY OF WORK ON COMPARATIVE BEHAVIOUR

Introduction

Foreign firms in LDCs are often presumed to display different investment characteristics from those of local firms with regard to several important characteristics such as factor proportions, size, profitability, technical efficiency, scale economics, utilization rates, import dependence and import-orientation. If foreign firms do differ from domestic counterparts with regard to these characteristics, it is argued that "systematic differences would have important economic and political implications with respect to employment creation, balance of payments and different rates of growth, future participation in the economy, and possible external dependence."[1]

In recent years, the failure of industrial sector jobs in LDCs to grow nearly as fast as the demand for them has generated high and rising ostensible levels of unemployment.[2] A proximate cause of high and rising apparent level of unemployment is seen to arise from the import of capital-intensive technologies. Policy makers and researchers are becoming interested in finding ways of encouraging more (efficient) labour-intensive technologies.[3]

While numerous works have been devoted to the study of the nature, contribution, and prospects of FDI, too little light has been shed on the issue of "foreignness," as it affects firm behaviour. The purpose of this chapter is to review previous work on comparative behaviour of foreign firms in LDCs. The review begins with a brief discussion of the nature of FDI in LDCs.

Nature of FDI

Historically, there have been two types of foreign capital inflow in most developing countries. They are "specific" and "non-specific" foreign capital. Following Pursell (1981, pp. 7-8), specific foreign funds are defined as "foreign capital inflow...equity or debt...which is specific to a particular investment project in the sense that the foreign funds would not enter the country unless that particular project is undertaken, and which do not affect the general borrowing ability of the country." The non-specific or nationally controlled foreign funds "are borrowed on the basis of the general credit worthiness of the country, are fungible between alternative investment projects and constitute part of the general fund of investible resources."

While most foreign borrowing may be classified as specific or non-specific, a particular form of borrowing usually will not conform to either category in all respects. Nonetheless, FDI, according to Pursell (Ibid, p. 8), "should normally be treated as specific because the financial flow is typically part of a package which also includes

technical, management, and marketing knowledge without which the project would not be undertaken."[4] Among the several forms the flow of foreign investment may take, the current trend in most LDCs drifts towards FDI particularly in the manufacturing sector for the following reasons: First, FDI, by its nature according to Meier (1968, p. 135) "entails the identification of an economic opportunity, the formulation of a productive project and its efficient implementation." Secondly, FDI, "can bestow substantial benefits on the host country where domestic management skills and entrepreneurship are embryonic and where there is no other way of organizing large scale manufacturing."[5] All these reasons seem to suggest that FDI is especially suitable for the LDC where technology, human skills and entrepreneurship are as much a bottleneck as the lack of capital.[6]

Notwithstanding, the effects of FDI on the balance of payments has been a dominant concern in both developed and less developed countries.

FDI and Its Implications for the Balance of Payments and National Income

Developed Countries. There has been a spate of theoretical discussion on the effects of FDI on the balance of payments and national income. The developed countries have argued that FDI by the MNEs has a negative impact on their domestic employment and the balance of payments as well as distorting the "normal play" of competition.

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Empirical evidence supporting negative effects of FDI on the United States balance of payments has been provided by the Hufbaner and Adler report. Hufbaner and Adler (1968) studied the United States investment in less developed countries.

On the other hand, Reddaway, (1968), in his study, found no support for adverse effects of FDI on the United Kingdom balance of payments. In fact, the United Kingdom's balance of payments has benefited from British overseas investment especially in less developed countries. Milward and Saul (1977, p. 495) likewise have found evidence suggesting that investment outside Europe brought returns to the home economies by opening new channels of supply for food stuffs and raw materials. Furthermore, Milward and Saul found that directly and indirectly, investment outside Europe encouraged exports, "though only the minority of loans were tied to the purchase of supplies in particular places. Nevertheless, it did not always bring increased trade."

Less Developed Countries. The less developed countries have argued that FDI has resulted in the monopolistic exploitation of the developing countries; imposed a heavy burden on their balance of payments and in general, has enabled the foreign firms to reap benefits far in excess of their contributions.[7] Nevertheless, empirical results of these arguments have been mixed.

Previous studies in this area have used balance of payments and income effects as determinants of the real costs or benefits of the FDI package. The literature in this area is

quite large. However, we may cite the following studies: Needleman, et. al. (1970), Lall and Elex (1971) and Dasari (1972) which provide discussion, as well as empirical evidence, on the balance of payments and income effects of FDI.

Needleman, et. al. (1970) studied the balance of payments effects of private foreign investment in Jamaica and Kenya. They surveyed 20 sample companies in Jamaica and 9 sample companies in Kenya. The contribution of FDI to both balance of payments and national income was estimated under four specific assumptions:

> (i) "Most likely" (largely import substitution) alternative assuming 20% and 15% replacement by local firms or Jamaica and Kenya respectively. Local firms have equal imported costs/sales ratio with foreign firms;
>
> (ii) Assumption (i) with imported costs/sales ratio 1/3 lower than that for foreign firms;
>
> (iii) Full replacement by local firms having equal imported costs/sales ratios; and
>
> (iv) Full replacement by local firms having 1/3 lower imported costs/sales ratios."
> Needleman, et. al. (1970).

For each of the above assumptions, Needleman and others calculated balance of payments and national income effects expressed as a percentage of the companies' total sales in Jamaica and Kenya. Needleman and others found that balance of payments and income effects are positively related to the rate at which FDI displaces local investment in Jamaica. Furthermore, Needleman and others found that FDI contributions

to balance of payments and national income are higher under assumptions (i) and (ii) (largely import substitutions) than under assumptions (iii) and (iv) (indigenous replacement assumption) for Jamaica. On the other hand, the Kenyan results support the hypothesis that balance of payments and income effects are inversely related to the rate at which FDI displaces local investment. Similarly, the contributions of FDI to balance of payments and national income in Kenya are higher under assumptions (i) and (ii) than under assumptions (iii) and (iv). A study of balance of payments and income effects of private foreign investment in manufacturing in India and Iran by Lall and Elex (1971) lends support to the findings of Needleman and others. Lall and Elex assessed balance of payments and income effects by specifying four assumptions: (i) "full replacement by imports, (ii) full replacement by local firms, (iii) most likely indigenous firms replacement and (iv) maximum possible indigenous firms replacement." The estimated balance of payments and national income effects for 53 sample firms in India and 16 in Iran suggest that FDI contribution to both balance of payments and national income is higher under assumptions (i) and (ii) than (iii) and (iv) for India and Iran. Lall and Elex found inverse relationships between the rate at which FDI displaces local investment and balance of payments and income effects.

The findings of Lall and Elex are for the most part in accordance with the findings of Needleman and others. None-

theless, a comparison of both studies reveals the following:

(i) the effects of FDI on balance of payments and national income are on the average lower in India and Iran than Jamaica and Kenya.

(ii) largely, the pattern of capital flows and repatriation is a matter of the age of the investment.

(iii) The coefficient of the regression of effect on various characteristics are insignificant.

(iv) Except in Kenya, exports are an insignificant proportion of sales, in the 88 firms studied--20 in Jamaica, 9 in Kenya, 53 in India and 16 in Iran. Sixty-nine of these firms export less than 5 percent of sales and 30 firms have no export at all.

(v) Of the 88 firms, 75 firms have negative direct balance of payment effect. By country, 8 of 11 in Jamaica, 3 of 9 in Kenya 48 of 53 in India and all 16 in Iran have negative direct balance of payment effects.

(vi) The most important factors explaining balance of payment variations are value of raw material imports, cost of local capital and value of output.[8]

Finally, Desari (1972) has presented data for 17 American owned firms in Philippines. Similarly, Desari made the following four assumptions: (1) full replacement by import, (2) full local firm substitution, (3) assumption "1": where no local firms exist and "2" where local firms exist, and (4) assumption "1" where no local firm exists, and a displacement rate determined by the ratio of local firms' sales to foreign firms' sales. He demonstrated that both the balance of payments and output effects of FDI for the Philippines are lower under the indigenous replacement (assumptions 3 and 4) alternative as compared to import substitution assumptions (1 and 2). From these results,

he concluded that age of the sample firms is inversely related to the net contributions of FDI. Further, for both income and balance of payments, the rate of displacement of local capital is inversely related to the net contributions of FDI.

FDI and Its Implications for Domestic Capital

Those who conceive of MNEs as the engines of development tend to focus on the advantage of FDI to the host countries as a result of a direct and indirect transfer of capital. It is argued that a transfer of capital to the host country adds to the resources available for development requirements, and saving availability. While the profitable investment of capital may constitute the main benefits accruing to the recipient country, some writers have argued that FDI displaces domestic capital and savings.

Weisskopf (1972), Areskong (1973) and others have tested the hypothesis that foreign capital displaces domestic capital and savings. Weisskopf, using data from 17 less developed countries, made a comprehensive cross sectional study of "under-developed countries" characterized by "saving constraints." In a general linear regression model, the following variables were used: ex ante gross domestic saving (S) on gross domestic product (Y), net foreign capital inflow (F)- net foreign aid and private capital, and total export (E). The regression result gave

$$S = a + 0.183Y - 0.227F + 0.176E$$

where a = the coefficient of the dummy variables representing individual countries.

Based on this result, Weisskopf concludes that the impact of foreign capital inflow on ex ante domestic savings in less developed countries is significantly negative. Further, 23 percent of net foreign capital inflow substitutes for domestic savings. What Weisskopf's results seem to suggest is that the net contribution of FDI to the host country is reduced by the substitution of foreign savings for domestic savings. It follows that a policy of trade constraints may improve the net contribution of FDI.[9] Similarly, Areskong's study focuses on 22 developing countries. The estimation of regression techniques on time series data (covering from 11 to 18 years), suggests that a weighted average of 51 percent of FDI supplements host country capital formation. The remaining 49 percent, goes to increase local consumption--increase imports and decrease in exports. To offset national income losses from reduced local investment, Areskong argues that there would have to be "substantial positive" host country social returns--added tax receipts and net externalities on the FDI.[10]

Other studies that were concerned with the contributions of FDI in the areas of technology trade (or transfer), export promotion, income, and employment generation in host countries include Pursell (1981), Alsaaty (1973), May (1965), Edozien (1968) and Iyanda (1975).[11]

Pursell (1981) studied 84 Ivory Coast manufacturing firms by estimating single-period cost/benefit or comparative

advantage indicators such as the domestic resource cost ratio and the economic return on capital. The cost-benefit ratio was calculated with shadow priced returns to domestic factors of production (land, labour and capital) in the numerator and the shadow value of net output in the denominator. Net output was defined as the difference between the foreign exchange value of output minus the foreign exchange value of traded inputs. The economic return on capital was calculated by expressing the difference between the shadow value of benefits and costs as a percentage of the shadow value of the capital stock. Using the above two indicators for a group of manufacturing firms in the Ivory Coast, Pursell's results suggest that (i) there is significant cost associated with the high level of foreign ownership of capital. (ii) Economic rate of return would not be improved by wholly or partly replacing the foreign equity with local capital. (iii) Economic performance is positively associated with foreign ownership, implying that "the often-discussed advantages of (FDI) by foreign firms (know-how in technology, management, across to market, etc.) outweighed the extra cost associated with foreign profits." Further, "increase in profit-tax rates may increase national economic rate of return from the operations of foreign firms which are intra-marginal in competitive industries or which for one reason or another have market power enabling them to earn above normal profit in the long run."[12]

Similarly, Alsaaty (1973) analyses time series data from 20 foreign firms and 8 local firms in the Philippines. The results reveal higher contributions to the Philippines' economy by foreign firms than domestic firms in terms of employment, training, technology, government revenue and productivity. However, a better performance by foreign firms is not positively associated with research and development, and contribution to social overhead is found to be insignificant.[13]

In Nigeria empirical studies of FDI are scarce. So far, only three studies have analyzed FDI's contribution to economic development in Nigeria. The descriptive work has been that of May (1965) who analyses the size, motives, and sectoral distribution of British investment in Nigeria between 1953-1963. May's major conclusion is that FDI averages 15 percent of total investment between 1953 and 1963. This represents a significant incremental source of capital. Further, in 1960, FDI has replaced capital from official sources. Edozien (1968) examines the question of "linkage effect" of FDI in Nigeria. The two questions considered are (i) Broad effect--"if the foreign firms establish a monopoly and/or monopsony position they could, with abandon, exploit these positions to the detriment of nationals of Nigeria".[14] (ii) Specific effects--if the existing domestic firms suffer economically unacceptable disadvantages and thereby have a high mortality rate forced on them, or if potential entrants are relatively excluded, then the import effect of FDI as a stimulant of local enter-

prise would be defected.[15] The empirical results show that the broad linkage effects were generally low in the trading sector. Manufacturing, which is a fast growing sector, has its normal high linkage effects reduced because of the high import content of the output of the existing industries. On the other hand, specific linkage effects were similarly found to be low. However, foreign investors were found to have played a real innovating role in the retail trading sector.

Iyanda (1975) presents a quantified analysis of the benefits of FDI in terms of some major variables--technology, capital, entrepreneurial and management skills--of economic development in Nigeria. Iyanda found that the key contribution of FDI to the Nigerian economy was neither capital nor technology but entrepreneurial and managerial skills. From this standpoint, Iyanda argued that the successful sale of FDI shares to Nigerians in the early 1970's demonstrated the existence of idle capital resources. Further, the level of technology needed for existing local demand does not seem to require partial or full foreign ownership. Thus, "the major contribution of FDI was in training Nigerians to perceive local investment opportunities, to activate local production resources, and to combine them into production units managed efficiently for profit".[16]

Nationality of Ownership and Factor Proportions

A frequent criticism of foreign firms is that they tend to be particularly biased towards the use of capital-intensive

methods which are inappropriate to the needs of labour-rich and capital-poor LDCs. The usual justification for this criticism is that foreign firms do face different relative factor prices from those facing domestic firms because they have, among other things, access to international capital markets where capital is relatively cheap. Additionally, it is argued that foreign firms tend to be capital-intensive because they prefer to spread current production and management systems--developed in the advanced country--into the LDC rather than be responsible for the costs of developing fully new, unproved and possibly "risky" systems which might be more appropriate to the domestic circumstances when examined separately.[17]

Another riposte as to why foreign firms adopt capital-intensive techniques is that the host country's government may, and very often does, distort input prices faced by foreign firms. Indeed, recent experience has shown that most developing countries in their attempt to industrialize quickly, have provided positive incentives to the foreign firms to adopt capital-intensive techniques. These incentives include exempting imported capital goods from duty by granting favourable tax treatment on fixed investment, by maintaining an over valued currency, and by setting statutory minimum wages above the free market. All these, the argument goes, provide foreign firms with highly profitable domestic markets protected from international competition. Further, the foreign firms have monopolistic advantage in the product markets.

Where there is no effective price competition, foreign firms are free to choose their own technology. In this case, foreign firms may have no incentive to adopt "socially efficient", labour intensive methods. Instead, they opt for the adoption of capital-intensive techniques tested and tried in a developed country's economy.[18] Also in the absence of an enforced "social legislation" by the host country's government, on manufacturing industry, there exists the possibility that foreign firms will only obey the letter of the law compared to local firms who are more familiar "with what constitutes minimum acceptance compliance".[19]

The drive towards capital intensity is also influenced by many other factors. Forsyth and Solomon (1977) noted the following: the lack of choice of technology (technological determinism) in a situation where machines are designed in and for high-wage countries; the limited choice of technology once the product is exactly specified; the preference for the latest and most modern techniques on the part of both governments and businessmen in LDCs; the influence of technicians from advanced countries; the fluctuation of wage rates--rising faster than interest rates--and the non-availability of skilled personnel to supervise labour intensive techniques.[20]

It is not possible to say, a priori, that the reason why foreign firms tend to be capital intensive is traceable to their foreignness hence we turn to empirical evidence.

Central to the thesis of the choice of technologies by foreign firms in LDCs is the argument that the techniques

adopted by the foreign firms are those perfected in response to the factor endowments of an advanced economy. Foreign firms are therefore always employing capital-intensive techniques and failing to adopt labour intensive techniques even when they are available.

Reuber's (1973, pp. 194-6) study of adaptation of technology by multinationals, drawn from a range of industries and advanced countries, revealed that 57 out of 78 cases introduced its production to developing countries intact and in an additional 19 cases it was introduced in adapted form. With respect to types of technological adaptation, for about 70 percent of the 77 responses, no specific adaptations were reported. The most important reason given by those firms who adapted was "to scale down plant and equipment to the lower volume found in the host country market." On the other hand, Courtney and Leipziger's (1974) result is mixed as to whether a large number of U. S. owned MNEs dispersed across 11 industries adapt technology in LDCs. For six industries, technology differs between developed and less developed country affiliates, but not systematically in a more labour-using or more capital-using way; and in the other five industries technology does not differ significantly.[21]

While Reuber and Courtney and Leipziger found mixed results regarding adaptation of technology, Reynolds and Gregory (1965, p. 295) and Hughes and Seng (1969, p. 196) concludes that foreign firms use the same production tech-

niques in developing countries as they do in the developed countries.

Another strand of the thesis is whether FDI contributes to factor proportions problems in LDCs. The results of most studies in this area support the general premises that FDI cannot be singled out as a distinct contributor to factor proportions in LDCs. However, they came to conflicting conclusions.

Mason (1973, p. 352) compared the operating characteristics of multinational and local firms with respect to the ratios in which they combined capital and labour in final output in Mexico and the Philippines. From 14 United States subsidiaries closely matched with 14 local firms, Mason (1973, p. 352) found that "techniques would appear not to vary greatly between the two countries, i.e., insofar as value added per employee and capital used per worker ratio are not significantly different." Further, United States firms paid higher wage rates and had a significantly higher proportion of their worker in the factory. A similar finding has been reported by Strassman (1968) and Little, Scitovsky, and Scott (1970). However, they concluded that foreign firms are more likely than domestic counterparts to use labour intensive techniques in developing countries.

The conclusion by Strassman, Little, Scitovsky and Scott that foreign firms are more likely to use labour-intensive techniques than local firms, is consistent with several

other empirical studies. Helleiner (1973, p. 25) reports that "preliminary results of a detailed study of 1,400 firms in Isreal, Colombia, the Philippines, and Malaysia indicate that in industries in which capital-labour substitution is evident, the multinational firms used their capital more intensively than local firms so as more than to offset higher capital-in-place to labour ratios." The evidence presented by Riedel (1975) strongly suggests that export-oriented FDI does not contribute to factor proportions problems in LDCs. Riedel's conclusion is based on the finding that in four important export industries in Taiwan, foreign firms appear to be more likely to use labour-intensive technology than local firms.[22] Additionally, two studies Pack (1976) and International Labour Organization (ILO 1972) have also provided similar evidence in Kenya. The ILO (1972) reports on the comparison of foreign and locally-owned firms producing similar goods in Kenya, indicate that foreign-owned firms are 20% to 30% less capital-intensive than locally owned firms. The reason given for this phenomenal difference between foreign and local firms is the superior skills in the organization and supervision of labour of the former.[23] Pack (1976) confirms that the foreign-owned firms are relatively more labour intensive than local firms in some plants in the Kenyan manufacturing section (food processing, paints, chemicals, textiles, and plastic containers). Based on this result, Pack argued

that foreign firms are more labour intensive because of their technical perception and managerial expertise in identifying the existence of labour-intensive techniques. What emerges from this conclusion is that factors other than factor prices, are important in the selection of techniques of production among foreign firms. One may add that the "cognition" and information give the multi-national foreign firms access to more information about the available techniques.[24]

The two explanations (ILO and Pack) as to why foreign firms are likely to be more labour-intensive break down when we look at the studies of factor proportions in Indonesia, Korea and Ghana. Wells (1972) reports that "a surprisingly wide range of technology in the same industry" exists in ten foreign-owned and thirty-three local firms in six carefully defined industries in Indonesia. Wells claims that on the whole, foreign owned firms had a clear tendency to be more capital-intensive. Cohen (1973) compares nine foreign firms with ten Korean firms and found no clear pattern as to whether foreign firms are more or less mechanized than Korean firms. Similarly, Forsyth and Solomon (1977) report--based on the comparison of 42 private Ghanaian firms with 69 resident expatriate firms and 43 multinational corporations' firms--that nationality of ownership is significantly related to choice of technology. Multinational corporations are found to install plant and machinery

embodying different factor proportions from those observed in private Ghanaian factories. However, "the direction of these differences is not always the same, and it is not the case, as has been suggested elsewhere, that multinationals always tend to be more capital intensive (or more labour intensive) than local competitors." The evidence is mixed from industry to industry.[25]

The only relevant study on manufacturing in Nigeria is that carried out by Iyanda (1975) who maintains that indigenous firms are more labour intensive and less capital intensive than foreign firms. With regard to job creation, indigenous firms are likely to provide more opportunities than foreign counterparts.[26] Iyanda's work is based on 42 firms (31 foreign and 11 Nigerian) and is mainly concerned with contributions of FDI to the Nigerian economy. Since Iyanda is not particularly concerned with comparative behaviour, further evidence is certainly required.

Nationality of Ownership and Technical Efficiency

That foreign firms are relatively efficient compared to either local firms or government firms is a recurrent hypothesis in the polemical literature. One reason often cited in the literature as to why foreign firms can compete so efficiently with local counterparts is because of foreign firms' relatively higher productive efficiency.[27] If this reason is correct, it implies that foreign firms are required to possess a relatively higher productive efficiency advantage

over the local firms in order to invest.[28] Analogously, it can be argued that local firms are also likely to be more efficient where productive efficiency is the same for both foreign and local firms.

The second reason is based on superior technology and better management which are frequently thought along "X-efficiency lines" to result in greater efficiency for foreign firms.[29] With regard to superior technology, the orthodox theory of profit-maximizing entrepreneurial behaviour predicts, of course, that entrepreneurs will constantly seek out the most efficient technology available. If this argument is correct, it implies that the choice of technology was not made on the basis of a rational process in the sense that sufficient information was not available to both foreign and local firms in a given industry to ensure that simultaneous selection of equipment never involved the choice of "technically inefficient" techniques.[30] On the other hand, better management as a source of efficiency is based on the neoclassical textbook view which assumes that there is a "deus ex machina" at work, who translates factor prices into correct choice of technique. Since translating factor prices into correct choice of technique depends on the abilities and perception of a set of gifted managers who may only exist only in foreign firms, this will result in efficiency.[31] But as Leibenstein (1966) has argued, firms are unlikely to achieve perfect technical

efficiency and that the departure from complete technical efficiency or X-inefficiency, is likely to be greatest in monopolies or firms with market power, where the strict discipline of competition is absent.[32] Given that the organizational structure of the foreign firms contributes to the element of monopoly and that X-inefficiency is likely to be greatest in monopolies, it could be argued that local firms with market power are also likely to be more efficient.

What little empirical evidence is available, brings to dispute the assumption that foreign firms are relatively efficient compared to either local firms or government firms. Pack (1976) found that managers without technical experience were primarily in locally owned companies in Kenya, while the technically trained managers were primarily in foreign subsidiaries. The former relied on the local market for investment finance, borrowing at rates of 6-7%, while the latter typically obtained funds from the parent company and were instructed to use discount rates of 10-15%, or three- or four-year payback periods in calculating the profitability of purchasing additional equipment. Considering their technical ability to search for labour using processes, Pack (Ibid, p.55) argued "given the similarity in the wage rate paid by the two types of firms, the differential in the cost of capital may have strengthened the incentive of foreign subsidiaries to search for labour-intensive processes, but such activity would have reduced unit costs for local companies as well;

their wage/cost-of-capital ratio, though higher than that of foreign subsidiaries, warranted further search for labour using processes but their technical ability limited this endeavour."

White (1976) tested the hypothesis that a monopoly is more like to indulge in less efficient production than a competitive industry. Using Pakistani and the United States cross-section data for a sample of thirty-one industries for 1967-1968, White found that Pakistani industries with higher concentration (and presumably greater monopoly power) tend to have significantly higher capital-labour ratios, and this effect is quantitatively important. Thus, White (Ibid, p. 588) concludes that "firms with market power do seem to be indulging in more capital-intensive methods than are firms facing competition." This result is consistent with Wells' (1973) and Ranis' (1975) arguments that in LDCs, less efficient production is likely to take the form of excessive use of capital-intensive equipment and methods. Mason (1973) also found that the United States firms are more capital-intensive than local firms in the Philippines and Mexico in terms of buildings and equipment per factory worker and total capital per employee. However, the rate of return to total capital does not support the hypothesis that United States firms possess relatively higher productive efficiency advantage over the local firms.

Of relevance to the present study was the finding of Tyler (1978) that the assembled 1971 Brazilian micro data file for industrial firms shows that foreign firms and government firms in Brazil tend to be more capital-intensive than their local counterparts. But in terms of technical efficiency, Tyler (Ibid, p. 373) concludes that "the contention that foreign firms possess greater levels of technical efficiency than domestic firms does not stand up in the analysis when the possibility of separate production function is admitted. On the other hand, there is evidence through the production analysis that foreign firms do possess greater return to scale and greater elasticities of substitution." The present study attempts a quantified analysis of foreign and local firms in Nigeria in terms of technical efficiency.

Summary

The distinguishing feature of FDI is that it is a package of technology, managerial skills and capital. This makes the package of FDI seemingly suitable for the developing countries, especially, where lack of technological entrepreneurial "know-how" is as much a bottleneck as the absence of capital funds.

On the other hand, the FDI package may result in monopolistic exploitation of the LDCs, imposing a heavy burden on their balance of payments and in general, enabling foreign firms to reap benefits in excess of their contributions.

From the survey, it is clear that there is no unanimity of opinion on the issues that were considered. Forsyth and Solomon (1977) have noted that the mixed results obtained from different studies may be due to differences in methodology and data--industry coverage and definition of industries, the attempt to use data on plant and machinery of widely varying vintages as a guide to modern choice of technology by the different firms, and the failure to separate out the distinct subgroups of entrepreneurs in the indigenous sector.

Secondly, some of the problems identified by the many studies such as the problem of benefit sharing between foreign and local firms, factor proportions and technical efficiency, appear to arise from the view that there are appropriate (generally labour intensive) techniques of production. Nevertheless, policy to increase the production and adoption of labour-intensive technologies should be encouraged.

On the other hand, capital intensive techniques generate high output per worker and minimize the wage bill as well as increasing the reinvestable surplus. Disney (1970) and Balasubramanyam (1980) argued that while no one would deny the possibility of employment potential of labour-intensive techniques to be high, they have often been found to compare poorly with capital-intensive techniques, especially, in terms of their efficiency and the investable

surplus. In addition, it is the case that the labour-intensive techniques sometimes use more of both labour and capital per unit of output compared to capital-intensive technologies. Secondly, it is also argued that proponents of labour-intensive techniques ignore questions which arise with regard to income distribution. In this sense, capital-intensive techniques which generate high levels of output constitute a better approach to income-distribution. Implied here is that through fiscal policy, the high level of output can be redistributed to those who are not being employed as a result of the capital-intensive techniques. As J. P. Lewis (1964, p. 55) observed,

> "Their basic fallacy is in the assumption that employment goals can ever be divorced from output and income goals. Any society, if it could rid itself of enough techniques and capital (capital intensive in this case) could keep every one of its ambulatory members fully employed, grubbing for roots and berries."

This argument in the main, offers small comfort to those who insist that appropriate technology to the less-developed countries must progressively become labour intensive. Finally, since the importance of the MNE in developing and supplying these technologies cannot be underestimated, it would seem that the LDCs are left with the choice of selecting and purchasing components of the direct investment "package", separately, whenever possible. The general implication is that it increases developing countries' dependence on a few sources for their capital and technological needs. This

possibility would seem to be less important if LDCs do not sacrifice much in terms of the benefits from FDI. Nevertheless, depending on a few sources by LDCs for their technological needs, would have important economic and political implications with respect to the future participation of foreign investment. Hence, we turn to the role of FDI in the Nigerian economy to illustrate these implications.

Chapter Four

FOREIGN DIRECT INVESTMENT IN NIGERIA, 1950-1980

Mason (1971) has noted that since World War II, an increasing number of developing countries have adopted a strategy of rapid industrialization to accelerate economic development and presumably to absorb unemployed or underemployed labour from the traditional sector.[1] The experience of these countries has also revealed the important role which foreign direct investment can play in the expansion of manufacturing industries. Nevertheless, the extent to which developing countries will actively court foreign direct investment in the future will depend upon how this form of investment is perceived to affect the strains and struggles of their economies.[2] Much attention in recent years has been focused on the factors which determine the inflow of foreign capital and how effective policy measures are influencing the flow of direct investment into developing countries. The purpose of this chapter is to shed some light on these issues by examining the case of Nigeria. More specifically, the chapter will review Nigeria's need for foreign investment and government policies and incentives regarding foreign investment.

Nigeria's Need for Foreign Investment

The need for foreign investment in many developing countries results from foreign exchange shortages or lack of intangible factors--technology, human skills and entrepreneurship

(executive capacity). Nigeria's need for foreign investment during the 1950's and 1960's is a consequence of foreign exchange shortages needed to build infrastructure, particularly railways, and for social welfare services such as health, education, and water supplies.[3]

Over the last decade, Nigeria's need for foreign investment has essentially been transformed from the shortage of foreign exchange to lack of executive capacity. The metamorphosis is due above all, to the rapid development of the oil industry which no doubt benefits the country by providing large foreign exchange resources. The Federal Ministry of Economic Development estimated that between 1975 and 1980 oil exports provided on average about 85 percent of the total foreign exchange earnings and about 41 per cent of the gross domestic product (GDP). Secondly, as Karp (1980, p. 309) has noted, Nigeria, "apparently subscribing to a missing-component theory of development--according to which lack of saving, of foreign exchange, and of executive capacity are the principal factors holding back economic progress in developing countries--felt justified in claiming that shortage of executive capacity was the sole remaining constraint on Nigerian development." Similarly, among the several forms the flow of foreign investment can take, Nigeria has currently drifted from official aids to foreign direct investment which is regarded as a major conduit for transferring technology and "know-how" to the developing countries.[4]

Policy Towards Foreign Investment

Colonial Government Policy. As the ideal of self-government for colonies continued to make great progress, it became apparent that political self-government without economic independence would be unrealistic. Consequently, Mars (1947, pp. 124-125) noted that policy was directed at (i) increasing local capital at a more accelerated rate than foreign capital; (ii) the eventual domestication of foreign capital; (iii) the substitution of local for foreign managers and technicians; and (iv) the equalization of marginal productivity in both the export and import sector.

These policies for the most part ran in opposition to the interests of the foreign investors whose loyalty was more attached to the metropolitan countries than to the colonies. The less than fervent attitude of foreign investors towards these policies is not surprising in view of the fact that they were both local monopolists and monopsonists.[5]

In the mid-1950's as Nigeria progressed towards political independence, foreign investors became interested in the post-independence government industrial policy. Recognizing Nigeria's dependence on foreign capital and technological skills, the government pursued what May (1965) referred to as "a liberal economic policy towards the private sector." The government issued a policy statement in 1956 which contained measures designed explicitly to attract foreign investment. Oliver (1957, pp. 181-183) noted the following measures: (i) assurances against further nationalization or rigid

demand for local ownership and employment (ii) free movement of goods and services within the country; and (iii) free repatriation of profit and capital were also assured.

While it is beyond dispute that the above policy statement was designed to encourage the inflow of foreign capital to Nigeria, it was more incentive than policy. Moreover, the basic goal of the statement was to attract foreign investment irrespective of its nature and potential benefits. However, industrial policy after 1960 was to reflect development of the country as the dominant economic goal.

Post-independence Policy. The government's first effort to formulate industrial policy was undertaken in 1962 with the formulation of a six-year development plan. Its purpose was to attract growth-generating industries through the provision of infrastructure and other public services with government capital expenditure. Notwithstanding, a more imminent problem was posed by a chronic balance of payments deficit which stood at $156.6 million in 1962.[6] Indeed, the government also aimed at increasing the extent of Nigerian participation, ownership, direction and management of industry.

A second industrial policy, formulated by the government, is clearly stated in the Second National Development Plan for 1970-74. It was stated in the plan that the objective was to raise the GDP by no less than 6.6 per cent annually during 1970/71-1973/74. However, plan projections of the real GDP, valued at factor cost, showed an annual growth rate of 7.6 per cent during that four-year period. Actually, GDP

according to the Federal Ministry of information (1970, pp. 34, 52, table 7) and Federal Ministry of Economic Development (1975, p. 21, table 2.5) grew much faster--reportedly at a rate of almost 11 percent. The Second Plan also included the following objectives: 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;
>
> (iii) increase the income realized from manufacturing activity;
>
> (iv) create more employment opportunities;
>
> (v) promote establishment of industries which cater for overseas markets;
>
> (vi) continue the programme of import substitution as well as raise the level of intermediate and capital goods production;
>
> (vii) initiate schemes designed to promote indigenous manpower development in the industrial sector; and
>
> (viii) raise the production of indigenous ownership of industrial investment."
>
> (Federal Ministry of Industries, 1971, p.79)

The above goals, although admirable, when viewed in isolation, in many cases conflict with the interests of foreign investors. This stems from the fact that the government attempts to exercise a high degree of control over their operations in order to increase the benefits accruing to Nigeria from foreign investment.

As can be seen in the sixth objective, the authors of the Second Plan expected the development of intermediate and capital goods in order to increase the proportion of inputs acquired

locally. Apparently, they felt the need to establish the following order of priority:

(i) Agro-allied industries

(ii) Petro-chemical industries

(iii) Greater integration, linkage, and diversification of the textile industry

(iv) An integrated Iron and Steel complex

(v) Passenger Motor Vehicle Assembly and related industries

(vi) Expansion of existing industries for export, and

(vii) Further import substitution in selected goods.[7]

A cursory examination of the above order of priorities suggests that observance of them is likely to increase the domestic value-added. Further, it will set the economy into "take off" stage where a high proportion of growth-generating factors, human and material will be locally supplied.

The most recent industrial policy is clearly affirmed in the Third National Development Plan--1975-1980. The basic idea of the Third Plan was to use the relatively short time during which a large surplus of foreign exchange would be available "to create the economic and social infrastructure necessary for growth."[8] The Third Plan set as its target a growth rate of 9.6 percent for 1975-80. Implied here is that average annual public investment would have to rise from 0.6 billion nairas i.e., the amount spent under the Second Plan (1970-74) to 4 billion nairas--an increase by a factor of almost 7.

Nevertheless, the government realized in all of the three plans that measures to induce foreign investment were necessary, if these plans were to be implemented. Hence we turn to incentives developed to encourage foreign investment.

Incentives to Foreign Investment

Why are industrial incentives implemented? What are the effects of incentives? The most important reason why industrial incentives are implemented is to produce certain desired effects. These effects according to Meier (1968, pp. 153-54) range from allocation effects, distribution effects to balance of payment effects. Firstly, allocation effects of incentives are designed to influence foreign investors to invest in one country rather than another. Secondly, distribution effects deal with the incentives offered to increase the share of the recipient country in the foreign investment as a whole. Thirdly, the balance of payment effect is aimed at encouraging foreign capital inflows because of the foreign exchange additions they represent.

These three effects--allocation, distribution and balance of payment--will interact and complement one another as far as the government's goals outlined in the plans are concerned. However, the experience of Nigeria shows that the incentives offered to foreign investor have been predominantly 'allocative' in nature. Since the 1950's, in addition to providing high levels of tariff protection, the Nigerian government has also attempted to attract FDI by offering various tax concessions in the form of generous depreciation allowances and tax

holidays. These incentives to industrial enterprises are composed of four Acts of Parliament and one Department of Customs regulation.

Tax Incentives

Income Tax Relief Act, 1958, (as amended by Decree No. 22, 1971). Initially, passed as the "Aid to Pioneer Industries Ordinance" in 1952, this Act provided for relief from Income Tax in the early years for public companies operating in industries which the government considered to have favourable prospects of growth in Nigeria and assistance to which will be in the public interest.

A tax holiday was granted for three to five years depending on the type of their capital investment as well as:

(1) the rate of expansion, standard of efficiency, and the level of development of the company;

(2) the implementation of any scheme for the utilization of local raw materials or the training and development of Nigerian personnel, and

(3) the relative importance of the industry and the need for its expansion.[10]

Phillips (1968) in his preliminary assessment of the 325 applications made for pioneer certificates between 1955 and 1967, claimed the following: 177 applications were approved, 91 were rejected and others were pending. Further, 93 of the 177 approved actually became beneficiaries, and approximately 62 percent received a tax holiday of five years. The Official Gazette (1972) listed 31 industries declared pioneers. They included: cultivation and processing of food crops, vegetables and fruits, manufacture of basic intermediate organic

and inorganic chemicals, fertilizers, petrochemicals, caustic soda, and chlorine.

A frequent criticism of tax relief as an incentive in LDCs is that it is 'a perverse type of subsidy' corrupting the principle of equity in taxation.[11]

The significance of the tax holiday has been tested by various studies. May (1965), found that only six of the twenty-six British Companies Operating in Nigeria attached much importance to the generous tax incentives offered. Hakam (1966), revealed that government incentives such as tax holidays (pioneer status) and relief from import duties on raw materials accounted for 16 percent of the reason why investors preferred to invest in Nigeria over other countries with similar incentives. Phillips, concluded the following:

> "All the foregoing on the significance of the tax holiday device tend to lead to the conclusion that it is not of crucial importance in the investment decisions of the grantees. It is possible, however, to generally discount the importance of this tax incentive since there will obviously be individual differences in emphasis on it. It is recognized that some of the grantees would have commenced operations without the incentives. The extent of this is, however, difficult to assess; although we have made an attempt to indicate what portion of the pioneer companies sector would probabaly have come into being without the incentive. In the process, a strong presumption has been created that the device may not, in fact, be the crucial factor it is often thought to be." (Phillips 1969, p. 164)

Berger (1975, p. 240), reached a similar conclusion, namely that fiscal incentives (i.e., tax exemption, low, or no import duties or accelerated depreciation), had not influenced managers to a great extent in their decisions to establish

firms in Nigeria. Accordingly, 84 percent of the firms would have definitely set up their plants in Nigeria regardless of the financial incentives.

Robinson (1961), although not related to Nigeria, found that whereas governments emphasized tax concessions as the most important inducement to foreign firms to invest in their countries, this factor did not even figure in the foreign investors' response to the factors to which they attached most importance in making decisions. What they thought to be the most important in ranking order were effective development planning and execution, liberal capital and profit repatriation, non-discrimination against foreign ownership and control, uniform treatment of home and foreign enterprises, and minimum 'red tape'. Hughes (1969) in a study of FDI in Singapore revealed that tax concessions may encourage companies to overstate invested capital as well as the adoption of capital intensive technique in a labour-abundant country. Moreover, there was a tendency to remain in production only for the duration of the tax concession. The inadequacy or failure to grant a tax incentive to all firms operating in the same industry has been observed by Moore (1960). He argued that the effect is a substitution of competition in bargaining power and negotiation skills for competition in productivity and economic efficiency.

On the other hand, a somewhat different result seems to emerge from the study of Reuber (1973). Protection of domestic LDCs markets stands out in importance for market development and government initiated projects. In contrast, financial aid and other incentives are relatively more important especially for export-oriented projects. Only ten out of a sample of the sixty-nine responses indicated fiscal devices made no difference to whether the project was undertaken. Further, while incentives have had some effects on the decision to locate projects among LDCs, the most important of these, he added, were tariffs and quotas on competing imports, concessions on imports of inputs and tax concessions.[12]

The findings of Reuber and others raise a fundamental question as to why fiscal incentives have proved to be insignificant in the Nigerian context. Two reasons are often cited. Firstly, apart from the long term implications, there is the double taxation agreement between Nigeria and most foreign countries. For example, the agreement with Britain, the most important source of foreign investment in Nigeria, takes the form of tax credit for income taxes paid abroad. Implied here is that the tax holiday merely leads to nil tax credit when incomes are repatriated. Further, agreements do not cover relief from import duties, obviously because of the practical difficulties involved. If relief from import duties results in higher profits and these are tax free, they merely enhance the tax liability of foreign companies

at home.[13] Moreover, the offer of tax incentives is not unique to Nigeria; other countries offer even more generous allowances.[14] Secondly, it is argued that all the public policies together for industrial stimulation was not as important in explaining Nigeria's industrial development in the last two decades as the size of the country's market in terms of population and expanding income.

Following Reuber (1973, pp. 127-129), other reasons can be suggested: First, there is the highly complex nature of the incentive systems and the relatively high transaction and administrative costs for both Nigerian and foreign companies. Second, the high information cost for the investors. Third, incentive systems may be subjected to additional risk and uncertainty associated with a given project. Fourth, there is the inability to give an authentic estimate of an incentive offer by the government at the planning level. In this case, return from the project may be contingent on a wide variety of uncertain demand and supply considerations. Fifth, the bargaining power of the investor may inevitably be weaker as compared to that of the Nigerian government. Further, the long-term future of the investment from the stand-point of the investor is subjected to considerable risk.

Companies Income Tax Act, 1961

Under the Tax Act, 1961, companies are permitted an accelerated depreciation of their capital assets. This represents an additional 15 percent depreciation to the normal allowance of 5-10 percent. Thus, investors in all sectors

are allowed in the first year after setting up a plant to artificially increase expenditures in their accounts up to 25 percent. On the other hand, if a firm had not made profit in a given year, the artificial increase in the expenditure could be deducted from the profit of the subsequent year. Further, the Act provided for an indefinite period of carrying forward unabsorbed balances of depreciation claims. Given that the Act tends to reduce the amount of taxes paid to the government as well as the payback period of capital expenditure, it may be suggested that the Act produces undesirable allocation effects. This implies that the distribution effect is adverse.

Custom Duties Incentives

Equally important to the government was the protection of the newly established industries. Three of the measures enacted in this regard were the Import Duty Relief Act, 1957; the Custom Duties Act, 1958; and the Custom Drawback Regulations, 1959.

Import Duty Relief Act, 1957. Sokolski (1965) has noted that before 1962 raw materials were imported free of duty into Nigeria. The respective duties for semi-finished and finished products were 10 and 20 percent. Apparently, the Import Duty Relief Act, 1957, (approved user scheme) provided protection for domestic producers as they were exempted from duty or granted a concessionary low rate of duty on materials brought into Nigeria for industrial use. Exemption from duty was granted if such materials could not be locally produced at

competitive prices or if the imported finished article had a lower proportion of import duty than imported inputs. The time period for relief covered a maximum of three years.

The Import Duty Relief Act was typically advocated for diverse reasons:

(i) the government was interested in the manufacture of finished goods;

(ii) the emergence of local manufacturing goods presupposes the availability of input suppliers which were not available because most manufacturing firms were pioneers;

(iii) restrictions of time and in money prevented government implementation of fully vertically integrated industries making dependence on foreign suppliers more economical.

(iv) local production scales were small in nature, thus implying a high cost of production.

To keep local production within a reasonably competitive range of the costs of imports, free access to input supplies required low import duty. Finally as Iyanda (1975, p. 54) has noted, while high import duty on such inputs is likely to be self-defeating to the desired goal of domestic market expansion, it will increase industrialization through further import substitution.

The Customs Duties Act, 1958. Of great importance is the Customs Duties Act, passed in 1958 (Dumped and Subsidized Goods Act). This Act enabled the government, subject to GATT regulations, to charge extra duties on specific imported goods, particularly where clear evidence existed that goods were being "dumped" in Nigeria or subsidized by any government or agent

in the country of origin. One of the advantages claimed in favour of the Custom Duties Act is that it provided infant industries the necessary time needed to mature and get an economically competitive production level. Notwithstanding, it is also possible that such custom duties may become permanent in order to sustain inefficient and uneconomical local firms.

The Customs Drawback Regulations, 1959 In terms of encouraging the export of Nigerian manufactured products, new customs drawback regulations were drafted in 1959. Thus, it became possible for export-oriented manufacturing firms, on proof of exportation, to collect duties paid on materials imported for use in the production of exported goods. Sokolski (1965) has observed that within the first two years of these regulations more than N315,333 had been repaid to various manufacturing firms.

Development plans and indigenisation

Over the past decade, the post-independence Nigerian Government position in favour of a liberal economic policy towards private enterprise (foreign private and MNEs) has been strongly attacked by those who argued that foreign firms tend to invest in plant and machinery which are "inappropriately capital intensive" (thus reducing the amount of new employment unnecessarily). Perhaps the best evidence for inappropriate capital intensity comes from the studies by Sutcliffe (1971) and Singer (1973).

Past experience with a high unemployment rate heightened government interest in the issue of foreign participation in the industrial sector of the economy. In describing the unemployment situation in 1970, for example, the government states in the Second National Development Plan that "the government cannot continue to tolerate a situation in which high-level Nigerian personnel, educated and trained at great cost to the nation, are denied employment in their own country by the foreign business establishment."

The Nigerian government began to intervene in the national control over the development and management of economic resources in 1970. Such government intervention has been frequent during the 1960s but it was in the 1970s that the government clearly specified indigenization as a top priority policy objective for the country. From the government's point of view, indigenization will increase the development of indigenous entrepreneurs as well as reducing unemployment.[15]

The policy of indigenization in Nigeria dates back to the first National Development Plan 1962-1968, when the government began to state its desire for Nigerians to play an increasing role in the economic sphere of the country. Consequently,foreign companies were told to cut the number of expatriate staff and to employ and train more Nigerians. A number of studies seem to cast doubt upon the view that the first National Development was clearly the policy to be pursued if the government was interested in indigenization of the industrial sector. Adedeji (1971) has noted that the plan made no attempt to coordinate governmental activities with development in the private sector. The chief author of the second plan (1970) has noted that the main weakness of indigenization in the past was the absence of an enforcement agency with the result that each employer decided how far it would go on the path of indigenization. At best, all that was available was moral suasion. Further the first plan is also criticized for its laissez-faire open economy orientation as well as its consequent failure to formulate policies that were responsive to the socio-political needs of the country.[16] More generally, the emphasis on the objective of cutting the number of expatriate staff was moderate. One reason for the moderation was the interruption of the economy

by the civil war which diverted the attention of the government.

Another reason was the shortage of industrial manpower. For example, the centre for management development survey (1969) revealed that the share of expatriate staff in management positions in Nigerian industries was about 55 percent. At the same time, about 1,200 management positions were vacant. A reduction in the number of foreigners may not have been desirable during this period, especially when there was a serious gap in industrial manpower supply.

From the foregoing discussion, it would appear that a more extensive policy of indigenization requires the removal of the laissez-faire open economy orientation which characterized the first plan. The second national development plan (1970-74) discussed above does just that. Beginning with the second plan, the government was to establish an agency whose sole responsibility would be to ensure that all employers (public and private) conform to the indigenization policy to which the nation has long been committed. Thus, Rimlinger (1973, p. 205) noted that the second plan is an important landmark in the development of indigenization policy not because it introduced any radical shifts in existing policy but because it specifically made indigenization its top priority policy objective. On the other hand, it cannot be denied that the drive towards indigenization in Nigeria in the 1970s was a result of conflict of interest. There was high ownership concentration skewed in favour of foreigners as well as a divided loyalty between national interests and foreign interests.

Much of the discussion of indigenization emphasizes that 'nationalization of industries is a political decision not an economic one, and it does not come to grips with the immediate problems of raising productivity' (Stolper 1966, p. 288). In the light of the above view, progress of the economy is sacrificed for the sake of indigenization. This would depend on the structure of the country and this latter component may be of varying significance. Unlike the situation prevailing in the centrally-controlled economies, indigenization in Nigeria has been done within the framework of a mixed strategy.[17] As the planners have pointed out in the first progress report (1972, p. 36): "Foreign investment is still welcome and will for a long time be an important component in Nigeria's economic development. In fact many business incentives operating in the country today are aimed at encouraging private foreign investment in Nigeria. What indigenization seeks to do is to delimit areas in which private investors will operate."

In order to ensure industrial expansion, the government provided labour assistance measures such as an industrial training fund. However, the foregoing measures would still leave the economy vulnerable to low productivity because of the shortage of skilled workers and the slow down in the rate of economic growth.

Recognizing the implications of the principal objectives of the second plan for industrial strategy, these objectives were nevertheless continued into the third plan period (1975-80) with indigenization of economic activities being the top priority.[18]

Implementation of the Indigenization Strategy

The single most important step towards the indigenization of industrial ownership has been the Nigerian Enterprises Promotion Decree of February, 1972. The decree has the following three objectives: to create opportunities for Nigerian businessmen; to maximize local retention of profits; and to raise the level of intermediate and capital goods production. More importantly, the decree seeks to promote indigenization by reserving certain industrial and commercial ventures exclusively for Nigerian citizens and associations. The decree lists twenty-two small scale enterprises in Schedule I that are to be reserved for Nigerians and Schedule II lists 33 industries in which foreign ownership is excluded if the paid up share capital of the enterprise does not exceed ₦400,000. If the turnover exceeds the stipulated amount, Nigerians must have 40 percent equity participation (see Appendix 4.A). Beginning in 1976, the number of enterprises in Schedule (I) was increased by seventeen and the number in Schedule (II) was increased by nineteen. The equity participation either by the government agencies or Nigerian citizens was raised to 60 percent.

On March 31, 1978, some industries not in Schedules I and II (see Appendix 4.B) were required to have 40 percent indigenous participation. Finally, the Insurance Decree No. 59 of 1976 offers majority equity shares in foreign insurance companies to Nigerian citizens.

Given the outline of the three objectives of the 1972 promotion decree, the government notes that their implications

has to be considered in further detail in relation to problems such as that of finding necessary finance to acquire foreign firms affected by the decree. In addition there is the problem of inadequately trained manpower to replace foreign expatriate staff--bearing in mind the general lack of managerial skill and know-how among Nigerian businessmen. A final problem is that it may provide opportunities for a few Nigerians at the expense of the majority of the population. Recognizing these problems, various steps were taken by the government to ensure that implementation progressed effectively. The two steps taken by the government to increase the availability of capital and to acquire foreign enterprises affected by the decree, were the establishment of the Nigerian Bank for Commerce and Industry (NBCI), and the encouragement of the Nigerian Industrial Development Bank to increase the percentage of its loans made to Nigerian owned or controlled enterprises. The manpower problem was to be met by the Centre for Management Training. Thus the supervision of the transfer of Schedule I enterprises from foreigners to Nigerians, and the determination of share prices, timing and the amount of sales of enterprises in Schedule II, were administered by the Nigerian enterprise Promotion Board and the Capital Issue Commission respectively.

Before 1967 the quotas for expatriates in firms were administered by the Ministry of Internal Affairs. Thereafter, the Expatriate Quota Allocation Board had representatives from Federal Ministries, i.e., Industry, Economic Development and Reconstruction, Mines and Power, Labour, Trade, Finance, External Affairs, and Internal affairs as well as the NIDB. Two

fundamental problems facing the board were the shortage of staff and the reliability of the information obtained regarding the true requirements of the firms and the real qualifications of both expatriate and Nigerian staff. It might be mentioned in this context that the possibility of corruption is perhaps increased when the decision made by the board is entirely based on the information supplied by the firms. This stems from the fact that the companies are likely to exaggerate the difficulties of finding qualified Nigerians for certain positions.[19] At the other end of the spectrum, the enforcement of decisions by the board is assisted by the requirement that foreigners have work permits. This provides an opportunity for the board to determine whether skills possessed by the foreigners are in fact not available in the country.

The Decree took effect on 31st March 1974, and Olayide et al (eds.) (1975, p.69) note the following:

> "(1) By the end of 1974, about 430 companies have complied under Schedule 1. The nominal value of shares of those companies under Schedule 1 was assessed as N53 million.
>
> (2) Over N30 million has so far, been spent in the acquisition of alien businesses under Schedule II of the decree. Thus on aggregate, a sum of N83 million has so far been spent on the acquisition by Nigerians of Schedule 1 enterprises and the indigenization of 40% of those enterprises falling in Schedule II.
>
> (3) From a total of 954 businesses in Schedule I and II, about 740 had complied by the end of 1974. This represents 77.5 per cent."

There is no doubt that while the scope for replacing expatriate staff with Nigerians and creating opportunities to produce the desired control of the modern sector of the economy is extremely important, the policy of indigenization in this area really does matter. Adejugbe (1979) observed that:

> "the effectiveness of the indigenization policy will depend, in the long-run, upon the entrepreneurial capability of the Nigerians. Mere creation of

> opportunities may fail to produce the desired control of the modern sectors of the economy by Nigerians."
> (Olaloku (ed.) 1979, p.48)

Consequently, it is possible to reduce the number of expatriates in a given firm and still be left with the problem described by Rimlinger (1973) that one firm may have fewer expatriate staff than another, but the expatriates of the first firm may tend to play a more pervasive and controlling role to the exclusion of Nigerians. Finally, regarding the impact of this policy of indigenization on the flow of foreign investment, as we have observed in Chapter 2 from the inflows of foreign direct investment, it has been favourable. Foreign direct investment has increased and has contributed significantly to the balance of payments since the indigenization policy has started.

Growth of Foreign Direct Investment

FDI before Independence Data on the share of foreign investment in the production and exports in Nigeria before independence is sparse. A rough estimate by Frankel (1938, p.17) suggests that between 1870 and 1936, foreign firms invested N80.6526 million in trading and mining.

A characteristic feature of FDI in Nigeria before independence is the dominance of foreign-owned firms in Nigeria by country of origin. At the end of 1936, there were 84 foreign-owned firms in Nigeria. British (wholly or partly owned) firms accounted for 51 per cent of all firms in Nigeria. The concentration of Britain's investment in Nigeria is largely explained by political and economic relationships.

The sectoral distribution of the principal foreign firms at the end of 1936 shows 46 firms in trade; 39 in tin mining; 12 in plantations and trade; 2 in shipping and trade; 1 in manufacturing, shipping and trade; 2 in manufacturing and trade;

8 in shipping only; 7 in manufacturing only; 4 in banking and insurance; and 1 in professions.[20]

From the sectoral distribution of foreign firms it is apparent that a very high proportion of the earliest foreign firms operating in Nigeria consisted of trading companies, importing manufactured products and exporting raw materials in return. It follows that growth in production was brought by the expansion of the primary export sector. On the other hand, only about 5 per cent of the foreign firms were engaged in manufacturing. This implies little rise in the production of the manufacturing sector.

Table 4.1 gives the source of funds for investment before independence in Nigeria. FDI averages 15 per cent through the period (1953-60). In 1960, FDI has replaced capital from official sources and it accounted for 18 per cent of the total investment funds. Nevertheless, FDI was second to personal savings in terms of sources of funds for investment in 1960.

A common criticism of the growth of FDI before independence is that it did not serve as a catalyst for development in Nigeria, even if some Nigerian cynics might have viewed it as more of a catalyst in British rather than Nigerian development. The link between FDI and development is best explained by the traditional "gap model". Chenery and Burno (1962), McKinnon (1964), and Chenery and Strout (1966) have stressed that increasing FDI would accelerate development in several ways. Firstly, it should encourage indigenous capital formation by accelerating domestic demand. This could be accomplished through the traditional multiplier acceleration process following any investment project. Secondly, it may contribute technical and managerial expertise, by relieving the bottle neck in the development process. Thirdly, it can free foreign-exchange available for consumer goods imports, thereby revising the balance of payments constraint to the mobilization of existing local resources.

TABLE 4·1

SOURCE OF FUNDS FOR INVESTMENT IN THE COLONIAL PERIOD 1953-1960

MILLION N

		1953-4	1954-5	1955-6	1956-7	1957-8	1958-9	1959-60
Private Capital Investment* (FDI)								
Overseas	1	10.0	20.8	19.2	38.2	34.2	28.0	48.0
Official Donations	2	7.0	6.4	7.8	5.2	6.8	7.8	7.0
Other Capital Inflows	3	-28.0	-77.2	-1.2	11.8	27.0	52.0	22.0
Sub-Total		-10.0	-50.0	+25.8	55.2	68.0	89.8	77.0
Personal Savings of Individuals and Small enterprises	4	45.2	62.2	66.4	80.6	90.6	89.2	147.2
Government Surplus and other National Savings	5	74.2	121.2	64.4	58.8	49.0	59.8	100.8
Subtotal		119.4	183.8	130.8	139.4	146.2	150.4	190.0
Total Investment		109.4	133.8	156.6	194.6	214.2	240.2	267.0
Overseas Private investment as a percentage of total investment funds		9.1	15.5	12.3	19.6	16.0	11.7	18.0

(*) Including reinvested profits. Note the estimated for personal savings and the investment by small enterprises are subject to a large margin of error. Source: May 1965.

These arguments, in fact, are the major planks of the thesis that the industrial growth before independence was low because of colonial industrial policy. It is argued that colonial industrial policy encouraged foreign investments to operate under what Mars (1947) called "a restrictionist exploitation policy". As a result, these firms made little effort to train Nigerians to acquire skills, or to establish industrial activities which would compete with metropolitan industries.

To argue that industrial growth was low at the end of the 1950s because manufacturing contributed less than 3 per cent to the GDP is valid. However, this does not take account of the informal sector (traditional handicrafts). Further, the attraction of FDI, especially in the manufacturing sector in any developing country, is to be explained for most part by policies towards foreign private investment, and the "climate" provided for the operations of foreign firms. Nevertheless, the thesis that the industrial growth was low because of the colonial industrial policy may have been overdrawn. This thesis, however, ignores the question of how keen the rich nations of the world are to transfer resources to most developing countries at a quantum that could expidite rapid economic transformation in the latter. As Olaloku ., et al (1979, pp.169-170) observed,

> "the rich nations (since the Second World War) seem too preoccupied with their internal and external economic problems - headaches of advanced capitalism or socialism - so that they consider the price of developing the poor countries too high to pay. Externally, for instance, the USA is concerned with the strength of the dollar and European nations are investing their resources to ensure the success of the European Economic Community. The USA which by the sheer size of her wealth in the world should offer the hope for resource flows, has not created encouragement from her past operation in this direction. Finally, with respect to the flow of private foreign investments the acid test still remains profitability, i.e. foreign ventures are found only in fields where profit rates are very high."

Given all these limitations, is there any point in emphasizing FDI as a catalyst for development? We believe so--as long as the emphasis is not overstressed. Further, if the precise implications of these limitations of FDI on industrial growth are kept in mind, it would seem that benefits lost from FDI under colonial domination cannot be singled out as the major cause of the low industrial growth during the 1950's.

The second argument regarding low industrial growth, is that advanced by Oliver (1957). He emphasized the critical importance of indigenous capital, skilled manpower and limited market potential. In this view, the lack of these factors taken together was the cause of the low industrial growth in Nigeria during the fifties. This argument has proceeded under the assumption of a closed economy. However, May (1969) has presented evidence indicating that Nigeria in the 1950s as well as the 1960s "continued to adopt a liberal economic policy towards private enterprise, in order to encourage overseas investment, particularly in manufacturing." Similarly, the limited market potential argument has proceeded under the general assumption that the extent of market size determines the inducement to invest, and that industrialization will take place in an open economy where market demand corresponds to a size which can support a specific plant at optimum efficiency.[21] For example, Kilby (1969, p. 26) has demonstrated that "sufficient demand for manufactured goods is clearly the first requisite for the establishment of manufacturing."

The size of market has been the prime asset in Nigeria's effort to industrialize. Despite a low per capita income of about $30 in 1960, a population of some 40 million (30 million in 1950), a relatively even distribution of income as well as a highly developed system of transportation, have given Nigeria Africa's second largest market, surpassed only by South Africa.

Although not conclusive, the foregoing evidence seem to indicate that low industrial growth may not be blamed on the lack of capital, and skilled man-power or limited market potential. It is not unreasonable to hypothesize that the shortage of capital would have been met from numerous sources: for example, large well established firms with ample capital resources, which were seeking profitable investment opportunities; individual entrepreneurial promoters who were attracted by the possibility of forming partnerships or obtaining the financial backing of government agencies on terms favourable to them; the machinery manufacturers seeking outlets for redundant equipments, and finally the machinery merchants.[22] If this hypothesis is correct, we would expect these numerous sources to have a significant impact on industrialization. This, of course, will depend on whether they based their investment decision on market potential. However, it is very doubtful whether such responses to market potential have influenced the decisions to invest in the manufacturing sector in Nigeria. As we have already pointed out, only 5 percent of foreign firms were engaged in manufacturing before independence.

Given that investors were not overly responsive to market potential in their decisions to invest in the manufacturing industry in the 1950s, one would like to ask whether the trading companies were not irrational and perceptive enough to base their decisions to invest on market potential, or if their perception of investment opportunities and investment decisions were not seen within the context of market potential. On the contrary, May (1965) has argued that in most cases the trading companies would have preferred to have continued to supply goods manufactured in the United Kingdom. "Due to economies of scale, this could be done in most cases more cheaply..... However, the pressure to set up local manufacturing (in the 1950s) would not only mean an immediate loss of an export market, but make it extraordinarily difficult to re-enter the field at a later stage".[23] On the other hand, Akeredolu-Ale (1972) reports that even though there were many markets which could have supported some efficient factories, appropriate publicity, tariff protection and other fiscal incentives ..... were absent because the colonial government did not provide them. In this view, "colonial policy held back the growth of the industrial sector until the mid-fifties partly because manufacturing in the colonies would reduce the market for British manufactured goods".[24] The foregoing arguments have both emphasized that market potential did not influence the trading companies' decision to invest in local manufacturing.

Both support the argument that low industrialization was due to protection of export or trading interests. What distinguishes them, Akerdolu-Ale pointed out, is the possibility that market protection could lead to industrial growth. Third, Oyejide (1975), Nwankwo (1971) and Liedholm (1970) have all argued that the Nigerian market was reserved for industrial products and was not supposed to develop or generate internal dynamics of its own, except insofar as such development was complementary to the growth of the mother country's own economy. Further, the general objective of the division of labour was to allow the provision of raw materials by Nigeria while Nigeria's market received in return manufactured industrial goods. Similarly, Mars (1948), Schatzl (1969) and Olayide and others (1975) have emphasized that industrial obstacles created by the colonial government provided opportunities for the trading companies to reject industrialization for the primary reason of protecting trading interest.

In general, what has been emphasized is that lack of market protection was a primary cause of Nigeria's low industrialization growth rate during the 1950s. Recent experience of industrialization via import substitution, especially in LDCs, has heightened interest in the issue of investment motivation based on market protection.

Hakam (1966) has succinctly summarized investment motivation based on market protection in Nigeria, in terms of four categories:

(i) "The firm has long held a good export relationship with Nigeria--hence, it aims to preserve the market for the company in face of rising duties and possible new industries which would imply local competition;

(ii) As a result of the parent company's strategy of investing in key global areas, convinced that Nigeria is a very important area and that it may be too late to gain entry profitably into the market if the decision were postponed too long;

(iii) The aim to expand sales into a new market, which would be difficult by merely exporting, especially if there is pressure to manufacture locally;

(iv) The aim of forestalling a major competitor's move or possible move to Nigeria." (Hakam 1966, pp. 50-51).

These findings are of course consistent with J. Schumpeter's (1934) statement of the motives of the entrepreneurial man. In this view, "the entrepreneur acts to found a private kingdom .....then there is the will to conquer: the impulse to fight, to prove oneself superior to another, to succeed itself..... finally, there is the joy of creating, of getting things done, or simply of exercising one's energy and ingenuity". [25]

Kilby (1969) empirically provided support for the market protection hypothesis in his study of Nigeria's industrialization from 1945 to 1966. Evaluating the United Africa Company's first tentative industrial ventures, he claimed that this was as a result of the company's beer trade which suffered a decline in Ghana in 1932 and also in the Congo in 1935, due to competition from local breweries started by Swiss entrepreneurs. "It was apparent that the Nigerian market would soon be richer than either of these, and that unless U.A.C.

took the initiative, a valuable merchant interest might be jeopardized.[26] Felix (1968) also provided evidence supporting industrialization based on market protection to stimulate employment, alleviate the balance of payment constraints on industrial development, and acquire the gains of technical change.

From the above, it can readily be conceded that market protection would lead to industrialization. Perhaps, it is possible, however, to provide a qualified answer to an alternative reason for the low industrial growth in the 1950s. First, there are essentially long-run questions about the capacity of the trading companies to protect a given market. Secondly, there are also the short-run issues concerning the possible economic disadvantages of reliance upon protection. The point here is that inducement to invest based on market protection has obvious implications for tariff policy.

An investor could request a certain level of tariff protection in order to compete against other sellers. The question of whether an independent government would provide such protection in the long run, played a significant role in the decision to invest. Further, protection should be understood to cover profit repatriation, non discrimination against foreign ownership and control, as well as equal treatment of foreign and home enterprises. If, then, we accept the role of protection in terms of the above definition in the decision to invest, and also distinguish between

forms of protection by the government and trading companies, a vital outcome of our position thus far is the fact that the trading companies rejected industrialization in order to protect their trading interest. On the other hand, if market protection was a critical inducement to investment, one wonders why they rejected industrialization. Industrialization would have merely changed the nature of demand (consumer goods--capital goods) and would not have reduced foreign dependence.

At this point, it is important to mention one particular feature of the pattern of trade which has taken place between Nigeria and industrial nations such as Britain. Nigeria provided a capitive market for Britain's manufactured goods, while in return supplying raw materials and tropical food stuffs.

In such a situation, it seems reasonable to assume that the trading companies were interested in preserving or promoting their vested interests as opposed to the industralization of Nigeria. However, too much weight should not be placed on this sort of evidence. There are two considerations here. Firstly, the basic relationship between the industrialized countries and Nigeria in the post colonial era has not changed significantly. In other words, the industrialization that has been taking place in Nigeria cannot be interpreted to mean that the trading companies are no longer protecting their interests. Secondly, often the firms responsible for

industrialization after independence have been, and are, foreign owned, and in many cases they established their position in the colonial era.

FDI After Independence

Size and Sectoral Distribution. There was a notable change in FDI with respect to size, composition and origin between 1962 and 1976. In 1962, the total stock of foreign private investment was estimated at ₦473.3 million (Table 4.2). By 1976, this figure had risen to ₦2333.8 million, an average annual growth rate of 20.29 percent. However, the growth rate within the period declined after 1965, reaching its lowest in 1968/69, when a 65.1 percent decrease occurred. Table 4.2 also highlights the industrial distribution of foreign investment. The fastest growing sector in the economy during the 1962-1976 period was mining and quarrying. Petroleum exploration and production are the two main activities in this sector. Its share of total investment increased from 36.7 percent in 1962 to 54.7 percent in 1972 and declined to 39.4 percent in 1976. The dominance of FDI in this sector, reflects in part the large amount of capital and a high degree of special knowledge, (especially in the oil sector), and the long pay-out periods as well as high risks in the oil sector.[27]

Foreign investment in the manufacturing and processing sectors accounted for 17.3 percent of the total foreign investment in 1962. It averaged 22 percent between 1962 and 1976. The highest penetration was in 1971 (28.0 percent).

Table 4.2

CUMULATIVE DISTRIBUTION OF FOREIGN PRIVATE INVESTMENT IN NIGERIA

ANALYZED BY TYPE OF ACTIVITY, 1962-1976

YEAR	FDI (Million)	MINING AND QUARRYING %	MANUFACTURING AND PROCESSING %	AGRICULTURE, FORESTRY AND FISHING %	TRANSPORT AND COMMUNICATION %	BUILDING AND CONSTRUCTION %	TRADING AND BUSINESS SERVICES %	MISCELLANEOUS %	TOTAL %
1962	473.3	36.7	17.3	2.0	1.1	3.8	38.4	0.7	100
1963	554.5	36.1	19.1	1.9	1.0	4.2	37.2	0.5	100
1964	689.7	40.1	18.2	1.7	1.1	3.8	31.4	3.7	100
1965	807.8	43.7	18.5	1.5	1.5	5.3	24.6	4.9	100
1966	913.9	49.8	17.6	1.1	1.5	2.2	24.8	3.0	100
1967	1015.8	45.9	22.2	1.2	1.1	2.5	24.8	2.3	100
1968	1094.3	49.1	20.0	1.1	1.1	2.4	24.2	2.1	100
1969	381.6	44.2	22.2	1.3	1.3	2.5	26.2	2.3	100
1970	1001.2	51.4	22.4	1.1	1.4	1.4	20.6	1.7	100
1971	1322.8	52.5	28.6	1.2	0.9	1.2	14.1	1.5	100
1972	1571.1	54.7	27.7	0.6	0.8	2.2	15.4	3.6	100
1973	1763.7	52.5	23.2	0.4	0.6	2.6	16.7	4.0	100
1974	1812.1	45.0	28.0	1.1	1.2	3.5	17.7	2.5	100
1975	2429.8	42.0	22.1	0.8	1.0	4.9	25.0	4.2	100
1976	2333.8	39.4	23.6	1.0	0.1	5.3	27.0	3.6	100

SOURCES: (1) Central Bank of Nigeria, Economic and Federal Review, December 1968, pp. 15-16 and Ibid, March 1976, p. 15.

(2) Central Bank of Nigeria, Nigeria's Principal Economic and Financial Indicators 1970-1979, N.D. Table X.

A detailed distribution of the investment in manufacturing is presented in Table 4.5.

Origin of Foreign Investment

Table 4.3 gives the percentage distribution of the flow of FDI from 1962-1976, by origin. In terms of countries, the United Kingdom accounts for the largest share (61.3 percent) in 1962 but this declines to 40.4 percent by 1976. The absolute value of United Kingdom's direct investment rises from ₦44.4 million in 1970 to ₦942.0 million in 1976. There has been a marked increase in FDI from the United States and other western European countries. The respective shares are United States, 8.8 percent in 1962, 23.7 percent in 1968 and 16 percent in 1976; and Western Europe, 21.2 percent in 1962 and 26 percent in 1976. The rapid growth rate of FDI from the United States has been mainly a result of the heavy investment in the oil industry.

Flow of Foreign Investment. A clearer view of the changes in the direction of FDI flow is presented in Table 4.4, which shows the outflow, inflow and net flow, by origin. The inflow and outflow of foreign investment have fluctuated between 1961 and 1974. In 1961, the inflow of foreign capital was ₦64.2 million. It rose to ₦106.4 million in 1969. The respective inflows of capital since 1970, are ₦251.0 in 1970, ₦489.6 in 1971, ₦432.8 in 1972, ₦577.8 and ₦458.8 million in 1974. The increase in capital inflow between 1962 and 1965 as well as 1970-74 is explained by the

Table 4.3

TOTAL AND PERCENTAGE DISTRIBUTION OF CUMULATIVE FDI BY ORIGIN

YEAR	FDI (Million)	UNITED KINGDOM	UNITED STATES	OTHER WESTERN EUROPE	OTHER
1962	473.3	61.3	8.8	21.2	8.7
1963	554.5	59.5	9.3	36.2	7.8
1964	689.7	56.1	12.4	23.5	8.1
1965	807.8	53.5	15.5	22.9	8.1
1966	913.9	53.3	15.4	23.4	7.9
1967	1015.8	47.1	23.6	21.2	8.1
1968	1094.3	47.9	23.7	20.1	8.3
1969	381.6	45.0	23.1	22.2	9.7
1970	1003.2	44.0	22.9	22.4	10.4
1971	1322.8	44.8	25.5	19.7	10.0
1972	1571.1	49.0	18.2	23.4	9.4
1973	1763.7	48.8	17.5	23.5	10.2
1974	1812.1	46.0	17.0	25.0	12.0
1975	2429.8	38.0	22.0	26.0	14.0
1976	2333.8	40.4	16.1	28.0	15.5

SOURCE: See Table 4.2.

Table 4.4

FLOW OF FOREIGN PRIVATE CAPITAL BY COUNTRY OF ORIGIN (₦ MILLION)

YEAR	UNITED KINGDOM			UNITED STATES			WESTERN EUROPE (Excluding U.K.)			OTHERS (Unspecified)			TOTAL		
	In-flow	Out-flow	Net Flow	In-flow	Out-flow	Net Flow	In-flow	Out-flow	Net Flow	In-flow	Out-flow	Net Flow	In-flow	Out-flow	Net Flow
1961	32.8	5.2	27.6	14.4	2.6	11.8	13.6	1.8	11.8	3.4	-	3.4	64.2	9.6	54.6
1962	16.8	11.0	5.8	9.0	1.0	8.0	15.2	1.4	13.8	8.8	1.0	7.8	49.8	14.4	35.4
1963	45.8	11.8	34.0	13.4	2.6	10.8	28.8	2.0	26.8	4.4	0.2	4.2	92.4	16.6	75.8
1964	99.4	43.4	56.0	32.8	2.8	30.0	36.2	5.6	30.6	13.6	4.2	9.4	182.0	56.0	126.0
1965	105.6	63.6	42.0	39.6	2.2	37.4	47.8	27.2	20.6	13.0	3.6	9.4	206.0	95.6	110.4
1966	101.0	49.8	51.2	16.2	1.8	14.4	47.4	20.2	27.2	9.2	3.2	6.0	173.8	75.0	98.8
1967	33.4	41.6	-8.2	59.4	3.0	56.4	9.8	10.4	-0.6	4.4	8.6	-4.2	107.0	40.4	63.6
1968	68.0	27.2	40.8	18.8	0.4	18.4	11.6	5.8	5.8	8.0	-	8.0	106.4	33.4	73.0
1969	36.2	46.0	-9.8	56.2	54.2	2.0	39.4	14.8	24.6	18.8	4.0	14.8	150.6	119.0	31.3
1970	94.6	47.2	47.4	74.6	48.2	26.4	53.0	28.4	29.6	23.8	5.6	18.2	251.0	129.7	121.3
1971	207.0	59.6	147.4	151.4	44.0	107.4	92.6	56.4	36.2	38.4	10.0	28.4	489.6	170.0	319.6
1972	236.0	58.3	177.7	17.1	67.8	-50.7	130.9	44.9	106.0	28.8	13.5	15.3	432.8	184.5	248.3
1973	265.8	174.6	91.2	174.3	153.0	21.3	91.7	43.5	48.2	46.9	14.1	32.8	577.8	385.2	192.6
1974	119.7	147.8	-28.1	159.0	-7.9	166.9	128.0	44.6	83.4	24.0	39.7	515.7	458.8	224.2	234.6

SOURCE: CENTRAL BANK OF NIGERIA, ECONOMIC AND FINANCIAL REVIEW 6 (DECEMBER 1968), p. 11 AND IBID 14 (MARCH 1976), p. 15.

rapid growth of investment in the oil industry. On the other hand, the decline between 1966 and 1969, is partly explained by the Civil War.

Total investment outflows rose from N9.6 million in 1961 to N95.6 million in 1965, after which they declined to N33.4 million in 1968. Between 1969 and 1973, they increased from N119 million to N385.2 million. Outflows as a percentage of inflows rose from 14.95 per cent in 1961 to 66.66 per cent in 1973.

In terms of intra-country comparisons, the United Kingdom inflow rose from N32.8 million in 1961 to N119.7 million in 1974 (264.9%). In the same period, the outflows rose from N5.2 million to N14.7 million (274.2%). While the United States' investment inflow rose from N14.4 in 1961 to N159 million in 1974, the outflow declined from N2.6 million in 1961 to -N7.9 million in 1974. Also, during the period the inflow from Western Europe increased from N13.6 million to N128 million and the outflow increased from N1.8 million to N44.6 million.

The intra-country comparison seems to suggest that the United Kingdom has been replaced by the United States and the rest of Western Europe as the dominant source of foreign private capital. The dominant position of the United States may reflect the internal financing of the U.S. companies. Barlow and Wender (1955) have provided some important insights into internal finance of U.S. companies. Their survey revealed that U.S. companies were more willing to plough back cash flows generated in the host country than to import additional capital from abroad. It was emphasized that U.S. companies are more interested in risking profits than new capital from the parent company in a particular situation and also tend to have a policy expanding out of earnings in their LDCs operations. The implication is

that a firm can grow gradually and stand on its own feet from profits earnings. Reuber (1973) agrees with this finding and argues:

> "The relative importance of internal cash flows as a source of private foreign investment in LDCs suggests that the long-term variations in the size of these flows is likely to have a considerable effect on the level of private investment in these countries. Similarly, policies that force foreign investors to divest themselves of the assets giving rise to internal cash flows or which expropriate their assets in some other form may be expected to reduce considerably the level of private foreign investment in LDCs by drying up important sources of investment finance relied upon by most foreign investors." (Reuber, 1973, p.105).

The survey evidence provided by two econometric studies by Steven (1969) and Servern (1970) does not fully support the profits earnings hypothesis and shows that the "gambler earning hypothesis" is invalid. One caveat to this finding is in order. The Steven and Servern studies made use of data which are heavily weighted by the developed countries for which the profits earnings hypothesis is less plausible compared to LDCs beset by wide ranging government regulations on foreign exchange payments and investments.

Magnitude and Nature of FDI in Manufacturing 1972

The magnitude of the presence of foreign firms in Nigerian manufacturing is examined in two ways, (i) the source of paid up capital and (ii) the industry allocation of investment by different investors.

The Source of Paid Up Capital The general growth rate of FDI in the manufacturing sector was discussed above. Notwithstanding the shortcomings of the aggregated data, it still seems to presume that FDI in the industrial sector has risen to an unprecedented level. Table 4.5 provides the breakdown, by industry and ownership categories of the source of paid up capital in the manufacturing sector. In addition to those

Table 4.5

MANUFACTURING INDUSTRIES 1972 - NIGERIA

Source of Paid-up Capital %

No.	ISIS CODE	Industries	No. of Estbs.	Nigerian	Foreign	G
1	3111	Meat	13	14.3	28.3	
2	3112	Dairy Products	5	1.3	98.7	
3	3113	Fruit Canning & Processing	4	.1	99.5	
4	3115	Vegetable Oil Milling	48	13.7	13.0	
5	3116	Grain Mill Products	7	2.3	86.0	
6	3117	Bakery Products	173	40.1	21.3	
7	3118/9	Sugar & Sugar Confectionery	10	9.1	38.4	
8	3121/2	Misc. food prep. & anim. feeds	7	16.1	83.9	
9	3131/3	Spirit, Distillery & Beer	9	12.8	79.9	
10	3134	Soft Drinks	9	8.8	70.0	
11	3140	Tobacco	5	9.2	36.4	
12	3211	Spinning, Weaving & F/Textiles	69	13.1	76.3	
13	3212	Made-up Textile Goods	15	5.3	76.7	
14	3213/5	Knitted Goods, Rope, Twine	16	3.1	53.0	
15	3220	Wearing Apparel	31	17.0	80.1	
16	3231	Tanning	6	32.6	45.8	
17	3233	Travel Goods	6	44.9	52.3	
18	3240	Leather Footwear	19	4.6	30.4	
19	3311	Saw Milling	123	20.4	66.5	
20	3320	Wooden Furniture & Fixtures	86	40.1	44.7	
21	3412	Paper Conts, boxes & Boards	9	21.0	52.1	
22	3419	Paper & Other Paper Products	7	14.5	13.2	
23	3420	Printing	77	19.7	18.1	
24	3511/2	Basic Ind. Chems, Fert & Pests	3	3.2	97.0	
25	3521	Paints	6	12.7	84.5	
26	3522	Drugs & Medicines	9	2.2	46.8	
27	3523	Soap, cosm, perfumes & Others	17	3.0	83.6	
28	3529	Other Chemical Products	10	7.5	78.2	
29	3540	Products of Petroleum & Coal	5	.2	90.1	
30	3551	Tyres & Tubes	12	17.1	45.3	
31	3559	Other Rubber Products	23	9.3	32.6	
32	3560	Plastic Products	24	6.8	84.6	
33	3610	Pottery	5	13.0	80.0	
34	3620	Glass Products	4	3.3	96.9	
35	3691	Bricks and Tiles	12	37.4	62.6	
36	3692	Cement	7	14.1	24.8	
37	3699	Concrete Products	21	18.1	62.9	
38	3720/3811	General Hardware (Basic Metal)	11	6.0	79.8	
39	3812	Metal Furniture & Fixtures	24	18.7	62.9	
40	3813	Structural & Metal Products	32	15.6	56.1	
41	3819	Fabricated Metal Products	23	5.0	82.7	
42	3822/4	Agric. & Special Ind. Machy	5	4.2	60.2	
43	3829	Machinery & Equipment	3	9.0	91.0	
44	3832	Radio/Tel/Comm. Eq & Apparatus	11	40.2	59.8	
45	3833/3839	Other Electrical Apparatus	7	79.1	20.9	
46	3841	Motor Body Building	3	—	7.1	
47	3843	Ship Building	3	100.0	—	
48	3901/3909	Misc. Products	18	15.0	84.2	
		Totals	1052	11.6	58.2	

Note: Calculated from Table 1.4. Percentages do not add up to 100 as government owned enterprises and joint ventures are excluded.

Source: F.O.S., 1979.

noted in Chapter 1, the following characteristics emerge from Table 4.5.

(i) In 1972, the respective shares of total assets controlled by Nigerian and foreign sources were 11.6 per cent and 58.2 per cent.

(ii) The respective shares of foreign investment in machinery and equipment, electrical and basic metal are 91.0 per cent, 59.8 per cent and 79.8 per cent. The significant proportion of foreign investment going to these three industries (machinery and equipment, electrical and basic metal) does not reinforce the criticism that foreign firms concentrate in those industries which have, through imports, developed considerably large domestic markets in LDCs. It reinforces the argument that foreign investment is significant in those industries which require heavy capital investment and high level technology and have a relatively small domestic market.

(iii) The local investment is dominant in bakery products (40.1%) and shipbuilding (100%). The small size of local investment in the other industries may result from foreign domination of such industries - conceivably as a result of the capital and technology requirements which are within the competence of foreign firms - or from a capital intensive characteristic of the industry.

(iv) The relative unimportance of Nigerian shareholding vis-a-vis, expatriate shareholding in most industries reveals that foreign investors and Nigerians are clearly

unequal partners in the modern industrial sector in the country.[28]

Inter-Industry Allocation of Investment by Different Investor Categories in Manufacturing

A breakdown of the industry allocation of investment in Nigeria is presented in Table 4.6. The areas in which investments are concentrated are spinning, weaving and finishing textiles industries; products of petroleum and coal; food industries; cement and drinks. Their respective percentages of total manufacturing investment are 18.2 per cent, 10.7 per cent, 9.5 per cent and 6.9 per cent. Of these five areas, foreign investment is dominant in three. The respective shares of foreign investment in spinning, weaving, and finishing textiles; products of petroleum and coal; and drinks are 76.3 per cent, 90.1 per cent and 75 per cent (see Table 4.5). On the other hand, Nigerian investment is concentrated in the food and cement industries. The tobacco industry which accounts for 13 per cent of the total investment in manufacturing is not dominated either by foreign or Nigerian investment.

From the foregoing, it seems that the structure of participation of different groups in the exploitation of the new economic opportunities and of the patterns of ownership and control of industrial resources 1972 varied considerably. However, the evidence is not enough to show a systematic bias against less profitable firms by foreign investment. This is apparent even when the evidence being used is the paid up capital of the industry concerned. There is the possibility that the actual volume of investment in each industry may vary from the paid up capital. While variations are likely to affect the absolute amounts involved, they are less likely to render the pattern of investment identified here invalid.[29]

TABLE 4.6

INTER-INDUSTRY ALLOCATION OF INVESTMENT

BY INVESTOR-CATEGORIES, MANUFACTURING SECTOR 1972 - %

Industry--Consumer Goods	Nigerian	Foreign
Meat Products	.71	.28
Dairy Products	.02	.38
Fruit Canning Preserving	-	.68
Vegetable Oil Millin	3.89	.73
Grain Mill Products	.21	1.58
Bakery Products	1.41	.15
Sugar and Sugar Confectionery	2.27	2.00
Misc. Food Prep. and Anim. Feeds	.71	.74
Total Food	(9.22)	(6.54)
Spirit Distillery and Beer	5.15	6.36
Soft Drinks	1.68	2.68
Total Drinks	(6.83)	(9.04)
Tobacco	(10.14)	(8.16)
Travel Goods	1.41	.32
Leather Goods	.32	.43
Wooden Furniture & Fixtures	3.68	.68
Printing	5.77	1.06
Knitted Goods, Cordage, Rope, Twine	.34	1.20
Wearing Apparel	.72	.68
Pottery	.02	.03
Glass Products	.04	.27
Soap, Perfumes, Cosmetics & Others	.55	3.15
Paints	.62	.82
Drugs and Medicines	.09	.38
Tyres and Tubes	2.52	1.34
Fabricated Metal Products	1.14	3.78
Radio, Tel. Comm. Eg. & Apparatus	1.69	.50
Other Electrical Apparatus	5.21	.30
Made Up Textile Goods	1.36	4.00
Total Consumer Goods	(51.67)	(42.65)
Investment and Related Goods		
Tanning	.99	.28
Saw Milling	2.46	1.60
Paper Cont., Paper boxes & Boards	1.63	.80
Other Paper Products	.97	.17
Spinning, Weav. & Fin. Textiles	(20.52)	(24.00)
Basic Ind. Chem. Fert. & Pest.	.02	.13
Other Chemical Products	.38	.78
Products of Petroleum & Coal	.02	(16.56)
Other Rubber Products	2.80	2.00
Plastic Products	.66	1.60
Misc. Manufacturing Industries	.45	.50
Bricks and Tiles	.97	.32
Cement	(9.64)	3.37
Concrete Products	3.04	2.03
Basic Metal	.28	.73
Metal Furniture & Fixtures	1.50	1.00
Structure Metal Products	1.92	1.38
Agricultural and special Ind. Mach.	.02	.06
Machinery and Equipment	.02	.04
Motor Body Building	-	-
Shipbuilding & Motorized Board	.04	-
Total Investment & Rela. Goods	48.33	57.35
Total All Industries	100.00	100.00

Note: Figures indicating Investment concentration are shown in parentheses. These are ratios of capital paid up in an industry to the total paid up capital. Calculated from Table 1.4,

Source: the same as Table 1.4.

Summary

This chapter has outlined government policy and incentives and analysed in detail the growth and characteristics of foreign investment. It traced the causes of the low industrial growth during the 1950's. In Chapter 5, we analyse the changing structure of the industrial sector in Nigeria.

Chapter Five

THE PATTERNS AND SOURCES OF GROWTH IN NIGERIAN MANUFACTURING INDUSTRY

Less developed countries can either produce goods for overseas markets (export-led growth)[1] or produce goods for the domestic market (import substitution) in their pursuit of industrial development. However these two strategies are not mutually exclusive.[2] In this chapter, we shall be concerned with the import substitution strategy as this has been of prime importance in Nigeria.

With respect to import substitution strategy, Raj and Sen (1961), and Colman and Nixson (1978, pp.187-188) have noted a number of options that are open to a LDC:

(a) "it can use its foreign exchange to import investment goods (for example looms), raw materials, fuels, etc. to manufacture consumer goods (cloth);

(b) it can use its foreign exchange to import capital goods (machine tools) to make both investment goods looms) which in turn produce consumer goods (cloth), and to make intermediate goods and develop domestic raw material supplies;

(c) it can use its foreign exchange to import capital goods (machine tools) to make capital goods (machine tools)."

As far as the above three options are concerned, it is generally accepted that the import-substitution strategies followed by most LDCs have largely been the first option (i.e. the importation of investment goods to manufacture consumer goods, previously imported, for the local market.) Nevertheless, option (b) is becoming popular with some semi-industrialised less developed countries.

The import substitution argument is usually based on the principle of promoting economic growth through the diversification of resources to cater for the domestic market.[3] However,

the attractiveness of import substitution to the less industrialised countries is due according to Kirkpatrick and Nixson (1983, pp.12-13) to "the perception that it is easier to save foreign exchange through ISI than earn it by exporting manufactured goods." Furthermore, it can also be "linked with the rise to power in the LDCs of groups or social classes whose interests were served by the development of the national market and industrialisation." Similarly, the existence of tariffs or direct and indirect restrictions on imports, or the threat that the host country will impose them, have induced foreign firms to establish domestic production facilities in order to protect their market position. As we have noted in Chapter 4, Kilby's (1969) study of Nigeria's industrilisation lends support for this "market protection hypothesis".

Attention has focussed recently on the quantitative contribution of import substitution industrialisation to aggregate industrial growth in LDCs. In an effort to construct an import substitution model, Chenery (1960) has shown that import substitution is a more important source of industrial growth than any domestic demand effect, since it accounts for 50% of industrialisation. Empirical evidence from many studies suggests that export demand and domestic demand are important as sources of growth as the economic base increases and there is additional integration of the economy. Further as Oyejide (1975, p.23) has noted, "export of manufactured goods may have to wait even longer because it requires vigorous action in terms of export promotion, the establishment of market networks and what is more important, a favourable commercial policy by the advanced countries in terms of the

importation of manufactured goods from the less developed countries." This chapter represents a case study of Chenery's import substitution model to determine the sources of industrial growth in Nigeria. We address the question: To what extent does Nigerian production, import, export and domestic absorption data on various groups of consumer, intermediate and capital goods fit the Chenery hypothesis noted above. The chapter begins with a discussion of the pattern of industrial growth after 1960 in Nigeria.

Pattern of Industrial Growth after 1960

Although the beginning of Nigeria's industrialization goes back well into the 1950's, the evidence suggests a great "spurt" of industrialization seems to have begun after independence in 1960. The period of rapid industrial growth coincided with the formulation of the First National Development Plan (1962;68), designed to promote industrialization.[4] Taking an optimistic view of the role played by the manufacturing sector in the process of economic development, Nigeria's government embarked on a process of government inspired or "planned" industrialisation.[5] The priority accorded to industrialisation of course has its roots in the concept of a "leading sector". Lewis (1967, p.15) argued that "in any economy one or more sectors serves as a prime mover, driving the economy forward". Hirschman (1958, pp.109-10) has also argued that the manufacturing industry is likely to be a more powerful generator of induced investment through the vertical linkage effects.

In many LDCs, it is argued that support for industrialization as a leading sector comes partly from its dynamic nature which involved greater (backward and forward) linkages as

compared with the limited "transmission of technological" and "organizational stimulus" from agriculture to the rest of the economy. Further support has its primary basis in the statistical evidence that is provided by the historical experiences of the advanced, industrial countries.

In recent years, substantial evidence has accumulated in the literature that Nigeria has enjoyed a rate of growth of its large scale manufacturing sector which is indeed impressive. Although manufacturing's relative contribution to both gross domestic product and gross national income remains statistically small, it is regarded as the leading sector whose growth should stimulate the rest of the economy. Berger (1975, pp.32;34) has provided evidence which suggests that there has been horizontal and vertical industrial growth through the diversification of industry. Horizontally, new industries have been established which were not directly related to the existing industries and, vertically, there has been an expansion of various industries producing inputs for other industries (for example a glass works producing bottles for an existing brewery). But the factors underlying the industrial growth are diverse and some have already been noted above. While these factors cannot be discussed comprehensively, four points are particularly relevant to our discussion here.

Firstly, there is the view that imports create domestic markets. Hirschman (1958, p.121) has argued that

> "imports still provide the safest, most incontrovertible proof that the market is there. Moreover, they condition the consumer to the product, breaking down his initial resistance. Imports thus reconnoitre and map out the country's demand; they reduce uncertainty and reduce selling costs at the same time, thereby bringing perceptibly closer the point at which domestic production can be economically started."

If one accepts the above argument, it follows that the rapid industrial growth in Nigeria after 1960 was a result of the

domestic market becoming large enough to reach a domestic supply threshold.

Secondly, there was a policy instrument, i.e. tariff protection, which turns out to have been significantly important in terms of encouraging the establishment of manufacturing industries in Nigeria in the 1960s. Oyelabi (1972, p.281) noted that nominal tariff rates on goods produced or goods that could be produced domestically, especially in the field of consumer goods, were rising after 1960. If we assume that initially, domestic supply will lag behind the growth in domestic demand, there is the possibility that domestic prices will rise. The combination of rising domestic prices and rising tariff rates would increase profits from investment in consumer goods or industries producing consumer goods. This in turn has an obvious implication for the pattern of growth in those industries. Further, imported raw materials were crucial to the manufacturing sector as shown in Table 5.1. Since tariffs on intermediate and capital goods imports were low, this provided an advantage to investors in terms of purchasing input materials or equipment. The relatively low capital outlay combined with high prices of finished products meant high profit rates in the consumer goods industries. It is important to point out that tariffs or restrictions on imports allow a country to omit the problem of having to maintain internal demand in equilibrium with supply.[6] However, such tariffs could hinder the development of domestic intermediate goods and capital goods industries. Thirdly, starting from 1960, development expenditures were increased. Table 5.2 shows federal and regional state government expenditures between 1960 and 1973. In 1960 according to Table 5.2, total government expenditure including transfers was 10.7% of G.D.P. By 1973, it increased to more than one quarter. Further, investment expenditure was 43.3% of the total government expenditure in 1960 and 44% in 1973.

Table 5.1

Imported Raw Material Content

of Manufacturing in Nigeria

Percent of Imported Raw Materials of Total	Number of Industries
Under 10	8
10 - 24	8
25 - 39	9
40 - 54	12
55 - 69	6
70 - 84	3
85 and over	7

Source: Federal Republic of Nigeria, Third National Development Plan, 1975-80, Volume 1, pp. 151-155.

Table 5.2

Nigeria: Federal and Regional/State Government Expenditure - Selected Fiscal Years Ending 31st March

Government Expenditure by Type	1960 N m	1960 % of sub Total (1+2)	1960 % of Total (1+2+3)	1966 N m	1966 % of sub Total (1+2)	1966 % of Total (1+2+3)	1973 N m	1973 % of sub Total (1+2)	1973 % of Total (1+2+3)	Change in % terms 1960/66	Change in % terms 1966/73	Change in % terms 1960/73
1. Current Expenditure on goods & services	82.8	56.7	41.8	275	67.8	56.0	952.9	56	49.7	+232.1	+246.5	+1050.8
GDP at current prices	1964.4			3210.6			7187.5					
Current Expenditure as % of GDP	4.5			8.8			13.2					
2. Investment Expenditure	63.2	43.3	31.9	130.6	32.2	26.6	748.6	44	39	+106.6	+473.2	+1084.5
Investment Expenditure as % of GDP	3.4			4.2			10.4					
Sub total	146	100	73.7	405.6	100	82.6	1701.5	100	88.7	+177.8	+319.5	+1065.4
Sub total as % of GDP	7.9			13.0			23.6					
3. Transfers	52.2		26.3	85.6		17.4	217		11.3	+64	+153.5	+315.7
Transfers as % of GDP	2.8			2.8			3					

Sources: F.O.S. Federal Republic of Nigeria, Annual Abstract of Statistics, 1984 and Digest of Statistics, vol.23 April and July 1974. Approved Recurrent and Capital estimates of the Federal States governments, 1972/73 and [illegible]. Federal Republic of Nigeria Report of the Accountant General of the Federation together with Financial statement for the year ended 31st March, 1973.

Fourthly, apart from mining and quarrying, the bulk of private foreign capital was concentrated in manufacturing over the 1960-70 period. This is partly explained by the fact that foreign investors had an almost exclusive controlling interest in those industries which were capital intensive, especially, in plastic products, fabricated metal products, electrical machinery and transport equipment, as well as tobacco and chemical products. By 1967, private foreign investors owned approximately 61% of the paid up capital investment in the manufacturing sector, while 12% was owned by Nigerian private investors, and the remaining 27% was accounted for by the Nigerian government.[7] As can be seen in Table 5.3, it would appear that the manufacturing industries have been based almost entirely on foreign investment

The four factors and those noted above, have helped in shaping the pattern of industrial growth in Nigeria. By 1965, when our data begins, there had been import replacement in major consumer goods industries such as textiles, leather and wood products. On the other hand, between 1965;1971 the largest increases in imports have been in capital goods (machinery, basic metal and transport equipment) as well as intermediate products, especially in chemicals. In the same period there was a decline in the importation of consumer goods with the exception of food and beverages (Appendix Table 5A-2). Inspection of Appendix Tables 5A1- and 5A1- reveals an increase in domestic demand for manufacturing goods from N751.52 million in 1965 to N1977.9 million in 1974. This is partly explained by the rapid increase in investment activities as well as the rapid increase in real income which influenced the demand for manufactured consumer goods. This implies a relative movement

Table 5.3

Source of Paid up Capital in
Nigerian Manufacturing Industries 1965

Group	₦M	Percentage
Nigerian Private Investment	15.28	11.9
Foreign Investment	78.17	60.9
Nigerian Government	34.91	27.2
Total	128.36	100.0

Source: Schatzl, (1969, p. 178)

away from agriculture towards industry which should be shown up by production data, and which may also be illustrated by labour force data, at least in relative if not in absolute terms. The lack of reliable labour force data for Nigeria poses difficulties in verifying the extent to which the planned objectives of the government have been achieved. If one accepts the relatively high growth rate of GDP during the 1960s and early 1970s as a yardstick for measuring per capita income, one can, with reservation, conclude that real GDP per capita has been rising over time.

Significantly, the four factors discussed above have also influenced the two periods under study differently in terms of import substitution as well as the extent to which increased in domestic demand were met by domestic supply. As noted above, tariffs reduce the growth of imports. Given the reduction in import growth, import substitution took place in most industries between 1965;1970. In the second period, (1970/71 - 1973/74), there was an increase in imports and domestic demand in all industries (Tables 5A-2 and 5A-3). This led to substantial negative import substitution in many industries and a high relative contribution of domestic demand to sources of growth in output and value added. Further, the rate of growth in domestic supply was lower than the rate of growth in imports during the second period. This was a disappointment for the second development plan of 1970-74 which emphasized import substitution as well as industries which cater for an overseas market in order to improve foreign exchange earnings.[8]

Gross Output and Gross Value Added The percentage increase in value added and gross output of manufacturing industries separately and by groups of industries according to the ISIC are given in Table 5.4 for the three years under study. Table 5.4

Table 5.4

Percentage Increase in Gross Output and Gross Value Added

ISIC		Gross Output			Gross Value Added		
		1965/6 1973/4	1965/6 1970/1	1970/1 1973/4	1965/6 1973/4	1965/6 1970/1	1970/1 1973/4
Consumer goods							
3111-22	Food and beverages	96	113	-8	267	147	49
3131-40	Tobacco, beer and spirits	180	45	93	2	50	-32
3231-40	Leather	410	261	41	266	100	88
3311-20	Wood products	88	36	38	71	16	48
3412-20	Paper, printing	502	250	72	448	186	91
3610-20	Pottery and glass	486	475	2	380	450	-13
Intermediate goods							
3211	Textiles	407	403	.8	381	479	-17
3521-50	Chemical products	444	243	58	518	284	61
3551-59	Rubber	49	29	16	78	37	30
3560	Plastics	597	211	124	192	225	-10
39	Miscellaneous	40	225	-57	18	250	-66
Capital goods							
3691-99	Other non-metallic	114	-15	150	144	-19	199
3720-3819	Basic Metal	127	43	58	191	88	55
3822	Machinery	-29	33	-42	-67	-20	-59
3832	Electrical equipment	298	154	57	224	171	19
3841-43	Transport	58	-89	282	18	-63	215
Total Manufacturing		185	121	29	222	145	31
Industries primarily producing							
Consumer goods		151	110	20	188	109	38
Intermediate goods		328	250	22	336	290	12
Capital goods		100	15	73	149	33	87

Source: Computed from Appendix Tables 5A-1, 5A-2 and 5A-3

Classification of industry groups follows Chenery (1960)

shows some interesting and important results on the growth of various industries within the period 1965/66-1973/74. First, the rapid growth rates of most industries are caused by their small bases. In terms of absolute value, some of these industries are not significant (see Appendices 5A-1, 5A-2, 5A-3). Secondly, growth rates among industries show an extremely wide range across individual industries as well as the sub-groups of industries. Thirdly, by comparing industrial growth rates for the two periods, it is apparent that the growth rate among individual industries and sub-groups of industries are faster in the first period (1965/66-1970/71). In other words, since 1970/71, there has been a general slow down in the rate of growth of most industries in terms of industrial output and of sub-groups of industries producing primarily consumer and intermediate goods. On the other hand, tobacco, beer, spirits, wood products, non-metallic goods, basic metals, and transport industries have all accelerated since 1970/71. Further, the acceleration of the growth rates of the last three industries has in turn accelerated the rate of growth in the sub-groups of industries producing primarily capital goods. Fourthly, there has been a decline in the growth rate in total value added over each of the two consecutive periods. The deceleration is found in most individual industries as well as industry groups. Fifthly, the consumer goods industries have been growing at a relatively slower rate as compared to intermediate and capital goods industries in the sub-groups between the first and second period. Industries producing primarily intermediate goods grew at a faster rate (relative to the protected consumer industries) in the first period than in the second. In the second period, intermediate and consumer goods in the sub-group industries had almost

the same growth rate. At the same time, industries producing consumer goods grew less than the industries producing consumer goods in the first period. But in the second period, they grew more than three and a half times as rapidly as consumer goods in the sub-group industries in terms of gross output. The above results are also true among individual industries as well as sub-groups of individual industries primarily producing consumer and intermediate goods in terms of value added. Furthermore, the high growth rates in the first period for intermediate industries in terms of output and value added were not a general pattern in all such industries. It has been largely dominated by the textile industry. Further, the high growth rate for industries producing capital goods in the sub-groups during the second period was a result of domination by the transport industry.

Rate of Growth and Trade Ratios Other important aspects of structural change which deserve comment are the proportion of domestic production in total supply, the share of exports as well as the composition of imports in total supply. The data presented in Table 5.5 shows the percentages of domestic supply, the share of exports and the composition of imports in total supply for individual industries and sub-groups for 1965/66, 1970/71 and 1973/74. On import replacement, a clearer trend is apparent. From 1965/66 to 1970/71, the share of domestic supply of consumer and intermediate groups of industries increased consistently with only five of the sixteen separate industries indicating any decline.

Table 5.5

Statistics on Production and Trade of Manufacturing in Nigeria 1965-1974

	Percentage of domestic production in total supply of manufactured goods			Percentage of exports in total supply of manufactured goods			Percentage of imports in total supply of manufactured goods		
	1965/6	1970/1	1973/4	1965/6	1970/1	1973/4	1965/6	1970/1	1973/4
Food and beverages	69	79	62	66.3	60.1	49	31	21	38
Tobacco, beer & spirits	88	92	94	.2	.02	.1	12	8	6
Leather	67	94.5	85	31.4	15.1	18.5	33	5	15
Wood products	54	51	46	8.3	14.0	18.4	46	49	54
Paper, printing	56	86	84	-	-	-	44	14	16
Pottery and glass	20	57.5	21.5	-	-	-	80	42.5	78.5
Textiles	33	78	70.5	9.6	4.5	1.6	67	22	29.5
Chemical products	44	55.5	57	.2	.1	.3	56	44.5	43
Rubber	86	80	80	71	38	39.1	14	20	20
Plastics	60	62	75	-	-	-	40	38	25
Miscellaneous	4	12.5	2	.3	9.1	21.4	96.2	87.5	98
Other non-metallic	64	53	55	13	44	36.2	36	47	45
Basic metal	49	56	59.4	.1	-	-	51	44	40.6
Machinery	2	2	.8	-	-	-	98	98	99
Electrical equipment	12	22	18	-	-	-	88	78	82
Transport	22	2	3	-	-	-	78.2	98	97
Total Manufacturing	43	57	48	16	18	11	57	43	52
Consumer goods	68	79	68	42.4	40	29	32	21	32
Intermediate goods	38	65	57.5	12.3	6	6	62	35	42.
Capital goods	29.6	27	26	1.2	3.3	4	70.4	73	74

Source: See Table 5.4

The percentage of domestic supply in total supply has been highest in 1970/71 with industries primarily producing consumer goods taking the commanding lead. Domestic supply, provided 43% in 1965/66, 57% in 1970/71 and 48% in 1973/74 of the total domestic demand. Further, domestic demand accelerated less rapidly than domestic supply between 1965/66-1970/71, but it rose more rapidly than domestic supply in the second period.

The respective shares of exports in total supply were 16% in 1965/66, 18% in 1970/71 and 11% in 1973. Assuming that 30% is taken as a level which an industry should attain in order to be classified as export-oriented, only four in 1965/66, three in 1970/71 and three in 1973/74 could be so classified. Several industries, especially those producing consumer goods and intermediate goods, have about 10% of production designated for export markets. These industries are clearly associated with primary production and their domestic costs of production seem to have fallen. But industries primarily producing capital goods, (with the exception of non-metallic minerals) are still far from the export market category. The most important manufactured commodities for Nigeria are leather, wood products (plywood), rubber, non-metallic minerals and food and beverages. These five products accounted for the bulk of Nigeria's manufactured goods exports between 1965/66 and 1973/74, all of which are

labour-intensive commodities. Many have argued that since these industries produce more labour-intensive commodities and have had high rates of growth of industrial employment, it raises the question as to whether Nigeria should specialize, according to comparative advantage, and produce and export labour-intensive commodities and import its capital intensive requirements. It is arguable that the comparative advantage of Nigeria lies in the production of labour-intensive goods since most industrial research, technological innovation and production techniques are controlled by the developed countries. On the other hand, without the technological transfer from developed countries, Nigeria will not be able to compete in international trade,[9] and this will lead to a greater technological gap between Nigeria and the developed economies.[10]

The percentage share of imports in total supply for manufacturing fell from 57% in 1965/66 to 52% in 1973/74. Between 1970/71 and 1973/74, there was a general increase in the importation of consumer, intermediate, as well as the capital goods in the sub-groups. The general rise in imports was due to the fact that the domestic demand rose faster than the domestic supply.

In summary, the manufacturing sector of the Nigerian economy has changed considerably over the period covered. The domestic supply of previously imported goods has led to changes in the import structure. Manufacturing has

become one of the fastest growing sectors and its growth rate has only been surpassed by that of the mining and quarrying. But it would seem on the basis of its contribution to both the gross domestic product and gross national income,[11] which has remained statistically small, that "the growth of the manufacturing is a lesser prime cause of the growth of the economy".[12] In fact, it seems to be the case that the rapid growth in most industries is partly explained by their small bases. Finally, the process of economic development involves the relative importance of various aggregates as well as changes in the composition of industrial output. In order to analyse the industrial growth process, we shall now turn to the various factors which are considered to be responsible for growth, as well as the structural changes possibly taking place within the industrial sector itself.

Import Substitution Model

General Description. The empirical frame-work for this chapter is based on the import substitution model developed by Chenery (1960) in his study of "the pattern of industrial growth". This model is used here to determine the sources of growth in domestic output and value added in Nigerian manufacturing industries. Chenery defines import substitution in terms of the reduction of the proportion of imports in total supply. Once one accepts the above definition, it follows that import-substitution is taking place if domestic supply rises faster than imports.[13] Conversely, if imports rise more rapidly as compared to domestic supply, then import penetration is occuring.

Applying the above definition and rule, Chenery (1960) apportions the growth in domestic output to (i) the growth in demand on the assumption that a constant proportion of total supply is imported and (ii) the reduction in the ratio of imports to total supply, which he refers to as import substitution.[14]

Specification of the Equations to be Estimated.

In the present work, Chenery's approach will be used with some modifications similar to those made by Lewis and Soligo (1965).

Following Lewis and Soligo (1965), the basic identity for measuring import substitution can be represented in the following notations and equations. We start with a general equilibrium condition that

$$D = S \tag{5.1}$$

where D is equal to total demand and S equals total supply. Further, the change in total supply is equal to the change in total demand, so that

$$\Delta D = \Delta S \tag{5.2}$$

where Δ represents change. These aggregates can be broken into their component parts. Thus, total supply is equal to domestic supply S_d plus import supply (M) and total demand is equal to the sum of final demand including inventory accumulation D_f, export demand D_x, and intermediate demand, D_I. Substituting these variables into (5.2) and rearranging, gives

$$\Delta S_d = \Delta D_f + \Delta D_I + \Delta D_x - \Delta M \tag{5.3}$$

As pointed out above, Chenery's model relates import substitution to the change in the ratio of imports to total supply

from one period to the next. Given the change in total demand, the change in total domestic output which would have taken place if there had been no import substitution is given by

$$\frac{S_d}{S}_1 \left(\Delta D_f + \Delta D_I + \Delta D_x\right) \qquad (5.4)$$

where $\frac{S_d}{S}_1$ is the ratio of domestic supply to the total supply in the base period which stays constant. In other words, if a country such as Nigeria continues to import in subsequent years the same proportion of its total supply as in the base year (1965/6 for this study), the change in domestic output which would have been required to meet the change in total demand is represented by equation (5.4). Equation (5.4) therefore describes changes in domestic supply in terms of changes in the three components of demand. However, the available data for Nigeria's manufacturing industries are not adequate to allow separation of domestic final demand and intermediate demand. They are combined in this study. Equation 5.4 can then be expressed as

$$\frac{S_{d_1}}{S_1} \Delta\left(D_f + D_I\right) + \frac{S_{d_1}}{S_1} \Delta D_x \qquad (5.5)$$

where 1 refers to the base period and the change in domestic supply due to import substitution is measured by the change in domestic supply which results from the actual change in the domestic proportion of total supply imported, when total demand is held constant. The total increase in domestic supply between any two periods is given by:

$$\Delta S_d = \frac{S_{d_1}}{S_1}\left(\Delta D_f + \Delta D_I\right) + \frac{S_{d_1}}{S_1}\Delta D_x + \left[\frac{S_{d_2}}{S_2} - \frac{S_{d_1}}{S_1}\right] S_2 \qquad (5.6)$$

Where $\frac{S_{d_2}}{S_2}$ is the ratio of domestic production to total supply in the second period. The change in domestic output can now be isolated into four parts.

(i) $\frac{S_{d_1}}{S_1}\Delta D_f$ represents the change in domestic supply due to the expansion of final demand.

(ii) $\frac{S_{d_1}}{S_1}\Delta D_I$ represents the change in domestic supply due to change in intermediate demand.

(iii) $\frac{S_{d_1}}{S_1}\Delta D_x$ represents the change in domestic production due to change in export demand.

(iv) $\left(\frac{S_{d_2}}{S_2} - \frac{S_{d_1}}{S_1}\right) S_2$ represents the change in domestic supply due to import substitution.

Sources of Change in Value Added

The foregoing discussion has largely focussed on the growth of domestic output. It also is important to analyze the growth in value added, since the latter measures the contribution of domestic factors of production to output. According to Lewis and Soligo (1965), sources of growth in the gross output, are

similar to those for value added. However, besides changes in demand, one would like to consider the changing relationship between value added and gross output over time, as well as, between industries. If a constant ratio of value added to gross output is maintained over time, both measures will yield the same results. Even if this is the case, however, the ratios of value added to gross output often vary across industries within manufacturing. It follows that estimates of the sources of growth for such a sector, will vary according to which measure is used, as the industry mix changes over time. We therefore allocate the change in value added to various factors by letting

$$\Delta V = \frac{S_{d_1}}{S_1}\frac{V_1}{S_{d_1}}\Delta\left(D_f + D_I\right) + \frac{S_{d_1}}{S_1}\frac{V_1}{S_{d_1}}\Delta D_x + \left[\frac{S_{d_2}}{S_2} - \frac{S_{d_1}}{S_1}\right]$$

$$\frac{V_1}{S_{d_1}} S_2 + \left[\frac{V_2}{S_{d_2}} - \frac{V_1}{S_{d_1}}\right]\frac{S_{d_2}}{S_2} S_2 \qquad (5.7)$$

Where ΔV is the change in value added to various factors, and $\frac{V_1}{S_{d_1}}$ is the ratio of value added to gross value of output and V is the value added. Assuming that the ratio of domestic production to total supply and the proportion of value added in domestic production are the same in both periods, the

first two terms in (5.7) measure the change in value added due to change in domestic and export demand, respectively. The third term measures the effect of import substitution while the last term measures the effect of the value added of changes in the ratio of value added to domestic output.

Further, the last term in 5.7 has been referred to by some as a 'residual' since it measures inter alia, the effect of inter-industry changes in the composition of domestic supply as well as changes in technical efficiency. These factors according to Lewis and Soligo (1965), "are usually grouped together and called technical change."

Relation to Previous Empirical Findings

Chenery (1960) has presented data indicating that the importance of import substitution is greatest in the early stages of industrialization and its relative importance as a source of growth declines consistently over time. As mentioned above, he demonstrated that "the increased share of domestic production in total supply, defined as import substitution, is more important than the pure demand effects (32%), since it accounts for 50% of industrialization".[15] Following the publication of these findings, Maizels (1963) provided empirical support for Chenery's claim when he analyzed the imports of industrial products of a sample of "semi-industrial countries" from 1913 to 1959. He concluded the following: (1) by 1959 the semi-industrial countries

had largely eliminated the import of "low technology" consumer manufacturers. (2) Between 1899 and 1959, the proportion of textiles and clothing in manufactured imports of the semi-industrial countries fell from 55% to 9%. The domestic supply of complex and heavy industry, such as machinery and transport equipment and chemicals, rose from 14% to 64%. Further the domestic supply of textiles and clothing in the lower income countries fell from 44% to 15%.[16]

A number of other studies, Lewis and Soligo (1965), Lewis (1969) and Ahmed (1968), have revealed the importance of import substitution in the early stages of development. Table 5.6 shows that virtually all of the growth from 1951/52-1954/55 in Pakistan has been due to import substitution with the commanding lead of 96.6%. In later years, it declined from 96.6% cited to, first, 22.9% in 1954/55-1959-60 and -0.3% in 1959/60-1963/64. Over the same period, domestic demand rose from 2.4% to 53.1% and 95.7% respectively. Export demand was of major importance in intermediate goods and this has been attributed to the growth of the jute textile industry.[17] The results for India cover two periods (1951-1956 and 1956-1961). The relative importance of import-substitution declined from 29.8% in 1956 to 13.3% in 1961. On the other hand, the relative contribution of domestic demand rose from 61.2% in 1956 to 83.5% in 1961.

The foregoing examples demonstrate that import substitution tends to dominate in the early stages of industrialization

Table 5.6

Percentage Contribution of Three Sources of Growth In Manufacturing Industry: India and Pakistan

	Domestic Demand	Export Demand	Import Substitution
India (1951-1956)*			
Consumer goods	83.3	6.2	10.4
Intermediate goods	25.9	26.1	47.9
Capital goods	45.1	0.4	54.4
All industries	61.2	8.8	29.8
India (1956-1961)*			
Consumer goods	83.5	0.1	16.2
Intermediate goods	80.5	7.2	12.1
Capital goods	88.5	0.4	10.9
All industries	83.5	3.2	13.3
Pakistan (1951-1954/5)**			
Consumer goods	2.5	1.4	96.2
Intermediate goods	7.2	5.2	87.4
Capital goods	-6.7	0.9	106.0
All industries	2.4	1.8	96.6
Pakistan 1954/5-1959/60**			
Consumer goods	55.7	16.5	27.8
Intermediate goods	34.0	57.8	8.1
Capital goods	71.8	1.0	27.2
All industries	53.1	24.0	22.9
Pakistan 1959/60-1963/4**			
Consumer goods	110.0	-1.1	-8.9
Intermediate goods	47.6	21.8	30.6
Capital goods	108.5	1.2	-9.6
All industries	95.7	4.6	-0.3

Sources: *Ahmed (1968)
**Lewis and Soligo (1965)

and its importance declines as the economy develops its own internal dynamics as well as further integration of the economy. What explains the early lead of import substitution as a source of growth is the fact that import substitution poses little problem in the earliest stages of infant industrialization. A policy of import substitution tends however to be increasingly difficult to follow beyond the stages of consumer goods to intermediate and capital goods. This stems from the fact that the capital intensity of import substitution industries and the import content of investment rises as the economy transits from consumer to intermediate goods.[18] A further problem is the demand factor. An increasingly large domestic market is required for the achievement of a minimally efficient scale of production of intermediate and capital goods industries.[19] It follows therefore, that import substitution gets "stuck" if an economy has not developed internal dynamics to facilitate the production of intermediate and capital goods.[20]

Table 5.7b presents some empirical evidence for Nigeria between 1957 and 1967. In the sub-period 1957-1962, domestic demand accounted for 25.4 per cent of the growth in the output of all manufacturing industries. The contribution of import substitution in the same sub-period was 74.2 per cent. On the other hand, in the sub-period 1962;1967, import substitution contributed 62.9 per cent while domestic demand contributed 36.9 per cent. From these results, Oyejide (1975, p.30) concluded that "clearly, therefore, the importance of import substitution has been greatest in the earliest stages of industrial growth and has been declining steadily over time."

Table 5.7.b

Percentage Contribution of Three Sources of Growth in Nigerian Manufacturing Industry by Sub-sectors: 1957-67; 1957-62; and 1962-67

Industry	Domestic Demand	Export Demand	Import Substitution
1957-1967			
Consumer goods	24.8	0.7	74.5
Intermediate goods	22.7	0.0	77.3
Capital goods	9.2	0.0	90.8
All industry	19.8	0.1	80.1
1957-1962			
Consumer goods	33.3	1.2	65.5
Intermediate goods	188.5	0.0	-88.6
Capital goods	11.0	0.0	89.0
All industry	25.4	0.4	74.2
1962-1967			
Consumer goods	37.2	0.7	59.5
Intermediate goods	30.1	0.0	90.0
Capital goods	33.2	0.1	66.7
All industry	36.9	0.2	62.9

Source: Oyejide (1975, p.29).

Data and Empirical Results, Nigeria: 1965-1974

Data The data series used for the results presented below have been constructed, using the Federal Office of Statistics (FOS) publications as the primary source. The years that were used for the cross-sectional analysis were 1965/66, 1970/71 and 1973/74. The fiscal year 1965/66 was chosen as the base period because

it was in the middle of the First National Development Plan. Further, the above plan emphasized the policy of economic development based on the import substitution model. Fiscal year 1970/71 was the second year chosen because the Second National Development Plan was launched in 1970. This plan promotes the programme of import substitution as well as the establishment of industries which cater to overseas markets. The last period chosen was the fiscal year 1973/74. This was two years after a fundamental change in economic policy regarding ownership of industry. In February 1972, a promotion decree was promulgated with the following principal objectives: to create opportunities for Nigeria's indigenous investors; to maximize local retention of profits; and to raise the level of intermediate and capital goods production.

Another reason for the selection of 1965/66, 1970/71 and 1973/74 is that these were census of manufactures years and detailed information is available for imports, exports, domestic output and value added at the 4-digit Standard Industrial Classification level. Further, data are available for 16 manufacturing industries in 1965/66, 48 industries in 1970/71 and 48 industries in 1973/74. The respective larger number of industries in 1970/71 and 1973/74 is a result of a disaggregation of Standard Industrial Classifications used in 1965/66, which increased the number of 4-digit industries. However, the 16 industries in 1965/66 are equivalent to the 48 industries in 1970/71 and 1973/74 respectively. From the ISIC, it was possible to aggregate the 48 industries in both 1970/71 and 1973/74 to 16 industries in 1965/66.

The 16 industries included are large scale industries. These are all part of the modern sector, and are manufacturing industries with ten or more paid employees. Hence, they are included in the census of manufacutring industries in Nigeria (CMI). This has meant the exclusion of small scale industries from the analysis, though its exact magnitude is virtually unknown. Kilby (1969) noted the following three features of small scale industry: (1) Such enterprise is not evenly spread geographically, but tends to be highly concentrated in the new commercial and administrative cities where there is considerable wage employment; there is comparatively little small industry in the large traditional towns of the north and western regions. This clustering occurs because the products of small industry are consumer goods and it is only where there is a concentration of consumer purchasing power that these essentially satellite activities can be supported on any scale. (2) At least three different types of producers can be identified in the small industry sector. Unskilled producers of crude consumer goods whose number is closely related to the volume of urban immigration, the skilled artisan producers of simple but better quality products, e.g. leather, and relatively complex modern small-scale industry, e.g. baking. (3) Total employment in urban small scale industry would seem to be in the neighbourhood of 100,000, which is less than in rural cottage industry, but

greater than the number employed in establishments of ten or more. (Kilby, 1969, p. 19)

It follows from the above that the spread of large scale industry in the new commercial and administrative cities, where there is considerable employment, may lead to the decline in the small scale industry over the same period.

Throughout the data collection, there was a particularly crucial problem with the import data, because of the divergence between domestic market prices of imports and the cost price, less duties; the former usually being higher. For this study use is made of current domestic prices since it was not possible to find detailed world price data for the imports covered. As Lewis and Soligo (1965) have pointed out, the lack of any adjustment for relative price changes will mean that differential movement between industries could be explained by changes in relative prices as opposed to changes in real flows of goods. Additionally, adjustments for relative price changes among industry groups may not eliminate the problem of intra-industry price and compositional changes.

Empirical Results. Before proceeding with the empirical results, it is necessary to mention that the available data for Nigeria's manufacturing industries are not adequate to allow separation of domestic final demand and intermediate demand. We therefore followed the method of Lewis and Soligo (1965) and combined these into a single variable. This differs from the method used by Morley and Smith (1969) where intermediate demands generated by import substitution itself is

added to the relative importance of import substitution that is actually taking place.[21] Nevertheless, the exclusion of intermediate demands due to import substitution poses no serious problem since only few intermediate goods were produced during this period.

(a) Sources of Growth in Domestic Output. The proposed formulation (equation 5.6) was used to calculate the absolute and relative contributions made by the three sources of growth specified for the three periods. Table 5.8 presents the relative contribution of each of the sources of growth to individual industries.

Consider first the entire period 1965/66-1973/74. The variable domestic demand was significant for each of the industry groups and contributed 71% to all industries. The highest contribution was made in the machinery industry which included the production of office and computing equipments. The remaining two variables, export demand and import substitution, contributed 9% and 19% respectively. The contribution of export demand was significant only in the food and beverages, wood products, basic metal and non-metallic industries. Industries producing non-metallic materials include pottery, china and earthenware, glass, cement, and concrete products. On the other hand, metal industries include tools, cutlery and general hardware. Import-substitution made a significant contribution in paper and printing, and in textile industries. The paper and printing industries include paper pulp and

Table 5.8

Percentage contribution of three sources of growth in manufacturing industry by industry group

	Food & Beverages	Tobacco, beer, spirits	Textiles	Leather	Wood Products	Paper, printing	Chemical products	Rubber	Plastics	Pottery & glass	Non-metallic	Basic mecal	Machinery	Electrical Equipment	Transport	Miscellaneous	All industries
1965/6 - 1973/4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Domestic demand	82	90	66	60	100	60	73	138	72	93	60	70	500	50	320	166	71
Export demand	43	-.02	-1	12	37.7	00	.5	1.5	00	00	68	.7	00	00	00	100	9
Import substitution	-25	9	35	28	-37.7	40	26.5	-23	28	7	-32	30	-600	43	-420	-166	19
1965/6 - 1970/1																	
Domestic demand	36	86	28	56	83	48.3	71.7	188	88	25	-200	59	70	25	25	-5	48
Export demand	40	.5	-	4	28	-	.1	-62	-	-	237	-2.2	-	-	-	-	11
Import substitution	24	14.5	72	40	-12	48.3	28.2	-37	4	75	-133	4.4	-10	75	-119	100	41
1970/71 - 1973/4																	
Domestic demand	256	95.2	1450	100	100	103	93	64	65	8100	64	85	100	137	50	167	132
Export demand	-38	5	-300	33	38	-	-	60	-	-	29	-	-	-	-	-	3
Import substitution	-322	-.2	-1050	-33	-50	-6	7	-20	32	-8000	7	14	-200	-50	50	66	-36

Source: Calculated from Appendix Table 5A-4. Equation 5.6 has been used to obtain these figures. For example, Leather industry in 1965-1973, according to Table 5.7:

$$\frac{Sd_1/S_1\ \Delta(D_x + D_I)}{\Delta Sd} = \frac{15}{25}\text{ N mil.,}\quad \frac{Sd_I/S_1\ \Delta D_x}{\Delta Sd} = \frac{3}{25}\text{ N mil. and}$$

$$\left[Sd_2/S_2 - Sd_1/S_1\right] S_2/\Delta Sd = \frac{7N}{25}\text{ mil}\left[\frac{15}{25} = 60\%, \frac{3}{25} = 12, \text{ and } \frac{7}{25} = 28\%.\right]$$

publishing while the textile industry produces raw cloth as well as clothing. Import substitution made a negative contribution to seven industries and less than 30% to nine industries. The negative contribution made by import substitution to various industries implies that import substitution did not occur over the whole spectrum of manufacturing industries i.e., from consumer goods through capital goods.

Turning to the period 1965/66-1970/71, some significant changes took place in the contributions of the three sources of growth. The results for the two variables--domestic demand and import substitution have a strong general similarity. They have approximately the same explanatory power in all industries together with domestic demand (48%) and import substitution (41%). In addition, both made a significant contribution to each industry group. The domestic demand contribution was more pronounced in rubber, plastics, wood products, tobacco, beer, spirits and machinery. On the other hand, import substitution took the lead in textiles, pottery and glass, electrical equipment and the miscellaneous category. The export demand variable, with 11% contribution to all industry, made a significant contribution to food and beverages (40%) and 23.7% to non-metallic industry. It is necessary to point out that industries producing non-metallic products are relatively unimportant in terms of their contribution to the GDP. However, the building and construction industry has helped the growth of the non-metallic mineral

products industries. The high percentage contribution of export demand (i.e., 23.7%) is partly explained by the fact that the country's demand for the products has not been adequately satisfied.[22] A priori, we would expect import substitution to be positive. This stems from the fact that 1965/66-1970/71 can be taken as an early stage of import substitution. Yet, this has not been the case in such industries as machinery and transport. This seems to reaffirm Chenery's finding that industries above what he referred to as a "typical" share of production were principally industries dependent on domestic agriculture while those that experienced little import substitution were often industries dependent on imported raw materials. However, the negative import substitution in industries such as rubber and wood products seem to suggest that dependence on domestic agriculture and local raw materials would not necessarily make an industry typical.

The empirical results for the period 1970/71-1973/74 confirm a priori expectations in terms of the decline in the relative importance of import substitution as a source of growth. Its contribution fell from 41% in 1970/71 to -36% in 1973/74, and made negative contributions to most of the industry groups. However, import substitution did fairly well in transport, non-metallic industries, miscellaneous and plastic industries. The export demand variable finished a weak second with 3% contribution to all industries. It made a 60% contribution to the rubber industry producing tires and tubes. Further, a substantial contribution was made to the

miscellaneous industry category. On the other hand, the source of growth for all industries grouped together was largely explained by domestic demand.

The foregoing discussion has uncovered the rather wide differences in the relative importance of various sources of growth in the individual industry groups. As stated above, we were unable to separate final demand D_F from intermediate demand D_I because of data problems. In order to remove the possibility of bias, one would like to examine sources of output growth by sub-groups of industries aggregated from individual industries statistics. The problem with such an approach, is that sub-groups results may be dominated by few industries.

The empirical results for the three sub-groups for two periods, 1965/66-1970/71 and 1970/71-1973/74, and also for the entire period 1965/66-1973/74, were calculated by dividing equation 5.6 by change in domestic supply (ΔS_d). The summary results for industry sub-groups are presented in Table 5.9. Looking first at the results for all manufacturing industries, wide differences between period one and two are evident. Import substitution accounted for 19% and export demand for 9.1% over the entire period. In period one, import substitution accounted for 41% and export demand for 11%. This reaffirms the empirical proposition that import substitution is a relatively more important source of industrial growth in the

Table 5.9

Summary Sources of Output Growth by Subgroups

of Industries Aggregated from Individual Industry Statistics

	(1)	(2)	(3)	(4)	Percentages Accounted for by: (5)	(6)	(7)
	Change in Domestic Supply	Change in Domestic Supply Due to Demand Expansion	Change in Domestic Supply Due to Export Demand	Change in Domestic Supply Due to Import Substitution	Demand Expansion	Export Expansion	Domestic Import Substitution
	ΔSd	$\frac{Sd_1}{S_1}(\Delta D_F + \Delta D_I)$	$\frac{Sd_1}{S_1}\Delta(D_x)$	$\left(\frac{Sd}{S_2}_2 - \frac{Sd_1}{S_1}\right)S_2$	Col. 2 ÷ Col. 1	Col. 3 ÷ Col. 1	Col. 4 ÷ Col. 1
1965/6 - 1973/4							
Consumer goods	256.3	199	50.991	5.3	78	20	2
Intermediate goods	345.6	197	-3.1	149	57	.9	43.1
Capital goods	111.4	113	17.06	-22	101.4	15.3	-20
Total industries	713.3	509	64.951	132.3	71.3	9.1	19
1965/6 - 1970/71							
Consumer goods	186	83	49.07	52.5	45	27	28
Intermediate goods	263	123.8	-4.61	142.3	47.1	2	54.1
Capital goods	17	16.7	7.06	-5.1	98	41.5	-30
Total industries	466	223.5	51.52	189.7	48	11	41
1970/1 - 1973/4							
Consumer goods	69.1	140.1	-.9	-70	202	-1	-101
Intermediate goods	82	106.2	-.7	-22.4	130	-1	-27.3
Capital goods	94	78	8	6.5	83	9	7
Total industries	245.1	324.3	6.4	-88.9	132.3	3	-36.2

Note: There is small calculation error because figures are rounded up.
Source: Computed from Appendix 5A-4

early stages of development. Consider next the second period, when the contribution of import substitution seems to have declined markedly, so that a value of -36% is produced. Export demand also fell from 11% in the first period to 3% in the second period. The domestic demand--the addition of intermediate and final demand--makes relative contributions of 71.3% in the entire period, 48% in the first period and 132.3% in the second period. In value terms, the magnitudes involved are 509 million for domestic demand, 132.2 million for import substitution and 65 million for export demand for the entire period. The results obtained in this study seem to be comparable to the results obtained in 1962 by Chenery, Watenabe, and Shisido. They ascribed 38% of the total growth in industrial output to import substitution, 56% to domestic demand and 6% to export demand.[23] It is not unreasonable to argue that the dominance of domestic demand as a source of growth in Nigeria (1974) and in Japan (1954) reflects a greater degree of integration within both economies or that both economies have operated on the strength of their own internal dynamics. Given the structural change which has taken place since 1954, it is the case that export expansion would be more important as a source of growth in the Japanese economy.[24]

An examination of the three groups producing consumer goods, intermediate and capital goods shows important differences between the two periods. In period 1965/66-

1973/74, import substitution was not a source of growth in capital good industries (-20%), and it made a negligible contribution to consumer goods (2%). Import substitution was of equal importance to intermediate goods, and it accounted for 43% of the growth in the intermediate goods industries. The impressive contribution made by import substitution to intermediate goods industries occurred mainly in textiles, plastics and chemical goods industries. The chemical goods industries include fertilizers and pesticides, and the plastic industries produce plastic household goods. Export demand was of major importance in capital goods industries because of the impressive contribution of the growth in non-metallic industries. On the other hand, domestic demand accounted for 78% of the growth in output of consumer goods industries as compared to 57% for intermediate goods industries and 101% for the capital goods industries. Principally, the relative importance of domestic demand in the capital goods industries, was largely dominated by machinery industries and transport industries producing motor bodies, shipbuilding and the ship repair industry.

Further, we consider an intertemporal comparison of the relative importance of the sources of growth between the first and the second periods for the three groups producing consumer, intermediate and capital goods industries. In period 1965/66-1970/71, import substitution was important in the intermediate goods industries and consumer goods industries. Over the same period, domestic demand accounted for 45% of the growth in the

consumer goods industries, 47% of the growth in the intermediate goods industries and 98% of the growth in the capital goods industries. Export demand was as important in the consumer goods industry as domestic demand was in the consumer goods industries. Its contribution was also impressive in the capital goods industries because of the growth in the basic metal and electrical equipments industries. By the 1970/71-1973/74 period, an interesting change occurred in the contribution made by the three sources of growth to industries primarily producing consumer, intermediate and capital goods. The significant change was the increase in the relative importance of domestic demand as a source of growth. Although import substitution occurred in few industries, growth in imports of competing goods was more rapid. In effect, there was negative import substitution. Consumer goods production in the second period, increased by 19.6% compared to domestic demand which rose by 65%. This resulted in a relative decline in exports. One final observation may be drawn from the remarkable contribution of domestic demand as a source of growth. Although the level of industrial development is still very low, per capita income has increased over time. As can be seen from period 1970/71-1973/74, the relative strength of domestic demand has been greatest in the consumer goods category of industries. Its influence on capital goods and intermediate goods industries has also been significant, but their growth can only be considered as essentially supplementary or "follow-up" to the growth in consumer goods industries.

(b) Import Substitution on a Value Added Basis

Morley and Smith (1969, p.7) have argued that "in a development context, it is more useful to measure import substitution on a value added rather than a gross production basis." In order to take account of the import substitution on a value added basis, we have used equation 5.7 discussed above.

Table 5.10 presents the value added by major industrial groups and the percentage distribution of value added for each of the years under study. The table reveals that the importance of consumer goods industries fell by a small margin between 1965/66 - 1973/74. Although significant gains were made in the intermediate goods industries, the industrial structure was still dominated by consumer goods industries with 47%. In 1973/1974, intermediate and capital goods industries shared 38.0% and 15.0% respectively. In the consumer and intermediate goods industries, it is clear that performances were dominated by a few industries. The influence of food and beverages dominated the consumer goods industries and they accounted for more industrial value added than all the value added by the capital goods industries combined. In the intermediate goods industries, chemical products and textile industries accounted for 87% of the value added in that category of industry. The gross value added rose from N161 million in 1965/66 to N518.25 million in 1973/74, thus generating an annual growth rate of 19.4% for this sector.

To estimate the sources of change in value added between periods, we employed equation 5.7. Calculated absolute values for each source of change in value added are reported in Table 5.11. The relative importance of each source of change in value

Table 5.10

Gross Value Added by Industries Groups

Industries primarily producing	1965/6		1970/1		1973/4	
	₦ Million	Percent	₦ Million	Percent	₦ Million	Perce
Consumer goods	84.8	53	177.6	45	244.35	47
Intermediate goods	45	28	175.6	44.5	196.31	38
Capital goods	31.2	19	41.4	10.5	77.59	15
Total Manufacturing	161	100	394.4	100	518.25	100

Source: Appendix tables 5A-1, 5A-2, 5A-3.

added was obtained by transforming equation 5.7 into its percentage form. Clearly, the results in table 5.11 indicate that the relative importance of each source of change in value added can be observed in two ways. First, the change in value added can be expressed as percentage of change in value added in the individual industry groups (consumer, intermediate and capital goods). Second, the change in value added in the individual industry groups, can be expressed as percentage of change in value added in the total industry.

Table 5.12 contains estimates of equation 5.7 using the first observation discussed above. According to table 5.12, import substitution accounted for 18% of the sources of change in value added, and its relative strength was more concentrated in the intermediate industries such as textiles and chemicals between 1965/66 - 1973/74. It accounted for 3.5% in the consumer goods and -6% in the capital goods industries. Over the same period, domestic demand accounted for 62% and export demand 9%. The relative importance of domestic demand was greatest in the consumer goods industries and its contribution was evenly distributed. In the intermediate category, its contribution was largely influenced by textile and chemical products. Basic metal and non-metallic dominated its contribution to capital goods industries. While non-metallic goods were important for the export demand variable, food and beverages dominated the contribution made by the residual to the source of change in the value added.

Table 5.11

Sources of growth in value added

		Food & Beverages	Tobacco, beer, spirits	Textile	Leather	Wood products	Paper, printing	Chemical products	Rubber	Plastics	Pottery & Glass	Other non-metallic	Basic metal	Machinery	Electrical Equipment	Transport	Miscellaneous	Total Manufacturing	Industries Primarily producing: Consumer goods	Intermediate goods	Capital goods
	1963/4-1973/4																				
(1) Value added / Dom. supply in period 1	(V_1/Sd_1)	.422	.256	.6	.444	.366	.508	.453	.428	.444	.5	.541	.220	.333	.270	.177	.5				
(2) Value added / Dom. supply in period 2	(V_2/Sd_2)	.291	.275	.339	.337	.516	.468	.533	.511	.186	.410	.617	.280	.236	.218	.495	.420				
(3) Two above one	$(V_2/Sd_2-V_1/Sd_1)$	.348	-.481	-.021	-.177	-.05	-.045	.066	.083	-.258	-.09	.076	.06	-.319	-.052	.318	-.08				
(4) Domestic demand	$(V_1/Sd_1\,Sd_1/S_1(\Delta D_f+\Delta D_i))$	34.6	37.8	22.2	7.3	7.9	12.3	48	7.7	7	2	8.1	12.3	1.1	2.1	5.7	.5	222.6	106.0	84.4	29.3
(5) Export demand	$(V_1/Sd_1\,Sd_1/S_1\,\Delta D_e)$	18.1	-.007	-.8	1.45	2.82	—	.137	-.856	—	—	9.19	.01	—	—	—	.4	30.44	21.37	-.326	8.8
(6) Import substitution	$(V_1/Sd_1(Sd_2/S_2-Sd_1/S_1)S_2)$	-10.33	3.78	44	3.348	-2.82	11.684	17.422	-1.284	2.22	.15	-4.328	5.28	1.465	1.89	-7.434	.5	65.582	3.632	62.870	-2.93
(7) Residual or techn. change	$((V_2/Sd_2-V_1/Sd_1)Sd_2)$	75.04	-41.005	-4.369	-4.011	-1.463	-3.084	11.2	3.3	-6.475	-.422	3.34	8.593	-.446	-1.037	2.426	-.170	41.566	25.051	3.477	13.03
(8) Change in value added	(ΔV)	117.01	.5	62.46	6.21	6.25	25.97	26.7	8.93	3.08	1.3	16.94	26.41	10.47	3.13	.38	.14	257.23	159.33	151.31	46.28
	1963/4-1970/1																				
(1) Value added / Dom. supply in period 1	(V_1/Sd_1)	.422	.256	.6	.464	.366	.508	.459	.428	.444	.5	.541	.22	.333	.27	.177	.5				
(2) Value added / Dom. supply in period 2	(V_2/Sd_2)	.448	.783	.46	.268	.481	.416	.313	.453	.464	.478	.316	.289	.333	.288	.6	.534				
(3) Two above one	$(V_2/Sd_2-V_1/Sd_1)$	.006	.027	.06	-.216	-.083	-.092	.054	.025	.020	-.022	-.025	.069	-.222	.018	.423	.036				
(4) Domestic demand	$(V_1/Sd_1\,Sd_1/S_1(\Delta D_f+\Delta D_i))$	13.726	9.072	18.4	4.356	2.82	7.112	25.704	6.42	3.108	.5	-3.346	3.52	.389	.54	.708	.1	97.327	41.386	53.732	1.011
(5) Export demand	$(V_1/Sd_1\,Sd_1/S_1\,\Delta D_e)$	19.834	-.051	.016	.213	2.487	—	.101	-2.14	—	—	3.852	-.013	—	—	—	.063	24.362	22.481	-1.958	3.830
(6) Import substitution	$(V_1/Sd_1(Sd_2/S_2-Sd_1/S_1)S_2)$	11.616	1.512	47.6	3.146	-.566	7.112	10.038	-1.284	.133	1.5	-2.164	2.66	.055	1.62	-3.363	2	81.857	24.328	58.547	-1.212
(7) Residual or techn. change	$((V_2/Sd_2-V_1/Sd_1)Sd_2)$	16.366	1.193	12.364	-4.838	-1.759	-3.67	5.972	.86	.224	-.101	.463	6.237	-.533	1.37	.046	.197	32.3	5.411	11.637	7.252
(8) Change in value added	(ΔV)	64.2	11.6	76.6	3	1.4	10.8	42	3.8	3.6	1.8	-2.2	12.2	.2	2.4	-2	2	233.4	92.8	120	10.6
	1970/1-1973/4																				
(1) Value added / Dom. supply in period 1	(V_2/Sd_2)	.448	.783	.46	.268	.481	.416	.313	.453	.464	.478	.316	.289	.333	.288	.6	.538				
(2) Value added / Dom. supply in period 2	(V_3/Sd_3)	.231	.275	.379	.357	.514	.463	.323	.511	.186	.410	.611	.286	.236	.218	.495	.420				
(3) Two above one	$(V_3/Sd_3-V_2/Sd_2)$	.303	-.508	-.081	.089	.033	.047	.01	.058	-.278	-.068	.101	-.009	-.097	-.097	-.07	-.118				
(4) Domestic demand	$(V_2/Sd_2\,Sd_2/S_2(\Delta D_f+\Delta D_i))$	22.448	30.337	13.36	2.412	3.348	12.48	30.78	1.339	4.136	3.826	9.286	13.001	.333	3.168	1.6	3.69	154.968	73.048	32.345	37.394
(5) Export demand	$(V_2/Sd_2\,Sd_2/S_2\,\Delta D_e)$	-3.416	.036	-2.76	.844	1.443	—	.156	1.338	—	—	4.136	—	—	—	—	3.076	3.866	-3.091	-0.171	4.128
(6) Import substitution	$(V_2/Sd_2(Sd_3/S_3-Sd_2/S_2)S_3)$	-24.302	1.566	-9.66	-.606	-1.824	-.832	2.052	.045	2.088	3.826	1.032	2.167	-.666	-1.132	1.0	-5.38	-41.786	34.112	-30.855	3.181
(7) Residual or techn. change	$((V_3/Sd_3-V_2/Sd_2)S_3)$	41.602	-43.303	-16.852	2.811	.965	3.325	1.75	2.306	-6.977	-.318	4.704	-1.289	-.136	-1.45	-.801	-.264	1.968	24.977	-20.037	1.028
(8) Change in value added	(ΔV)	32.63	-11.1	-16.16	5.28	4.85	15.17	34.7	4.73	.52	.28	19.16	14.21	-.47	.73	2.58	-1.86	124.41	67.31	20.91	36.10

Source: Appendices 5A1-5A3.

Table 5.12

Summary Source of Change in Value Added

Aggregated from Individual Industry Statistics

	Change in Value Added ΔV	Domestic Demand $\frac{V_1}{Sd_1}\frac{Sd_1}{S_1}\left(\Delta D_f + \Delta D_I\right)$	Export Demand $\frac{V_1}{Sd_1}\frac{Sd_1}{S_1}\Delta D_x$	Import Substitution $\frac{V_1}{Sd_1}\left(\frac{Sd_2}{S_2}-\frac{Sd_1}{S_1}\right)S_2$	Residual (technology) $\left(\frac{V2}{Sd_2}-\frac{V_1}{Sd_1}\right)Sd_2$	Demand Expansion Col. 2 ÷ Col. 1	Export Expansion Col. 3 ÷ Col. 1	Import Substitution Col. 4 ÷ Col. 1	Tech. change Col. 5 ÷ Col. 1
1965/6 - 1973/4									
Consumer goods	159.53	106.9	21.57	5.632	25.051	67	13.5	3.5	16
Intermediate goods	151.31	86.4	-.326	62.878	3.477	57	-.22	41.5	2.3
Capital goods	46.39	29.3	9.2	-2.927	13.038	63	20	-6	28
Total mfg. ind.	357.23	222.6	30.44	65.583	46.39	62	9	18	11
1965/6 - 1970/1									
Consumer goods	92.8	41.584	22.481	24.522	5.411	45	24	26	6
Intermediate goods	130	53.732	-1.958	58.547	19.637	41	1	45	15
Capital goods	10.6	1.911	3.839	-1.212	7.252	18	36	-12	60
Total mfg. ind.	233.4	97.227	24.362	81.857	32.3	42	10	35	13
1970/1 - 1973/4									
Consumer goods	67.31	75.049	-1.091	-34.122	24.977	111	-1	-50	37
Intermediate goods	20.91	52.345	- .171	-10.855	-20.037	250	-1	-50	-96
Capital goods	36.19	27.594	4.128	3.181	1.028	76	11	9	3
Total mfg. ind.	124.41	154.988	2.866	-41.796	5.968	125	2	-33	5

Source: Computed from Table 5.11

From 1965/66 - 1970/71, import substitution was the dominant source of growth in the intermediate goods industries with 45% and it accounted for 26% in consumer goods industries, -12% for capital goods and 35% for the total manufacturing industries. About 82% of import substitition's contribution to intermediate industries was due to textile industries. Although domestic demand accounted for 42% in terms of all industries, its importance was considerably reduced in the consumer goods, intermediate goods and capital goods industries. It has approximately the same explanatory power for consumer and intermediate goods industries, 45% and 41% respectively. The export expansion took the lead in the capital goods category because of the non-metallic industry. This lead is, of course, not very significant, since in absolute value, the magnitude involved is only a little above 3 million. The residual source (technology) made an important contribution to the capital goods industries with a 60% lead over the other sources of growth in value added.

Over the period 1970/71 - 1973/74, a different picture emerged regarding the sources of change in value added. The expansion in domestic demand was a dominant source of change in the three categories of industries. Import substitution was an important source of change in consumer and intermediate goods industries, and it made some contribution to capital goods industries. While import substitution made a significant negative contribution to most industries, its influence as a source of change in value added declined from 35% in 1965/66 - 1970/71 to -33% in 1970/71 - 1973/74. The export expansion and residual

source did not make an overall significant contribution in this period. The latter did fairly well in the basic metal industries and the former made some gain in the intermediate industries.

Table 5.13 gives the distribution of change in value added in the individual industry groups expressed as a percentage of change in value added for total manufacturing industries. Starting from the top panel, import substitution accounted for about 18% of the total change while domestic demand accounted for 62% of the change in value added in all industries. In this period, consumer goods industries were responsible for 45% of the total value added. The intermediate goods industries accounted for 42%, while the capital goods industries contributed 13%. Of the 42% value added in the intermediate goods industries, import substitution accounted for 18% and 24% by expansion in domestic demand. Wide differences also showed up in the relative importance of export expansion, domestic demand and import substitution, and in the relative importance of the industrial groups in the two sub-periods. From 1965/66 - 1970/71, almost two-fifths of growth in value added was accounted for by domestic demand, while more than one-third was due to import substitution. About one-third was shared between export demand and residual sources. In this period, the relative contributions were 40% for consumer goods industries; about 56% for the intermediate goods industries and 5.5% for the capital goods industries. After 1970/71, almost all the growth in value added could be attributed to domestic

Table 5.13

Distribution of Change in Value Added

In the Individual Industry Groups

Percent of Total Industry

	Demand Expansion $\frac{V_i}{Sd_1}\frac{Sd_1}{S_1}\left(\Delta D_C + \Delta D_I\right)$	Export Expansion $\frac{V_1}{Sd_1}\frac{Sd_1}{S_1}\Delta D_x$	Import Substitution $\frac{V_1}{Sd_1}\left(\frac{Sd_2}{S_2}-\frac{Sd_1}{S_1}\right)S_2$	Technical Change $\left(\frac{V_2}{Sd_2}-\frac{V_1}{Sd_1}\right)Sd_2$	Change in Value Added ΔV
1965/66 - 1973/4					
Consumer goods	30	6	1.0	7	45.0
Intermediate goods	24	-.1	18	1	42.0
Capital goods	8	2.6	-1	3.6	13.0
All industries	62	9	18	11	100
1965/6 - 1970/1					
Consumer goods	18	9.6	10.5	2	40
Intermediate goods	23	-1.0	25	8.0	55.0
Capital goods	1	2.0	1.0	3	5.5
All industries	42	10	35	13	100
1970/1 - 1973/4					
Consumer goods	60	-1	-27	20	54
Intermediate goods	42	- .1	- 9	-16	17
Capital goods	22	3	3	1	29
All industries	125	2	-33	5	100

Source: Calculated from Table 5.11.

*Table 5.12 broke down the share of each source of each industry group's increase in output, while Table 5.13 expressed each as a percent of total increase in total industrial output value added.

demand. A glance at Table 5.13, (1970/1 - 1973/4) reveals that domestic demand was significant in all industries when compared with import substitution which made a negative contribution to all the individual groups of industries. Finally, in 1970/71 - 1973/74, the relative contribution to total value added was 54% for the consumer goods industries, 17% for intermediate goods industries and 29 % for the capital goods industries. These figures suggest that the consumer goods industries become dominant in terms of contribution to total value added in the second period, while the intermediate goods industries dominated the first period.

There has been a substantial differential in the rate of growth of industries producing consumer, intermediate and capital goods, with the former two growing almost at the same rate for the period under study. Further, a substantial share of growth in each of these industries was due to import substitution. This has been greatest in the period 1965/66 - 1970/71. But the rapid decline in the intermediate goods industries between 1970/71 and 1973/74 can be interpreted to mean that it has not contributed consistently to both value added and the growth of value added in the manufacturing sector of the economy. On the other hand, the relative share of capital goods industries rose from 5.5% in 1970/71 to 29% in 1970/71 - 1973/74. This is explained by the basic metal and non-metallic industries.

Summary

It is appropriate to commence this summary by pointing out some of the difficulties of the Nigerian case analyzed in

this chapter. First, the results are undoubtedly affected by the level of aggregation, and greater disaggregation may produce different findings.[25] Secondly, these results hold only for the time period under review.[26] Third, insofar as the exact magnitude of the extensive domestic supply of smaller scale industry is virtually unknown, the data on domestic supply deals with employment and output of industries employing ten or more. Given the limited data on domestic supply of smaller scale industry, we have approached the general issue of import substitution from the assumption that any evidence of import substitution can be interpreted as a result of output not formally recorded in the statistics or to the output expansion effects of large scale industry. Even more serious, perhaps, than the limited information on smaller scale industry is the lack of data on intermediate demand, and which made it impossible to differentiate intermediate demand and final demand. In effect, we have a large negative import substitution and a large positive domestic demand. A large negative import substitution effect and a large positive domestic demand effect leads to a trade-off relation between the magnitude of contributions made by the two variables to a given industry. This stems from the fact that the exclusion of intermediate demand generated by import substitution itself will under-estimate the actual amount of import substitution that is taking place. Further, a negative or a negligible import substitution may occur in an industry where import substitution has already taken place

before our base year (1965/66) as well as where imports of competing items rose faster than domestic supply. However, some argued that local production, whether by foreign or indigenous firms is better from the foreign exchange point of view than imports either exclusively or partially. Given that the best alternative for meeting increasing demand is local production, in the next chapter we consider in what way factor intensities, size, profitability, technical efficiency, and scale economies differ between foreign and local firms.

Chapter Six

TECHNICAL EFFICIENCY AND FDI

Introduction

In the current discussion of foreign firms operating in less developed countries, a central issue has been the question of the economic differences between private foreign firms and private local firms. A frequent hypothesis is that foreign firms are relatively efficient compared to private local firms. This hypothesis has implications that are important for many areas of policy. As noted in Chapter 3 in the present study, a systematic difference between the foreign firms and local firms with regard to efficiency would have economic and political implications with respect to employment creation, balance of payments, the rate of economic growth and future foreign participation in the economy. The debate on the question of efficiency between foreign and local firms has been intense and support for this hypothesis is usually found in the polemical literature either extolling the virtue of foreign direct investment or condemning it.[1]

Why does the possibility that foreign firms are relatively efficient compared to local firms seem more plausible? This question has been the focus of a growing body of literature extending over the branches of industrial organisation theory, international trade theory and the theory of the firm. A brief discussion of some theoretical explanations for foreign direct investment may help to place the question in perspective. The theory of foreign direct investment postulates that foreign firms possess some advantages which enable them to invest successfully abroad regardless of the extra costs of operating in foreign and distant markets.[2] These advantages

include efficiency of its market organisation, technical efficiency (productivity, plant utilization and managerial skills), etc. Let us take these advantages of foreign firms in turn.

Market Organisation

Foreign firms could be efficient because of their market organisation. Marketing is absolutely vital to foreign direct investment and it also constitutes a source of oligopolistic advantage perhaps as some have argued even greater than that of technology. There are three ways in which market organisation might affect efficiency. The first is through marketing research which enables a firm to gain an understanding of consumers' needs in various markets. Second, through advertising and promotion, firms are able to maintain market power. Third, efficiency may be affected by: (a) the distribution arrangements for getting products efficiently to their markets; (b) for distributing them to wholesalers and retailers; and (c) for maintaining adequate stock.[3] The combination of market research, advertising and promotion, and distribution advantages may be expected to result in better performance for the foreign firms as compared to local firms

Technical Efficiency (Productivity, Plant Utilization and Managerial Skills)

Differences in productivity, plant utilization and managerial skills might be indicators of technical efficiency.[4] With regard to technical efficiency, attention has been focussed on the superior management advantage of the foreign firms. It is argued that the main reason why foreign firms are able to compete so effectively with local firms is because of their relatively higher productive efficiency.[5] "Productive efficiency"

is defined as the ability of a production organisation to produce a well specified output at minimum cost. Furthermore, a production organisation includes the physical capital required to produce a specific output, production labour, and supervision and managerial personnel. We shall return to technical efficiency in Section 3. However, we would like to point out that the managerial superiority of foreign firms over local firms, arises "from better training, higher standards of recruitment, faster communication with the parent company, and the world as a whole, and a more dynamic outlook generally."[6] In addition to market organisation and technical efficiency, it is possible that foreign firms would always be significantly different from local firms in matters of efficiency because of the following advantages: (i) A foreign firm may have a well-tried and proven product that there is market demand for; (ii) It operates in many countries and only intends to carry out some operations in the local market. Research and development is carried out in the home country, but there are externalities in the application of this world-wide. It may also benefit from scale economies realised in the home country; (iii) It has a better credit standing and access to credit in international financial markets on favourable terms; (iv) it has a pool of experienced personnel to draw upon from the home country and (v) As Dunning (1981, p.11) has noted,

> "...policies differ widely across national boundaries. ...different tax rates and fiscal provisions, exchange rate policies, import substitution and export promotion policies. Such policies, of course, affect all firms, but to the enterprise producing in more than one country they represent discriminatory treatment, and since their options, with respect to geographical resource allocation, are wider, they are able to respond differently than indigenous companies."

There is no doubt that some of the advantages mentioned above (such as greater entrepreneurial ability which enables foreign firms "to take risks, or to seek, locate and carry out viable ventures in the uncertain world of business")[7] would lead to greater efficiency as compared to local firms. Nevertheless, these advantages might also vary systematically according to the country of operation. Again, much depends on whether local firms enjoy the same advantages in which case as Lall and Mohammad (1983, p.147) expressed the position, certain proprietary monopolistic advantages which enable foreign firms to invest successfully abroad, have, "of course, to be net of similar advantages enjoyed by large local competitors, and their deployment in a given economy must depend upon the income levels, demand patterns, industrial development and government policies faced by MNCs in that particular country." It may also be argued that because of the competition provided by foreign firms, local firms are likely to be as efficient as foreign firms. For example Reuber et al. (1973, pp.178-179) have argued that "in addition to providing a competitive spur to the efficiency of local producers, foreign affiliates may provide first hand examples of improved management and production practices that local firms may choose to emulate."

As we have noted in Chapter 3, empirical evidence suggests that foreign firms are not significantly different from local firms in matters of efficiency. Regarding technical efficiency, Tyler (1978) found in the case of Brazilian manufacturing industries that foreign firms do not possess greater levels of technical efficiency compared to local firms when the possibility of a separate production function is accepted.

Reuber et al's (1973) survey revealed fairly strong circumstantial evidence that the productive efficiency of foreign affiliates is at least as high as, and probably higher than, that of local producers. Lall and Streeten (1977) did not find any empirical evidence to support any strong allegation for or against MNCs as regard their relative efficiency, choice of technique or productivity in India and Colombia. From the empirical evidence, the question may be asked: would foreign firms always be significantly different from local firms in matters of efficiency? This chapter reports an attempt to answer this question. The chapter evaluates empirically the hypothesis that foreign firms are relatively efficient compared to private local firms based upon the micro data for manufacturing establishments in Nigeria. In Section 1 the two central concepts (technical efficiency and allocative efficiency) which underline the economic measurement of efficiency are reviewed. The second section outlines the production analysis employed to examine differences in production estimates for foreign and local firms. In the third section the data base and the variables used are discussed. The empirical results are presented in Section 4 while the main conclusions are drawn in Section 5.

Efficiency and Measurement

Economists have approached the question of measurement of efficiency in two ways. They are technical efficiency and allocative efficiency. Following Farrell (1957), technical efficiency reflects the physical efficiency of the input-output production transformation. On the other hand, price efficiency or allocative efficiency refers to the economic efficiency of optimal factor allocation. The distinction between the two components according to Farrell, can be readily illustrated

using a simple diagram as shown in Fig.1. Following micro-economic tradition, let the utility's output, Electricity (E) be produced by two factors Capital (K) and Coal (C). Accordingly, summing up the technology by a unit isoquant permits one to measure productive efficiency relative to the standard required by the isoquant. In Fig.1. the line UU' indicates a unit isoquant. On the South-west of UU' are points representing infeasibility while points to the North-east of UU' are inefficient. Consider a firm's input combination such as F, the distance OF relative to OH measures the extent to which the same amount of output could be produced with fewer inputs used in the same proportion. Put differently, the ratio of OH/OF defines Farrell's degree of F's technical inefficiency. Consequently, the technical efficiency index bounded between zero and one is an input-based measure, i.e. the ratio of best practice input usage to actual usage, output remaining fixed.[8]

Further extention of Fig. 1 allows one to illustrate very simply Farrell's measure for the allocative efficiency of production organisation which is independent of technical efficiency. Allocative efficiency relates to the proper choice of input combination and, "hence introduces the opportunity cost of factor inputs to the measurement of productive efficiency."[9] We now return to Fig.1 and draw a price or isocost line denoted LL'. Clearly, the input combination corresponding to H' minimizes the cost of producing a given unit of output. If we suppose that a firm's input combination is at point H, then the ratio OW/OH measures the extent of F's allocative inefficiency independent of its technical inefficiency. In other words, the distance OW

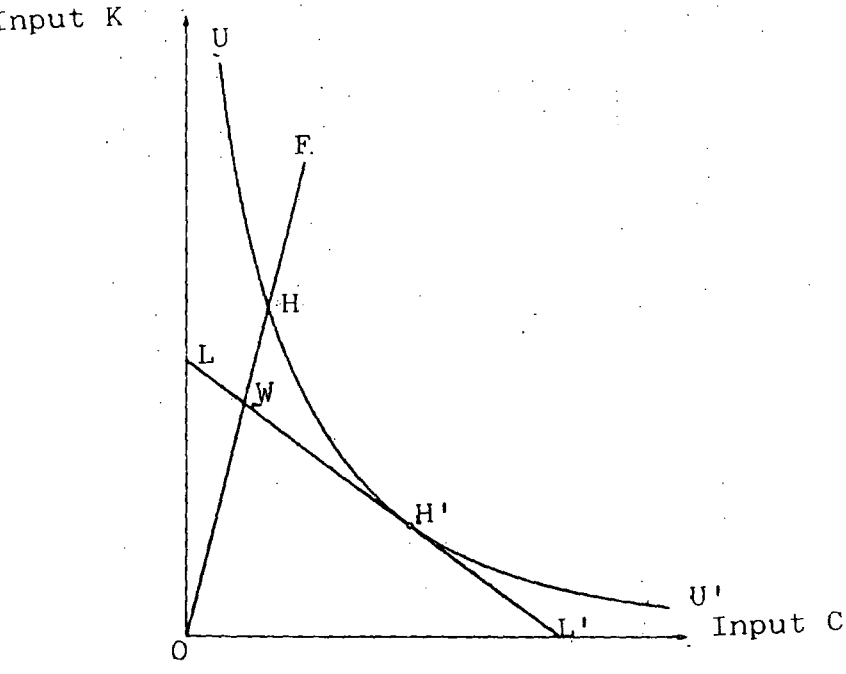

Fig. 6.1 Farrell approach to measurement of Productive efficiency.

relative to OH measures the part of costs for which a given output could be produced if the relative use of inputs are changed. Finally, if we combine technical efficiency and allocative efficiency into a single index, it gives Farrell's "overall efficiency". In Fig.1, this is given by the ratio of OW/OF which is the product of OW/OH and OH/OF.

Nerlove (1965) in his effort to generalize Farrell's measure, relied on the unique properties of the Cobb-Douglas production function. He summarized differences among firms under three separate headings: (i) differences in price efficiency which involves a measure of a firm's ability to maximize short-run profits given a particular production function, environment and a competitive situation; (ii) differences in technical efficiency as summarized in the production function, i.e. differences among firms in a competitive situation are observed from the state of technical knowledge and the possession of fixed factors; and (iii) differences in economic environment, reflecting conceivable changes in output and factor prices across the board. It will be desirable to consider the three categories. Regarding price efficiency, Yotopoulos and Lau (1971) draw attention to the distinction between short- and long-run efficiency which focuses on the fixity of inputs. They utilize profit functions to estimate the relative efficiency of a sample of Indian firms. In the profit function specification, capital and land are treated as fixed factors, and labour as variable. However, the profit data in our micro data are not reliable indicators of true profitability. Hence we omit profit from the analysis. Further, economic environment which is measured in the cardinal sense appears to be of limited expedience. Since the production function

itself is limited to the examination of technical efficiency, the analysis in this study will focus on technical efficiency.

Production Function Estimates

Our estimates of production function are closely related to those of Tyler (1978). Like him, we are concerned with the problem of technical efficiency and ownership characteristics. However, we differ from Tyler on the basis of the data used in the analysis of production functions. While Tyler focussed on micro data for manufacturing firms in Brazil, we shall concentrate on Nigerian micro data for manufacturing firms.

Let us begin with managerial ability and entrepreneurship. We shall assume, with Tyler, that managerial ability in using economic resources is the "true" firm-specific and entrepreneurship is a fixed factor which is not easily measured. Regarding managerial ability, it is argued for example by Desai (1976, p.111) that "even given identical input quantities there may be inter firm variations in efficiency in terms of output produced. The same firm may also increase/diminish in efficiency over time. This may be due to non-measurable and unspecified inputs such as managerial ability...such variations are expressed by an efficiency parameter which determines the relative shift of the production function over firms or over time." Implied here is that variation among firms in the same industries is dependent principally upon relative managerial expertise in the firm, hence the managerial factor is the firm specific resource.[10] From Schumpeter (1939, pp.84-87) the function of entrepreneurs is to apply general technical knowledge to firm-specific purpose. In line with Schumpeter, the neo-classical theory assumes that

an entrepreneur faced with market prices beyond his control, is left with the job of arranging the inputs of capital and labour to maximise his profits. Further, his services or expertise can only be thought of as having economic and technical aspects. From his technical expertise, he is able to get more output from a given set of input in his firm compared to another entrepreneur in other firms. The question becomes, where does his ability show up? The theory suggests that the entrepreneur's ability is reflected in the production function, i.e. the production function of his firm may have a higher technical efficiency. It follows that managerial ability and entrepreneurship can only be seen in the context of technical efficiency. As Tyler (1978) has suggested "if we could envisage managerial ability and entrepreneurship operating within the production function it would be in the context of technical efficiency." Similarly, it is often suggested in cross sectional production function estimates that managerial ability and entrepreneurship are randomly distributed across firms. On the contrary, a set of talented managers may be associated with certain classes of firms or industries. We would argue, like Tyler, that differences in managerial ability and entrepreneurs' expertise cannot be ignored in the OLS estimates. With cross-section data, it is often suggested that least squares will give consistent estimates of the production function provided it is assumed that the production function only varies from firm to firm because of unexpected factors. Nevertheless, Tyler (1978, p.366) has argued that if systematic differences of technical efficiency are ignored, there is the possibility that the parameter values derived through the production function are biased. Indeed there may even be

separate production functions for different groups of firms or industries.

There remain the problems of examining differences in technical efficiency over firms and the analysis of firm specific technical efficiency. The approach that has been suggested with respect to differences in technical efficiency is to specify that the production function and value of the parameters of the function are the same for all firms and classes of firms. This specification implies that differences in technical efficiency are reflected in differences in the value of an individual firm's intercept in the production function. From Hoch (1955) and Mundlak (1961) it has been shown that with joint time series and cross section data, firm specific technical efficiency can be analysed through a transformation or through co-variance analysis of production functions.[11] Desai (1976, p.90) has noted cross section and time series data are extremely useful when continuous cross section or "panel" data are available. The technique helps to combat multi-collinearity as well as increasing the efficiency of the estimates.

We have used single equation, ordinary least squares, to estimate the production functions and we recognise the ill-effects of multi-collinearity on ordinary least squares regression coefficients, i.e. "wrong signs, drastic changes in regression coefficients after minor data revision or omission of one or two observations, and conflicting conclusions from the usual significance tests."[12] Nevertheless, its application may not appreciably distort the empirical results of the focus of the study, namely, ascertaining differential

behaviour of foreign firms within industries. A cross-section of information for manufacturing establishment will be used in the inter-firm estimates.

Specification of the equation to be estimated

Differences in production function estimates between foreign and local firms can be examined in terms of the statistical estimates of Cobb-Douglas production function, Constant Elasticity of Substitution (CES) and a more generalized, non-homothetic translog function. Following Tyler (1978), the traditional Cobb-Douglas function is log linear and can be estimated directly from the OLS estimating equation:

$$\text{Ln } S_i = \text{Ln } A + \alpha \text{ ln } K_i + \beta \text{ Ln } L_i \qquad (6.1)$$

where S = Sales (proxy for output).

K = the firm's stock of physical capital.

L = the firm's average number of employees and

α and β are the respective output elasticities for capital and labour.

LnA is a constant such as the Solow (1957) catch-all, and can be interpreted as technical efficiency. This stems from the fact that for given values of K and L, the magnitude of A will proportionately affect the level of S.

Further, it is possible to extend equation (6.1) and determine the differences in technical efficiency between foreign firms and local firms. In this connection, we introduce an intercept dummy variable into equation (6.1). We can in the present case write:

$$\text{Ln } S_i = \text{Ln } A + \gamma D_{fi} + \alpha \text{ Ln } K_i + \beta \text{ Ln } L_i \qquad (6.2)$$

where D_{fi} = (1 for foreign firms or MNEs and
(0 for indigenous firms.

and the null hypothesis is $H_0 : \gamma = 0$ indicating equal levels of technical efficiency for foreign and local capital. If rejected, the alternative hypothesis is $H_1 : \gamma \neq 0$ is to be accepted.

The formulation of equation (6.2) assumes that foreign and local firms' output elasticities are equal. What separates the two groups of firms is the production function's intercept which is assumed to reflect different levels of technical efficiency. Suppose we allow for differences in the output elasticities in the two groups of firms, then our specification implies a Cobb-Douglas production function with different output elasticities for local and foreign firms. Now, we are in a position to introduce slope dummies in (6.2) to capture differences of the respective output elasticities for foreign and local firms. Then, it follows from (6.2) that

$$\text{Ln } Si = \text{Ln } A + \gamma D_{fi} + \alpha \text{ Ln } K_i + a_1(D_{fi}.\text{Ln } K_i) + \beta \text{ Ln } Li + a_2(D_{fi}.\text{LnLi}) \qquad (6.3)$$

where the coefficient a_1 and a_2 are then interpreted to be the differences of output elasticities for foreign and local firms respectively. Alternatively, one can separate the data for the two groups of firms and estimate equation (6.1) separately for each category. Either choice produces the same results for the regression coefficients - a mathematical expectation. However, the standard errors of equations (6.1) and (6.3) will not be the same because of the underlying assumption made in each case.[13]

We have confined the discussion to linear equations until now, i.e. equations linear in parameters. In economic theory, it is the case that situations frequently arise where the

specification has to be non-linear. Whereas a Cobb-Douglas specification is a first approximation, we have to face up to the fact that it can be misleading.[14] In order to test for possible specification error in equations (6.1) - (6.3), we adopt CES production function as a direct test of the Cobb-Douglas function. It can be written as

$$S = A \left| \delta K^{-P} + (1 - \delta) L^{-P} \right|^{-\frac{\mu}{P}} \qquad (6.4)$$

Here A is the efficiency parameter, the returns to scale parameter is μ and the substitution parameter is P. The term δ is the distribution parameter since we can relate the share of the two inputs (capital and labour) in total output to δ. The parameters A, δ in (6.4) play the same role as the coefficients A and α in Cobb-Douglas function. However, the parameter P (the substitution parameter) in (6.4) has no equivalent in the Cobb-Douglas function. This P in (6.4) is what determines the value of the constant elasticity of substitution.[15] In order to treat equation (6.4) and the consequent input demand functions as a system, a linear approximation of the CES function has to be obtained. This is done by taking a Taylor series expansion round $P = 0$ as suggested by Kmenta (1967). This yields

$$\text{Ln} \frac{S}{L} = \text{LnA} + a_1 \text{ Ln } L + a_2 \text{ Ln} \left(\frac{K}{L}\right) + a_3 \left[\text{Ln} \left(\frac{K}{L}\right)\right]^2 \qquad (6.5)$$

where $a_1 = \mu - 1 = \epsilon - 1$

$a_2 = \mu (1 - \delta)$

$a_3 = -\frac{1}{2} \rho\mu\delta (1 - \delta)$.

As it can be observed from (6.5), the function is equivalent to Cobb-Douglas function if A_3 is insignificantly different

from zero. In other words, at $P = 0$, the CES is equivalent to Cobb-Douglas. Following Griliches and Ringstad (1971, pp.9-10), the closer the elasticity of substitution of the production function is to 1 (i.e. $P = 0$), the better the approximation. In this sense, equation (6.5) possesses a direct test of whether the Cobb-Douglas form is an acceptable estimating model. It follows that if a_3 is significantly different from zero, the Cobb-Douglas form should be rejected.

There are, however, some problems concerning a_3 in equation (6.5). Firstly, it would seem that the further the elasticity is from unity, the more important the higher-order terms, which have been excluded, become. Consequently, $a_3 \neq 0$ may imply production functions outside the CES class. Secondly, it is argued that a_3 is formed as the product of at least two parameters that are less than unity. It follows that the evaluation of the sign and magnitude of a_3 certainly required large samples and adequate dispersion of capital-labour ratio. Finally, the parameter estimates of a_1 and a_2 (and by implication P, μ and δ) are not independent of the units by which K and L are measured.[16] Griliches and Ringstad (1971, p.10) have recommended that an evaluation of the elasticities at the (geometric) mean levels of the inputs and, in particular, at a level where the geometric means of the sample are equal, i.e. $\bar{K} = \bar{L}$ and $\text{Log}(\bar{K}/\bar{L}) = \text{Log}(1) = 0$.

Tyler (1978, p.372) has suggested that a possible rejection of the Cobb-Douglas specification through the analysis of the CES function (6.5) may not necessarily mean that equation (6.5) is to be accepted. Our assumption in (6.5) is that even if, for a particular industry, one could expect

proportionality between inputs, and therefore a homothetic function, there is little a priori reason to expect the same function to be applicable across industries. On the other hand, the strong simple correlations between the factor ratios and the output level among firms suggest some elements of non-proportionality in the use of factors, over and above the effect of changes in relative prices. In this case, the CES function which is homothetic, i.e. the K/L ratio is constant irrespective of the scale of output, may be inconsistent with the data.[17] Hence non-homothetic factor ratio equation is required to test for homotheticity. The formulation of homothetic equation in (6.5) can be transformed to a translog production function by expanding the square term. The translog production function is written as

$$\text{Ln}\,\frac{S}{L} = \text{Ln}\,A + a_1\,\text{Ln}\,L + a_2\,\text{Ln}\left(\frac{K}{L}\right) + a_{31}\,(\text{Ln}\,K)^2 - 2a_{32}\,(\text{Ln}\,K.\,\text{Ln}\,L) + a_{33}\,(\text{Ln}\,L)^2 \qquad (6.6)$$

where $a_{31} = a_{32} = a_{33} = a_3$. Thus, homotheticity requires that $a_{31} = a_{32} = a_{33} = a_3$. As has been suggested by Griliches and Ringstad (1971), this specification can be tested as a linear hypothesis. The decision rule is that if null hypothesis of equality is rejected, a more general, non-homothetic production function is the more appropriate specification.

Data and some other measures of Efficiency

The data used in the estimates are from the 1972 micro data file for manufacturing firms in Nigeria. Our data are for the 1,052 manufacturing establishments as given in the industrial survey of Nigeria 1971-1972. The efficiency measures are sales, capital stock and employment.

(a) The Sales Variable

Sales value is the value of that part of goods produced by the establishments which was actually sold during the enquiry year (1972). The value of goods bought for resale without further processing is excluded. Valuation is at market prices. From the survey, it was possible to construct aggregate and disaggregate data for industries and individual firms respectively.

(b) Capital Stock

The capital stock is the value of the firm's total fixed physical capital in money terms employed in the business at the end of year (1972). The use of fixed assets has numerous problems. Lall and Streeten (1977, pp.99-100) note the following:

> 1) "Some items, such as the amount of depreciation each year are inherently subject to arbitrary valuation within a fairly wide range.
>
> 2) Inflation, which normally is not taken into account, may distort the value of fixed assets.
>
> 3) There are basic conceptual problems regarding the definition of such items as 'capital employed' to which convention provides a workable but not completely satisfactory answer.
>
> 4) There are the problems of comparison and interpretation implied in using data from a short period of the lives of firms of different ages facing different market conditions."

(c) The Labour Input

This chapter uses only the total labour input, constructed using information taken from the industrial survey of 1972. The survey carried out by the Federal Office of Statistics provides information on the number of employees per establishment, production workers per establishment and production workers per number of employees separately. Number employed

is defined as those employees who are regularly on the payroll of the establishment. We were not able to separate hours as an additional explanatory variable as suggested by Feldstein (1967) and Craine (1972) from the survey.[18] However, we do assume that average hours were roughly constant across industries.

Various ratios measuring the extent to which foreign firms are more efficient than local firms have been proposed and used in empirical analysis. Researchers have usually opted for the simplest and most easily available measures. Nevertheless, it is possible to examine directly from the micro data on Nigerian manufacturing firms several economic characteristics which may show differences in efficiency.

Profitability may be expected to be directly related to efficiency. The proposition often stated is that "greater profitability in foreign firms would reflect greater economic efficiency".[19] Further, profits can also be taken as an indirect indicator of managerial efficiency or what Lall and Mohammad (1983, p.150) referred to as "in a very broad manner the ability of management to make the best of a given environment". Table 6.1 gives the unweighted average of profit rates for individual manufacturing industries at four digit levels. The average profitability for foreign firms in all industries is however slightly more than that for locally owned private firms in all industries. Nevertheless, a test of median by Mann-Whitney U-test in Chapter 8, shows that there is no difference in the rate of profits between foreign and local firms. The difficulties and limitation of measuring efficiency with profit, have been extensively discussed in the literature. Tyler (1978, p.361) has

TABLE 6.1 Average Capital Intensity, Probability, and Firm Size by Industry in Nigeria, according to nationality of Ownership, Micro Data File Sample, 1972

(1) Industry	(2) Average Capital-Labour Ratio (K/L) (N 000/Employee)		(4) Average Profitability Expressed as ratio of Profits to Net Assets		(6) Average Net Assets N 000	
	Foreign Firms	Local Firms	Foreign Firms	Local Firms	Foreign Firms	Local Firms
Meat	2.05	2.05	.147	.148	47.8	53.8
Dairy products	3.30	----	.504	----	82.8	----
Fruit Canning & Processing	3.81	----	.803	----	31.0	----
Vegetable Oil Milling	1.53	1.53	.244	.243	24.5	23.4
Grain Mill Products	4.42	6.25	.151	.151	632.4	6.717
Bakery Products	1.07	1.08	.088	.107	1.4	1.3
Sugar & Sugar Confectionery	4.28	4.30	.471	.471	120.6	129.0
Misc. Food Presp & Anim. Feeds	3.28	3.30	.434	.434	194.2	120.0
Spirit, Distillery & Beer	6.92	6.97	.590	.590	648.5	571.0
Soft Drinks	2.83	2.84	.493	.492	338.3	290.0
Tobacco	3.64	3.63	.414	.415	546.5	636.6
Spinning, Weaving & F/Textiles	3.00	2.97	.106	.107	399.6	379.9
Made-up Textile Goods	3.00	3.00	.142	.143	371.8	129.1
Knitted Goods, Rope, Twine	2.19	2.20	.344	.346	109.0	97.1
Wearing Apparel	3.00	3.14	.223	.224	113.8	14.3
Tanning	1.62	1.61	.250	.260	33.7	40.0
Travel goods	1.50	1.48	.400	.396	13.8	12.6
Leather Footwear	1.15	1.15	.196	.194	48.3	55.3
Saw Milling	.82	.83	.140	.140	10.0	9.7
Wooden Furniture & Fixtures	.76	.76	.090	.102	3.3	3.8
Paper Conts, boxes & boards	1.50	1.50	.212	.189	71.1	81.7
Paper & other Paper Products	7.22	7.23	.096	.127	38.0	41.7
Printing	1.86	1.90	.332	.334	39.7	40.1
Basic Ind. Chems, Fert & Pests.	3.26	3.24	.826	.824	402.5	24.9
Paints	3.68	3.68	.333	.333	119.0	109.1
Drugs & Medicines	3.00	2.94	.310	.309	79.7	72.4
Soap, Cosm. perfumes & others	3.31	3.30	.574	.574	171.7	157.2
Other Chemical Products	2.37	1.42	.652	.653	89.0	99.3
Products of Petroleum & Coal	54.51	54.50	.109	.110	576.8	253.6
Tyres and Tubes	5.24	5.23	.524	.487	216.4	186.7
Other Rubber Products	5.01	3.56	.460	.460	62.3	56.4
Plastic Products	4.28	4.28	.875	.876	149.4	136.0
Pottery	1.17	1.17	.156	.156	6.6	6.6
Glass Products	1.49	1.59	.160	.157	13.9	1.3
Bricks and Tiles	1.40	1.40	.768	.988	192.2	207.6
Cement	17.77	17.80	.822	.823	523.0	634.2
Concrete Products	2.58	2.57	.240	.240	58.2	55.8
General Hardware	9.02	9.03	.003	.004	4.2	4.7
Metal Furniture & Fixtures	1.11	1.10	.281	.280	49.4	48.5
Structural & Metal Products	1.31	1.31	.273	.274	48.2	48.5
Fabricated Metal Products	1.81	1.81	.179	.180	165.1	164.0
Agric. & Special Ind. Mchnry	5.10	5.10	.162	.163	17.6	17.5
Machinery & Equipment	.93	----	.857	----	6.0	----
Radio/Tel/Comm. Eq, & Appar.	1.78	1.80	.347	.350	52.1	42.0
Other Electrical Apparatus	1.02	1.02	.641	.643	173.3	109.3
Motor Body Building	1.34	.38	.018	.019	.2	.2
Ship Building	----	.10	----	.052	----	.3
Miscellaneous Products	1.24	1.25	.229	.330	22.9	8.6
Totals	6.20	4.76	.354	.331	102.1	70.6

Source: Computation from Micro Data File 1972.

For number of firms in sample, see Table 1.3.

Foreign firms are firms whose paid up capital by source of ownership as of 31 December 1972 is private non-Nigerian.

Local firms are firms whose paid up capital by source of ownership as of 31 December 1972 is private Nigeria.

See Appendix A-1 for sample of survey.

observed in the case of Brazil that "using profit figures for analytical purposes, is however impossible owing to the likelihood of a systematic bias understating the profit of foreign firms". Further, foreign exchange regulations tend to force foreign firms to remit profits to their home office through over-invoicing imports from affiliates. Additionally, it is argued that foreign firms do benefit from their overseas subsidiaries through knowledge sharing, and in many cases, the subsidiaries receive meagre or no payment from their parents for the reverse knowledge or know-how transfer. Carr (1978, pp.44-45) has suggested that, "...the value of know-how transfers both ways may be some 2 per cent annually of the total investments, with perhaps 1 per cent to be added to the reported profit figures of foreign affiliates as compared to purely local firms." Clearly, whether one concludes that greater profitability in foreign firms would reflect greater economic efficiency depends on how profitability is measured.[20]

A major important question in industrial organization is whether the size of firms has any significant influence on their efficiency and to some extent profitability. Baumol (1967) has argued that the larger firms are in positions to earn higher rates of return on their investment compared to the smaller firms. His explanation is that larger firms enjoyed both those advantages open to smaller firms as well as the ability to undertake projects which are beyond the organisational capability of the smaller firms. On the other hand, some have argued that inefficiency is directly related to size. Further, large firms may not be in a position to undertake the options open to small firms as efficiently

as the small firms and therefore profitability may decline with size of firms. Also Tyler (1978) has suggested that " past efficiency may have resulted in growth of firm size". One variable many studies have used to measure firm size is net assets. Nevertheless, two opposing views have been developed regarding the use of net assets as stated in the balance sheets. Some have argued that the value of net assets (current) does vary from firm to firm according to peculiar and changing market conditions which would affect the value and quantity of stocks and the volume of trade credit receivable. A counter-argument is that such distortions have minor effects when firms of approximately similar ages operating in roughly similar conditions are compared. Further "averaging process may cancel out most individual firms' aberrations".[21] Let us now compare the size of net assets of the foreign firms and local firms as given in Table 6.1, columns 6 and 7. The general picture suggested by the net assets figures is that at the aggregate manufacturing sector level, the foreign firms are substantially larger than the local firms. It is possible that the magnitude of the differences observed in the aggregate net assets between the two groups of firms is great because of the limited "organizational" and financial capabilities of the local firms in some industries such as products of petroleum and coal, etc. We are not able to test this hypothesis because of the lack of data.

Capital-labour ratios may be expected to be directly related to the efficiency of a firm. The proposition often stated is that foreign firms operating in LDCs are in a position to employ capital- and skill-intensive technologies hence they are more efficient than the local firms. The whole

question of the choice of technology between foreign and local firms in Nigeria will be developed in Chapter 8. A comparison of the individual industries' capital-labour ratios in Table 6.1, lines 2 and 3, suggests mixed results. For all foreign manufacturing firms, the average capital-labour ratio is higher but the foreign firms may in some cases employ labour differing in quality from that employed in local firms.

Empirical Results: (A) Aggregate Cross-Section Production Function

This section will concentrate on the results obtained from Cobb-Douglas, CES and non-homothetic aggregate production functions across all industries within the manufacturing sector. The results for the Cobb-Douglas equation 6.1 are reported in Table 6.2(1). The explanatory power of the function (measured by R^2 and F) is high and the F statistic is significant at the 1 per cent level. The α and β coefficients are statistically significant at the 1 per cent level. However, A is not significantly different from zero. The coefficients α and β suggest that the effect of capital and labour on sales are of the same order of magnitude.

The coefficients α and β can be used to throw some light on industry-level returns to scale, i.e. $\alpha + \beta > 1$ indicating increasing returns to scale and $\alpha + \beta < 1$ indicating decreasing returns to scale. As reported in Table 6.2(1), the combined value ($\alpha + \beta$) is 1.17 and this implies slightly increasing returns to scale for the total manufacturing industries in Nigeria.

The technical efficiency parameter, A, is negative. It gives the indication that for given values of K and L,

TABLE 6.2 Cobb-Douglas, C.E.S. and Translog Production Function Estimates for a 1972 Survey of Nigerian Industries (N = 88)

	Year	No. of observation	Form of Equation	Ln A	α Ln K	β Ln L	γD_{Fi}	a_1	a_2	a_3	R^2	F	DW
(1)	1972	88	Cobb-Douglas Equation 6.1	-.1465 (0.1473)	.5528 (5.0698)	.6237 (2.9492)	-	-	-	-	.78	151.0	1.766
(2)		88)44 Local)44 Foreign	Cobb-Douglas Equation 6.2	-.3373 (0.3156)	.5306 (4.4979)	.6671 (2.9124)	.0001 (.5185)	-	-	-	.79	104.0	1.744
(3)		88)44 Local)44 Foreign	Cobb-Douglas Equation 6.3	-.3152 (0.2941)	.5306 (1.6480)	.0001 (1.0030)	-.0001 (1.003)	.0002 (.6111)	.7284 (2.0901)	-	.80	66.6	1.724
(4)		88	C.E.S. (approximation) Equation 6.5	.1686 (.1624)	-	-	-	.1319 (.8962)	.6577 (4.4419)	-.0501 (1.0456)	.48	25.8	1.8098
(5)		88	Translog (approximation) Equation 6.6	4.1697 (.484)	-	-	-	-.9777 (.4010) a_{31}	.7810 (.6456) a_{32}	a_{33}	.48	15.0	1.814
								.0568 (.9033)	-.0496 (.3620)	.0338 (.0969)			

Note: t-values are in parentheses. Dependent variable is log of sales as proxy for output. Other variables are defined in the text.

the magnitude of A will negatively affect the level of sales. Finally, the degree of factor intensity can be assessed by the ratio of α to β. According to Bridge (1971, p.326) "the degree of factor intensity can be assessed by the ratio of α to β. A production function with a higher α/β ratio represents a more labour intensive technique than a function with a low α/β ratio." As reported in Table 6.2(1) the ratio of α/β is $^{.5528}/_{.6237}$ or approximately .9. This could be interpreted to mean that the total manufacturing industries are characterised by labour intensive techniques.

In order to consider possible differences in the Cobb-Douglas production functions for the local and foreign firms, we allow for a difference in the parameters in the two groups. From equation (6.2) we consider a Cobb-Douglas production function with the intercept dummy variable $\gamma = D_{Fi}$. The assumptions of (6.2) are, (i) a production function's intercepts would reflect different level of technical efficiency, and (ii) output elasticities are constrained to be equal for both local and foreign industries. The results of equation (6.2) are given in Table 6.2(2). The expectation was that a positive and statistically significant regression coefficient γ for the dummy D_F would reflect greater technical efficiency for foreign firms. The result for γ did not meet <u>a priori</u> expectations. The γ coefficient is quite low and insignificantly different from zero. This result can, cautiously be interpreted as consistent with no greater technical efficiency on the part of foreign firms when all industries are considered together. Further, it is possible that disaggregating by firms may reveal both positive and significant results for some firms. Nevertheless the coefficient γ is positive.

However, this low positive γ coefficient cannot be ascribed to greater technical efficiency for foreign firms. In equation (6.2), output elasticities are constrained to be equal for both foreign and local firms. Further tests can be performed on the assumptions underlying the model. In particular if we relax the assumption of equal output elasticities for both groups of firms. Tyler (1978, p.368) has argued that "relaxing the assumption that the output elasticities are the same for domestic and foreign firms is the equivalent to admitting that domestic and foreign firms may possess different, but still Cobb-Douglas production functions". Therefore we use equation (6.3) which allows differences in the output elasticities for foreign firms in relation to local firms. The results of estimating equation (6.3) for all industries are presented in Table 6.2(3).

The estimates of the elasticities of output with respect to both labour a_2 and capital (a_1) are positive but only a_2 is significant at the 5 per cent level. A comparison between a_1 and a_2 coefficients seems to suggest high return to scale with respect to labour in the foreign firms. While the coefficient α is not individually reliable, the combined ($\alpha + \beta$) indicates increasing returns to scale for the foreign firms. One possible reason is the argument that there is more highly skilled labour in the foreign firms.

The intercept dummy in Table 6.2(3) is negative and insignificantly different from zero. This seems to suggest that the positive sign observed for the intercept dummy in the results of equation 6.2 represents a greater return to scale for the foreign firms. Nevertheless, the results

in equations (6.2) and (6.3) have a strong general similarity. They have approximately the same explanatory power with an R^2 between .79 and .80, and in addition, the intercept dummies are statistically insignificant.

One obvious reason why little variation in the intercept and scope dummies in equations (6.2) - (6.3) have been explained could be that the Cobb-Douglas function is too restrictive. Secondly, the property of homotheticity is not one that can be applied or assumed a priori, it requires testing with other useful function such as the generalised CES function, for which the property of homotheticity does not hold. In other words, the constant elasticity of substitution provides a function which allows the elasticity of substitution to differ from unity. Smyth et al. (1975, p.8) have argued that, "even if for a particular industry a homothetic function exists, it is not the case that the same function will be applicable across industries. Therefore, in a cross section of industries the proportionality requirements would not be met overall even if they were met for individual industries, as capital-labour ratios differ between industries".

Considering the above reasons, we relaxed the assumption that production for local and foreign firms obey Cobb-Douglas specification in equations (6.1) - (6.3). Following an approximation based on Taylor series expansion suggested by Kmenta (1967), equation (6.5) was then used to estimate efficiency, distribution, substitution and scale parameters for foreign and local firms. The results are given in Table 6.2. The α coefficient (a_2) is significant at the 5 per cent level and the returns to scale (a_1) is not significant at either the 5 or 10 per cent levels. With regard

to a_3, the expectation was that if it is significantly different from zero, the Cobb-Douglas specification should be rejected. The coefficient of a_3 as reported in (4) of Table 6.2 is not significantly different from zero, implying that the Cobb-Douglas model cannot be rejected as an adequate model for the total industries. One must be careful with such interpretations because it is possible that the samples were not large enough to permit sufficient variation of capital and labour which would allow a_3 to be estimated with sufficient precision.[22]

As we have seen, equation (6.4) collapsed to the equivalent Cobb-Douglas form since a_3 was insignificantly different from zero. In view of the inept performance of the CES function, two questions can be asked. Firstly, what would have been the degree of error if we had accepted the Cobb-Douglas function in a situation where CES specification is more appropriate? Secondly, let us suppose that a_3 in equation (6,5) was significant and as a result the Cobb-Douglas specification was rejected. Does that mean that the CES form is to be accepted as the appropriate form?

The disagreement over the first question is considerable. While there is no doubt that the elasticity of substitution may well be in error, some have argued that the influence of the elasticity of substitution on growth is insignificant.[23] Likewise, others have argued that while differences in the elasticity of substitution matters a little in the "aggregate conventionally measured concept", among industries, differences in the elasticity of substitution may have a significant effect on the rate of growth.[24] Since there is no unified view regarding the effect of elasticity of substitution on growth

rates, the question may be asked: will a mis-specification of elasticity of substitution parameter (σ) impart the return to scale parameter bias? From Maddala and Kadana (1967) it can be shown that Cobb-Douglas will give a true indication of the factor intensities in the case where L and K are independent with similar log normal distributions, e.g. $\theta_1 \equiv \theta_2 \equiv 0$. However where these distributions are homogeneous, the bias can be made arbitrarily large.[25] There is also growing evidence from Monte Carlo experiments that suggests the use of Cobb-Douglas functions to estimate returns to scale may not lead to much bias if the distributions of L and K are independent.

To answer the second question, we shall employ a more generalised estimating equation than (6.4) to test for homotheticity. Equation (6.6) was used and the specified non-homothetic production function gives the results reported in Table 6.2(5). The basis of equation (6.6) is to test for homotheticity which requires that $a_{31} = a_{32} = a_{33} = a_3$. Following Griliches and Ringstad (1971) and Tyler (1978), we tested the hypothesis that a non-homothetic production can be accepted as appropriate if the null hypothesis of equality is rejected. An F-test of the null hypothesis of the equality of a_{31}, a_{32}, a_{33} and a_3 led to its rejection. This suggests that there is non-homotheticity in the underlying model. This result provides support for Griliches'(1967 and 1968) findings that the hypothesis that distribution, efficiency and scale parameters are the same for all 2 digits industries, is inconsistent with the evidence. Tyler (1978) also found evidence of non-homotheticity in the case of Brazilian manufacturing industries. The point here as we have noted

above is that a homothetic function may be possible in a single industry, but proportionality requirements would not be met across industries because capital-labour ratios differ between industries.

Empirical Results: (B) Inter-Firm Production Function Estimates for 1972 Survey of Nigerian Industrial Firms

The results reported so far indicate that additional work on cross-sectional production functions based on data drawn from local firms and foreign firms separately would probably be very valuable. We have argued all along that disaggregating data may make a difference in some of the results presented. Further, the lack of precision in estimating a_3 was probably due to the fact that the samples were not large enough to permit sufficient variation of capital and labour. We hoped that since the number of observations has increased from 88 to 969, a_3 in the Kmenta form should now be found to be significantly different from zero.

The results of estimating the basic Cobb-Douglas function defined by equation (6.1) are reported in Table 6.3(1). The overall fit of the regressions measured by R^2 and F are fairly good for both local and foreign firms. The combination of $(\alpha + \beta)$ coefficients suggests an increasing returns to scale to both local and foreign firms. However, the local firms would seem to have slightly higher returns to scale. The ratios of α/β is higher in the foreign firms than local firms. The intercept (A) in both local and foreign firms suggests a gap in technical efficiency.

However, the technical efficiency (A) is negative for both foreign and local firms and insignificantly different from zero. We conclude that there is no evidence to support the proposition that foreign firms possess greater technical efficiency,

TABLE 6.3 Inter-Firm Production Function Estimates for 1972 Survey of Nigerian Industrial Firms. Foreign Firms = 487 and Local Firms = 482.

	Intercept LN A		α	a_1	β	a_2	a_3	Scale Elasticity $\alpha + \beta$	Elasticity of Substitution σ	R^2	F	DW
1) Cobb-Douglas Equation 6.1												
Foreign Firms	-0.6341 (.4000)	-	.6336 (3.5753)*	-	.6000 (5.6032)*	-	-	1.2336	1.0000	.68	515	1.3707
Local Firms	-0.8518 (.5336)	-	.4041 (3.2912)*		.8700 (5.6631)*	-	-	1.2741	1.0000	.87	1599	2.3125
2) C.E.S. Equation 6.5												
Foreign Firms	-0.4337 (.2719)	-	-	.1815 (0.7970)	-	1.0270 (2.8714)*	.1146 (-1.0295)	1.2085	0.8970	.42	116.8	1.3896
Local Firms	-0.5175 (-.3349)	-	-	.2420 (1.1097)	-	.7354 (4.9643)*	-.0953 (1.5852)	0.9774	0.9129	.62	259.3	2.6958

* indicates statistical significance at the 5 per cent level or better.

The numbers in parentheses below the regression coefficients are calculated t-values.

Source: O.L.S. Regression Estimates.

when both groups are considered separately.

Next, the soundness of CES equation (6.5) was investigated by running it separately for each of the two groups (foreign and local). The expectation was that if a_3 is significantly different from zero, the Cobb-Douglas form should be rejected. The results of equation (6.5) are reported in Table 6.3(2). The returns to scale is not significantly different from zero for both foreign and local firms. The coefficient a_2 which is capital's share weighted by the returns to scale, $\mu(1 - \delta)$, is significant for both groups at the 5 per cent level. Regarding the key coefficient in the Kmenta form, a_3, it is found to be insignificantly different from zero for both groups of firms. This would suggest that the Cobb-Douglas function is an adequate medel for explaining the production behaviour of foreign and local firms. Nevertheless, scale elasticity, i.e. $(\alpha + \beta)$ suggests that foreign firms possess greater returns to scale than local firms. The elasticity of factor substitution shows approximately the same magnitude for both groups.

Turning to the intercepts, they are both insignificantly different from zero. A comparison of the intercepts in the Cobb-Douglas and CES for both groups suggests that foreign and local firms are closer in technical efficiency in the CES form than the Cobb-Douglas form.

Conclusions

Notwithstanding that a great deal more research needs to be done, the results presented in this chapter allows a number of important conclusions to be drawn. First, separate production functions do exist for both foreign and local firms. But foreign firms are not seen to possess greater levels of

technical efficiency than local firms. Second, it appears that foreign firms do not possess any relative advantage but their relationship with the local firms in Nigeria is a complex one. There is a major reason to expect that local firms would not be different from foreign firms given that most of the locally controlled firms are resident expatriates. It follows that the similarities observed in our analysis may be due to the fact that certain behavioural and economic characteristics of the foreign firms may also be displayed by resident expatriates. However, our data do not allow us to separate resident expatriates from genuine privately owned indigenous firms. Our results do leave us open to the criticism levelled by Forsyth and Solomon (1977) that the practice of aggregating resident expatriates' firms and genuine privately owned indigenous firms will tend to hide such differences and may seriously affect comparisons with foreign firms. In the next chapter we investigate domestic cost differences between foreign and local firms.

Chapter Seven

DOMESTIC COST DIFFERENCES - A COMPARISON OF FOREIGN AND LOCAL MANUFACTURING FIRMS IN NIGERIA: A DISCRIMINANT ANALYSIS APPROACH

The previous chapter has considered differences in technical efficiency between foreign firms and local firms in Nigeria. We now turn to an investigation of cost differences between foreign firms and local firms. Firstly, we briefly examine the role of cost differences in economic approaches to foreign direct investment. Secondly, we specify the hypotheses to be tested and the variables used. Thirdly, the technique of discriminant analysis which is used in testing these hypotheses, is briefly reviewed. Fourthly, a description of the data and the results of the discriminant analysis are presented. Finally, we draw the main conclusion in part five.

Cost differences and the theory of FDI

Differences in the cost of production have been central to the theoretical analysis of why firms go abroad. There are two main reasons why cost of production is emphasised in the theory of foreign direct investment. Firstly, the cost of production variable is a locational specific factor in either the home country or host country. It is now widely accepted that the coexistence of ownership advantages and locational factors, provides the most obvious explanation of why a firm will organise manufacturing operations abroad. Giddy and Young (1982, p.58) have pointed out that with the possession of certain firm-specific advantages (able to develop new products, skills in marketing, organisation of finance, expertise in differentiating products, etc.) the company could simply export to overseas markets. "To explain the choice of foreign direct investment,

it is necessary therefore to take into consideration location-specific factors in either the home or host countries. These include variables such as trade barriers and other government policies, market characteristics, costs and productivity."[1]

The second reason why cost of production is emphasised in the theory of foreign direct investment is the growing "sourcing activity" which has been noted in the context of both developed and less developed countries.[2] It is argued that MNCs operate a world-wide sourcing policy for manufacture and assembly, the aim being to minimise total production costs.[3]

Given the above reasons, the theories of foreign direct investment currently evolving in the literature have, as a result, focussed heavily on production costs. According to Hymer (1976) and Kindleberger (1969), foreign firms who wish to compete in a foreign market against local firms must possess some advantages such as patented or unavailable technology, special access to capital or markets, economies of scale, economies of vertical integration, differentiated products, etc. Tschoegl (1982, pp.203;206) has noted that the proposition that foreign investors must possess a countervailing advantage over local firms needs to be viewed in the light of the following points.

(1) The conditional statement which assumes that a country is equally open across all economic sectors and to all origins just because it permits some foreigners to operate in some industries.

(2) The assumption of the existence of local competition.

(3) The assumption that foreign firms face higher costs than local firms.

Regarding the first assumption, Nigeria as we have already pointed out in Chapter 4, permitted foreign direct investment in all sectors during the 1950s and early 1960s. However, during the 1970s, the government delimited areas in which private foreign investors could operate. Given that foreign investment is still welcome and will for a long time be an important component in Nigeria's economic development, it follows that the conditional statement is relevant to those areas in which the foreigners are allowed to participate.

With respect to the assumption of local competition, there are those who uphold the idea that frequently, especially in less developed countries, local firms are not available to compete effectively in the particular product lines in which the foreign investor is interested. A second argument is that local firms do not change their policies in order to compete fully with foreigners. Finally, lack of effective competition is also associated with rapidly growing host markets. The basic argument reflects the assumption that there are transient costs to the firm associated with growth such that the optimal rate of growth for existing firms might be less than that of the whole market. Consequently "this could create an opportunity for new firms who, while perhaps higher cost producers, would still find entry attractive."[4]

Given the above arguments, it would seem that cost variables will provide little explanation for foreign direct investment especially in those areas or industries where there are 'attenuated' competition from the local investors. In the case of Nigeria, we assume that there is strong competition between local firms and foreign firms. Furthermore, we assume that local firms in Nigeria will be less accommodating to local

oligopolistic arrangements and are willing to change their policies in order to engage in more competitive behaviour.[5]

The assumption of significant differential costs suggests that foreign firms face higher costs than do local firms. These costs derive from the fact that foreign firms must operate in "alien and distant markets". However, it is argued that the extra costs will be a function of the firm's nationality, industry and corporate history. In some situations these extra costs may even approach zero. We also assume that the non-trivial differential costs exist in Nigeria, so that foreign firms face greater costs than local firms. The higher costs of production may reflect poor accessibility to major suppliers or major markets, higher transport and communications costs and a lower quality labour force which might require training at additional cost.

Previous empirical studies in this area are scarce. So far, only two studies have compared cost differences in manufacturing industries. The empirical work based on developed countries has been that of Oksanen and Williams (1978), who compared industrial cost and employment characteristics for manufacturing industries in Canada and the United States. Their empirical results indicate that "the national origin of an industry can be ascertained from its cost and employment structure with very high accuracy."[6] Similarly, Iyare and Gemmell (1983) also compared cost differences between two developing countries' - Ghana and Nigeria - manufacturing industries. They found some support for the view that cost and employment characteristics of similar industries differ between the two nations. These two studies were concerned with international cost differences. They are both relevant to considera-

tions of international economic policy but not domestic economic policy. In addition, studies focussing on domestic cost differences between foreign and local firms or industries have compared the wage payments made by foreign and local firms. Dunning (1976) compared wage payments of a sample of 500 U.S. affiliates operating in Britain in 1973. His results indicate that the U.S. affiliates tend to pay higher than average wages, as measured by differences in the yearly wage bill per capita. Stopford (1979) lends support to the findings of Dunning. Stopford's results were based upon the United Kingdom Census of Production for 1975. He found that, in most industries, the differences in wage payments were within 10 per cent. Studies focussing on developing countries include: Mason (1973), for the Philippines and Mexico, Langdon (1975) for Kenya, Sourrouille (1976) for Argentina, Jo (1976) for South Korea, Iyanda and Bello (1979) for Nigeria and Possas (1979) for Brazil. Results of these studies have established that in most industries foreign firms paid more than local firms. On the other hand, a study by Cohen (1975) for Singapore and Taiwan, found that local firms tended to pay higher wages than foreign firms in Singapore. With respect to Taiwan, the result was mixed. Sabolo and Trajtenberg (1976) have estimated U.S. MNE's annual wages between 1.4 and 2.1 times higher than indigenous firms in Latin America. Finally the study by Papandreou (1980) for Greece found differences in average wages per head between foreign and local firms that were not statistically significant.[7]

The present study differs from the above studies because we are comparing foreign and local firms in terms of several cost and employment variables. Secondly, while most studies have generally made comparisons between foreign and local firms

in terms of money wage rates, total employee benefits (including fringe benefits) will be used in this study. Thirdly, we hope to reflect some of the problems raised by Dunning (1981, p.300) as "the difficulty (with previous empirical) studies is to identify the extent to which any differences observed in the wages paid by MNE affiliates (compared to indegenous firms) is ascribed to their foreign ownership as such, or to other attributes of the affiliates, for example, size, product mix, skill composition, location (within a country) and so on." Given that our interest is in differential costs, it is reasonable to focus on data needed to describe differences between firms of the two ownership groups. Hence we turn to the hypothesis to be tested and variables used in the testing.

Hypotheses and Variables

The basic hypothesis being tested in this chapter is whether cost and employment characteristics differ significantly between foreign and local ownership. Put differently, can nationality of a firm be ascertained from its cost and employment structure with very high accuracy? The use of firm data in this chapter follows a similar study by Oksanen and Williams (1978). Their comparison of industrial cost and employment characteristics was based upon 124 industries in America and Canada. Ideally, we would have liked to compare firms within an industry. The lack of useful data becomes an increasing problem at greater levels of disaggregation than the industry level. It is only at the firm level that some of the more interesting aspects of cost and employment characteristics become apparent. However, we are comparing a more homogeneous sample of firms and despite the rather aggregate nature of the estimates, certain features of the cost comparisons may still be apparent.

We would argue that the Nigerian 4-digits industrial grouping used in the compilation of official statistics is, to a large extent, based on the technology of production as opposed to some form of market structure. For example, one of the questions asked during the Survey was that each firm should briefly describe the activities of its establishment, such as products manufactured or processed.

Since no one variable is an adequate proxy for either cost structure or employment characteristics, several variables have been chosen whose combined effects show a systematic or random difference between foreign and local firms. We shall begin with employment characteristics.

(a) Number of employees per firm (X_1)

The most commonly used variable to measure size is the number of company workers. Since average firm size serves as a proxy for the various economies of scale, economies of scale may be an important determinant in explaining differences in cost and employment in the two groups of ownership. From the FOS (1972) data, in Table 7.1, the total number of employees in manufacturing industries is estimated to be 167,470. This figure represents an increase of 15 per cent over the 1971 figure of 145,445 employees in the manufacturing industries. The number of employees accounted for by all foreign firms (defined in this study as all firms whose paid up capital is 100 per cent foreign) ranges from the low of 60 in the printing industry to a peak of 28,282 in the spinning, weaving and finishing textiles industry (Table 7.2). For the local firms (defined in this study as all firms whose paid up capital is 100 per cent local) the number of employees ranges from 10 in products of petroleum and coal to 4,855 in the spinning, weaving and finishing textiles

TABLE 7.1

	1 NO OF ESTABLISHMENTS			2 TOTAL EMPLOYED		
	1970	1971	1972	1970	1971	1972
Meat products	11	11	13	1243	1600	2740
Dairy products	3	3	5	203	303	470
Fruit canning and preserving	3	3	4	279	250	266
Vegetable oil milling	29	34	48	5220	6009	9978
Grain Mill products	4	4	7	949	1444	1668
Bakery products	87	149	173	3796	4799	5017
Sugar and sugar confectionery	12	9	10	6223	5210	5288
Misc. food and animal feed	5	6	7	488	700	616
Spirit distillery and beer	7	8	9	3488	3563	4231
Soft drinks	6	8	9	818	772	1305
Tobacco	4	5	5	3170	4228	4188
Textiles	39	61	69	27068	32626	37067
Made up textile goods	11	13	15	5589	3860	3564
Knitted goods	3	9	16	1104	1937	4280
Wearing apparel	21	23	31	2037	1553	1976
Tanning	7	4	6	668	868	990
Travel goods	4	6	6	750	772	671
Foot wear	12	15	19	2755	2856	2359
Saw milling	75	106	123	8455	9732	9073
Wooden furniture fixutes	50	66	86	3212	5443	5900
Containers and paper board	6	7	9	985985	1479	1720
Paper products	5	5	7	1117	1429	1432
Printing	67	65	77	7454	7842	9874
Basic Ind. chemical	4	5	3	397	511	331
Paints	6	6	6	617	678	756
Drugs and medicines	7	8	9	1010	807	1355
Soap, perfumes and others	14	13	17	3699	3877	5137
Other chemical products	10	9	10	776	1276	1536
Prod. of petroleum and coal	5	3	5	381	423	488
Tyres and tubes	8	8	12	1657	1742	3014
Other rubber products	25	19	23	6915	4271	4646
Plastic products	15	19	24	2157	2966	3969
Pottery and glass products	6	6	9	1452	1649	1515
Bricks and tiles	5	8	16	226	349	684
Cement	5	6	7	1507	3126	3218
Concrete products	10	15	21	2233	2247	2819
Basic Metal	9	11	11	2314	2306	589
Metal furniture and fixtures	16	20	24	2498	3850	4789
Structural metal products	23	27	32	2675	3866	5117
Fabricated metal products	16	18	33	5375	7632	7686
Manufacture of Agr. and Industry machinery	4	5	5	200	245	323
Machinery and equipment	3	3	3	372	230	215
Manufacture of radio Tel and comm. eq. & app.	9	8	11	911	718	1017
Other electrical supplies	5	4	7	643	832	1093
Transport Equipment	7	7	6	730	923	447
Misc. products	20	21	18	1148	2246	2053
Total	703	870	1052	127056	145445	167,470

Source: FOS (1977)

Figures include Government, Co-operatives and joint ventures firms.

Table 7.2: Cost and Employment Characteristics by Industry in Nigeria, according to Ownership, Micro Data File Sample, 1972.

	1=Local 2=Foreign	TC	WS	E	VA	FA	OP	MN
1	1	2080	349	391	693	864	269	1
2 MEAT PRODUCTS	2	5715	691	775	1926	1591	534	31
3	1	50	4	4	23	23	4	2
4 DAIRY PRODUCTS	2	3919	456	444	1712	1567	282	11
5	1	829	475	1367	1292	2694	1212	15
6 VEGETABLE OIL MILL.	2	3472	450	1297	1700	1557	1154	14
7	1	12568	42	38	196	246	32	3
8 GRAIN PRODUCTS	2	6497	1582	1630	8357	8974	1394	76
9	1	1170	635	2012	1914	2173	1720	61
10 BAKERY PRODUCTS	2	4935	332	1048	1017	1154	914	32
11 SUGAR AND SUGAR	1	4420	327	681	1375	2643	309	12
12 CONFECTIONERY	2	23037	2148	2030	5803	6705	1683	45
13	1	889	86	951	236	325	29	6
14 MISC. FOOD	2	6056	445	514	1232	1493	412	25
15 SPIRIT DISTILLERY	1	7004	492	542	8073	256	357	31
16 AND BEER	2	55715	4322	3380	50396	1612	2230	186
17	1	909	71	115	1161	324	81	7
18 SOFT DRINKS	2	3600	565	913	8380	2561	648	58
19	1	6185	560	385	5651	1483	258	13
20 TOBACCO	2	36027	4263	1574	15632	5549	1020	55
21 SPINNING, WEAVING &	1	5429	2924	4855	3298	14414	4280	96
22 FINISHING TEXTILES	2	81411	17034	28282	47429	83954	24931	568
23	1	445	104	189	167	564	161	3
24 MADE UP TEXT. GOODS	2	7615	1514	2735	4134	8166	2424	56
25	1	2389	69	132	1471	291	117	3
26 KNITTED GOODS	2	11464	1186	2248	4568	4978	2009	53
27	1	2242	210	335	1224	1052	271	22
28 WEARING APPAREL	2	3150	990	1640	5771	4978	1281	104
29	1	2591	207	322	736	522	276	6
30 TANNING	2	3018	291	453	1037	734	391	12
31	1	156	119	301	91	445	153	12
32 TRAVEL GOODS	2	1631	166	350	106	523	369	14
33	1	2089	614	109	69	125	99	3
34 LEATHER FOOTWEAR	2	6811	718	717	454	626	656	20
35	1	1997	215	1856	2278	1536	1453	47
36 SAW MILLING	2	4515	1420	6047	7427	4967	5390	151
37 WOODEN FURNITURE	1	2273	457	2366	1899	1891	2031	94
38 & FITTINGS	2	3770	1356	2637	2117	2008	2264	105
39	1	2078	688	361	1626	541	287	17
40 PAPER PRODUCTS	2	4425	767	896	2551	1343	712	42
41	1	1159	275	1432	698	1500	150	13
42 OTHER PAPER PRODUCTS	2	4166	683	1303	635	1365	137	12
43	1	4339	1404	65	2483	3620	1500	105
44 PRINTING	2	2908	1280	60	2281	3326	96	1007
45	1	72	80	10	46	35	5	1
46 BASIC IND. CHEMICALS	2	410	93	321	2076	1044	145	37
47	1	1016	28	96	683	354	62	7
48 PAINTS	2	2759	741	639	4542	2431	434	63
49	1	84	170	29	85	88	15	2
50 DRUGS & MEDICINES	2	3207	1043	6248	1801	1865	331	36
51	1	1556	180	154	803	514	98	8
52 SOAP, PERFUME, ETC	2	24275	5021	4294	22366	14326	2739	212
53 OTHER CHEMICAL	1	3890	69	8	334	273	101	3
54 PRODUCTS	2	7676	730	1201	3479	2853	1055	29
55 PROD. OF PETROLEUM	1	18	3	1	4638	2633	1	1
56 & COAL	2	36171	1304	440	41706	23963	447	36
57	1	2314	555	515	2969	2498	379	26
58 TYRES AND TUBES	2	8772	1470	1365	5401	7146	1003	70
59	1	956	207	432	476	1544	364	9
60 OTHER RUBBER PROD.	2	3331	724	2104	1648	5420	1276	32
61	1	1013	192	269	451	1156	223	9
62 PLASTIC PRODUCTS	2	12602	2389	7327	5609	10149	2729	104
63	1	101	17	37	30	55	30	1
64 GLASS PRODUCTS	2	2969	511	1074	888	1602	3012	12
65	1	349	87	256	151	358	209	7
66 BRICKS AND TILES	2	585	145	428	252	509	349	84
67	1	3011	353	454	1796	8078	363	19
68 CEMENT	2	9296	421	798	3158	14194	438	33
69	1	1434	308	107	1399	1353	318	16
70 CONCRETE PRODUCTS	2	4985	1069	1173	4858	4701	1104	57
71	1	1149	84	66	141	118	29	1
72 BASIC METAL	2	15281	432	470	1871	1453	389	15
73 METAL FURNITURE	1	2276	410	894	1264	962	713	15
74 & FITTURES	2	7454	1360	3012	4250	3342	2399	52
75 STRUCTURAL METAL	1	3894	628	798	1762	1044	661	22
76 PRODUCTS	2	14002	2258	2870	4336	3760	2472	80
77 FABRICATED METAL	1	1248	294	384	1725	696	336	4
78 PRODUCTS	2	32104	4849	6356	28535	11514	5556	94
79 AGRI. & SPECIAL	1	29	8	14	42	69	14	1
80 IND. MACHINERY	2	619	124	194	603	991	166	8
81 MACHINERY &	1	65	11	19	18	20	14	1
82 EQUIPMENT	2	432	188	196	194	298	140	10
83 RADIO, TV & COMM.	1	2435	250	409	1537	445	271	22
84 EQ. AND APP.	2	5119	372	608	2285	1041	403	32
85 HOUSEHOLD ELEC.	1	5817	433	667	1373	893	796	21
86 APPARATUS	2	1537	167	228	343	233	211	5
87 MANF. IND. NOT	1	683	182	308	403	344	74	6
88 CLASSIFIED	2	3827	1053	1720	2245	2156	1728	38

Source: Computed from F.O.S.(1977) Industrial Survey (1972).

TC = Total cost (raw material, fuel, electricity, water, repairs, contract work, and goods for resale
WS = Wages and salaries
E = Employees
VA = Value added
FA = Fixed assets
OP = Operatives
MN = Nigerian managers

Government, Co-operatives and joint ventures firms are excluded.

industry. The survey of 43 firms (31 foreign and 11 Nigerian) by Iyanda (1975) shows that the number of workers employed in the foreign firms ranged from a low of 132 to a peak of 4,420, with an average of 1,051 employees per firm.[8] As noted in Chapter 1, foreign firms in that study were defined as any firm with at least 40 per cent of its voting stock owned by non-residents of Nigeria, or with not less than 25 per cent foreign ownership but under a contracted foreign partner management. The 11 indigenous firms had a total employment of 3,657 with a minimum of 104, a maximum of 753, and an average of 332 employees.

The general picture conveyed by the two surveys strongly confirms that foreign firms are generally larger than local firms in Nigeria. The size advantage should give the foreign dominated industries a substantial edge in undertaking large scale capital intensive investment. Further, it is argued that the existence of economies of scale in production will tend to mean that firms with small plants will be at a cost disadvantage compared with firms with large plants. In this case, differences in the numbers of employees per firm in both ownership groups may reflect economies of scale.

(b) Skilled and semi;skilled operatives per firm (X_2) and operatives peremployee (unskilled worker) (X_3)

Mason (1973) has argued that since foreign firms are more experienced in the production of technically refined products and have developed well-defined procedures for their production, it is most likely that they would employ lower level operatives in the production process.[9] If the local firms require a higher level of operative, this difference in the quality of operative will be reflected in employment costs. On the other hand, Reuber (1973, p.172) argued that "it seems

likely that the projects undertaken by foreign investors require personnel with greater skills - given that these projects tend to be concentrated in industries where advanced technology, management and marketing skills are required - than if local investors were to undertake projects in other areas of activity". In line with Reuber's argument, there would be a very marked difference between local and foreign firms in terms of skilled and semi-skilled operatives per industry. On the other hand, significant differences in numbers and quality of personnel may not be reflected in the employment costs. For example, it has been argued that foreign investors have access to labour markets around the world. Given their knowledge of labour market conditions, and their ability to tap the pool of labour within the firm internationally, they are able to recruit at lower cost more highly skilled persons at lower salaries than would be feasible for a local firm attempting to recruit comparable persons abroad.[10]

Another factor that determines the number of skilled persons in local and foreign firms is the training programs. It is generally accepted that foreign investment projects increase the level of training and skill found in LDCs significantly.

Three points of significance emerge out of the empirical evidence on why foreign investors have increased the level of training and skill found in the LDCs. First is the need to provide as much highly skilled employment as possible to local personnel in order to reduce foreign personnel; secondly, the local regulations and political pressure which require foreign firms to hire local personnel; and thirdly, from the standpoint of both salaries and allowances, the foreign firms find it advantageous to use local trained personnel as compared to foreign personnel.[11] On the other hand, employees trained by foreign

firms may later leave the firms and work for local firms. In this case, it is possible for local firms to have as large a number of skilled personnel as in the foreign firm. Assuming that local firms are able to recruit these skilled workers trained by foreign firms, it would presumably show up in lower costs for the local firms compared to foreign firms.

In the case of Nigeria, Iyanda (1975, p.143) has found that a much higher percentage (58%) of foreign firms have established training departments as compared to (30%) of the local firms. One reason suggested for this higher percentage is that foreign firms are larger than local firms. Further, the existence of a training department is expected in a large firm which will be able to justify the costs as a result of frequent use. The possibility exists therefore that foreign firms in Nigeria are likely to provide more formal employee training opportunities than local firms. If this were the case, we would expect the number of skilled workers per firm to be higher for foreign firms than for local firms.

(c) Managers or professionals per unskilled workers (X_4)

Several reasons are suggested in the literature why foreign firms use relatively more managers or professionals in relation to the number of unskilled workers, whereas local firms use more skilled workers. A frequently cited reason why foreign firms use more unskilled workers is that they have a long experience in the production of technically refined products. In order to see that the procedures are being properly followed and implemented, a large input of managerial supervisory talent is required. On the other hand, there is the absence of information and well-defined production procedures in the local firms, hence they rely on skilled workers more heavily.[12] In the case

of Nigeria, we would argue that the production process of many products is not likely to be monopolised by foreign firms. This stems from the fact that most technological know-how being transferred to most developing countries, including Nigeria, consists of "medium level skills which are widely available in the world market. This type of technological know-how comes in the form of capital equipment and machinery which is not exclusive to a particular firm.[13] In this case, if we observe differences in the use of managers between foreign and local firms, it might reflect the fact that local firms find it difficult to recruit managers locally or attract overseas managers.

Another argument that has been made in support of why foreign firms employ more managers focusses on "inward mobility". For example, in Nigeria, empirical study has revealed that more managers move into foreign-owned firms. The reason often cited is that foreign firms are able to attract more managerial employees than local firms because of better compensation, including fringe benefits.[14] Further, the foreign firms give more prospects for overseas travel and training, and a career structure that leads to high positions not only in Nigeria, but elsewhere in Africa and overseas. In this case, where the managers per unskilled workers variable distinguishes between foreign and local firms, one possible explanation would be differences in training programs and inward mobility.

(d) Wages per employee (X_5) and Wages per skilled operative (X_6)

There are a number of reasons why wage payments in different firms and industries may vary. Differences in wage payment could result (in a perfectly competitive market) from the skill mix of the labour force and the productivity of

individual employees. It could result from working conditions, the system of payments, and the amount of overtime and shift working. As labour markets are usually not perfectly competitive, differences in wages may result from imperfections such as sex differentials in wage payments, the existence of regional labour markets, the nature and strength of the bargaining power of workers through their trade unions, the influence of the government "as well as the market power of the firms and other aspects of market structure."[15] With respect to differences in wage payments between foreign and local firms or industries, it is argued that foreign firms have access to international capital markets where capital is relatively cheap. Consequently they pay high wage rates, based on international standards, for skilled labour, management and unskilled labour.[16] Mason (1973) has provided evidence that United States firms operating in some developing countries have a lower cost of capital and pay higher wages. From this standpoint, he concluded that United States firms must obtain their capital on more favourable terms than do local firms from both local and international sources. There is other empirical evidence to support the view that foreign firms have a lower cost of capital. As we have noted in Chapter 3, local firms in Kenya according to Pack (1976) relied on the local market for investment finance and they borrowed at rates of 6 - 7%. On the other hand, foreign firms relied on the parent company and were allowed to use discount rates of 10 - 15% or three- or four-year payback periods in calculating the profitability of purchasing additional equipment. However, Pack noted a similarity in the wage payments by the two types of firms (local and foreign) even though foreign firms obtained

their capital on more favourable terms than was the case with the local firms. Finally, it is also argued that foreign firms are concentrated in the industries with higher profits which permit the labour force to earn higher wages by capturing part of the monopoly profits. However, in Nigeria, wages in the private sector are strongly affected by changes in the public sector wages schedules which are set by government commissions. Trade Unions have a strong influence on these recommendations. With regard to capital, policies such as duty free capital importation or accelerated capital depreciation discussed in Chapter 4, have made capital relatively cheap. Differences in wage payments could reflect differences in productivity, labour intensive techniques as well as the degree of conformity to local wages.

(e) Fixed assets per firm (X_7)

Average size of a firm or industry serves as a proxy for the various economies of scale which large firms can exploit in product development, production, marketing or finance. Similarly, total assets employed in the business could also serve as a measure of firm or industry size. From this standpoint, size of fixed assets can be cited as a possible measure of scale between foreign and local firms. In terms of total assets, foreign firms in Nigeria as reported in Table 7.2 above, are larger than local firms. However, capital costs should be much less important in explaining variations between foreign and local firms in Nigeria. As we have noted above, the Nigerian government policy seems to provide similar capital (costs) to foreign and local investors. A difference in value between local and foreign groups may be due to the existence of multi-plant or "technological economies which

make for large firm size". Further, higher capital costs for foreign firms may reflect (a) large scales of operations, and (b) an over-valuation of local capital stock (to lower profit rates).

(f) Value added per firm (X_8), Value added per employee (X_9) and Value added per fixed assets (X_{10})

Differentials between foreign and local firms in X_8, X_9 and X_{10} (henceforth referred to as Productivity) could reflect an effective absorption of new technology by foreign firms (Brash, 1966). In the case of Nigeria, we would argue that effective absorption of new technology may not account for productivity differentials between local firms and foreign firms. This stems from the fact that technology, as an input factor of production does have a derived-demand. What has been suggested is that the level and type of consumption goods demanded in a given local economy determines the level and type of technology absorption. With respect to Nigeria, it is the case that domestic demand consists mainly of goods at a relatively low level of technological sophistication. Hence it may be argued that domestic production will probably utilize a similarly low level of production process. Further, the same general argument can be made in the case where income increases and the economy shifts to higher levels of demand for capital and intermediate goods. However, it is possible that we might find some traces of modern techniques of management and production available to some foreign firms, that would result in their having a higher productivity. This is not likely to produce significant differences in productivity across the board. It is our position that foreign firms are larger than local firms and this could well have an influence on productivity.

A second argument that could be made regarding productivity is that local firms in Nigeria employ less capital per worker, and this, combined with lower managerial efficiency, would result in the value added per worker of local firms being below the level of foreign firms. As we have observed in Chapter 6 in the present study, there was no significant difference in technical efficiency between the two groups. The question of whether local firms are less capital intensive will be discussed in the next chapter.

The variables and reasons why they should distinguish between foreign and local firms presented above, are far from complete, and to some extent conflicting. However, we have summarized in Table 7.2a some of the reasons why we believe that these variables might vary between foreign and local firms in Nigeria.

The Technique of Discriminant Analysis

The primary focus of this chapter is on how best to distinguish between foreign and local firms on the basis of a set of known members' characteristics or variables. In order to do this, we have employed the econometric methodology based on "two-group discriminant analysis". Such an approach is justified because the technique allows one to classify 'individuals' on the basis of certain known characteristics into one of several "mutually exclusive and exhaustive groups".[19] In the present study, we wish to classify 969 firms across 44 industries into one of two groups - foreign firms and local firms - on the basis of characteristics such as the number of employees per firm, wage rates per firm, etc. Another justification for the use of this technique is that discriminant analysis calculates an index from a linear combination of

Table 7.3: A Summary of Hypotheses and Variables

Variables	Hypothesis	Local Firms	Foreign Firms
X_1 = No. of employees per firm	Higher or Lower	Higher if a) more labour intensive b) exploiting the country's comparative advantage c) carrying out all stages of production	Higher if larger in size Lower if a) limited size plants established for local market - motive for establishment - import substitution not exporting b) carrying out limited amount of value added locally
X_2 = Operatives per firm		As above	As above
X_3 = Operatives per employee		Higher if a) use productive processes which rely on intermediate technology which needs more skilled labour. b) over-manning of skilled workers in local industry.	Lower if a) more routine production processes. Technology tried and tested in home country. Machines in host country less likely to break down. b) higher technology may need fewer skilled workers. c) Lower levels of skilled manning agreed in line with standards of home country.

Table 7.2a (cont...)

Variables	Hypothesis	Local Firms	Foreign Firms
X_4 = Managers per firm		Lower if more difficult to recruit managers locally or attract overseas managers	Higher if a) firm size larger b) more coordination needed as inputs imported c) need to confirm to rigorous product specifications.
X_5 = Wages per employee		Lower if a) productivity lower (MP_L) b) more labour intensive c) conform to low local wages	Higher if a) productivity higher b) more capital intensive c) conform to wage levels of home country
X_6 = Wages per operative		As above in 5	As above in 5
X_7 = fixed assets per firm		Lower if Converse	Higher if a) larger b) easier access to capital c) techniques more capital intensive d) rate highly fixed asset values, i.e. transfer pricing

Variables	Hypothesis	Local Firms	Foreign Firms
X_8 = Value added per firm		Lower if Converse	Higher if a) larger industries b) easier access to capital c) more capital intensive d) more advanced technology
X_9 = Value added per employee		Higher if more skilled workers	Higher if a) more managers b) more capital intensive c) more advanced technology
X_{10} = Value added per fixed asset		Higher if more skilled workers Lower if Converse	Lower if more capital intensive but diminishing marginal returns to capital Higher if a) more advanced technology b) more managers c) tried and tested processes i.e. no R & D costs in local market d) overvalue fixed assets to minimise value added per fixed asset and hence reduce local tax burden

Note: These are some of the reasons why cost and employment characteristics may differ between foreign and local firms.

the available characteristics which will maximize the statistical discrimination between groups.

Previous studies (Riedel, 1975; Forsyth and Solomon, 1977; Oksanen and Williams, 1978; and Iyare and Gemmell, 1983) have employed discriminant analysis to classify firms or industries into foreign of local groups. The procedure of discriminant analysis is explained in Dhrymes (1970), Kendall (1957), Kendall and Stuart (1966), Lachenbruch (1975), Massy (1963), Johnston (1972), Cooley and Lohnes (1971) and Bolch and Huang (1974).

The "discriminant functions" estimated here are of the form:

$$Y_i = b_i X_{1i} + B_2 X_{2i} + b_3 X_{3i} + \ldots\ldots b_{10} X_{10i} \qquad (7.1)$$

where Y_i is the score on discriminant function i, the b's are weighting coefficients, and the X's are the standardized value of the ρ-discriminating variables used in the analysis. A mathematical discussion of how equation (7.1) is derived, is provided in Appendix 7.A. It may be noted "that the estimation of the coefficients does not depend upon a set of observations for a dependent variable. Rather, maximization (with respect to vector b) of a cross-category variation yields a linear combination of the original variables."[20] Further, the two-group discriminant analysis is analogous to regression on biniary dependent variables using least squares.[21]

Given that our aim is to obtain a method for classifying a firm as either foreign or local, it is necessary to have a rule for discrimination. From Bloch and Huang (1974) and Anderson (1958) it can be shown that if costs of misclassification are equal for two groups and if the a priori probability of an observation belonging to one group equals the probability

of its belonging to the other, a simple classification rule as in 7.2 can be used. For the present study let b' be the (1 x 10) vector of estimated coefficient, then we may calculate the critical score as

$$Y^* = b' (\bar{X}_F + \bar{X}_C)/2 \qquad (7.2)$$

where $\bar{X}$ = sample mean for foreign and local firms respectively. The rule for discrimination can now be expressed under the assumption of a multivariate normal distribution as: classify as a local firm if the critical score is less than Y^* and classify as a foreign firm if the critical score is more than Y^*.

There are two main tests of significance in discriminant analysis. Firstly, one can test the hypothesis that the groups from which the individuals come are in fact distinct groups - their means are significantly different from each other. In this test, it is possible to transform the test statistic into an F statistic. Secondly, one can assess the ability of the discriminant function to classify individuals correctly. Given that individuals are classified into groups on the basis of the discriminant scores, it is therefore possible to see if individuals are classified into those groups where they really belong. Finally there is the classification matrix that summarizes the number of correct and incorrect classifications for each group. This is quite useful in the sense that one is able to see where misclassifications occur.

Data

Data for this chapter and the next were from a 1972 survey of manufacturing establishments by the Federal Office of Statistics published in 1977. The sample included 1,052 establishments in 48 industries in 1972. Because of missing

data, 44 industries are included in the analysis of this chapter.

The Survey of 1972 provides highly aggregated data for most of the variables used and this poses a problem of measurement in comparative analysis. It would be highly desirable to compare firms producing very similar products but the nature of the data does not permit such a comparison. Since firms are not distinguished between foreign and local firms for most variables, we have made use of 10 variables in which foreign and local firms are most clearly distinguished.

From this approach we have concluded that the number of employees per firm, operatives per firm, operatives-employees ratios, managers per firm, wage rates, fixed assets, value added-assets ratios, and value added per firm, are important in determining the origin of an industry. Numbers employed are defined as employees who are regularly on the pay roll of the establishment. These do not include working proprietors, family workers and apprentices. Operatives are defined as skilled and semi-skilled operatives using simple production machinery and complex production machinery. Wages and salaries are gross earnings of employees before deduction of pension contributions and income tax. Bonuses, overtime payments and allowances are included (e.g. rent subsidy and motor vehicle basic allowance). Fixed assets include residential buildings, non-residential buildings, transport equipment, machinery and equipment, land, land improvement and other construction except land. Value added is gross output minus industrial costs. In this survey "value added" means census value added.

Empirical Results

Before presenting the empirical results, we would like to make the following points. Firstly, foreign firms and

local firms are firms with 100 per cent private non-Nigerian paid up capital and 100 per cent private Nigerian paid up capital respectively. Secondly, we are comparing foreign firms' data across 44 industries with local firms' data across 44 industries.

The results of the discriminant analysis are presented in two sections. In Section A are the results using the direct method. Section B contains results using the Stepwise method.

A. Direct Method

In the direct method, all the dependent variables in equation 7.1 are entered into the analysis simultaneously. In other words, variables are not selected one by one in order of explanatory power. The set of variables which, it is hypothesized, distinguish foreign firms from local firms is composed of the following:

X_1 = number of employees per firm

X_2 = operatives per firm

X_3 = operatives per employee

X_4 = managers or professionals per firm

X_5 = wages per employee

X_6 = wages per operative

X_7 = investment costs (fixed assets) per firm

X_8 = value added per firm

X_9 = value added per employee

X_{10} = value added per fixed asset

The results of the direct method are presented in three subsections. In Section 1 are the classification coefficients. We present and interpret the standardized coefficients in Section 2. The classification table and matrix are presented in Section 3. Before presenting these results, the significance of the discriminant function, and hence the null hypothesis

that the included variables fail to distinguish foreign from domestic firms, is tested by Wilks' Lambda which can be converted into an F-statistic. The F-value of 9.932 with 10 and 77 degrees of freedom indicates the null hypothesis is rejected and the groups are indeed distinct.

1) Classification function coefficients

The classification function coefficient for the foreign and local firms using the direct method are given in Table 7.3. They indicate the following:

Table 7.3

Classification Function Coefficients - Direct Method

Variable	Local Firms	Foreign Firms
Number of employees per firm	-0.00035	-0.00025
Operatives per firm	-0.00031	-0.00083
Operatives per employee	3.11611	4.15978
Managers per firm	0.04284	0.06866
Wages per employee	-3.35532	-4.73930
Wages per operative	2.02304	2.51845
Fixed assets per firm	0.00017	0.00011
Value added per firm	-0.00035	-0.00012
Value added per employee	0.00143	0.00148
Value added per fixed asset	0.13185	-0.04887
Constant	-2.62505	-3.77893

a) The coefficients for the number of employees per firm are both negative for local and foreign firms. This implies that the number of employees per firm has almost the same influence in classifying a firm in one group as in another. However, if employees per firm increases, we would expect

more firms to be classified as foreign firms and less firms to be classified as local firms.

b) The coefficients for both local and foreign firms with respect to operatives per firm variable are negative. Since the negative coefficient is higher in the foreign group, firms with high scores for operatives per firm variable are less likely to be classified as foreign firms. In other words, more firms will be classified as local firms for this variable.

c) With respect to the operatives per employee ., the coefficient of the foreign firms is higher than the local group. This can be interpreted to mean that the operatives per employee variable contributes most to classifying firms into the foreign group than the local group. It also means that if the number of operatives per employee increases, the likelihood that a firm will be classified as foreign increases, while the likelihood that a firm will be classified as local decreases. This result is as expected.

d) The coefficient for managers is higher for the foreign firms. Since percentage of top management positions held by foreigners is likely to be higher in foreign firms, we have excluded foreign managers. We made use of Nigerian managers. While both coefficients are positive, firms with more managers tend to be in the foreign group. This result is as expected.

e) The coefficients for both local and foreign firms are negative in wages per employee . Firms with high values for this variable are less likely to be classified in the group they actually belong to.

f) The coefficients of wages per operative are about the same for foreign and local firms. However the weight of the

wages per operative variable has relatively more influence in classifying firms in the foreign group than in the local group. Our a priori expectation was that this variable will be positive. However, we expected the weight for the foreign firms to be significantly larger than the local group.

g) The fixed assets per firm variable turns out to be positive for both local and foreign firms. The inherited importance of foreign investors in scale intensive sectors seems not to be supported by this result. The local firms coefficient for this variable seems to be slightly higher than the coefficient of foreign firms. It is possible that foreign firms have a lower cost of capital than local firms. The result, however, suggests that if fixed assets increase, the probability that a firm will be classified as local increases more than the probability that a firm will be classified as foreign.

h) The value added variable has negative coefficients for both local and foreign firms. The weights suggest that firms with high values for value added variable are least likely to be classified as local firms. This result, however, suggests that the value added variable has about the same influence in classifying a firm in local or foreign groups.

i) The coefficients of value added per employee are large and positive for both foreign and local firms. However, the coefficient for the foreign group is slightly higher indicating that if value added per employee increases, the likelihood that a firm will be classified as foreign increases more than the likelihood of classifying a firm as local.

j) Finally, the coefficient for the value added per fixed asset is positive for the local firms and negative for the foreign firms. The weight for the value added per fixed asset in the local group indicates that firms with higher values for this variable are more likely to be classified as local firms. The negative coefficient for the foreign group implies that firms with high values for this variable are least likely to be classified as foreign firms. This result is quite contrary to our expectations.

2) In Table 7.4, we present the coefficients of the standardized discriminant coefficients. Given that the first function accounts for 100 per cent of the dispersion, only one discriminant function is used in the analysis. From the first discriminant function, firms with highest discriminant scores are classified as foreign. Similarly, firms with lowest scores are classified as local. The mean discriminant scores are -.67382 for local or group 1, and .67382 for foreign or group 2.

Table 7.4

Standardized Discriminant Coefficients - Direct Method

Variable	(coefficients)
Number of employees per firm	0.249
Operatives (skilled) per firm	-1.056
Operatives (skilled) per employee	2.085
Managers per firm	2.293
Wages per employee	-3.479
Wages per operative	0.920
Fixed assets per firm	-0.380
Value added per firm	0.087
Value added per employee	0.020
Value added per fixed asset	-0.619

a) The coefficient of number of employees per firm is positive as expected, since firms with higher values for this variable are more likely to be classified as foreign (the group with high discriminant score).

b) The result for the operative per firm shows a negative coefficient because firms with lower values for this variable are most likely to be classified as local firms.

c) The operatives per employee variable shows a large and positive coefficient. This stems from the fact that firms with large discriminant scores are classified as foreign firms.

d) The weight of managers per firm is positive as expected. It implies that firms with high discriminant scores for this variable are mostly classified as foreign firms.

e) The coefficient of wages per employee is negative. This result corresponds with the classification function coefficient result. It also implies that more firms will be classified as local firms for this variable than as foreign firms.

f) Similar to the classification function coefficients result, the coefficient of wages per operative is positive. Firms with high discriminant scores for this variable are most likely to be classified as foreign firms.

g) The coefficient of the fixed assets per firm is negative since firms with lower discriminant scores for this variable are most likely to be classified as local firms.

h) The value added per firm and the value added per employee variables show positive results. The weight for these two variables suggest the likelihood of firms with higher discriminant scores being classified as foreign firms.

i) The coefficient of value added per fixed asset gives the same result suggested by the classification function coefficient result reported in Table 7.3. The coefficient is negative since firms with lower discriminant scores are mostly likely to be classified as local firms.

Finally a comparison of the classification function coefficient results with those of the standardized discriminant coefficients show that they are similar in size. Further, the conclusions drawn from both results are quite similar.

3. Performance of Discriminant Function using Direct Method

Table 7.5 reports the classification of firms by discriminant analysis using the direct method. It gives the computed discriminant scores and classification probabilities for the 88 observations across 44 industries. Of the 88 observations used in the analysis, 18 observations were misclassified. Given the assumption of a multivariate normal distribution, we have converted the discriminant score of each observation into probability of group membership. The criterion for assigning an observation is that an observation is assigned to a group which it has greatest probability of membership. For example, as reported in Table 7.5, foreign firms in the vegetable oil milling industry are misclassified. The misclassification occurs because these foreign firms' probability of being in the local group is .7125 and thier probability of belonging to the foreign group is .3986. Put differently, the discriminant score for the vegetable oil milling industry in the foreign group is less than zero, hence it has been incorrectly classified as belonging to the foreign group. This same interpretation applies to all those 18 observations that are incorrectly classified as belonging to foreign or local groups.

TABLE 7.5 CLASSIFICATION OF INDUSTRIES BY DISCRIMINANT ANALYSIS - 1972 DIRECT METHOD

	Industry	Actual Group[a]		Highest Group[b]	P(X/G)[c]	P(G/X)[d]	2nd Highest Group[e]	P(G/X)	Discriminant Score
1		1		1	0.7244	0.6066	2	0.3934	-0.3212
2	MEAT PRODUCTS	2		2	0.5131	0.5067	1	0.4933	0.0198
3		1		1	0.9342	0.7348	2	0.2652	-0.7564
4	DAIRY PRODUCTS	2		2	0.4564	0.8712	1	0.1288	1.4185
5		1		1	0.9055	0.6788	2	0.3212	-0.5551
6	VEGETABLE OIL MILL.	2	***	1	0.7725	0.6014	2	0.3986	-0.3053
7		1	***	2	0.9772	0.7046	1	0.2954	0.6432
8	GRAIN PRODUCTS	2		2	0.6129	0.5563	1	0.4437	0.1679
9		1	***	2	0.5568	0.5287	1	0.4713	0.0855
10	BAKERY PRODUCTS	2		2	0.7642	0.6234	1	0.3766	0.3739
11	SUGAR AND SUGAR	1		1	0.6156	0.5576	2	0.4424	-0.1717
12	CONFECTIONERY	2		2	0.4770	0.8661	1	0.1339	1.3850
13		1		1	0.6043	0.5890	2	0.4110	-0.2671
14	MISC. FOOD	2		2	0.6535	0.5752	1	0.4248	0.2249
15	SPIRIT DISTILLERY	1		1	0.0011	0.9950	2	0.0050	-3.9282
16	AND BEER	2		2	0.0015	0.9945	1	0.0055	3.8502
17		1		1	0.8505	0.7617	2	0.2383	-0.8623
18	SOFT DRINKS	2	***	1	0.8115	0.6426	2	0.3574	-0.4353
19		1		1	0.8270	0.7470	2	0.2530	-0.8033
20	TOBACCO	2		2	0.3579	0.8954	1	0.1046	1.5933
21	SPINNING, WEAVING	1		1	0.9616	0.7257	2	0.2743	-0.7220
22	FINISHING TEXTILES	2		2	0.0025	0.9932	1	0.0068	3.6990
23		1		1	0.7783	0.6292	2	0.3708	-0.3922
24	MADE UP TEXT. GOODS	2	***	1	0.6032	0.5517	2	0.4483	-0.1641
25		1		1	0.8534	0.7808	2	0.2192	-0.8506
26	KNITTED GOODS	2		2	0.9638	0.7250	1	0.2750	0.7193
27		1		1	0.6277	0.5633	2	0.4367	-0.1889
28	WEARING APPAREL	2		2	0.6892	0.7495	1	0.2505	0.8131
29		1		1	0.8089	0.6416	2	0.3584	-0.4320
30	TANNING	2	***	1	0.7325	0.6105	2	0.3895	-0.3354
31		1		1	0.5952	0.5479	2	0.4521	-0.1425
32	TRAVEL GOODS	2		2	0.5729	0.5370	1	0.4630	0.1700
33		1		1	0.3864	0.8885	2	0.1115	-1.5400
34	LEATHER FOOTWEAR	2		2	0.6857	0.5897	1	0.4103	0.2691
35		1	***	2	0.5839	0.5420	1	0.4580	0.1749
36	SAW MILLING	2		2	0.9497	0.7297	1	0.2703	0.7569
37	WOODEN FURNITURE	1	***	2	0.8429	0.7641	1	0.2359	0.8720
38	& FIXTURES	2		2	0.9252	0.7378	1	0.2622	0.7677
39		1		1	0.6179	0.8293	2	0.1707	-1.1729
40	PAPER PRODUCTS	2	***	1	0.5318	0.5160	2	0.4840	-0.0474
41		1	***	2	0.5178	0.5091	1	0.4909	0.0270
42	OTHER PAPER PRODUCTS	2		2	0.5907	0.8366	1	0.1634	1.2117
43		1		1	0.0957	0.9904	2	0.0096	-3.4401
44	PRINTING	2		2	0.0734	0.9851	1	0.0149	2.4642
45		1		1	0.0349	0.9770	2	0.0230	-2.7835
46	BASIC IND. CHEMICALS	2	***	1	0.5742	0.5376	2	0.4624	-0.1179
47		1		1	0.8714	0.6659	2	0.3341	-0.5119
48	PAINTS	2		2	0.9608	0.6988	1	0.3012	0.6246
49		1		1	0.1923	0.9349	2	0.0651	-1.9777
50	DRUGS & MEDICINES	2		2	0.5760	0.8405	1	0.1595	1.2330
51		1		1	0.8980	0.7466	2	0.2534	-0.8010
52	SOAP, PERFUME, ETC	2		2	0.0143	0.9854	1	0.0146	3.1341
53	OTHER CHEMICAL	1	***	2	0.9959	0.7112	1	0.2888	0.6687
54	PRODUCTS	2		2	0.6265	0.5127	1	0.4873	0.1872
55	PROD. OF PETROLEUM	1		1	0.1638	0.9467	2	0.0533	-2.1355
56	& COAL	2		2	0.2715	0.9141	1	0.0859	1.7740
57		1		1	0.7701	0.6258	2	0.3742	-0.3815
58	TYRES AND TUBES	2		2	0.8489	0.6573	1	0.3427	0.4835
59		1		1	0.7631	0.6229	2	0.3771	-0.3724
60	OTHER RUBBER PROD.	2	***	1	0.6631	0.5796	2	0.4204	-0.2181
61		1		1	0.8312	0.6504	2	0.3496	-0.4606
62	PLASTIC PRODUCTS	2		2	0.5142	0.8540	1	0.1460	1.3107
63		1		1	0.7949	0.6359	2	0.3641	-0.4139
64	GLASS PRODUCTS	2		2	0.6542	0.5755	1	0.4245	0.2259
65		1		1	0.6836	0.5885	2	0.4115	-0.2662
66	BRICKS AND TILES	2		2	0.6264	0.8270	1	0.1730	1.1607
67		1		1	0.8372	0.6528	2	0.3472	-0.4684
68	CEMENT	2	***	1	0.7117	0.6092	2	0.3908	-0.3309
69		1		1	0.7269	0.7988	2	0.2012	-1.0231
70	CONCRETE PRODUCTS	2		2	0.5837	0.5174	1	0.4826	0.0515
71		1		1	0.9931	0.7102	2	0.2898	-0.6652
72	BASIC METAL	2		2	0.7455	0.7934	1	0.2066	0.9984
73	METAL FURNITURE	1		1	0.7908	0.6343	2	0.3657	-0.4086
74	& FIXTURES	2		2	0.5435	0.5222	1	0.4778	0.0660
75	STRUCTURAL METAL	1		1	0.7512	0.6180	2	0.3820	-0.3568
76	PRODUCTS	2		2	0.8622	0.7517	1	0.2483	0.8220
77	FABRICATED METAL	1		1	0.8363	0.7664	2	0.2336	-0.8887
78	PRODUCTS	2		2	0.5627	0.8440	1	0.1560	1.2526
79	AGRI. & SPECIAL	1		1	0.8472	0.6567	2	0.3433	-0.4311
80	IND. MACHINERY	2	***	1	0.8665	0.6641	2	0.3359	-0.5058
81	MACHINERY &	1		1	0.7658	0.6238	2	0.3762	-0.3753
82	EQUIPMENT	2	***	1	0.7079	0.5994	2	0.4006	-0.2990
83	RADIO, TV & COMM	1		1	0.7647	0.6236	2	0.3764	-0.3745
84	EQ. AND APP.	2		2	0.5702	0.5357	1	0.4643	0.1060
85	HOUSEHOLD ELEC.	1		1	0.6651	0.5331	2	0.4669	-0.0985
86	APPARATUS	2	***	1	0.9964	0.6754	2	0.3246	-0.5436
87	MAFG. IND. NOT	1		1	0.6935	0.5923	2	0.4077	-0.2704
88	CLASSIFIED	2	***	1	0.7037	0.5973	2	0.4027	-0.2927

Note: 1 = Local industries ; 2 = Foreign industries

a) The group number of the group the case actually belongs to

b) The group number (G) of the closest group

c) The probability of a case in group G being that far from the centroid

d) The probability of the case being in group G

e) If the probability of membership in the second closest group > .0005

f) Centroids: Foreign = 0.67382 ; Local = -0.67382

*** Indicates wrongly classified.

The matrix showing how well the discriminant function works in discriminating between foreign and local groups is presented in Table 7.6.

Table 7.6

Classification Matrix : Direct Method

Actual Group	No. of Cases	Predicted Group Membership	
		Local	Foreign
Local (1)	44	38	6
		86.4%	13.6%
Foreign (2)	44	12	32
		27.3%	72.7%
Per cent of "Grouped" cases correctly classified:			79.55%

As reported in Table 7.6, out of 44 cases in the local group, 38 or 86.4% were classified as local firms and 6 or 13.6% had characteristics of foreign firms. Similarly, of the 44 cases in the foreign group, 32 or 72.7% were classified as foreign firms and 12 or 27.3% had characteristics of local firms. Overall, the direct method discriminant functions classified 79.55 per cent of the 88 observations into the groups where they actually belonged.

In Figure 7.1, we report all groups stacked hostogram of the discriminant function. it indicates the positions of observations and how close or far they are from the group mean. As can be seen in Fig. 7.1, cases misclassified in group 1 are very close to the centroid of group 2. Similarly those misclassified in group 2 are very close to the centroid of group 1. From the figure it is also possible to see how far apart similar

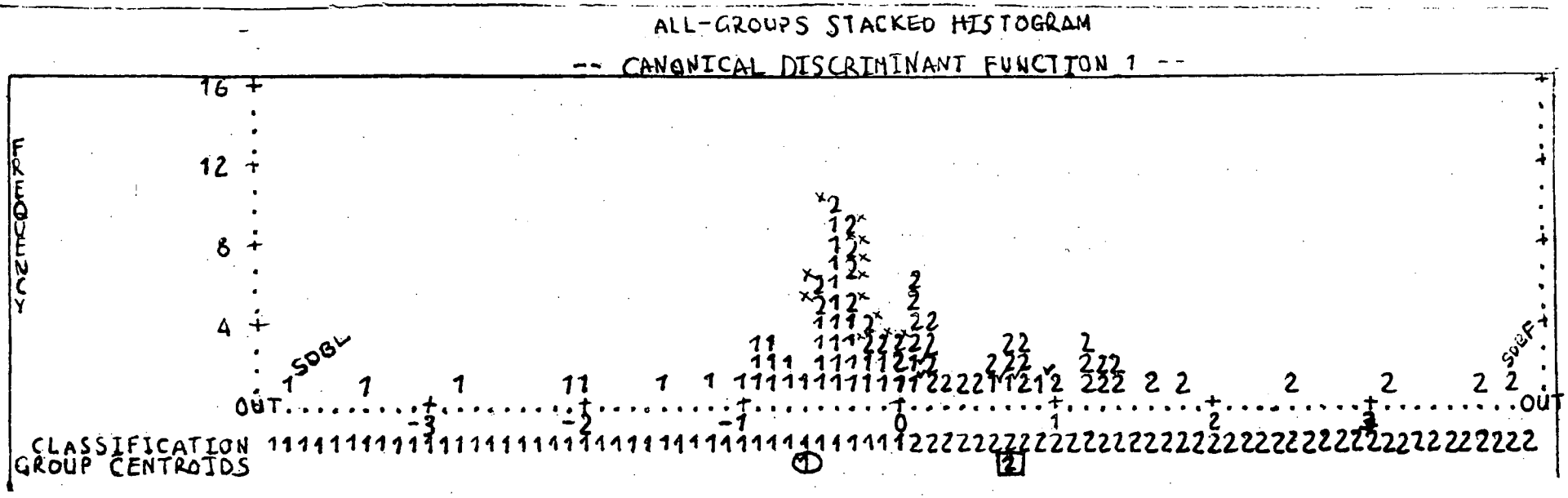

Figure 7.1:
1 denotes Local group
2 denotes Foreign group
0 denotes Local group mean = -.67382
□ denotes Foreign group mean = .67382
✓ denotes misclassified cases in group 1
X denotes misclassified cases in group 2.

firms are. For example, the spirit, distillery and beer industry has discriminant scores of -3.9282 for the local group and 3.8502 for the foreign group (see Table 7.5, nos.15 and 16). The S.D.B.L. in Fig.7.1 represents the position of the spirit, distillery and beer industry for the local group. Similarly, the S.D.B.F. indicates the position of the spirit, distillery and beer industry for the foreign group. Both locations suggest that foreign and local groups are far apart for this industry in terms of the characteristics used in the analysis.

B. Stepwise Method

The second method used in classifying firms is the stepwise selection method. In the stepwise procedure each variable is selected from a set of given variables one by one on the basis of its discriminating or explanatory power. Thus, marginal contribution of a given variable holding a previously selected variable constant is tested by the F-ratio.[22]

$$F = \frac{R^2_{p+1} - R^2P/1}{1 - R^2_{p+1} / (N - P - 1 - 1)}$$

As in the case of direct method, the set of variables which are hypothesized to distinguish foreign from local firms is composed of the following:

X_1 = number of employees per firm

X_2 = operatives per firm

X_3 = operatives per employee

X_4 = managers or professionals per firm

X_5 = wages per employee

X_6 = wages per operative

X_7 = investment costs (fixed assets) per firm

X_8 = value added per firm

X_9 = value added per employee

X_{10} = value added per fixed asset.

The results of the stepwise method are also presented in three subsections. The first section contains discussions of the classification coefficients results. In two, the standardized coefficients results are presented. The classification table and matrix are presented in section three.

(1) Classification function coefficients results using the stepwise method are presented in Table 7.7.

Table 7.7

Classification Function Coefficients = Stepwise Method

Variable	Local Industries	Foreign Industries
Operatives per firm	-0.00024	-0.00099
Managers per firm	0.01824	0.04059
Wages per employee	-1.78805	-3.00039
Wages per operative	1.40209	1.84472
Operatives per employee	1.79478	2.68810
Value added per fixed asset	0.078901	-0.07111
Constant	-1.84689	-2.70422

They imply the following:-

(a) The coefficients of operatives per firm and wages per employee give the same implications as the coefficients derived using direct method. However, the coefficients are slightly different. The weight of operatives per firm decreases from -.00031 to -.00024 for the local firms and increases from -.00083 to -.00099 for the foreign firms. This implies that the influence of the operative per firm variable has increased in classifying more firms

into the local group than the foreign group. The coefficients of both operatives per firm and wages per employee imply that more firms will be classified as local firms for both variables.

(b) The coefficients of managers per firm, wages per operative and operatives per employee are all positive for both groups. First, the managers per firm variable weights suggest that firms with larger numbers of managers are most likely to be foreign firms. Second, firms paying higher wages per operative are more likely to be classified as foreign firms rather than local firms. Third, firms with more operatives per employee are mostly foreign firms and least likely to be local firms.

(c) The weight of the value added per fixed asset is positive for the local group and negative for the foreign group. These results correspond to the results of the direct method results presented in Table 7.3. It also implies that when value added per fixed asset increases, the likelihood that a firm will be classified as a local firm increases, while the likelihood that it will be classified as a foreign firm decreases.

(2) The coefficients of the standardized discriminant coefficients using the stepwise method are presented in Table 7.8. Also reported in Table 7.8 are values of Lambda and F associated with each coefficient. For the set of variables presented in Table 7.8, the F-statistic is 13.8 with 6 and 81 degrees of freedom. The first function explained 100 per cent of the dispersion between the two groups. The canonical discriminant functions evaluated at group means give -.64649 for the local firms and -64649 for the foreign firms. This implies that

Table 7.8

Standardized Discriminant Function Coefficients using Stepwise Method

Variable	Discriminant Coefficients	Wilks' Lambda	F-* Statistics	Sig-** Levels
Managers per firm	2.06833	.84589	7.7428	.0008
Wages per employee	-3.18627	.80281	6.8774	.0003
Operatives per firm	-1.41087	.77998	5.8532	.0003
Value added per fixed asset	-0.53595	.74612	5.5801	.0002
Operatives per employee	1.86249	.72059	5.2344	.0001
Wages per operative	0.85691	.70044	4.8876	.0001

Note: The coefficients are listed in the table by the order in which they entered the equation, * and ** indicate significances between pairs of groups at each step.

firms with high scores are classified as foreign and those with low scores are classified as local. The coefficients of wages per employee, operatives per firm and value added per fixed asset all have the same negative signs as those reported in Table 7.4 when the direct method was used. Similarly, the managers per firm operatives per employee, and wages per operative all have positive signs as those reported in Table 7.4. However, the difference between Tables 7.4 and 7.8 is that we are able to interpret significances between pairs of groups at each step. At step one, the feature which most clearly distinguishes foreign and local firms is managers per firm. The F-value of 7.7428 with 1 and 86 degrees of freedom shows that both groups are significantly different at a level better than 1 per cent in terms of this variable. At step two, wages per employee is the next important variable that distinguishes both groups. It has an F-value of

6.8774 with 2 and 85 degrees of freedom which is significant at .0003. The operatives per firm shows significant difference between the two groups at step three while value added per fixed asset was important at step four. Both variables are significant at 1 per cent levels. Finally, at steps five and six, operatives per employee and wages per operative show significant differences between the groups at the same level. After step six, variables such as number of employees per firm, value added per firm, fixed assets per firm, and value added per employee, reported in Table 7.4, failed to distinguish foreign and domestic firms.

Table 7.9 presents tabulation of the number of observations that the discriminant function using the stepwise method classifies correctly. Examination of Table 7.9 shows that 69 of the 88 observations are correctly classified. It is also the case that foreign firms were misclassified most often.

The matrix indicating how well the discriminant function works in distinguishing among groups is presented in Table 7.10. As can be seen in Table 7.10, out of 44 cases in the local group, 40 or 90.9% were classified as belonging to the local group. Similarly, of the 44 cases in the foreign group, 29 or 65.9% were classified as foreign firms and 15 or 34.1% had characteristics of local firms. Overall, the stepwise method discriminant functions classified 78.41 per cent of the 88 observations into groups where they actually belong. A comparison between the direct method and stepwise method in terms of overall performance shows that by sequentially selecting the "next best" discriminator at each step (stepwised) is almost as good as using the full set of variables (direct method). Finally, the histogram of the distribution of cases along the function is presented in Fig.7.2. From Frank, Massy and Morrison (1965) these classifica-

TABLE 7.9 CLASSIFICATION OF INDUSTRIES BY DISCRIMINANT ANALYSIS - 1972 STEPWISE METHOD

	Industry	Actual Group[a]		Highest Group[b]	Probability P(X/G)[c]	P(G/X)[d]	2nd Highest Groups	P(G/X)[e]	Discriminant Score
1		1		1	0.7077	0.5868	2	0.4131	-0.2716
2	MEAT PRODUCTS	2		2	0.5709	0.5258	1	0.4742	0.0798
3		1		1	0.9853	0.6925	2	0.3075	-0.6280
4	DAIRY PRODUCTS	2		2	0.4826	0.8564	1	0.1436	1.3810
5		1		1	0.9251	0.6714	2	0.3286	-0.5525
6	VEGETABLE OIL MILL.	2	***	1	0.7783	0.6158	2	0.3842	-0.3646
7		1	***	2	0.8409	0.6402	1	0.3598	0.4457
8	GRAIN PRODUCTS	2		2	0.9020	0.6634	1	0.3366	0.5246
9		1		1	0.5633	0.5221	2	0.4779	-0.0685
10	BAKERY PRODUCTS	2		2	0.6588	0.5659	1	0.4341	0.2050
11	SUGAR AND SUGAR	1		1	0.5800	0.5338	2	0.4662	-0.1047
12	CONFECTIONERY	2		2	0.4286	0.8652	1	0.1348	1.4380
13		1		1	0.6954	0.5817	2	0.4183	-0.2550
14	MISC. FOOD	2		2	0.6717	0.5715	1	0.4285	0.2226
15	SPIRIT DISTILLERY	1		1	0.0067	0.9872	2	0.0128	-3.3589
16	AND BEER	2		2	0.0123	0.9833	1	0.0167	3.1699
17		1		1	0.9710	0.7074	2	0.2926	-0.6819
18	SOFT DRINKS	2	***	1	0.7464	0.6030	2	0.3970	-0.3231
19		1		1	0.9734	0.6884	2	0.3116	-0.6132
20	TOBACCO	2		2	0.1524	0.9362	1	0.0638	2.0772
21	SPINNING, WEAVING &	1		1	0.8306	0.6363	2	0.3637	-0.4326
22	FINISHING TEXTILES	2		2	0.0086	0.9948	1	0.0052	4.0618
23		1		1	0.7909	0.6207	2	0.3793	-0.3809
24	MADE UP TEXT. GOODS	2	***	1	0.5725	0.5265	2	0.4735	-0.0827
25		1		1	0.9510	0.7141	2	0.2859	-0.7080
26	KNITTED GOODS	2		2	0.9127	0.6669	1	0.3331	0.5368
27		1		1	0.5911	0.5353	2	0.4647	-0.1098
28	WEARING APPAREL	2		2	0.8204	0.7557	1	0.2443	0.8735
29		1		1	0.7850	0.6186	2	0.3815	-0.3736
30	TANNING	2	***	1	0.7196	0.5919	2	0.4081	-0.2876
31		1		1	0.7270	0.5950	2	0.4050	-0.2974
32	TRAVEL GOODS	2	***	1	0.6252	0.5509	2	0.4491	-0.1680
33		1		1	0.0148	0.9818	2	0.0182	-3.0838
34	LEATHER FOOTWEAR	2	***	1	0.5230	0.5025	2	0.4975	-0.0078
35		1		1	0.6094	0.5437	2	0.4563	-0.1356
36	SAW MILLING	2	***	1	0.5841	0.5320	2	0.4680	-0.0991
37	WOODEN FURNITURE	1	***	2	0.8786	0.6544	1	0.3456	0.4937
38	& FITTINGS	2		2	0.9086	0.6654	1	0.3346	0.5317
39		1		1	0.7521	0.7763	2	0.2237	-0.9624
40	PAPER PRODUCTS	2		2	0.5343	0.5081	1	0.4919	0.0250
41		1	***	2	0.5572	0.5192	1	0.4808	0.0596
42	OTHER PAPER PRODUCTS	2		2	0.6491	0.8060	1	0.1940	1.1015
43		1		1	0.0075	0.9865	2	0.0135	-3.3198
44	PRINTING	2		2	0.0640	0.9620	1	0.0380	2.4986
45		1		1	0.0549	0.9690	2	0.0310	-2.5691
46	BASIC IND. CHEMICALS	2	***	1	0.8279	0.5026	2	0.4975	-0.0076
47		1		1	0.7856	0.6187	2	0.3813	-0.3745
48	PAINTS	2		2	0.9694	0.7080	1	0.2920	0.6849
49		1		1	0.1712	0.9312	2	0.0688	-2.0149
50	DRUGS & MEDICINES	2		2	0.4437	0.7788	1	0.2212	0.9735
51		1		1	0.9941	0.6956	2	0.3044	-0.6391
52	SOAP, PERFUME, ETC	2		2	0.0024	0.9915	1	0.0085	3.6767
53	OTHER CHEMICAL	1	***	2	0.8210	0.6326	1	0.3674	0.4202
54	PRODUCTS	2		2	0.6214	0.5492	1	0.4508	0.1926
55	PROD. OF PETROLEUM	1		1	0.1920	0.9257	2	0.0743	-1.9212
56	& COAL	2		2	0.2197	0.9185	1	0.0815	1.8738
57		1		1	0.6460	0.5602	2	0.4398	-0.1871
58	TYRES AND TUBES	2		2	0.9024	0.7300	1	0.2700	0.7691
59		1		1	0.7395	0.6001	2	0.3999	-0.3139
60	OTHER RUBBER PROD.	2	***	1	0.6544	0.5639	2	0.4361	-0.1988
61		1		1	0.7860	0.6189	2	0.3811	-0.3749
62	PLASTIC PRODUCTS	2		2	0.6402	0.8085	1	0.1915	1.1139
63		1		1	0.7993	0.6241	2	0.3759	-0.3922
64	GLASS PRODUCTS	2	***	1	0.6883	0.5786	2	0.4214	-0.2451
65		1		1	0.7128	0.5890	2	0.4110	-0.2785
66	BRICKS AND TILES	2		2	0.7290	0.7831	1	0.2169	0.9929
67		1		1	0.5900	0.5347	2	0.4653	-0.1076
68	CEMENT	2		2	0.6615	0.5671	1	0.4329	0.2087
69		1		1	0.8355	0.7511	2	0.2489	-0.8542
70	CONCRETE PRODUCTS	2		2	0.6790	0.5738	1	0.4262	0.2309
71		1		1	0.9642	0.6852	2	0.3148	-0.6017
72	BASIC METAL	2		2	0.9902	0.7339	1	0.2661	0.7845
73	METAL FURNITURE	1		1	0.7991	0.6241	2	0.3759	-0.3920
74	& FIXTURES	2	***	1	0.5969	0.5352	2	0.4648	-0.1090
75	STRUCTURAL METAL	1		1	0.7232	0.5934	2	0.4066	-0.2923
76	PRODUCTS	2		2	0.9228	0.7234	1	0.2766	0.7434
77	FABRICATED METAL	1		1	0.9435	0.7166	2	0.2834	-0.7174
78	PRODUCTS	2		2	0.6995	0.7917	1	0.2083	1.0525
79	AGRI. & SPECIAL	1		1	0.7829	0.6176	2	0.3824	-0.3769
80	IND. MACHINERY	2	***	1	0.7867	0.6192	2	0.3808	-0.3759
81	MACHINERY	1		1	0.8604	0.6476	2	0.3524	-0.4706
82	EQUIPMENT	2	***	1	0.9074	0.6649	2	0.3351	-0.5301
83	RADIO, TV & COMM.	1		1	0.7277	0.5953	2	0.4047	-0.2983
84	EQ. AND APP.	2		2	0.5989	0.5389	1	0.4611	0.1205
85	HOUSEHOLD ELEC.	1		1	0.6088	0.5434	2	0.4566	-0.1347
86	APPARATUS	2	***	1	0.8822	0.6557	2	0.3443	-0.4883
87	MAFG. IND. NOT	1		1	0.6611	0.5624	2	0.4376	-0.1942
88	CLASSIFIED	2	***	1	0.7526	0.6055	2	0.3945	-0.3313

Note: 1 = Local industries ; 2 = Foreign industries

a) The group number of the group the case actually belongs to

b) The group number (G) of the closest group

c) The probability of a case in group G being that far from the centroid

d) The probability of the case being in group G

e) If the probability of membership in the second closest group > .0005

f) Centroids: Foreign = 0.64649 ; Local = -0.64649

*** Indicates wrongly classified

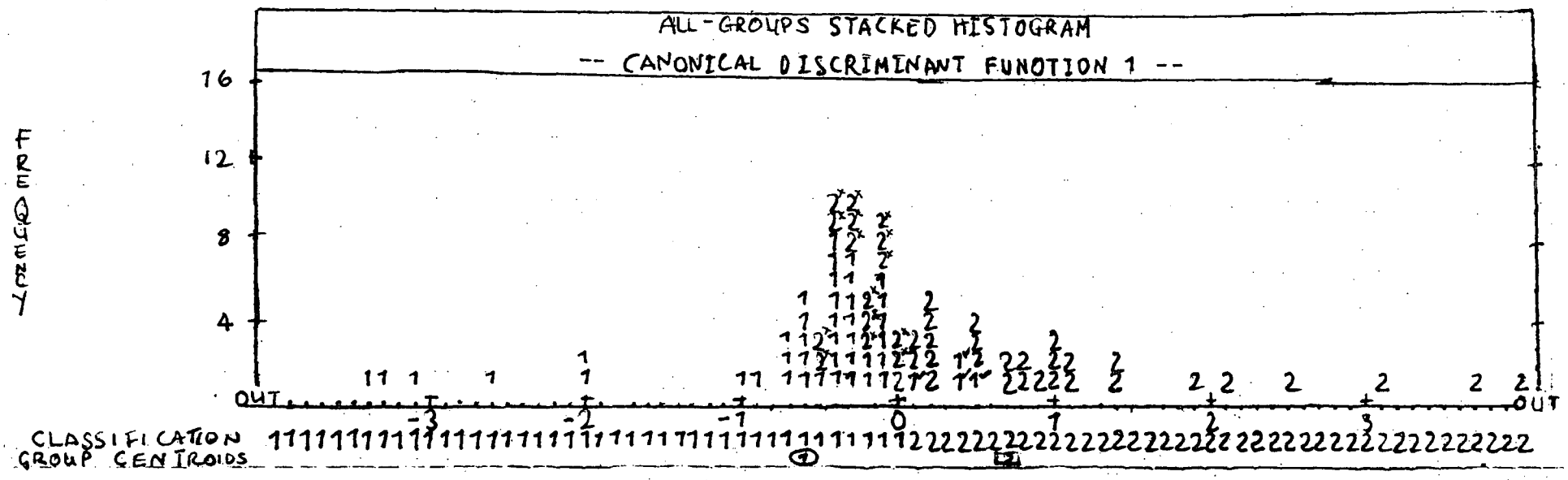

Figure 7.2:

1 denotes Local group
2 denotes Foreign group
0 denotes Local group mean = .-64649
denotes Foreign group mean = .64649
denotes cases misclassified in group 1
X denotes cases misclassified in group 2

Table 7.10

Classification Matrix : Stepwise Method

Actual Group	No. of Cases	Predicted Group Membership	
		Local	Foreign
Local (1)	44	40 90.9%	4 9.1%
Foreign	44	15 34.1%	29 65.9%
Percent of "Grouped" cases correctly classified:			78.41%

tion results, as reported above, may be biased upward. This stems from the fact that we have applied the discriminant functions to the same data from which the functions were estimated. Accordingly, validation tests should be made which would better measure the functions' discriminating power. The method suggested by Frank, Massy and Morrison is that of using a subsample of the observations to derive the discriminant function. These newly derived discriminant functions are then applied to a new set of data in order to test their discriminating ability.

Following Frank, Massy and Morrison, discriminant functions were estimated: first, using randomly assigned sample to foreign and local groups in three experiments, and second, using half of our sample, i.e. two sets of 22 randomly selected cases for each group in three experiments.[23]

By assigning cases at random to the foreign group and local group to yield a set of 44 observations for each group, we were able to correctly classify firms 58.37 per cent in the first experiment, 51.14 per cent in the second and 53.41 per cent in the third experiment. The average from the three repetitions of correct classification is 54.3 per cent. Given

that the discriminant function is expected to be correct 50 per cent in each experiment, it follows that there was a 3.41 per cent upward bias by applying the discriminant functions to the same data from which the functions were estimated. In line with these results, our 79.55% correct classification using the direct method and 78.41% using the stepwise method should be adjusted downwards to approximately 76.14 per cent and 75 per cent respectively.

The results of randomization experiments based upon one half of the same are reported in Table 7.11.

Table 7.11

Discriminant Coefficients from Randomization Experiments based upon one half of the sample[a]

Variable	Experiment		
	1	2	3
Operatives per firm	-0.2493	-0.9212	-1.1101
Managers per firm	0.7073	0.5572	2.0963
Wages per employee	-4.3692	-1.0400	-2.2601
Wages per operative	0.9996	1.5520	0.9068
Operatives per employee	1.2970	1.5520	1.9068
Value added per fixed asset	-0.2163	-0.2659	-0.5560

Note: These results are from Stepwise Method.

[a] Random numbers are used to separate the sample into 22 industries per group used to estimate a discriminant function, while the remaining 22 per group are used as a test of the usefulness of the function in classifying firms (see Oksanen and Williams, 1978, pp.100-101).

Inspection of Table 7.11 reveals consistency with the findings reported on Table 7.8. The pattern of signs of coefficients remain the same in each of the three experiments. In experiment 1 the percentage of the observation correctly classified is

77.27 per cent. The respective percentage of the observation correctly classified in experiments 2 and 3 are 72.73 per cent and 75 per cent.

Summary

We have assessed the significance of the discrimination between foreign and local firms on the basis of some cost and employment variables. First, we consider whether 10 variables viewed jointly are sufficient to distinguish between foreign and local firms. The results of the direct method approach show that the percentage of correct classification can be predicted with certainty of approximately 76.14 per cent. The ten coefficients of the discriminant function summarized in Table 7.4 show the characteristics which in combination, indicate whether a firm is identified as foreign or local. Second, the stepwise method results show the six variables that are useful in discriminating between the groups. It was further observed that the six variables in the stepwise equation classified observations approximately 75 per cent. This implies that the stepwise function adequately summarizes the information contained in the direct method without a great sacrifice in the discriminating power of the function. Our results indicate that managers per firm are particularly important in distinguishing among ownership groups.

The overall results provide some support for the view that cost and employment characteristics of similar firms differ significantly according to ownership. It is the case however that these differences are systematic indicating that ownership of a firm can be determined from its cost and employment structure with some accuracy.

Chapter Eight

IMPACT OF FOREIGN INVESTMENT ON CHOICE OF TECHNOLOGY AND RELATED ISSUES IN NIGERIAN MANUFACTURING, 1972: A NON-PARAMETRIC APPROACH

The debate on the choice of techniques has focused on two issues. Firstly, the extent to which technology is imported and secondly the combinations in which domestic factors of production are employed. In this chapter we shall be primarily concerned with the use of domestic factors of production rather than the question of technological transfer. Further, the choice of technique is narrowly defined here to mean techniques of production within the manufacturing sector. As has been pointed out by Colman and Nixson (1978, pp.266-267) less developing countries have to make a choice between different technologies in many areas such as agriculture, industry, construction and even services.

For more than three decades, the choice of technology for developing countries has been subject to debate. The debate arises in connection with one of the most serious charges levelled against foreign firms operating in LDCs. It is argued that foreign firms employ capital- and skill-intensive technologies which are inappropriate for labour abundant economies. Consequently, there has been (a) an aggravation of employment problems, (b) a worsening of income inequalities, (c) a distorting influence on technology used by other industrial firms, and (d) a bias in production towards the sort of high-income, sophisticated and differentiated products for which the technology has been developed.[1] In view of the above problems, various criteria for dealing with the choice of techniques have been proposed.[2] These criteria include (a) a "factor intensity criterion" which emphasises that

labour-intensive techniques should be adopted in a country where labour is the abundant factor; (b) an "output-capital" criterion which focuses on the increase in output through the use of a greater amount of labour with a given amount of capital; (c) the "social marginal product" which requires that the total available capital should be intensively deployed such that the marginal unit of capital in each industry or sector should produce the same contribution to the national product; (d) the "growth criterion" which emphasised the creation of less employment and output now in order to achieve more employment and output in the future; and (e) the marginal growth contribution which consists of the present value of a given project's direct contribution to consumption and "the present value of the consumption stream resulting from reinvestments associated with the project."[3]

The "most complete" and "pioneering" attempt on a theoretical level to deal with the factor proportions problem was made by Eckaus (1955). Since the publication of Eckaus' theoretical research on the factor proportions problems, a wide range of literature has emerged on the subject. Reynolds (1965) has pointed to the effects of rapidly rising minimum wage rates on employment in Puerto Rico. The effects of factor price distortions, lack of skills and technological fixity have been observed in the manufacturing industries in Mexico and Puerto Rico.

Although questions concerning factor proportions problems have occupied most of the literature during the last three decades, Mason (1973) has noted that little attention has been directed specifically to the "role multinational firms may play in the choice of technology". The efforts of Mason (1973),

Yeoman (1968) and Forsyth and Solomon (1977) and others, represent the limited attempts to investigate empirically the role of multinational firms in the choice of technology in the developing countries. The basic questions addressed by these studies are: Do multinational firms employ production techniques which are more capital-using than those employed by local firms? If they do, can they be singled out as a major contributor to the factor proportions problem confronting developing countries?[5] The alternative question is: Why is it widely believed that MNCs display different investment characteristics from those of local firms?[6] As we have noted in Chapter 3 of the present study, empirical results of these studies produced a definite conclusion that both nationality of ownership and the multinational firms are an important factor in the choice of technology. However, they disagreed as to whether foreign firms can be signled out as the major contributor to the factor proportions problem confronting developing countries. In view of widespread disagreement on what seems to be a relatively straight forward issue, the point of view has been taken by Forsyth and Solomon (1978, p.284) that "there is a substantial variation from one industry to the next in the factors underlying the relationship between nationality of ownership and technology used, or that the methodology employed by various researchers is deficient. In fact, it does seem probable that both arguments are valid." Nonetheless, as the factor-proportions problem is crucially important to the developing countries more empirical studies are needed.

The objective of this chapter is to analyse technique differences between foreign and local firms, and to investigate the extent to which foreign firms contribute to the factor

proportion problem in Nigeria. Further related issues to choice of technology such as labour force composition, wage rate differences, size differences, productivity differences and profitability are examined. This stems from the fact that choice of technology for example, may cause wage rate differences. As Colman and Nixson (1978, p.254) have observed, "it is unrealistic to assume that the real wage rate is constant whatever technique of production is chosen. In particular ... employing capital-intensive production methods are likely to pay higher wages, thus reducing the reinvestable surplus and promoting the rapid growth of consumption on the part of employed workers, rather than the rapid growth of employment." Section Two presents the hypotheses to be tested and the variables used. The data base is discussed in Three. Our methodology and results are set out in Section Four.

Hypotheses and Variables

We have already noted that a great deal has been written about the choice of technology in developing countries. One point of controversy has been the question of the introduction of "inappropriate" (excessively capital-intensive) techniques by foreign firms and how this could distort the choice of technology in the developing economies.[7] Ideally, one would like to investigate whether technologies used by our sample firms have been inappropriate. However, there are some complications arising from the lack of data and suitable alternative technologies. Lall and Streeten (1977, p.105) have pointed out that one needs data that can "deal with the fundamental problem of whether technologies used by sample firms have been appropriate with reference to some social optimum."[8] Further, suitable alternative technology may not

actually be available for some of the production processes being investigated. In view of these complications and the limitation of our data, we shall focus on the proportions of capital and labour in final output and total factor productivity.

Before presenting our hypotheses, we would like to point out that foreign firms are defined as all firms which during the survey stated that their paid-up capital by source of ownership as of December 31st, 1972, was private non-Nigerian. Local firms are defined as all firms which during the survey stated that their paid-up capital by source of ownership as of December 31st, 1972, was private Nigerian.

(a) Capital-intensity

Our basic hypothesis is that foreign firms are more capital intensive than local firms. There are good reasons to expect that foreign investors will be prevalent in industries where capital-labour ratios are high. Firstly, it has been argued that foreign firms are able to better afford large minimum capital expenditures and it will be easier for them to transfer in unadapted form highly capital-intensive techniques in use abroad. Secondly, there may be an association between advanced technologies, skills, scale and capital intensities.[9] Thirdly, as we have noted above, a range of technologies appropriate to LDCs may simply not exist in the lines of production in which foreign investors are interested. Fourthly, there are other factors in LDCs such as "inappropriate prices for labour and capital (relatively over pricing the former); low labour productivity, lack of competition, patterns of consumption favouring modern products; the danger of having technologies stolen if they are too simple; lack of local adaptive R & D; the threat of labour problems; and the greater adaptability of

capital-intensive plants to fluctuations in demand."[10] Arguing the same points in reverse, we may ask whether or not it is the case that, when local firms are able to better afford large minimum capital expenditure, they will import highly capital-intensive techniques. Secondly, the introduction of excessively capital-intensive technologies by foreign firms may encourage local firms to operate similarly capital-intensive techniques due to "demonstration effects".[11] Likewise, if the government promotes a highly capital-intensive pattern of industrialization, local firms may be encouraged to become more capital intensive. This also implies that they may produce their products with the same level of sophistication as the foreign firms.

Furthermore, it is possible that foreign investors are concentrated in capital-intensive industries. This does not necessarily mean that compared to local investors, foreign investors use more capital intensive technology in particular industries. For example, it has been suggested that when foreign firms are put under competitive pressure, they are more able to adapt given basic technologies to suit factor endowments in the host countries. Helleiner (1975) has argued that "in particular industrial sectors, the multinational firm has often proven more responsive and adaptable in its factor and input use, especially in the ancillary activities associated with the basic production process, than local firms; and so it perhaps should with its wide range of experience upon which to draw."[12] However, at the aggregate manufacturing sector level, the conclusion one may draw from the literature is that the capital intensity of foreign firms tends to be high compared to local firms. In addition, foreign firms have not shown any

excessive enthusiasm for adopting labour-intensive techniques. The expected result of this test is, consequently, uncertain.

In order to focus on differences in factor proportions between foreign and local firms in Nigeria, we use as our measure the "technical capital-labour ratio" - the ratio of expenditure on plant, buildings and machinery to labour. The latter includes unskilled, semi-skilled and skilled operatives, and excludes all general administrative, clerical and ancillary workers. Forsyth and Solomon (1977, p.266) have suggested that investment in working capital could be relevant in the analysis of the causes of any observed "nationality effects" on the choice of technology. Further, the results generated by the two measures, i.e. the technical capital-labour ratio and working capital will enable one to examine the view that "a systematic relationship exists between the degree of labour intensity of the technology and working capital requirements."[13] Following Forsyth and Solomon (1977), we have used an "overall capital labour ratio" which incorporates working capital - stock of raw materials and finished products as well as work-in-progress.

With regard to the two variables discussed above, controversy exists as to whether they constitute good measures of capital intensive output. Jorgenson and Griliches (1967, p.257) in their study of "The explanation of productivity change" have noted the error in the measurement of capital input with capital stock. They argued, "an almost universal conceptual error in the measurement of capital input is to confuse the aggregation of capital stock with the aggregation of capital service ... The ability "to contribute to production" is of course, measured by the price of capital services, not the price of investment goods". Lary (1968) and Mason (1973) have both pointed out

some of the problems associated with capital per worker as a measure of capital intensity. They include:

i) differing ages of capital between the units being compared (technological efficiency may differ);

ii) differing rates of capital exhaustion (intensity of utilisation may differ between units);

iii) cyclical variations which may affect the rate of capital utilization;

iv) differing levels of market power;

v) differing accounting rules regarding the period over which the physical assets are to be written off;

vi) differing price levels over time (identical plant may differ in book value merely because of different price levels at the time of acquisition); and

vii) differing levels of organisation integration.[14]

To reflect these limitations, Mason has suggested the Lary measure of the flow of capital services[15], i.e. the ratio of wages paid to the flow of capital services as measured by the estimated market value and the estimated economic life of buildings and equipment. One valid criticism of the Lary measure of the flow of capital services however may be that the purchase price of capital equipment is directly related to the expected flow of services from it. Nevertheless, our data only show the market value for buildings and equipment and we have made use of the ratio of wages to buildings and equipment to measure capital intensity.

Scale

Foreign firms are hypothesised to be more productive than local firms. The reason most commonly advanced why firms go abroad is that foreign firms possess plant economies of scale

advantages over local firms. In other words, in an industry comprising both local and foreign firms, one might expect the latter to have plant economies of scale advantages. This is partly because foreign firms hope to exploit scale advantages in foreign markets hence the decision to set up production facilities abroad.[16] It is also partly because certain facilities require scale economies and foreign firms have the finance and expertise to set up and operate such facilities.[17] Additionally, optimum factor proportion and level of scale of operation are thought to be intimately linked in industries where economies of scale are important. "It is therefore desirable to allow for the independent impact of scale on choice of techniques and thus on technical capital-labour ratio."[18] At the same time, it is becoming increasingly recognised that, economies of scale are available to all firms which can reach the requisite size. In line with the above view, Lall and Streeten note the following two points:

1) "economies of scale, either of the 'classical' type arising simply from the size of plant, or of the most recent type arising (in the case of multi-product plants in oligopolistic differentiated-product industries) from longer production runs are available to all firms which can reach the requisite size. They do not constitute a special source of market power for foreign firms ... unless large size can be attained only by having access to some other special advantage, such as finance, technology or marketing ... economies of scale ... serve only as a permissive ... factor in overseas expansion.

2) ... Firms ... have grown more by using multi-plant operation than by increasing the size of plants, their strength deriving less from the technical advantages of large plant than from other factors ... (such as R & D ...) and which do yield economies to large firms."[19]

Put rather differently, what the above two points suggest is that the influx of foreign firms and their concentration in many areas of manufacturing industry, could be accompanied by a proliferation of small scale plants. Furthermore, it is also

possible that plant-level economies may not be important in LDCs if the size of the domestic market determines the scale of operations of manufacturing enterprise. In the light of the above discussion, the scale of productivity results are unpredictable. As our measure of productivity, we have used two ratios involving value added: (i) the ratio of value added to fixed assets and (ii) value added per employee. The ratio of value added to fixed assets may be seen as a measure of capital productivity and the value added per employee as a measure of labour productivity. If both ratios are higher for foreign firms, it will probably reflect capital intensity. The third variable used is the fixed assets per firm as shown by the F.O.S. data. The advantage of using fixed assets per firm has been pointed out by Lall and Mohammad (1983, p.150). They noted that "this scale measure is at the enterprise rather than the (more common) plant ... level and so does not measure only the technical factors contributing the scale economies. However, it has the advantage that it captures such factors as the existence of multi-plant or technological economies which make for large firm size."[20]

Wage Rates

The hypothesis is that foreign firms pay higher wages to non-Nigerians and, skilled and semi-skilled personnel (operatives), and that average wages for all employees are higher than in local firms. Characteristics that will produce higher wages for employees of foreign firms include:

(1) Capital intensity

There are a number of reasons why capital intensity will exert a significant influence on wage levels. Firstly, foreign firms are said to be biased towards high capital-intensity and

are likely to transfer the most advanced management techniques from advanced countries. If so, it is apparent that they will offer relatively high salaries to attract high-level foreign and local personnel. The assumption here however is that capital intensive technology often requires more skilled personnel to service it. Secondly, many believe (Dunning, 1981, p.289) that capital intensity "may affect the bargaining power of workers, as trade union membership tends to be greater in more capital intensive industries and a strike will be more costly for an employer here than in a labour intensive industry". In other words, employers in capital intensive industries will pay higher wages in order to avoid strikes.

(2) Productivity

It has been suggested that the ability to pay the work force different rates would depend on productivity. If foreign firms are more productive, they would tend to pay the highest wages as compared to local firms.

(3) Profitability

The ability of foreign firms to pay higher wages may also be due to high profit rates.

(4) Reuber (1973 , p.175) has argued that "one would expect that as foreign investment creates more jobs it would also tend to raise wages and salaries locally despite considerable unemployment. This effect seems most likely to show up in the market for skilled and semi skilled workers as well as for highly trained professional categories where the elasticities of local labour supplies are likely to be lowest."

(5) Regarding the adaptation of foreign technology, it is argued that most "basic" or "core production technology used by foreign industries is not adapted in any significant

way to low-wage conditions, hence the high wage rate.

In order to examine differences in wage rates between foreign and local firms in Nigeria, we have used the following variables: average wage rates paid to operatives (skilled and semi-skilled workers), non-Nigerian wages, and wages for all employees (managers, operatives, clerical and non-Nigerian). We would expect average wage rates for skilled and semi-skilled workers to be higher in foreign firms because as we have noted in Chapter 7, foreign firms tend to provide more formal training for their employees than local firms. This, of course, would depend if there is a strong positive correlation between skill-intensity and wage rate. It may be pointed out that the non-Nigerian wages data as shown in the FOS data do not specify whether these are operatives or managers' wages.

Labour force composition

Two hypotheses are tested: foreign firms use relatively more skilled and semi skilled personnel; and foreign firms use relatively more managers than local firms. We have constructed three variables to measure labour force composition - operatives per firm, Nigerian managers per firm and non-Nigerian employees per firm.

In Chapter 7, we have noted that foreign firms have a long experience in the production of technically refined products and have as a result developed well-defined procedures for their production. Further, because of higher quality control, more sophisticated products and marketing, etc. more managers are needed. If so, we would expect foreign firms to employ more managers than local firms. On the other hand, local firms are expected to use more operatives because of the lack of well endowed information systems and well defined production procedures. Regarding non-Nigerian employees,

foreign firms are expected to employ more given their much easier access to foreign employees.

Data

The chapter limits itself to the large private sector of Nigerian manufacturing industry. As we have pointed out in Chapter 1, this would seem to be the most appropriate area in which to conduct an investigation of foreign investment in manufacturing. Small-scale or traditional industrial activities do not usually attract foreign investment. The data for this chapter come from the industrial survey of Nigeria (1972) published by Federal Office of Statistics (FOS) (1977). The FOS has compiled balance sheet information for a sample of 1,052 large manufacturing enterprises from 1,213 establishments contacted. The grouping of manufacturing establishments into industrial classes according to the FOS, has been dictated in a number of cases, by the need to comply with confidentiality rules. Thus, in order not to disclose information where there are fewer than three establishments in a particular industry, such an industry has been merged with an appropriate industry class. The sample is divided by the FOS into various sectors from which we identified 48 manufacturing industries. For each of these industries, the FOS provides information on the foreign share of total equity ownership and these are shown in Table 8.1 & 8.2. The table shows the extent of foreign and local ownership in each industry in 1972. Data are available for gross output, value added, number of employees, wages and salaries, net capital expenditure and written down values of fixed assets.

Methodology and Empirical Results

In order to test the above hypotheses, we have conducted the Mann-Whitney U-test - a more powerful distribution-free

Table 8.1 & 8.2 SOURCE OF PAID-UP CAPITAL FOR 969 LARGE PRIVATE COMPANIES (197

(₦ 000)

Industry	Local Firms	Private Nigerian	Foreign Firms	Priva Forei
Meat Products	2	315	8	62
Dairy Products	1	11	4	85
Fruit Canning and Preserving	2	-	1	1,50
Vegetable Oil Milling	4	1,727	19	1,63
Grain Mill Products	6	96	1	3,52
Bakery Products	160	629	13	33
Sugar and Sugar Confectionery	2	1,010	8	4,26
Misc. Food Preparations and Animal Feeds	1	315	6	1,64
Spirit Distillery and Beer	2	2,285	7	14,13
Soft Drinks	3	745	6	5,95
Tobacco	1	4,500	4	18,14
Spinning, Weaving and Finishing Textiles	10	9,110	41	53,18
Made-up Textile Goods (except wearing apparel)	1	606	14	8,83
Knitted Goods, Cordages, Rope and Twine	6	150	10	2,64
Wearing Apparel	17	321	10	1,51
Tanning	2	438	4	61
Travel Goods	1	625	5	72
Leather Footwear	8	146	10	96
Saw Milling	104	1,092	16	3,56
Wooden Furniture and Fixtures	53	1,632	26	1,51
Paper Containers, Paper Boxed and Paper Boards	2	723	7	1,79
Other Paper Products	1	428	6	38
Printing	26	2,563	36	2,35
Basic Industrial Chems, Fertilizer and Pesticides	1	9	2	30
Paints	1	276	5	1,83
Drugs and Medicine	1	40	5	85
Soap, Perfumes, Cosmetics and other Cleaning Preps.	1	245	16	6,99
Other Chemical Products	3	168	7	1,75
Products of Petroleum and Coal	1	8	4	36,81
Tyres and Tubes	1	1,120	9	2,97
Other Rubber Products	4	1,245	17	4,44
Plastic Products	1	287	23	3,55
Pottery	3	11	1	6
Glass Products	3	20	1	62
Bricks and Tiles	6	432	6	72
Cement	4	4,280	2	7,50
Concrete Products	7	1,351	14	4,62
Basic Metal, Cutlery, Hand Tools and Gen. Hardware	3	124	8	1,63
Metal Furniture and Fixtures	7	662	16	2,21
Structural Metal Products	7	850	24	3,07
Fabricated Metal Products	2	505	26	8,40
Agricultural and Special Industrial Machinery	1	10	3	14
Machinery & Equipt. (exc. elec.)	1	10	2	10
Radio, TV and Communication Equipt. and Apparatus	1	746	10	1,11
Household Elec. App. and other Elec. Supplies	2	2,315	5	61
Motor Body Building	1	-	1	2
Ship Building (including Motorized Boats)	3	15	-	
Manufacturing Industries not elsewhere classified	3	198	12	1,11
TOTAL	482	44,396	487	222,20

Source: Calculated from F.O.S. (1977).

method to test for differences in central tendency between foreign and local firms in individual characteristics. The Mann-Whitney U-test is distribution-free because assumptions about the shape or distribution of the "parent" population are not required. As we have pointed out in Chapter 1, the Mann-Whitney U-test is used because the four digit industries are too aggregative for present purposes. With regard to "power-efficiency", Siegel (1956, p.126) has argued that "if the Mann-Whitney test is applied to data which might properly be analysed by the most powerful parametric test, the t-test, its power-efficiency approaches $3/\pi$ = 95.5 per cent as N increases ... and is close to 95 per cent even for moderate-sized samples. It is therefore an excellent alternative to the t-test."

The Mann-Whitney U-test

The problem is to test whether two independent groups have been drawn from the same population. Following Siegel (1956, p.116) consider samples from two populations, population A (foreign firms) and population B (local firms). The null hypothesis, Ho, is that foreign firms and local firms have the same distribution. The alternative hypothesis H_1, against which Ho is tested, is that foreign firms are "stochastically" larger than local firms, a directional hypothesis. Since the alternative hypothesis, H_1, states the direction of the predicted difference, our tests are one-tailed. Let us consider a rejection region of α = .20 since we are looking for direction of differences. It follows that we will reject H_1 when the probability of no difference between the samples exceeds α = .20.

The U Statistic

The U Statistic is calculated as follows:

$$U = n_1 n_2 + \frac{(n_1(n_1 + 1)}{2} - \sum R_1 \qquad (8.1)$$

$$\text{or } U' = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - \sum R_2 \qquad (8.2)$$

Where n_1 = size of the smaller sample

n_2 = size of the larger sample

R_1 = sum of the ranks of the smaller sample

R_2 = sum of the ranks of the larger sample.

To apply the U test, we let N_1 = the number of local firms and n_2 = the number of foreign firms. In order to carry out the rank sum test procedure, we first combine the n_1 and n_2 into a single group of $n_1 + n_2 = N$ observation, "which are all different because of the continuity assumption."[21] The pooled observations $(n_1 + n_2)$ are arranged in order of magnitude, while keeping track of which observations are from which sample. Finally, we assign the ranks 1, 2, ..., N to the combined ordered observation[22], with n_1 for local firms and n_2 for foreign firms. According to Siegel (1956, p.116) "in this ranking, algebraic size is considered, i.e. the lowest ranks are assigned to the largest negative numbers, if any."

Mann and Whitney, (1947) and Siegel (1956, pp.120-121) have observed that "as N_1, n_2 increase in size, the sample distribution of U rapidly approaches the normal distribution, with

$$\text{Mean} = \mu u = \frac{n_1 n_2}{2}$$

$$\text{and Standard Deviation} = \sigma u = \sqrt{\frac{(n_1)(n_2)(n_1 + n_2 + 1)}{12}}$$

That is, when $n_2 > 20$ we may determine the significance of an observed value of U by

$$Z = \frac{U - \mu u}{\sigma u} = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)(n_1 + n_2 = 1)}{12}}} \qquad (8.3)$$

which is practically normally distributed with zero mean and unit variance". Given that the hypothesis tested by the Mann-Whitney analysis is that the medians of the two groups (n_1 and n_2) are equal, a Z value from equation 8.3 that is large enough so that the hypothesis is rejected tells us that the chances of the medians being the same is very small.

Empirical Results

This section presents the results of estimation using the Mann-Whitney U test. Before proceeding with the empirical results, it is necessary to mention some of the features of the statistical approach employed in this chapter. Other researchers using this approach have observed that (a) the unit of analysis is the individual firm and the information used in the statistical tests relates to the position of individual observations in a ranking; (b) the ability of an individual firms with extreme observation to affect the results is eliminated; (c) the use of ranking procedure includes only information on the direction of differences between observations as opposed to the distance between them which in turn limits the influence of "outliers".[23]

For the results presented below, we have calculated U for all the variables. In each case, the probabilities which indicate the likelihood of committing a type 1 error, i.e. falsely rejecting null hypothesis Ho, are also reported. We are comparing foreign and local firms. We have used data for 482 local firms across 44 industries and 487 foreign firms across 44 industries. As noted above, foreign firms are all firms with non-private Nigerian paid up capital and local firms are all firms

with private Nigerian paid up capital. Those firms with Federal government, regional government and other sources of paid up capital are excluded. Appendix 1A shows the questionnaire used for the industrial survey.

Capital intensity

The hypothesis being tested is that foreign firms are more capital intensive than local firms. The first variable used is buildings and machinery per firm employee. From the calculated probability of .016 reported in Table 8.3(a), foreign firms are more capital intensive than local firms. Nonetheless it is possible that foreign firms employ more machinery and equipment per employee but not significantly more buildings. As reported in Table 8.3(b) machinery and equipment per employee is higher for foreign firms. Further, we test separately the hypothesis that foreign firms hold a higher proportion of their physical assets in buildings. The calculated probability of .333 leads us to reject the hypothesis. What this seems to suggest is that foreign firms tend to be more capital intensive than local firms because of the relative heavier investment in machinery and equipment. However, perhaps because machinery and equipment are imported this may explain the differences. Secondly, it could be that foreign firms' estimates of a building's economic life is lower than that of local firms. This point of view is not supported by the result of the Lary measure of the flow of capital services. As reported in Table 8.3(d), foreign firms have a significantly higher market value for buildings and equipment. Finally, the introduction of a total capital-labour ratio which includes stocks of raw materials and finished products as well as work-in-progress provides even stronger evidence of significant variation

TABLE 8.3 THE MANN-WHITNEY U TEST RESULTS; CAPITAL INTENSITY VARIABLES

H_1: What is the direction of the hypothesised relation?	Calculated probability*	U	Z	Decision
Foreign firms are more capital intensive than local firms where capital intensive is measured by				
a) Buildings and Machinery per employee	0.016	710.5	-2.14	Accept H_1
b) Machinery and equipment per employee	0.0006	577.1	-3.26	Accept H_1
c) Total capital per employee	0.001	598.8	-3.08	Accept H_1
d) Ratio of wages to capital services flow (12 per cent)+	.0009	594.5	-3.11	Accept H_1

Note: n_1 (local group) = 44 industries with (482 firms) and

n_2 (foreign group) = 44 industries with (487 firms).

+ This is the estimated market value for buildings and equipment.

* Our tests are one tailed.

of technology with nationality of ownership. It would seem that the four capital-intensive measures used in this chapter regardless of their differences show significantly different effects for foreign owned firms.

(b) Capital and Labour Productivity

The hypothesis being tested is that foreign firms are more productive than local firms. We have used four variables which include the value added/employee ratio, value added per firm and fixed assets per firm. The results of the U test for these variables are presented in Table 8.4. Of the four variables used to measure capital and labour productivity only value added per employee shows a significant difference between the groups. Foreign firms exhibit a tendency to have a higher value added per employee. This result is consistent with the finding in Chapter 7 that more firms are likely to be classified as foreign in terms of the value added per employee variable. The better performance of foreign firms as compared to local firms in terms of the value added/employee ratio may reflect the significant difference detected in factor proportions. Further this may well be accounted for by the labour force composition or the nature of the firms where foreign ownership is greatest. On the other hand, the capital productivity or thevalue/assets ratios, seem to show conflicting tendencies for the two groups. Foreign firms do not have more value added per fixed capital. The value added per firm and fixed assets per firm suggest no difference between the two groups. These results seem to suggest that foreign investors are not dominant in the large scale capital intensive sector and there are fewer multiplant operations in the manufacturing sector.

A comparison between the capital intensity results and capital and labour productivity results suggest the following:

Table 8.4

The Mann-Whitney U-test Results:
Capital and Labour Productivity

H_1: What is the direction of the hypothesised relation?	Calculated probability	U	Z	Decision
Foreign firms are more productive than local firms as measured by				
a) Value added/ employee ratio	0.002	620.6	-2.89	Accept H_1
b) Value added/ fixed assets ratios	0.370	927.5	0.33	Reject H_1
c) Value added per firm	0.4129	941.5	-0.32	Rehect H_1
d) Fixed assets per firm	0.2743	896.0	-0.60	Reject H_1

See note on Table 8.3.

(a) foreign firms are more productive in terms of value added per employee but use more capital; (b) regardless of industrial composition of the samples and of the particular characteristics of management of the different industries in question, foreign firms in Nigeria as such, would be significantly different from local firms in matters of technology but less significantly different as far as returns on capital (efficiency) are concerned; (c) the mixed results regarding productivity weaken the strong allegations for or against foreign firms as regards their relative efficiency, choice of technique and productivity. However, our results could be altered if value added per firm and capital invested are under reported by foreign firms due to transfer pricing. We do not know the extent of this problem; (d) the value added per firm and fixed assets per firm results seem to suggest that foreign firms may not have grown more (e.g. by using multi plant operations). This may be because the government has not permitted foreign entry or expansion in those industries requiring high minimum investment.

Wage rates

The hypothesis tested is that foreign firms pay higher wages to operatives (skilled and semi skilled), non-Nigerian and Nigerian managers and higher average wages per employee (overall). Table 8.5 presents the results of the four variables. Firstly, the average wages per employee result is presented in Table 8.5(a). The calculated probability is slightly more than .20 to accept the null hypothesis of no significant difference. It is possible that in some cases, foreign firms pay higher wages, but on the average, the wages paid by foreign firms are not significantly different from those of the local firms. However, the non-Nigerians' wages in foreign firms are significantly different from wages of non-Nigerians in

Table 8.5

The Mann-Whitney U-test Results:
Wage Rates Variables

H_1 What is the direction of the hypothesised relation?	Calculated probability	U	Z	Decision
Foreign firms pay higher wages than local firms as measured by				
a) Average wages per employee+	0.232	879.4	-0.73	Reject H_1
b) Non-Nigerian wages*	0.0007	584.3	-3.20	Accept H_1
c) Nigerian Managers' wages	0.420	943.2	-0.20	Reject H_1
d) Operatives (skilled and semi-skilled) wages	0.0049	658.3	-2.58	Accept H_1

Note: * These are wages of foreign operatives, supervisors or managers.

\+ = b + c + d plus unskilled and clerical wages.

See note on Table 8.3.

local firms. Perhaps this could reflect the fact that the non-Nigerians in foreign firms are Americans or Europeans while those in local firms are Asians. On the other hand, the wages paid to Nigerian managers are similar in both groups. This implies that in the majority of cases, foreign and local groups pay the same wages for both managers and professional personnel. A possible reason is that Nigerian managers hold similar positions in foreign and local firms. For example, it has been observed by Iyanda (1975, pp.115-116) that foreigners are more in the top management positions (directors and heads of departments) than at lower management levels in both foreign and local firms. On the other hand, such departments as personnel, public relations, legal and stores are often headed by Nigerian managers in both ownership groups. Given that many Nigerians are qualified in these lower management levels, it is apparent that in a large number of cases firms will not pay managers above going rates. The last variable used to compare wage rates between ownership groups is operatives' wages. As reported in Table 8.5(d), the wages paid to operatives are significantly different between the groups. This result is quite similar to the discriminant analysis result in Chapter 7 where we found that more firms are classified as foreign in terms of the operatives' wages variable. One possible reason why foreign groups pay more wages to operatives is that they used more operatives per employee. Secondly, it is possible that opportunity costs for unskilled labour may be well below market wage rates. On the other hand, the costs for skilled labour tends to be above market wage rates.[24]

d) Labour force composition

As we have already mentioned, it is believed that foreign firms have a higher value added per employee and they pay higher wages per operative because of the labour force composition. In order to verify this assumption, we then tested the hypothesis that labour force composition differs between foreign and local firms. The results of the four variables - employees per firm, Nigerian managers and operatives per employee and non-Nigerians per employee - are shown in Table 8.6. Firstly, the number of employees per firm shows that there are significant differences between foreign and local groups. Secondly, the result in Table 8.6(b) shows that foreign firms employ more managers than the local firms. This result is quite consistent with the result in Chapter 7 where we found that more foreign firms are likely to be classified as foreign in terms of number of managers employed. The calculated probabilities for operatives and non-Nigerian employees indicate that foreign firms use more operatives and non-Nigerians. What the operatives result seems to suggest is that the high value added/labour ratio observed for the foreign group in our productivity measure is due to the fact that foreign firms employ more operatives. The obvious implication is that even though foreign firms are more capital intensive, they have not drifted technologically towards the use of larger, more closely integrated units of equipment. This stems from the fact that increasing capital-intensity may involve a smaller labour force with relatively more managers or supervisors. By this we do not mean to imply that local firms are drifting technologically towards the use of larger, more closely integrated units of equipment. The higher number of skilled personnel in the foreign firms

Table 8.6

The Mann-Whitney U-test Results:
Labour Force Composition Variables

H_1: What is the direction of the hypothesised relation?	Calculated probability	U	Z	Decision
Labour force composition differs between foreign and local firms				
a) Employees per firm	0.0047	655.4	-2.60	Accept H_1
b) Managers (Nigerians) per employee	0.017	713.4	-2.12	Accept H_1
c) Operatives (skilled and semi-skilled) per employee	0.0037	646.7	-2.68	Accept H_1
d) Non-Nigerians per employee	0.004	649.6	-2.65	Accept H_1

See note on Table 8.3

may reflect the wage differences we observed between foreign and local firms that attract many skilled personnel to foreign firms. Similarly the higher number of non-Nigerian personnel may reflect the absence of qualified Nigerians. In other words, the qualified Nigerians may have been absorbed by the local firms.

(e) Size

The hypothesis to be tested is that foreign firms are larger than their local counterparts. In most empirical work, measures often used are sales, total assets, net assets, equity and employment. As Smyth, Boyes and Peseau (1975, p.7) have noted, measures of firm size that are found in the literature consist of three categories. They include inputs into the productive process, outputs and the value of the firm. Empirical studies such as Armstrong and Silberton (1965), Ferguson (1960), Fleming (1970), Griliches (1967), Horowitz 1962) and Scherer (1965) have used employment as a measure of firm size. Studies focussing on capital inputs have used assets as their measure of firm size. These studies include: Aislabi (1971), Barnal (1962), Cohen and Smyth (1973), Davenport (1971), Ferguson (1960), Hall and Weiss (1967), Hart (1965; 1968), Larner (1966), Mackintosh (1963), Marcus (1969), Marris (1971), Mermelstein (1969), Radice (1971), Samuels and Smyth (1965), Singh and Whittington (1968) and Smyth, Samuels and Tzoannos (1972). Sales as a measure of firm size has been employed by studies such as Diwan (1970), Ferguson (1960), Gale (1973), Kamerschen (1968), Rowthorn (1971), Scherer (1965) and Whalen (1965). Finally, stock holders' equity as a measure of size has been used by Benishay (1961), De Alessi (1966), Florence (1957), Hart and Prais (1956),

Hart (1962), and Kamerschen (1968).[25] In this study measures adopted are sales, fixed assets and net assets. We have already pointed out in Chapter 7 some of the problems associated with comparing figures for assets. Regarding the use of sales as measure of size, it is argued that the result is likely to be biased since only the more successful companies are likely to publish sales figures. In this study, we are not faced with such a problem because sales figures are available for all firms operating in 1972 in Nigeria. The results of the three measures of size employed in this chapter are presented in Table 8.7.

Table 8.7

The Mann-Whitney U Results: Size Variables

H_1 What is the direction of the hypothesized relation?	Calculated Probability	U	Z	Decision
Foreign firms are larger than their local counterparts				
a) Sales	0.460	955.5	-0.10	Reject H_1
b) Fixed assets	0.274	896.0	-0.60	Reject H_1
c) Net assets	0.006	688.0	-2.50	Accept H_1

See note on Table 8.3

The sales results indicate that foreign firms are not significantly different from their local counterparts. One possible explanation for the lack of difference between the two groups is that sales are probably determined by the size of the domestic market. If one is to assume that most firms in our sample produce for the domestic market, it follows that foreign investors ignore

scale operation considerations in their decision to engage or invest in an industry.[26] The lack of sales difference between the two groups seems to suggest that "scale of operation of manufacturing enterprises in LDCs is determined more by the size of domestic market than by any minimum requirements of technology or scale".[27] The general picture conveyed by the fixed assets result strongly confirms that foreign firms on average are not necessarily larger than local firms. It lends support for our results in Chapter 7 that more firms will be classified as local firms than foreign firms in terms of fixed assets variable. On the other hand, the net assets result indicates a tendency for the foreign group to be larger than the local group. It is possible that the firms being compared are not of similar ages operating in roughly similar conditions. This is because as we have pointed out in Chapter 6, "the value of net assets may vary from firm to firm according to peculiar and changing market conditions which would affect the value and quantity of stocks and volume of trade receivable."[28] It is recognised that firms included in our sample are not of similar ages. But we do not have data to overcome the vintage problem arising from age differences among firms being compared.

(f) Profitability

The hypothesis to be investigated is that foreign firms are more profitable than local firms. We have used three measures. Firstly profits are defined as net profits before interest and tax. We assumed that income tax treatment of different firms is the same for both the foreign and local groups. However, we do recognise that the Companies Income Tax Act (1961) may affect the profit result. This allows a

firm in the first year after setting up a plant to artificially increase expenditure in their account up to 25 per cent. In other words it is possible that in many newly established firms profits will be smaller than the old establishments. The second variable is the ratio of profits to assets. Some of the problems associated with this measure have been noted by Smyth, Boyes and Peseau (1975, p.52). They argued that assets may not be valued properly since some assets are valued at historical cost while for others, replacement value may be what is used. Further, "over a period of sustained inflation, firms with relatively old assets will report smaller assets than firms with recently acquired assets. Firms undertake asset revisions but the timing of such revisions is irregular."[29] The third variable is the dividend/assets ratio. It may be pointed out that the rate of return on equity is considered by most studies as the most ideal measure of profit. Many have argued that "it is what profit maximisers might be expected to maximise and invested capital is what is at risk in a firm."[30] The results are presented in Table 8.8. In Table 8.8(a) the calculated probability is more than .20 per cent and as a result the null hypothesis of no difference is accepted. We would have expected significant differences since foreign firms are older in many cases than local firms. Apparently the age of firms in operation seems not to have exercised a strong influence on their profitability. Further, many new firms may not have shown low profits because of the Act of 1961 discussed above.

On the other hand, the dividend/total assets ratios and profit assets ratios show that foreign firms have higher

Table 8.8

The Mann-Whitney U-test Results: Profit Variables

H_1: What is the direction of the hypothesised relation?	Calculated probability	U	Z	Decision
Foreign firms are more profitable than local firms as measured by				
a) average profits per firm	0.2389	882.0	0.71	Reject H_1
b) profit/fixed assets	0.0132	701.8	-2.22	Accept H_1
c) dividend/fixed assets	0.001	598.5	3.08	Accept H_1
d) advertisement	0.254	888.0	0.66	Reject H_1

See note on Table 8.3

returns on fixed assets. This may be due to their external knowledge, i.e. being able to buy machinery at lower prices, managerial efficiency, financial patterns or age or years of operation. Furthermore, as noted above, it has been argued by some that the age or years of a firm's operation may exercise some influence on their profitability. However, Lall and Streeten (1977) found no significant differences in profitability between Indian and Colombian sample firms classified into three age groups. A more plausible explanation would be that the level of advertisement may exercise a considerable influence on the level of profits. However, the result as reported on Table 8.8(d) suggests that there is no significant difference between the foreign and local firms in the amount devoted to promotional expenditures.

Transfer Pricing

In the discussion of profitability there does not seem

to be a significant difference in the pattern between foreign and local firms. However, significant differences occur regarding returns on capital. One may ask: Why do foreign firms pay more dividends than local firms? One general answer to this question is that it provides a channel for transfer pricing. We do not have sufficient information to show the effects of over-pricing and of imputed overpricing on profitability. Nevertheless, we have made use of interest paid, money spent on insurance as well as dividends paid. The results are presented in Table 8.9. The use of transfer pricing as a means of remitting profits is not supported by interest payments and insurance. This should be expected since most foreign firms borrow from local banks and have insurance with local insurance

Table 8.9

The Mann-Whitney U-test Results:
Transfer Pricing Variables

H_1: What is the direction of hypothesised relation?	Calculated probability	U	Z	Decision
Foreign firms transfer profit through:				
a) Interest	0.326	913.5	0.45	Reject H_1
b) Divident	0.0002	552.5	3.46	Accept H_1
c) Insurance	0.308	906.5	0.51	Reject H_1

See note on Table 8.3

companies. There is support for the association of higher dividends with foreign firms. The implication is that dividends paid to foreign shareholders are remitted abroad and thus pose a formidable danger to the economy in terms of the balance of

payments. This inference about dividends and the origin of ownership should be treated with caution. The evidence does not seem strong enough to suggest that dividends provide the channel for transfer pricing.

Interpretation of Principal Results

We investigated the ratios in which foreign firms and domestic firms combine capital and labour in the final output. The main concern was to test for significant differences between the two groups.

As far as capital intensity is concerned, we must admit that all pairs are in the direction of the sample of the foreign firms. The direction of these results suggests that foreign firms tend to be more capital intensive than the local firms. However, these results are quite surprising since local firms depend entirely on foreign technology. One suspects that the results would have been different with a more accurate measure of the variables between firms producing similar goods. Such a measure inevitably suffers from the probability that foreign firms may use more modern machinery on average as compared to domestic firms.

A mixed picture emerges from labour productivity and capital productivity. The labour productivity ratios support the tendency suggested by the capital intensity data. On the other hand, the capital productivity ratios seem to show no conflicting tendency for both foreign controlled firms and their local counterparts.

Labour composition and wages and salaries show mixed results. The use of operatives by both groups is significant in the expected direction. Wages and salaries support the expected direction- that foreign firms pay higher wages and salaries to operatives. On the other hand, average wages are

the same for both groups. The significance of this result lies in a generalization that skill intensity and wage rates are positively correlated.

With respect to investment motivation and size, there is indeed no support for the hypothesis that foreign firms are mainly interested in large scale operation. The evidence suggests however that foreign firms employ larger net capital expenditures than the local firms.

The behaviour of profitability was also considered. We found no relationship between profitability and nationality of ownership or control of firms. The dividends/total fixed assets ratio and profits/total fixed assets, are both significant in the expected direction.

The last part of our analysis provided information on profits and transfer pricing. The analysis is based on the assumption that foreign firms may pay more dividends because of transfer pricing practices. Thus, we accept the hypothesis that foreign firms pay higher dividends. However, much weight cannot be placed on these results. This is because any means of remitting profits can be judged in relation to some standard and such a standard is rather difficult to specify.[31]

In conclusion, the data do not deny that foreign firms are contributing to factor proportions problems. But it would be naive to single out the foreign firms as the only contributor to this problem in Nigeria. However, Nigeria is a labour-abundant country and foreign firms employ more capital per worker in relation to the level of development. This accelerates the level of technology transferred. The net effects of technology transfer may be positive, or negative, but what matters from the point of view of policy is whether it is justified to transfer technology-intensive production processes

where abundant labour has not diminished through increased labour demand; or where labour costs have not risen to a level that justifies increased use of advanced technology. On the other hand, it is very encouraging that foreign firms are contributing significantly towards the transfer of skills to the economy. Although this might be interpreted as benefiting the foreign firms, one may argue that such conclusions would be unwarranted if (a) such benefits are not confined to the foreign-owned economic sector; (b) such benefits are diffused and absorbed into the local economic sector. It is, of course, this type of integration into the local economy that brings about 'linkage effects'. The linkage effect could be affected through the availability of trained labour from foreign firms to local firms, the generation of domestic capital and local resources complementary to foreign investment, and contribution to government revenue.[32]

But as Lall and Streeten (1977, pp.198-9) have pointed out, the issue of how foreign ownership affects local enterprise appears somewhat ambiguous because it is claimed that foreign industries both suppress it and encourage it. The two propositions are not, however, incompatible. The foreign industries may, if given a free hand, take over the leadership of the most dynamic technological and marketing based industries while providing the expansion of domestic ancillary industries. The final effect is likely to be that local enterprise, in the relevant sector, is reduced to a secondary role; though a few exceptional firms (especially state-owned ones) may survive and be competitive. Consequently, if the control of the most dynamic technology is restricted to the foreign dominated enclave of the Nigerian economy, some have argued that it may,

perhaps, lead to technological distortions and technical discontinuities in the indigenous enterprises.[32]

Chapter Nine

SUMMARY AND CONCLUSIONS

Introduction

The purpose of thus study has been to investigate the impact of foreign direct investment on the development of manufacturing industries in Nigeria. We have used data for large manufacturing establishments to analyse a number of issues - growth and structural change, sources of growth in the manufacturing industries, technical efficiency and ownership characteristics, choice of technology and nationality of ownership, and domestic cost differences between foreign and local firms.

Before summarising our results, we must stress again that these results may not hold for small establishments, and the non-industrial sectors such as agriculture services, and may thus not be generalised in other developing countries. Nevertheless, the large firms studied do account for a considerable proportion of the economic activity in the industrial sector of Nigeria. Further, both foreign and local firms are well represented in the large establishments.

Growth and Sources of Growth in Nigerian Manufacturing Industries

The manufacturing sector enjoyed rapid rates of growth over the 1960-1974 period. In Chapter 2, the analysis of the economic structure of Nigeria shows that the average growth rate of the manufacturing sector within this period was about 11 per cent per annum. In Chapter 5, the data on growth of the various industries shows that there is an extremely wide range of growth rates for different industries. For the analysis the manufacturing sector was divided into three sub-groups: industries producing primarily consumer goods, those producing primarily intermediate goods, and those

producing primarily capital goods. The consumer goods industries and intermediate goods industries have been growing at relatively faster rates than capital goods industries.

We also investigated, in Chapter 5, the extent to which the actual production, import and domestic absorption data on various groups of consumer, intermediate and capital goods fit the generally accepted hypothesis that the importance of import substitution is greatest in the early stages of industrialisation, and that its relative importance as a source of growth falls off steadily over time. Analyses were carried out for the entire period (1965-1974) and two sub-periods (1965-1970; 1970-1974) respectively. The empirical results indicate that: (i) The substitution of local products for imports has been for the most part complete for consumer goods and that imports consist primarily of capital goods and intermediate goods. The respective shares of capital goods, intermediate goods and consumer goods in 1974 were N626.6 million (54%), N333.3 million (29%) and N201.5 million (17%).

Given that imports are a large proportion of the total supply of intermediate and capital goods, it seems that intermediate and capital goods present the greatest scope for further import substitution. However, we would like to point out that it is possible that consumer goods prices declined during the period, while the prices of intermediate goods rose moderately and the prices of capital goods rose considerably. Further, Papanek (1965) has argued that the use of current price data would understate the rate of growth in consumer goods as well as the extent of import substitution in these goods. On the other hand, current price data tends to overstate both the rate of growth and the degree of import substitution for capital goods. (ii) For the 1965-1974 period, the results of industrial growth based

on Chenery's approach shows that 71.3 per cent of the growth in the gross output of manufacturing industries was due to demand expansion and 19 per cent was due to import substitution. On the other hand, in the period since 1970, domestic demand has grown very rapidly. Import substitution has not proceeded in consumer and intermediate goods. The respective contribution of demand expansion and import substitution to the growth of gross output of manufacturing industries was 132.3 per cent and -36.2 per cent. Our results seem to provide a strong support for Oyejide's (1975, p.76) assertion that "the later stages should show greater integration within the domestic economy and hence greater importance of the domestic demand as a factor of growth." In that study, Oyejide found that 80.1 per cent of the growth in the gross output of manufacturing industries in Nigeria during the 1967-1957 period was due to import substitution while 19.8 per cent was due to the expansion of domestic demand. (iii) As our results indicate in Table 5.8, import substitution in intermediate goods was significant in the period 1965-1970, the longest period covered by our estimates. These results agree more or less with the pattern Lewis and Soligo (1965) found in Pakistan. In that study, they found that import substitution in intermediates and capital goods as a whole and in most of their sub-groups was significant from 1954/55 to 1963/64, the longest period covered by their estimates.

However, as with all cross-sectional analysis, empirical results must be interpreted cautiously. On the basis of the data and statistical analysis used here, we were able to identify industries where a considerable amount of import substitution has occurred. Following Morley and Smith (1969) these measures do not indicate how much lower domestic production

would have been had import shares remained constant. Secondly, we have not introduced backward linkages directly into our measurement of import substitution. It is therefore possible that we have underestimated import substitution in intermediate goods industries. As we have pointed out above, few intermediate goods were actually produced during this period hence differences in results may not be great. In addition, feedback effects on relative prices, efficiency, aggregate demand, and capacity, are relevant in the determination of the total impact of import substitution. In particular, our results regarding import substitution in consumer and intermediate goods should be interpreted cautiously, awaiting confirmation with more up-to-date analysis and "a complete model of the economy incorporating these feedbacks."[1]

Technical Efficiency and Ownership Characteristics

In Chapter 6, we investigated the hypothesis that foreign firms are relatively efficient compared to local firms. Our first concern was with whether separate production functions exist for foreign and local firms irrespective of the specification of the production function. We found this indeed to be the case; that separate production functions exist for foreign and local firms irrespective of the specification of the production function. Secondly, the intercept of the production function indicates that foreign firms are not any more technically efficient than the local firms. This finding is largely consistent with the finding of Tyler (1978). Tyler concluded that "the contention that foreign firms possess greater levels of technical efficiency than domestic firms does not stand up in the analysis ..." of the Brazilian manufacturing industries. Further, our results also permit the reconciliation of the statement by Lall and Streeten (1977), that there is little

a priori reason to expect that, regardless of the industrial composition of the sample and of the particular characteristics of the management of the different firms in question, foreign firms as such would be significantly different from local firms in matters of technology and efficiency.

Finally, our results certainly do not support any relative advantage for foreign firms and this has obvious implications for their growth as well as their ability to cope with the ever changing environment. It is difficult to judge a priori whether or not foreign firms and local firms should differ significantly in Nigeria. Several factors such as "resident expatriates" which we have not tested may equally well be significant in determining technical efficiency between foreign and local firms. If we were able to separate firms owned by resident expatriates (principally Indians, Lebanese and miscellaneous European Nationals), we might have been able to reveal some interesting results. It is possible that resident expatriates' firms may behave differently from the "genuine" privately owned indigenous firms.

Domestic Cost Differences

The basic question considered in Chapter 7, was whether cost and employment characteristics in local firms differ systematically from those in foreign firms. The framework used was discriminant analysis. Attention was focused on ten cost and employment variables. Using the direct method, we were able to classify observations into foreign or local firms with an accuracy of 76 per cent. On the other hand, the stepwise method results indicate that the percentage of correct classifications can be predicted with an accuracy of 75 per cent. The six coefficients of the discriminant function in the stepwise

method indicate the characteristics which, in combination, determine whether a firm is classified as foreign or local. Our results also indicate that the variable which most clearly distinguishes foreign firms from local firms is the number of managers per firm. On balance, a more important result is that in this sample, local firms can be distinguished from foreign firms on the basis of the variables used.

Finally, our results provide some support for the view that cost and employment characteristics of similar firms differ significantly between nationality of ownerships. It is possible that these differences are systematic but any final decisions on the question of cost differences that were shown in this study must await discriminant function estimation for highly disaggregated data for which this study provides a basis.

Choice of Technology and Related Issues

The last part of the study, Chapter 8, provided information on the choice of technology and related issues by comparing the operating characteristics of foreign firms and local firms with respect to the ratios in which they combined capital and labour in final output. The analysis is based on the assumption that foreign firms employ production techniques which are more capital using than those employed by local firms. To avoid ordinary least-squares regression biases and heteroscedasticity, a non-parametric procedure was adopted for the empirical analysis. We have used four variables (buildings and machinery per employee, machinery and equipment per employee, total capital per employee and the ratio of wages to capital services flow) as our measures of factor proportions and choice of technology. Based on the Mann-Whitney U-tests, we found significant variation of technology with nationality of ownership. The results indicate that, in general, foreign firms are more

capital intensive than local firms. Although our results point to the fact that higher capital-labour ratios are usually found in the foreign firms, it may vary from industry to industry. As we have observed in Chapter 6 (Table 6.1) the capital-labour ratio was only lower for the foreign firms than local firms in the grain mill products industry.

The use of indirect indicators of factor proportions was also instructive. Firstly, we tested the skills mix between foreign firms and local firms. Our results suggest that foreign firms show a marked tendency to employ a high proportion of managers, skilled and semi-skilled operatives and non-Nigerians. The results may be challenged on the grounds that the high operative ratio for the foreign firms could reflect semi-skilled operatives. However, there is no direct evidence on this point since our data does not separate operatives into skilled and semi-skilled workers. If this is the case that the high operative ratios for the foreign firms reflects the number of semi-skilled workers they employ, our results provide support for the view suggested elsewhere that foreign firms employ more managers and semi-skilled workers because they have a long experience in the production of technically refined products as well as defined procedures for production.

Empirical evidence from other studies on skills mix illustrate additional consequences of ownership differences. A study by I.L.O. (1972, p.447) has shown that domestic firms are more capital-intensive than foreign firms because domestic firms are relatively deficient in highly skilled labour and as a result, rely on operative skills and machine pacing which favour capital-intensive methods. On the other hand, Forsyth and Solomon (1977, p.288) found that where indigenous firms are

seen to be skill-intensive, these are industries in which there is no significant difference in K_T/L values (the ratio of expenditure on plant and machinery to spending on labour - apprentices, unskilled, semi-skilled, and skilled operatives). Their explanation was that "...in some cases highly skilled labour may have substituted directly for both K_T and the operatives component of L, leaving a proportionately smaller capital stock and labour force and a more skill-intensive process. The two explanations do raise fundamental questions. Firstly, does it mean that foreign firms are capital-intensive as in the case of Nigeria because of a deficiency in highly skilled labour? The evidence suggests that employees of foreign firms are better trained than employees of local firms in Nigeria. Secondly, does it mean that where foreign firms are skill intensive there is no significant difference in K_T/L values compared to their local counterparts? The present study neither corroborates nor refutes these two explanations. However, our results suggest that there could be a positive correlation between capital-intensity and skill-intensity.

The next indirect indicator of factor proportion investigated was productivity. This is based on the assumption that differing technologies of production will yield significantly different results in terms of productivity and relative factor intensity. Our results indicate that foreign firms show a tendency to have high value added per employee.

Finally, we compared wage rates between the two groups. This was based on the assumption that foreign firms tend to pay higher wage rates than local firms because foreign firms are biased towards high capital-intensity. Our results suggest that average wages and managers' wages are not different between foreign and local firms. On the other hand,

foreign firms appear to pay higher wages to skilled and semi-skilled operatives, and non-Nigerians.

On the basis of the evidence, it is possible that foreign firms are contributing to the factor proportions problems in Nigeria. As we have pointed out above, Nigeria is a labour-abundant country and foreign firms employ more capital per worker in relation to level of development, accelerating the level of technology transferred. The net effects of technology transfer may be positive or negative, but what matters from the point of view of policy is whether it is justified to transfer technology-intensive production processes where abundant labour has not diminished through increased labour demand, or where labour cost has not risen to a level that justifies increased use of technology. But the acquisition of new skills, through formal and informal training would tend to result in a high quality of labour. This represents foreign firms' contribution to the qualitative change in labour. If this increases output over time, it has an obvious implication for per capita income and the level of economic development. While it is very encouraging that foreign firms are contributing significantly towards the transfer of skills to the economy, at the same time, it is also beneficial to the foreign firms. One may argue that such conclusions would be unwarranted if such benefits are diffused and absorbed into the local economic sector.[2] It is, of course, this type of integration into the local economy that brings about linkage effects.[3] The linkage effect could be affected through availability of trained labour from foreign firms to indigenous firms, the generation of domestic capital and local resources complementary to foreign investment, and contribution to government revenues.[4] Finally, our results admit that higher

capital/labour ratios, higher wage rates, higher total factor productivity and a higher rate of return to capital are all in the direction of the sample of foreign firms. These results confirm that it is possible to accept the hypothesis that foreign firms are capital-intensive relative to local firms. Nevertheless, there is merit in Forsyth and Solomon's (1977, p.279) argument that "the search/R. and D. costs of MNEs in locating the optimum technology may, in some industries, be markedly lower than those of competing (local firms), so that the former are able to take advantage more effectively of the opportunities afforded by low wage rates for profitable substitution of labour for capital." Further, Pack (1976) recognized the technical perception and managerial expertise of foreign firms in taking advantage of labour-intensive techniques in the Kenyan manufacturing sector. It is possible that the opportunities to substitute labour for capital by foreign firms identified by Forsyth and Solomon in Ghana and Pack in Kenya are present in the Nigerian manufacturing sector. We suggest that there is great need for additional research into the choice of technology at the firm level.

Policy Considerations

The issues of "foreignness" and the development of industry dealt with in this study points to the need to give top priority to an increasing Nigerian share in the benefit resulting from foreign direct investment. At the same time, if Nigeria is to increase its share of benefit, efforts should be made to increase the country's "technology-absorptive capacity".

Increasing FDI Benefits As our analysis indicates, some progress has been made to increase the Nigerian share in the benefit resulting from FDI. The Nigerian Enterprises Promotion

Decree of 1972 requires that twenty-two small scale industries should be reserved wholly for indigenous investors, and the ownership of capital by Nigerians in thirty-three other industries must be at least 40 percent of the equity participation. In 1976, equity participation of Nigerians was raised to a minimum of 60 percent and majority equity shares in foreign insurance companies were offered to Nigerians. But the benefits from indigenization may prove only temporary, unless the focus of action is aimed at providing indigenous capital and technology, as well as the local raw materials needed for local production. Present conditions in Nigeria would seem to be particularly well suited for action in these areas. It is essential that research and development activities be encouraged especially with the exploitation of many domestic accessible raw materials, as well as the introduction of new technology to the production process of many locally consumed commodities. Unless fully supported research projects from government funds are envisaged, it seems inevitable that a system combining foreign firms and local firms in meeting local demand will remain in force for some time in Nigeria. This fact seems to support the view expressed by Balasubramanyam (1980) that if developing countries are to derive the maximum benefit from FDI, they should "adopt effective tax policies to transfer income from the foreign firms."

Tax Policies The literature dealing with various tariff protection and various tax concessions offered to foreign firms by developing countries is both complete and convincing. Practically all the studies reviewed in Chapter 4 differed

regarding the impact of tariff protection and tax concessions on the inflow of foreign capital. However, they uniformly show that tax concessions redistribute income in favour of foreign firms. This study has argued in Chapter 4 that tax holiday merely leads to nil tax credit when incomes are repatriated. Further, agreements do not cover relief from import duties obviously because of the practical difficulties involved. If relief from import duties results in higher profits and these are tax free, they merely enhance the tax liability of foreign companies at home. On the basis of its economic impact alone, public policies for industrial stimulation are not as important in explaining Nigeria's industrial development in the last two decades as the size of the country's market in terms of population and expanding income. This is not to imply that tariff protection and tax concessions are not desirable in some cases.

It is our position that Nigeria's government should continue to attract foreign capital and enterprise into joint ventures with Nigerian enterprises. In addition, if the government pays more attention to comparative advantage in choice of industries for development, the importance of tariffs in determining relative prices and the pattern of resources use will be reduced. While there were some indications that Nigerian planners favoured export promotion, the industrialization program in the Third Plan was on the whole designed to substitute domestic products for imports. Much could be done, nonetheless, to give equal treatment to export and import substitutes as this will at least ensure that Nigeria produces in accordance with its advantage.

Choice of Technology

The "appropriateness" of the technologies which are

transferred to LDCs by MNEs has given rise to controversy in recent years. In general, foreign firms including MNEs are found to be more capital intensive than the local firms. Our results would appear to support Forsyth and Solomon's (1977) observation for Ghana that "the direction of these differences is not always the same, and it is not the case, as has been suggested elsewhere, that multinationals always tend to be more capital-intensive or more labour-intensive than local competitors; this appears to vary from industry to industry". However, as we have observed from Chapter 4, the Nigerian government has generally encouraged capital-intensive techniques through favourable tariff treatment for capital goods as well as allocating licenses on a priority basis to importers of capital equipment. If one admits that the Nigerian government has made little or no progress towards permitting an unrestricted play of competitive forces, it is possible that the choice of technology by foreign firms will vary from industry to industry. We agree with Balasubramanyam (1980) that "the incentives provided by developing countries in the form of distorted factor prices and protected product markets may be no less to blame for the adoption of capital-intensive technologies by foreign firms". It is important then that the government should act in favour of competition in product markets. Further, the government needs to ensure that factor prices represent the real social opportunity costs of factors of production.[5] Nevertheless, the Nigerian government action on price distortions has apparently been slowed by the persistence of import substitution policies.

Labour Intensive Technologies

This study has argued against the transfer of technology-intensive production processes where abundant labour has not diminished through increased labour demand; or where labour costs have not risen to a level that justifies the increased use of technology.

In order to promote labour-intensive technologies, the Nigerian government should encourage an applied industrial research designed to produce labour-intensive technologies which would effectively utilize Nigeria's physical resources, which would otherwise be idle, and which could form the basis of other local industries. This also includes capital-saving technology or both labour and capital-saving technologies.[6] If labour-intensive technologies are to survive, a stabilized wage policy must be maintained. As wage costs per man-hour rise, capital-intensive methods become the most economic ones. Consequently, it would be a waste of the country's resources to invest in labour-intensive machinery that would later have to be abandoned.

Finally, this study in Chapter 3 has argued that since the importance of foreign firms in developing and supplying most technologies cannot be underestimated, it would seem that LDCs are left with the choice of selecting and purchasing components of the direct investment "package" separately, whenever possible. However, in the case where the direct investment package cannot be purchased separately, efforts should be made to increase the "technology-absorptive capacity", i.e. a modification of science policy towards adaptive as opposed to basic research.[7]

In conclusion, the results from the quantitative study of the Nigerian industrial sector collaborate the findings of Bruton (1976, pp.71-89) and White (1976). Bruton concluded

that labour-intensive technologies were available in the manufacturing sector of LDCs. Evidently, Bruton found relatively high elasticities of labour substitution by product type. Similarly, White (Ibid., p.589) found that the potential for "technological flexibility" exists in the Pakistani manufacturing sector. At the same time, however, effort to develop more systematic policies that will influence incentives as well as entrepreneurial behaviour are significant, particularly those "policies affecting relative prices". There are some reasons to believe that workable relative prices and "competitive environment" policy arrangements may soon be developed as Nigeria would like to increase its share of benefits arising from foreign direct investment.

FOOTNOTES

Introduction

1 See Balasubramanyam (1980) for an excellent discussion on the North and South debate on these issues.

2 Cohen (1973, p.190) has noted that "the lack of detailed evidence did not, however, prevent the commission from concluding that foreign investment has contributed greatly to the growth of developing countries and can do even more in the future."

3 The main sectors were to be consumer durables, basic intermediates as well as capital goods.

4 See Chenery (1960).

5 Morley and Smith (1969, p.14).

6 See Chapter 6 for further discussion.

7 Oksanen and Williams (1978, p.98).

8 Further discussion in Chapter 7.

9 Mason (1973, p.351).

10 Siegel (1956, pp.116-126).

11 Reuber (1973, p.3) noted that "within the manufacturing sector, direct investment has been most heavily concentrated in industries characterized by advanced and rapidly improving technology, by a high degree of product differentiation and by cost advantages based on relatively cheap labour and raw materials industries such as chemical, rubber, machinery of all kinds, transportation and equipment, and consumer goods".

Chapter 2

1 Denison (1967) and Maddison (1970, p.34).

2 See Helleiner (1966) and Karp (1980, p.302).

3 Onibode (1980) and Aluko and Ijere (1965).

4 Second Progress Report (1974, p.14).

5 See Central Bank of Nigeria (1979, p.173).

6 Karp (1980, p.303) expressed Hirschman coefficient as

$$C = \left[\sum x^2 / \left(\sum x\right)^2\right]^{1/2}$$

Where C = Commodity concentration index
x = Value of an exported commodity in any period.

7 Ibid., p.304.

8 Ibid.

9 Ibid., p.307.

10 See Federal Office of Statistics (FOS) Annual Abstracts of Statistics, various issues.

11 For a more detailed evaluation of the impact of the oil industry on Nigerian economy, see Pearson (1970).

12 See World Bank Report (1974, p.12) and Third National Development Plan (1975-80, p.81).

13 Third National Development Plan (1975-80, pp.65-66).

14 While crude oil exports from recently discovered Nigerian deposits began in 1958, they did not become quantitatively important until 1970.

15 For consumption of electricity by type of consumer, 1960/61-1973/74 and 1975/76, see ECN/NEPA Annual Report.

16 See Olayide (1975, pp.8-9).

17 Ibid., p.9.

18 Ibid., p.119.

19 Olaloku et al., (1979, p.245).

20 Kirkpatrick and Nixson (1983, p.21).

21 Olaloku et al., (p.246).

22 Central Bank of Nigeria (1968, p.70).

23 See Tims (1974, p.77) and Karp (1980, p.311).

Chapter 3

1 See, for example, Tyler (1978).

2 Pack (1976, p.45).

3 White (1976, p.575). He notes that "these are valued, not only for the employment that they will encourage, but also for the more favourable income distribution that is likely to result".

4 Pursell (1981, pp.7-8) notes that "cost of these specific capital inflows should therefore be treated as a specific foreign cost in evaluating activities in which this type of investment is found".

5 Streeten (UNC TAD TD/BK. 3/79/Add. 1. p. 8). See also Iyanda (1975).

6 Lal (1975, p.7) has argued that the views that FDI is expected to substantially replace foreign aid flows as a source of capital for developing countires needs to be treated with caution. This view is consistent with Papanek's (1973, pp.121-122) empirical results. He demonstrated that the coefficient of regression of growth of foreign aid (.39) is nearly twice that of savings (.20), FDI (.17) and other foreign flows (.19). These results bring to dispute the assumption that FDI could bridge the savings gap and foreign-exchange gap. Further, these results seem to suggest that foreign aid is able to fill the two gaps of foreign exchange and savings better than other foreign flows, and is therefore more specifically designed to foster growth. However, Reuber (1973, p.245) has stated that "if the choice lies between foreign aid, inter-governmental and international loans, on the one hand, and more private investment, on the other, the latter option is likely to allow greater scope for national independence and to pose less of a threat to sovereignty than the former". Further, as Hirschman and Bird (1968, p.13) affirm, foreign aid creates a dissonance in the recipient country. This, in turn, disintegrates government support and impels the recipient country to defend its independence by moving away from the position of the donor country especially in areas not covered by the aid agreement.

7 Balasumbramanyam (1980, p.59).

8 Balasumbramanyam, op.cit., p.57. The review of balance of payments and income effects in LDCs is heavily influenced by Iyanda's (1975) work.

9 Weisskopf (1972, p.37).

10 Areskoug (1973, pp.13-14).

11 For other studies in these areas, see BOS, Sanders, and Secchi (1974), Hughes and Seng (1969), Markensten (1972), Helleiner (1973, 1975), and Reuber (1973).

12 Pursell (1980), p.12).

13 Alsaaty (1972, pp.79-138).

14 Edozien (1968, p.202).

15 Ibid.

16 Iyanda (1975, p.187).

17 Forsyth and Solomon (1977, p.260) have argued "that this would lead them to favour capital-using methods, as would the availability of free or, at least, subsidized technical know-how from affiliates".

18 Balasubramanyam (1980, p.46) have noted that "when the firms have monopolistic advantage in the product markets, there is less pressure on them to minimize costs - the objective of the so-called economic man. And the objective of the engineering man to push the production process towards more advanced automated techniques, prevails. This, of course, applies equally to foreign and local firms".

19 Forsyth and Solomon (1977, p.260) observed that foreign firms have the reputation for unnecessarily heavy expenditures on welfare and fringe benefits in LDCs.

20 Helleiner (1975) points out further reasons for the selection of capital-intensive technologies by (MNE) firms. Firstly, capital-intensive techniques are characterized by large-scale production while small scales of production are associated with labour intensive techniques. Since MNEs operate on a large scale, capital-intensive techniques would be preferred. In this view, scale economies dictate the techniques of production as opposed to factor price considerations. Secondly, the prevailing conditions in the LDCs make material inputs more expensive and to a considerable extent, they are difficult to acquire. In this situation, capital-material substitution (mechanized handling which reduces breakages, storage facilities which reduce spoilage and the like), is easier than labour-material substitution. Thirdly, LDCs' governments may put pressure on the MNCs to adopt the latest techniques which are usually capital intensive. The MNEs in interest of 'good citizenship', bow to these pressures.

21 Courtney and Leipziger (1974).

22 Riedel (1975, p.517).

23 The report continues that "although they are short of supervisors, they can recruit them more easily than locally owned firms... foreign firms account for the whole production in some inherently capital-intensive sectors. There are also signs that capital-intensive technical change is affecting the manufacturing sector, and particularly that some large foreign enterprises with brand name advantages have been able to capture and create enough of a market to make use of very capital-intensive, large scale methods", ILO (1972).

24 See Caves (1974).

25 Forsyth and Solomon (1977, p.278).

26 "While the difference in capital intensiveness is not statistically significant at the 95 per cent confidence level, that in labour-intensiveness is significant both at the 95 and 99 per cent confidence levels", Iyanda (1975, p.134).

27 Reuber (1973, p.178).

28 Since productive efficiency is not shared by local firms, foreign firms with this advantage overcome additional costs arising from the cultural, legal and institutional differences, as well as the lack of knowledge of local market conditions and the expense in terms of communication and misunderstanding of operating at a distance.

29 "Assertions along these lines are frequently found in the polemical literature either extolling the virtues of foreign direct investment or condemning it". Tyler (1978, p.361).

30 See Forsyth and Solomon (1977, p.267).

31 See Pack (1976) and White (1976).

[32] While Scitovsky (1943) has recognized that entrepreneurs faced a trade off between profits and leisure and that they would choose between them on the basis of an overall utility framework, White (1976) claims that "simple profit maximization and cost minimization did not provide a complete enough picture".

Chapter 4

[1] Mason (1971, p.171).

[2] Riedel (1975, p.506).

[3] This need was met largely through grants, official development assistance and other aids coming mainly from Britain.

[4] See Balasubramanyam (1980, p.2).

[5] See Iyanda (1975, p.44). He noted that "the confrontation which would have resulted from such a conflict was muted by two factors. First, the colonial office was responsible for both the political and commercial affairs of the territory. It thus resolved any conflicts between the administrators and the companies. The second is that foreign companies were both local monopolists and monopsonists."

[6] See Economic and Financial Review, (1971, p.77).

[7] Federal Ministry of Industries (1971, p.79).

[8] Federal Ministry of Economic Development (1975, p.48). See also Karp (1980, p.309).

[9] Ibid., (p.309).

[10] Industrial Directory (1971, pp.88-89).

[11] See Fiscal Survey of Panama (1964, pp.178-181), Taylor (1954, p.4) and Iyanda (1975, p.50).

[12] Reuber (1973, pp.127-128).

[13] This may not be the case if higher profits in Nigeria are gained by raising the price of subsequent inputs into the cost of foreign production.

[14] Phillips (1968, p.154).

[15] The view that has been expressed in many of the studies, for example, Kilby (1969, p.335), and Sokolski (1966, p.79), is that government efforts aimed at stepping up the indigenization of the private sector of the economy are known to have proved unsuccessful. However, Akeredolu-Ale (1971, pp.206-207), has contested this view on the ground that evaluations of the performance of Nigerian businessmen by most studies have only adopted rather limited and conservative criteria of success. Further, they have assessed the contribution of indigenous enterprise through the analysis of the potentialities of small scale industry.

[16] The Second National Development Plan (1970, p.289).

17 Although the regulation under which companies can be incorporated in Nigeria is set out in the Companies' Decree, 1968 by the Federal Military Government of Nigeria to make better provision for the incorporation, regulation and ... of companies in Nigeria. Nigeria's high priority has been so much with fostering growth in general and especially the growth of manufacturing industry. Little attention is paid to the regulation of market conduct. Further, company law in Nigeria has been a carbon copy of the English legal system until 1968.

18 Federal Ministry of Economic Development (1975, p.29).

19 Rimlinger (1973, p.210), pointed out that such claims do not necessarily indicate ill will on the part of the companies. Managers naturally seek to leave themselves as much freedom as possible in the face of uncertainty regarding the future.

20 Mars (1947, pp.20-21, 50).

21 See the vast literature on the balanced growth and unbalanced growth controversy.

22 Kilby (1969, p.75).

23 May (1965, p.252).

24 Akeredolu-Ale (1972, p.114).

25 Quoted in Hagen (1975, p.270).

26 Kilby, op.cit., p.67.

27 Robinson (1964) has noted that the British colonial government awarded Shell and British Petroleum the total land area of Nigeria as an oil concession in 1937. But the company was only able to export oil from Nigeria in 1958 and full break-even was not expected until 1968.

28 See Teriba, et al., (1972, p.17) for the same conclusion.

29 See Akeredolu-Ale, op.cit., p.59. Since Nigerian companies are likely to be over represented numerically among non-reporting establishments, their actual presence may be understated by these figures. Further, they tended to be relatively small.

Chapter 5

1 Countries such as Hong Kong, Singapore, South Korea and Taiwan have pursued export-led growth development strategies.

2 See Colman and Nixson (1978, p.187).

3 Myint (1970, p.192).

4 National Development Plan (1962-1968, p.34).

5 Coleman and Nixson (1978, pp.207-208 and 213). They argued that "industrial development has not been a planned process in most LDCs, and in general, it has been left in the hands of the private sector. Planning ministries have drawn up broad guidelines and set overall targets for private sector, and government has intervened in an ad hoc and eratic manner (protection, licensing arrangements, etc.) in an attempt to influence private sector behaviour, but this is as far as 'planning' could be said to have gone". Further, this is not to deny the importance of the State's role in the majority of LDCs at the present time, nor its importance in the establishments of intermediate and capital goods industries (in India and Brazil, for example). Many LDC governments have also nationalized foreign manufacturing operations on a large scale.

6 Myrdal (1956, p.276).

7 Edozien (1968, p.196) has noted that the year 1962 witnessed a heavy disinvestment amounting to 15.4 million (30.8%) in the trading sector, a phenomenon which the central bank has attributed partly to a switch by major companies from overseas to Nigerian banks for borrowing and partly to a shift from retail trade to manufacturing by the major companies.

8 See Second National Development Plan (1970-1975).

9 Stewart (1973, p.253). She notes "Technological dependence on the developed countries will be maintained, since without the technological transfer from the developed countries, the developing countries will not be able to compete in international trade."

10 See Sunkel (1973).

11 The contributions of manufacturing to the GNP is smaller than its contribution to GDP since more than 50% of the paid up capital in industrial sector establishment is owned by foreigners. See Olaloku (op.cit., p.34).

12 Lewis (1967, p.16).

13 Sutcliffe (1971, p255), claims that the reduction in the import content of manufactured supplies indicates that import substitution should be used to cover only the direct substitution of domestic production for the import of the same product.

14 Lewis and soligo (1965, pp.94-139).

15 Chenery (1960, p.641).

16 Maizels (1963), noted that the import content of supplies declines with the progress of industrialization, at least up to the point where a fairly matured level is reached.

17 Lewis and Soligo (op.cit., p.107).

18 Ahmed (1968).

19 While greater capital requirements and more sophisticated technological skill make it difficult to proceed beyond the consumer stage, it is further aggravated by the lack of MNC co-operation. The first stage of the process is pushed to the maximum possible extent or put in Felix (1964) sense, the premature widening of the productive sector.

20 Colman and Nixson (1978., p.200) have argued that the problem associated with the tendency of import substitution to get stuck at the stage of consumer goods substitution is not, of course, insuperable and to a certain extent is related to the particular kinds of consumer goods industries established. For example, modern sophisticated capital goods which, to say the least, will prove very difficult to produce locally.

21 Morley and Smith's (1971) results from Brazilian data show approximately one-third more import substitution than Chenery (1960) for manufactured and 53% more for the economy as a whole. Thus, Chenery-type definition of import substitution will lead to underestimation to an extent depending on the development of intermediate goods industries.

22 The ratio of import to domestic supply - cement, concrete and glass products - ranges from 5% to 20%. See Third National Development Plan 1975-80.

23 Chenery, Watanabe and Shisido (1962, pp.98-139).

24 Oyejide (1975, pp.26-27).

25 Trade data is not sufficiently disaggregated in Nigeria especially in consumer goods to permit a further identification of a given product.

26 There is not one generally accepted and consistent measure of import replacement. Different measures can produce different findings and often conflicting estimates of the quantitative importance of import substitution.

Chapter 6

1 Tyler (1978, p.361).

2 Lall and Streeten (1977, p.25).

3 Ibid., (p.26).

4 Hood and Young (1979, p.112).

5 Reuber et al., (1973, p.178).

6 Lall and Streeten (1977, p.57).

7 Ibid.,(p.21).

8 Kopp (1981, p.479).

9 Ibid., (p.480).

10 Hood and Young (1979, p.64).

11 See Walters (1963, p.22) and Tyler (1978, p.367) has suggested that in the event the two data sets are not available, firms could be grouped and the relative technical efficiency is examined among the groups. Further, each group production function can be estimated to test the significance of differences in group estimates.

12 See Vinod (1978, p.121).

13 Rao and Miller (1971, p.91).

14 See Desai (1971, p.67).

15 Chiang (1974, pp.415-416).

16 Bosworth (1976, pp.97-98).

17 Tyler (1978, p.372) has observed that "while there is great variance in K/L ratios over time, foreign firms tend to be more capital intensive than domestic enterprises. Since these foreign firms also tend to be larger than domestic firms, the capital-labour ratio may rise with the scale of production."

18 Many studies in recent years have used labour hours as an explanatory variable. The estimated equiation is given as

$$Y_{jt} = A_t K_{jt}^{\alpha t} (L_{jt} H_{jt})^{\beta t}.$$

However, Fedstein (1967) and Craine have introduced hours as an additional explanatory variable. Their equation is given as

$$Y_{jt} = A_t K_{jt}^{\alpha t} L_{jt}^{\beta t} H_{jt}^{\gamma t}.$$

Critics of the Feldstein & Craine approach have pointed out that strong multi-collinearity between K and L on the one hand and between K and LH on the other hand, make estimates of and unauthentic.

19 Tyler (1978, p.381).

20 Carr (1978, p.44) has noted that the essential element of most direct investment is the special skills and know-how which are included in the package. Profit earnings are thus not merely payment for the capital or foreign exchange received but also for the associated know-how. "A measurement problem arises because the know-how payments also take the form of royalties or technical fees, and there is no agreement as to how the payments are generally divided, or whether profits may be deflated by excessive royalty charges.".

21 Lall and Streeten (1977, p.102).

22 Bosworth (1976, p.104).

23 See for example Nelson (1965).

24 Nerlove (1967).

25 Maddala and Kadane (1967) suggest that if $\hat{\alpha}$ and $\hat{\beta}$ are the least squares estimates of the Cobb-Douglas function parameter then,

$$E(\hat{\alpha}) = v(1-\delta) - \tfrac{1}{2}\rho v\delta(1-\delta)\theta_1$$

$$E(\hat{\beta}) = v\delta - \tfrac{1}{2}\rho v\delta(1-\delta)\theta_2$$

Where θ_1 and θ_2 are the least squares coefficients of $(\text{Log } K - \text{Log } L)^2$ on Log L and Log K. If θ_1 and θ_2 are zero, then $E(\hat{\alpha} + \hat{\beta}) = v$ and there will be no bias in estimate of the returns to scale.

Chapter 7

1 Giddy and Young (1982, p.58) "Where such factors favour a foreign rather than a domestic location, then the foreign direct investment route will be chosen in place of exports."

2 Lall and Streeten (1977, pp.201-30)"Sourcing refers to the production and interchange of specific components, processes and services by geographically dispersed units of a TNC, the aim being to minimise the costs of the total process; the dispersion of IBM units in Europe and the location of electronic plants in Hong Kong, Taiwan or Mexico provide excellent examples."

3 Hodd and Young (1978, p.58).

4 Tschoegl (1982, p.204).

5 Reuber (1973, p.178) has argued that foreign affiliates represent an important source of new entrants for most LDCs which, by comparison to established firms, local as well as foreign affiliates, may be less accommodating to local oligopolistic arrangements, may be more willing to challenge local "rules of the game" and may engage in more competitive behaviour.

6 Oksanen and Williams (1978, p.101).

7 See Dunning (1981, p.274).

8 Iyanda (1975, pp.131-132).

9 Mason (1973, p.172).

10 Reuber (1973, p.172).

11 Ibid., (p.202).

12 Mason (1973, p.351).

13 Iyanda (1975, p.148).

14 Ibid., (pp.159-161).

15 Dunning (1981, pp.282-283).

16 Balasubramanyan (1980, p.43).

17 Olaloku et al., (1979, pp.113-114).

18 See Lall and Mohammad (1983, p.150).

19 Johnston (1972, p.334) and Gramm (1973, p.341).

20 Oksanen and Williams (1978, p.99).

21 Lachenbruch (1975, pp.17-19) and Ladd (1966).

22 See Riedel (1975) and Ladd (1966).

23 See Oksanen and Williams (1978, pp.100-101) for detailed discussion of this procedure.

Chapter 8

1 Lall and Streeten (1977, p.71).

2 See Kahn (1953), Chenery (1953), Galenson and Leibenstein (1955) and Eckstein (1957).

3 For detailed summary of these criteria, see Colman and Nixson (1978, pp.246-254).

4 See Mason (1973).

5 Ibid.

6 Forsyth and Solomon (1977).

7 Lall and Streeten (1977, p.105).

8 Ibid. Such social optimum would need to be postulated in concrete terms.

9 Lall and Mohammad (1983, p.150).

10 See Helleiner (1975), Streeten (1972) and UNCTAD (1976).

11 Hood and Young (1979, p.187).

12 Helleiner (1975, p.169).

13 Forsyth and Solomon (1977, p.267).

14 Mason (1973, p.350).

15 Lary (1968).

16 Kindleberger (1969(.

17 Lall and Streeten (1977).

18 Forsyth and Solomon (1977, p.268).

19 Lall and Streeten (1977, p.27).

20 Lall and Mohammad (1983, p.150). They noted that "Multiplant economies...have a positive and significant effect on MNC entry."

21 See Pratt and Gibbons (1981, p.249).

22 Ibid.

23 Forsyth and Solomon (1978, p.289). See also Gibbons (1976).

24 Forsyth and Solomon (1978, pp.293-294). They have argued that in view of the fact that a high premium is attached to creating new jobs, the choice of technology by the foreign firms in some industries at least, should be considered appropriate - more socially desirable (as well as privately profitable), than the choice of technology by the indigenous firms.

25 See Smyth, Boyes and Reseau (1975, p.27) for a discussion of the implications of using arbitrary measures of size.

26 Knickerbocker (1973) and others have suggested that firms (oligopolistic) normally do not place too much weight on scale consideration in decision to move especially to counter each others decisions.

27 Lall and Streeten (1977, p.101).

28 Ibid., (p.102).

29 See Friedman and Friedman, 1972.

30 See Smyth, Boyes and Peseau (1975, p.52).

31 Lall and Streeten (1977, p.151).

32 Singer (1950, p.477).

33 Onimode (1980.

Chapter 9

1 Morley and Smith (1969).

2 Singer (1950, p.477).

3 Edozien (1966) has noted that with the expansion of the market and the growth of firms, not only will foreign firms or controlled manufacturing industries subcontract some of the work currently done internally by the firms to Nigerian businessmen, but that the auxiliary of satellite industries which are bound to crop up - given the potentially high backward linkage effects of manufacturing industries - will, in the main, be in local hands, p.203.

4 See Reuber (1973, p.149).

5 Balasubramanyam (1980, p.73).

[6] See Marsden (1970, pp.475-502).

[7] Balasubramanyam (Ibid).

INDUSTRIAL SURVEY

OF NIGERIA

1971 & 1972

FEDERAL OFFICE OF STATISTICS
LAGOS, NIGERIA, 1977

APPENDIX 1-A

CONFIDENTIAL

Form IS-66-1

REPUBLIC OF NIGERIA

INDUSTRIAL SURVEY, 1972 Code

MANUFACTURING

Authorised under the 1957 Statistics Act.

Please read carefully the enclosed instructions before completing this form.

Item 1—FORM OF OWNERSHIP (TICK ONE)

_____Sole Proprietorship

_____Partnership

_____Private Limited Company

_____Public Limited Company

_____Government

_____Co-operative

Item 2—PAID UP CAPITAL BY SOURCE OF OWNERSHIP AS OF DECEMBER 31ST, 1972

1. Private Nigerian .. .. £_____
2. Private non-Nigerian .. .. £_____
3. Federal Government .. .. £_____
4. Regional Government .. .. £_____
5. Other (specify)

_____ £_____

TOTAL .. .. .. £_____

Item 3—OPERATIONS DURING 1972

A. First year of operation for this establishment_____
(If this establishment did not operate during 1972 answer only items applicable)

B. Number of months in operation during 1972_____

C. Hours per week and shifts (Explain changes during 1972 if any, under "Remarks")

1. Normal hours of work per week_____

2. Number of shifts worked (Tick one)

_____One shift _____More than one shift.

TO BE DETACHED BY THE STATISTICAL AUTHORITIES

Item 4—IDENTIFICATION

A. Name of establishment_____

2. P.O. Box or P.M.B._____

3. Town_____

B. Actual Physical Location:

1. Number and street_____

2. Town_____

D. Is this establishment part of a multi-unit enterprise? (TICK ONE)

_____Yes _____No

C. Mailing address (if different from B):

1. Number and street_____

E. Name and address of headquarters (if answer to part D is "yes")

Item 5—CONTACT PERSON

Name, address, and telephone number of persons who should be contacted if questions arise regarding this report.

Name (PRINT) *Mailing address* *Telephone number*

Item 6—CERTIFICATION

I certify that the answers to this report are complete and correct to the best of my knowledge and belief and cover the period

_____to_____

Name (PRINT)_____

*Signature*_____

*Official designation or title*_____

Item 7—EMPLOYMENT AND WAGES AND SALARIES DURING 1972

Paid Employees as of the last working day of each month stated. Do not include working owners and unpaid workers (Part D). Wages and salaries INCLUDE allowances, bonuses, and commissions but do not include employer social insurance contributions (Part E) or payments in kind (Part F).

Paid Employees	Number employed as of the last pay period or working day in				Leave Blank	Wages and salaries during 1972
	March	June	September	December		£
A. Nigerian Professional, administrative and managerial						£
Clerical and other office workers						£
Skilled and semi-skilled operatives						£
Unskilled operatives						£
B. Non-Nigerians (Expatriates)						£
C. TOTAL						£

D. Number of other workers as of the end of December 1972

1. Working proprietors _____ 2. Unpaid family workers _____

3. Unpaid apprentices _____ 4. Home workers _____

E. Employer contributions to National Provident Fund and private pension schemes. .. £ _____

F. Non-cash payments for rations, goods in kind, housing, clothing and medical benefits (valued at cost)

Nigerians £ _____ Non-Nigerians (Expatriates) £ _____

Item 8—KIND OF ACTIVITY

Describe briefly the activities of this establishment such as products manufactured or processed, merchandise handled, types of services performed, or repairs made. (For example : baking, saw milling, palm oil milling, motor repairing, wooden furniture making, etc.)

Item 9—Quantity of Goods produced and sold, Value of Goods sold, Contract Work, Resales, and Miscellaneous Receipts during 1972

A. Value of goods sold: In column 1 describe each product of this establishment and in column 6 report the total value of goods sold including taxes already paid and the cost of transportation provided by you.

Description of product and by-products (1)	Leave Blank (2)	Unit of measure (3)	Quantity of goods produced (4)	Quantity of goods sold (5)	Value of goods sold (6)
1.					£
2.					£
3.					£
4.					£
5.					£
6.					£
7.					£
				Total Value	£

B. Value of contract work done for others on their material

Describe _____ £ _____

C. Miscellaneous receipts for repairs or maintenance work done for others

Describe _____ £ _____

D. Resales of products bought and resold without further manufacture or processing

Describe _____ £ _____

E. Value of assets produced by own employees for capital account _____ £ _____

F. Total (Items A through E) _____ £ _____

Item 10—Value of Inventories at Beginning and End of Year

If inventory accounts are kept, show book values of each type of inventory listed below; otherwise provide careful estimates, using the delivered price of the last purchase of each item before the reference dates less rebates or discounts but including taxes and duties.

Type of inventory	Value of inventories (£)		Leave blank
	Beginning of year	End of year	
A. Raw materials, containers, component, fuels, etc.			
B. Work in process			
C. Finished products			

Item 11—Cost and Quantity of Raw Materials and Cost of Fuels, Electricity and other Expenses in 1972

A. Description of principal raw materials, component parts, containers used (1)	Leave Blank (2)	Unit of measure (3)	Quantity (4)	Cost (5)
1.				£
2.				£
3.				£
4.				£
5.				£
6.				£
7. Minor raw materials				£
B. Fuels (specify) 1.				£
2.				£
C. Electricity purchased				£
D. Cost of contract work done by others on materials supplied by the establishment				£
E. Cost of repairs and maintenance work done by others				£
F. Cost of goods bought and resold without further manufacture				£
G. Excise Taxes				£
H. Other costs, total				£

Details of other costs (optional):

1. Rental payments £ _____ 2. Professional fees £ _____
3. Office material, telephone and postage £ _____ 4. Insurance £ _____
5. Advertising £ _____ 6. Hired transport £ _____
7. Water £ _____ 8. Others (specify) £ _____

(Do NOT include labour expenses, interest charges, taxes on earnings, or depreciation).

I. Total costs (sum of A to H)	£

Item 12—Value of Fixed Assets, Capital Expenditures, and Sales of Fixed Assets

Type of Assets (1)	Original Book Value of all fixed Assets, January 1st, 19. (2)	Cost of additions to assets during 1972			Receipts for sales during 1972 (6)	Depreciation during 1972 (7)	£ Expected capital expenditure during 1973 (8)
		New (3)	Used (4)	Produced by own labour (5)			
A. Vehicles							
B. Machinery and equipment							
C. Residential buildings							
D. Other Buildings							
E. Civil Engineering works							
F. Land							
G. Total (sum of A-F)							

Item 13—Capacity of Power Equipment and Electricity generated

	Number of Units	Rated Horsepower
1. Prime movers connected to machinery but not to generators		
2. All electric motors		
3. Electricity generated (in Kilowatt hours)		

Item 14—Remarks

Appendix 4-A

1. Advertising agencies and public relation businesses
2. All aspects of pool-betting businesses and lotteries
3. Assembly of radios, radiograms, record changers, television sets, tape recorders, and other electric domestic appliances not combined with manufacture of components.
4. Blending and bottling of alcoholic drinks
5. Blocks, bricks, and ordinary tiles manufacture for building and construction
6. Bread and cake making
7. Candle manufacture
8. Casinos and gaming centers
9. Cinemas and other places of entertainment
10. Clearing and forwarding agencies
11. Hairdressing
12. Haulage of goods by road
13. Laundry and dry cleaning
14. Manufacture of jewelry and related articles
15. Newspaper publishing and printing
16. Ordinary garmet manufacture
17. Municipal bus services and taxis
18. Radio and television broadcasting
19. Retail trade (except by or within department stores and supermarkets)
20. Rice milling
21. Singlet manufacture
22. Tire retreading

Schedule II: Enterprises Barred to Aliens under Certain Conditions (40-percent equity participation by Nigerians required)

1. Beer brewing
2. Boat building
3. Bicycle and motorcycle tire manufacture
4. Bottling soft drinks
5. Coastal and inland waterways shipping
6. Construction industries
7. Cosmetics and perfume manufacture
8. Department store and supermarkets
9. Distribution agencies for machines and technical equipment
10. Distribution and servicing of motor vehicles, tractors, and their spare parts or other similar objects
11. Real Estate agency
12. Fish and shrimp trawling and processing
13. Furniture making
14. Insecticides, pesticides, and fungicides
15. Internal air transport (schedule and charter services)
16. Manufacture of bicycles
17. Manufacture of cement
18. Manufacture of matches
19. Manufacture of metal containers
20. Manufacture of paints, varnishes, and similar articles

Appendix 4-B

INDUSTRIAL ENTERPRISES PANEL 1976

Additions to Existing Schedule I

1. Cosmetics and perfume manufacture
2. Supermarkets and department stores having annual revenues of less than N2 million
3. Distribution agencies, excluding motor vehicles, machinery and equipment, and spare parts
4. Real estate agency
5. Furniture making
6. Manufacture of suitcases, briefcases, handbags, purses, wallets, portfolios, and shopping bags
7. Passenger bus services of any kind
8. Poultry farming
9. Printing of stationery (when not associated with printing of books)
10. Slaughtering, storing, distributing, and processing of meat
11. Travel agencies
12. Wholesale distribution (of local manufactures and other locally produced goods)
13. Commercial transportation (wet and dry cargo and fuel)
14. Film distribution (including cinema films)
15. Manufacturers' representatives
16. Indenting
17. Commission agents

Additions to Existing Schedule II

1. Supermarkets and department stores having annual revenues of more than N2 million
2. Banking: commercial merchant and development banking
3. Insurance: all classes
4. Mining and quarrying
5. Basic iron and steel manufacture
6. Cement manufacture
7. Petrochemical feed-stock industries
8. Fertilizer production
9. Pulp and paper mills
10. Plantation sugar and processing
11. Salt refinery and packaging
12. Construction industries
13. Plantation agriculture for tree crops, grains, and other cash crops
14. Textile manufacturing industries
15. Internal air transport (schedule and charter services)
16. Oil milling and crushing industries
17. Distribution and servicing of motor vehicles, machinery and equipment transport, and their spare parts
18. Literages
19. Wholesale distribution of imported goods

21. Manufacture of detergents and soaps
22. Manufacture of suitcases, briefcases, handbags, purses, wallets, portfolios, and shopping bags
23. Manufacture of wire, nails, bolts, nuts, rivets, and similar articles
24. Paper conversion industries
25. Passenger bus services (interstate)
26. Poultry farming
27. Printing of books
28. Production of sawn timber, plywood, and veneers and wood conversion industries
29. Screen printing on cloth and dyeing
30. Slaughtering, storing, distributing, and processing of meat
31. Shipping
32. Travel agencies
33. Wholesale distribution

Source: Nigerian Enterprises Promotion Board, Nigerian Enterprises Promotion Decree, 1972 (Logos: NEPB, 1973), pp. 9-10.

Proposed Schedule III

All other enterprises not coming within Schedules I or II should have a minimum Nigerian participation of 49 percent (paragraphs 8, 19).

The second stage of the indigenization scheme shall go into effect not later than December 31, 1978. This will give time for efficient execution of the scheme. The ministries of justice and industries are directed to ensure that all legislation reorganization and strengthening of the Nigeria Enterprises Promotion Board and other preparatory work should be completed forthwith.

Source: Federal Republic of Nigeria, Federal Military Government's Views on the Report of the Industrial Enterprises Panel (Lagos: Federal Ministry of Informtion, 1976), pp. 8-11.

APPENDIX

Summary Statistics by Industry (# millions)

ISK	Industry Group	Table 5-A1 1965 - 1966 Gross Output	Value Added	Imports	Exports	Total Supply	Domestic Supply	Table 5-A2 1970/1971 Gross Output	Value Added	Imports	Exports	Total supply	Domestic demand	Table 5-A3 1973/1974 Gross output	Value added	Imports	Exports	Total supply	Domestic demand	No.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
3111-22	Food and beverages	103.8	43.8	46.074	99.364	149.874	50.51	221	108	57.694	176.702	278.894	111.192	203.31	160.83	126.26	160.89	329.57	168.68	1
3131-40	Tobacco, beer & spirits	30.4	23	4.018	.086	34.418	34.332	44.2	34.6	3.962	.008	48.162	48.162	85.255	23.5	5.237	.075	90.487	90.4=2	2
3211	Textiles	41	16.4	83.274	11.972	124.274	112.302	206.4	95	59.343	12.102	265.743	253.641	208.05	78.86	87.37	4.8	295.42	290.62	3
3231	Leather	6.2	3	3.082	2.918	9.282	6.363	22.4	6	1.3	3.578	23.7	20.122	31.59	11.28	5.43	6.871	37.02	30.147	4
3311-20	Wooden products	15.6	8.8	13.382	2.414	28.982	26.568	21.2	10.2	20.086	5.714	41.286	35.572	29.26	15.05	34.719	11.775	63.979	52.204	5
3412-20	Paper, printing	11.4	5.8	8.988	-	20.388	20.388	39.5	16.6	6.350	-	46.250	46.250	68.63	31.77	12.816	-	81.446	81.466	6
3521-50	Chemical products	32.2	14.8	40.384	.132	72.584	72.452	110.6	56.8	88.4	.284	199	198.716	175.01	91.5	133.395	.815	305.405	307.59	7
3551-59	Rubber	26.6	11.4	4.330	21.852	30.930	9.078	34.4	15.6	8.641	15.180	43.041	26.861	39.76	20.33	9.784	19.396	49.544	30.148	8
3560	Plastics	3.6	1.6	2.422	-	6.022	6.022	11.2	5.2	6.959	-	18.159	18.159	25.10	4.68	8.407	-	33.507	33.507	9
3610-20	Pottery & glass	.8	.4	3.130	-	3.930	3.930	4.6	2.2	3.395	-	7.995	7.995	4.69	1.92	17.05	-	21.74	21.74	10
3691-99	Other non-metallic	21.8	11.8	12.204	4.350	34.004	29.654	18.6	9.6	16.707	15.458	35.307	19.849	46.58	28.74	37.785	30.58	84.365	53.785	11
3720-3819	Basic metal	63	13.8	64.680	.128	127.680	127.552	90.4	26	70.075	-	160.475	160.475	143.26	40.21	97.536	-	240.796	240.796	12
3822	Machinery	1.8	1	82.138	-	83.938	83.938	2.4	.8	115.677	-	118.077	118.077	1.4	.33	177.772	-	179.172	179.172	13
3832	Electrical equipment	5.2	1.4	38.090	-	43.290	43.290	13.2	3.8	47.948	-	61.148	61.148	20.72	4.53	92.97	-	113.69	113.69	14
3841-43	Transport	18	3.2	64.600	-	82.600	82.600	2	1.2	96.813	-	98.813	98.813	7.63	3.78	220.626	-	228.256	228.256	15
39	Misc.	1.6	.8	41.078	.138	42.678	42.540	5.2	2.8	36.383	3.8	41.583	377.83	2.24	.94	94.174	20.629	96.414	75.785	16
Total Manufacturing		383	161	511.874	143.354	894.874	751.52	847.7	394.4	639.733	224.826	1487.673	1262.807	1092.48	518.25	1161.331	255.831	2253.811	1997.990	
Industry primarily producing																				
Consumer goods																				
1+2+4+5+6+10		168.2	84.8	78.674	104.782	246.874	142.092	353.3	177.6	92.787	177.002	446.287	269.285	422.73	244.35	201.512	179.611	624.241	444.649	
Intermediate goods																				
3+7+8+9+16		105	45	171.488	34.094	276.488	242.394	367.8	175.4	199.726	32.366	567.526	535.16	450.16	196.31	333.13	45.64	783.29	737.65	
Capital goods																				
11+12+13+14+15		109.8	31.2	261.717	4.478	371.512	357.034	126.6	41.4	347.22	15.458	473.82	458.362	219.59	77.59	626.689	30.58	846.279	815.599	

Sources: See Appendix A.

Appendix 5A-4

ABSOLUTE CONTRIBUTION OF THREE SOURCES OF GROWTH IN MANUFACTURING INDUSTRY

	Food & Beverages	Tobacco,beer,spirit	Textiles	Leather	Wood products	Paper, printing	Chemical products	Rubber	Plastics	Pottery & glass	Non-metallic	Basic metal	Machinery	Electrical equip.	Transport	Miscellaneous	Total Manufacturing	Consumer goods	Intermediate goods	Capital goods	
1963/6-1973/4																					
(1) Domestic supply + (Period 1) Total supply	-.692	.883	.329	.667	.528	.559	.445	.860	.597	.203	.641	.493	.021	.121	.215	.037					
(2) Domestic supply + (Period 3) Total supply	.616	.942	.704	.853	.457	.842	.567	.802	.749	.215	.552	.594	.007	.182	.033	.023					
(3) Two minus one	-.076	.059	.375	.186	-.081	.283	.124	-.058	.152	.012	-.089	.101	-.014	.062	.184	.014					
(4) Domestic demand	82	50	58	15	14	34	104	18	16	4	15	56	2	8	32	1	509	-199	197	113	
(5) Export demand	43	-.009	-2	3	5	0	.3	-2	0	0	17	.06	0	0	0	.6	64.951	50.991	-3.1	17.06	M Mil
(6) Import substitution	-25	5	110	7	-5	23	38	-3	5	.3	-8	24	-3	7	-42	-1	132.3	5.3	149	.22	
(7) Change in domestic supply	100	56	167	25	14	57	143	13	22	4.3	25	80	.4	16	-10	.6	713.3	256.3	345.6	111.4	
1965/6-1970/1																					
(1) Domestic supply + (Period 1) Total supply	.692	.883	.329	.667	.538	.559	.445	.866	.597	.203	.641	.493	.021	.121							
(2) Domestic supply + (Period 2) Total supply	.792	.917	.776	.945	.513	.862	.555	.799	.616	.575	.526	.563	.020	.215							
(3) Two minus one	.1	.034	.447	.278	-.025	.303	.112	-.061	.019	.372	.115	.070	-.001	.095							
(4) Domestic demand	42	12	46	9	5	14	56	15	7	1	-6	16	.7	2	4	-.2	223.5	83	123.8	16.7	
(5) Export demand	47	-.07	.04	.44	1.7	-	.22	-5	-	-	7.12	.06	-	-	-	.13	51.52	49.07	-4.61	7.06	M Mil
(6) Import substitution	28	2	119	6.5	-1	14	22	-3	.3	3	-4	12	-.1	6	-19	6	199.7	51.52	142.3	-5.1	
(7) Change in domestic supply	117	14	165	16	6	29	78	8	8	4	-3	27	1	8	-16	4	466	136	261	17	
1970/1-1973/4																					
(1) Domestic supply + (Period 2) Total supply	.792	.917	.776	.945	.513	.862	.555	.799	.616	.575	.526	.563	.020	.215							
(2) Domestic supply + (Period 3) Total supply	.616	.942	.704	.853	.457	.842	.567	.802	.709	.215	.552	.594	.007	.182							
(3) Two minus one	.196	.025	.072	.092	-.056	-.02	.012	.003	.133	-.360	.026	.031	-.013	-.033							
(4) Domestic demand	46	39	29	9	8	10	60	3.2	9	8.1	18	45	1	11	3	5	324.3	140.1	10.2	78	
(5) Export demand	-7	.1	-6	3	3	0	.3	3	-	8	8	-	-	-	-	2	6.4	-.9	-.7	8	M Mil
(6) Import substitution	-58	2	-21	-7	-4	-2	4	-1	4.5	-8	2	7.5	-2	-4	3	-10	-99.9	-70	-22.4	6.5	
(7) Change in domestic supply	-18	41	2	9	8	29	64	5	14	.1	28	53	-1	8	6	-3	245.1	69.1	82	94	

Appendix 7-A

Discriminant Analysis

Discriminant analysis is designed for cases where a variable (or set of variables) is assumed to fall into one of a member of discrete categories. In the present case the categories are foreign (MNEs) and local firms. The object is to obtain a linear combination of a set of measurements that will optimally classify observations into each group.

The approach adopted here follows Johnston (1972) and Forsyth and Solomon (1977). The framework, as developed by Johnston, discriminates between the member of two or more populations (P_1 and P_2) on the basis of a set of measurements on the attributes of members of the population. A priori probabilities of population membership are given by P_1 and P_2 for respective populations.

Classification of an observation depends on the vector of measurements. As illustrated by equation (6.1), observations can optimally be classified into one or other groups.

$$Y_{i_{1972}} = b_1 \text{ Ln } X_{1_i} + b_2 \text{ Ln } X_{2_i} + b_3 \text{ Ln } X_{3_i} \ldots b_{44} \text{Ln } X_{44_i} \qquad (6.1)$$

In equation (6.1), the estimation of the coefficients does not depend upon a set of observations for a dependent variable. This implies that maximization with respect to vector b of across-group variations in the data relative to within group variation gives a linear combination of the original variables.

Since the case we want to treat is a distribution that has a density function, the population density is given as f_1 (X) and f_2 (X), in P_1 and P_2 respectively. As one way of defining 'minimum cost' in the two populations, a priori probabilities of population membership are given by P_1 and P_2 for individual populations. This is followed by a classification rule which divides X space into the regions, R_1 and R_2. If the observation falls in R_1, it can be classified as coming from P_1 or multinational enterprise firms and if the observation falls in R_2, we allocate it as coming from P_2 or indigenous firms.

We are concerned with optimal discrimination or the procedure that minimizes misclassification costs. This requires a classification rule which minimizes the expected costs of misclassifications. The probability that an individual is wrongly classified from an observation from P_1 is

$$f(2/1, R_1) = \int_{R_2} f_1 (X)\, dX$$

classified as,

$$f(1/2, R_2) = \int_{R_1} f(X)\, dX$$

Accordingly, the cost of misclassification is given by,

$$C(2/1)\, P_1 \int_{Rs} f_1 (X)\, dX + C(1/2)\, P_2 \int_{R1} f_2 (X)\, dX =$$

$$C(2/1)\, P_1 f_1 (X) - C(1/2)\, P_2 f_2 (X)\, dX + C(1/2)\, P_2$$

where $C(1/2)\, P_2 = \phi$, $(X) = R_2$ = positive constant.

The whole equation is minimized if $\phi(X)$ or R_2 is defined as the set of X's for which $R_2 \leq 0$. Our application of this technique assumes a priori probabilities of $P_1 = P_2$. Let $C(1/2) = C(2/1) = 1$, (the misclassification costs). The logarithms of R_1 and R_2 regions can be stated as,

$$R_1 : \text{Ln } f_1 (X) - \text{Ln } f_2 (X) \geq o$$

$$R_2 : \text{Ln } f_1 (X) - \text{Ln } f_2 (X) < 0$$

Further, our application includes the assumption of two multivariate normal populations with equal co-variance and different mean vectors. Let $P_1 : X = N(\mu_1, \Sigma)$, j and $P_2 : = N (\mu_2, \Sigma)$. We can find the desired discriminant function by transforming,

$$\text{Ln } f_1 (X) - \text{Ln } f_2 (X) = 1/2 \ (X - \mu^2)' \Sigma^{-1} \ (X - \mu^2) - 1/2$$

$$(X - \mu^1) \ \Sigma^{-1} \ (X - \mu^1)'$$

and this gives the discriminant functions for P_1 P_2 (i.e. D_{12}).

$$D_{12} = X' \ \Sigma^{-1} \ (\mu_1 - \mu_2) - 1/2 \ (\mu_1 + \mu_2)' \Sigma^{-1} \ (\mu_1 - \mu_2)$$

$$R_1 : D_{12} > 0 \qquad R2 : D_{12} < 0. \qquad (6.3)$$

The overall goodness of fit can be examined in a number of ways. First, we wish to test the null hypothesis that there is no difference in the mean vectors over the two groups. In this context, the distance between main vectors are measured by Wilks' λ.

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