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Nigeria's Non-Oil Exports: Determinants of Supply and Demand, 1970-90

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Abstract

This paper reviews Nigeria's non-oil export performance during the period 1970-90, analyzes the factors underlying the dismal performance, and estimates the supply-price elasticity of the exports for both the short and long run. A distinguishing feature of the analysis is the incorporation of the effect of domestic demand in the export supply equation for agricultural commodity exports -- a feature usually reserved for the manufactured goods where it is generally assumed that domestic demand competes with export demand. The results provide evidence of the adverse effects of restrictive government policies on exports and underscore the utility of pricing policy in eliciting export supply.

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Summary

Since 1986, the Nigerian Government has undertaken a series of measures designed to promote non-oil exports, including exchange rate and institutional reforms. The success of the measures will depend, inter alia, on what factors constrain export growth, and on the responsiveness of the exports to price incentives. This paper, therefore, examines the factors underlying the past performance of Nigeria's non-oil exports, and attempts to estimate the supply-price elasticities of Nigeria's agricultural exports. It uses a model that specifies both demand and supply side determinants of exports, measures the responsiveness of export volumes to these determinants, and distinguishes long-term developments from short-term fluctuations.

A dominant theme in studies that have examined the erosion of Nigeria's agricultural and other non-oil exports is that unfavorable domestic terms of trade for exports, declining output, and increasing domestic demand are the principal contributors to the dismal performance, and that these factors reflect the interaction of inappropriate domestic pricing policies and the oil boom. The results of this study accord with findings of earlier studies, and generally support the view that domestic market conditions strongly influenced export behavior in Nigeria. The elasticities derived from the model indicate a positive, although relatively limited, response of agricultural exports to price incentives, a structural shift in the export supply function associated with the export promotion measures, and a fairly short lag in the response of exports to the explanatory variables. There is also evidence that further expansion in exports was limited by growing domestic demand. Overall, the results provide evidence of, and support for, the usefulness of pricing policy in export promotion.

I. Introduction

The weakening of the world oil market in the early 1980s and Nigeria's ensuing payment difficulties rekindled the urgency for diversifying the country's export base. To promote non-oil exports, Nigeria introduced in 1986, as part of its structural adjustment program, a number of measures which included reform of the exchange rate system, elimination of export licensing, abolition of commodity marketing boards, and other export promotion initiatives. ^{1/}

The overall success of the export promotion strategy will depend, inter alia, on what factors constrain export growth and on the responsiveness of producers to changes in the exchange rate and relative prices. Accordingly, a better understanding of the determinants of past export performance, and the direction and magnitude of the relevant elasticities, is desirable. This study, therefore, reviews the performance of Nigeria's non-oil exports and investigates the price responsiveness of export supply, using data for the period 1970-90.

The paper is organized as follows: Section II provides a synopsis of Nigeria's export performance since 1970, followed in Section III by a review of the factors underlying Nigeria's dismal export performance. In Section IV, we delineate a methodological framework to quantify the determinants of Nigeria's exports, and estimate supply elasticities. The study's principal conclusions follow in Section V. Definitions of the data used in the estimation, and the sources of these data are given in Appendix I.

II. Developments in Non-Oil Exports, 1970-90

1. Composition and structure of non-oil exports

Agricultural products dominate Nigeria's non-oil export trade, accounting for nearly 70 percent of the value of non-oil exports. Agro-manufactures and semi-manufactures have remained relatively insignificant, averaging 7.9 percent over the period under review. Miscellaneous and other manufactures, including tin metal, textiles, and fertilizer, account for the remainder. Small quantities of minerals, consisting predominantly of columbite, were exported during the 1970s, but exports of this mineral virtually disappeared in the 1980s (see Chart 1).

Of the agricultural products, cocoa beans are the single most important export commodity, representing more than half of the total value of non-oil exports since 1975. Rubber and palm kernels have been of limited importance, with each accounting for less than 10 percent of the total value of

^{1/} For a detailed account of the incentives proffered, see Central Bank of Nigeria: Annual Report and Statement of Accounts, and Export (Incentives and Miscellaneous Provisions) Decree 1986.

agricultural exports. Coffee exports have been small and erratic. Other agricultural commodities such as hides and skins, groundnuts, groundnut oil, palm oil, and timber were of great importance in the early 1970s but have greatly diminished in significance since then because of restrictions governing their export. 1/ Since 1988, several agricultural products--including pineapples, cashew nuts, spices, fish and shrimps--have been exported, albeit in relatively small quantities.

Agro-manufactures consist mainly of processed cocoa products, including cocoa butter, powder, cake, and paste. Exports of groundnut cake diminished after 1976. Manufactured exports have been dominated by tin metal, whereas textiles and fertilizer have only been exported recently, and account for a minute proportion.

The geographical distribution of Nigeria's non-oil exports is heavily concentrated in Europe. The countries of the European Community absorb more than 70 percent of Nigeria's non-oil exports. West Germany, the Netherlands, and the United Kingdom represent the country's major export markets. The share of the United States has been constant at about 10 percent. Exports to Japan have remained below 3 percent. Despite efforts to stimulate inter-African trade through the creation of the 16-member Economic Community of West African States (ECOWAS) and other treaties, exports to African countries constitute only 3.0 percent of Nigeria's non-oil exports.

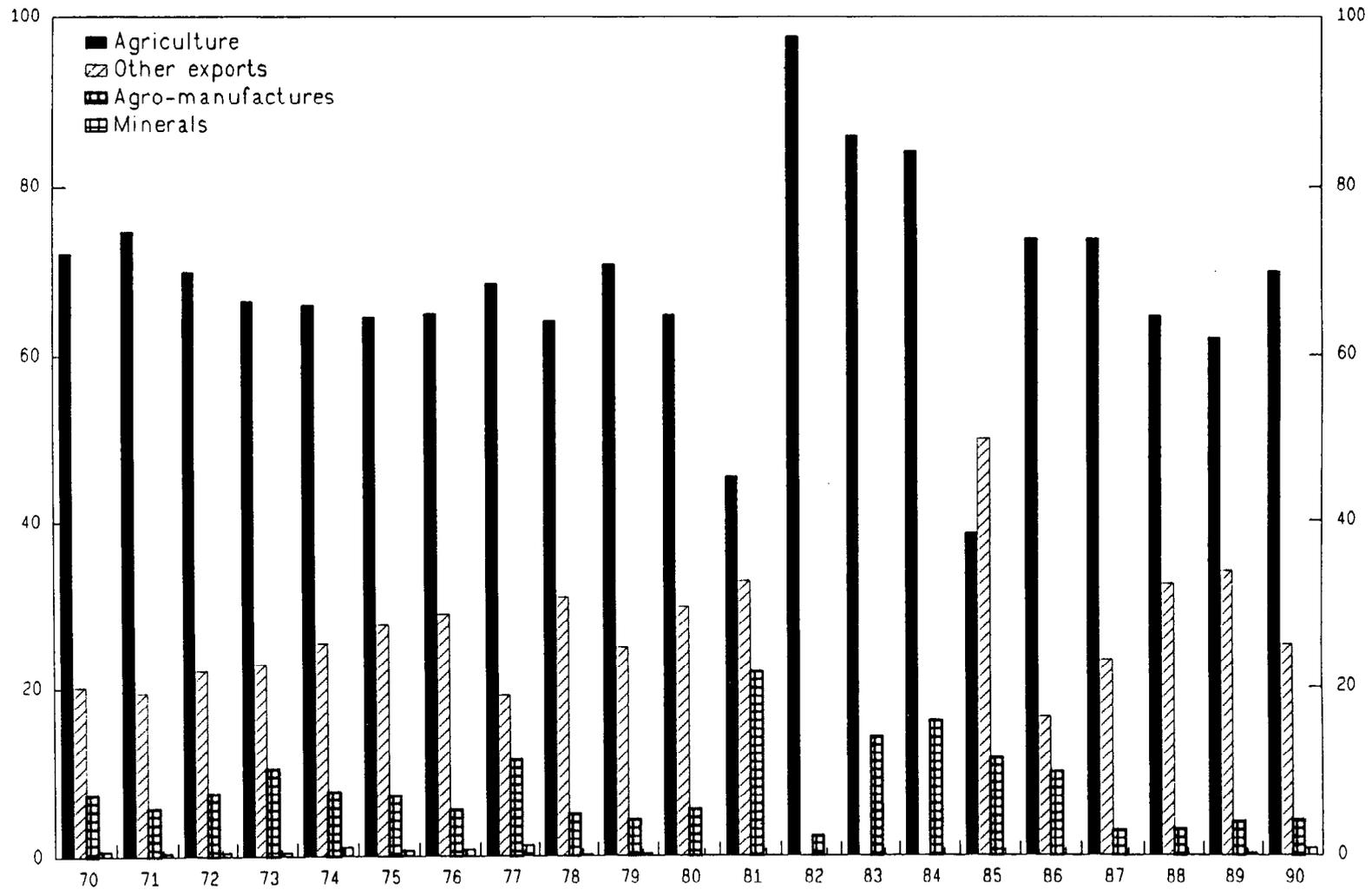
2. Performance of non-oil exports

Several indicators of performance show that non-oil exports fared poorly during the 1970-90 period. The share of non-oil exports in total exports diminished from 40 percent in 1970 to less than 5 percent for much of the 1980s, while the contribution to GDP declined from 6.5 percent in 1970 to 0.4 percent by 1984, and only recovered somewhat thereafter reaching 1.3 percent by 1990. In international markets, Nigeria lost market shares in all commodities, except palm kernels (see Appendix II, Table 7 & 8).

Although the diminishing importance of non-oil exports in the Nigerian economy was inevitable because of the colossal increase in oil exports, non-oil exports also declined in absolute terms, particularly during the 1980s. A composite volume index for non-oil exports shows that by 1980 exports were one third below the level obtained in 1970, and no major improvement was registered in the subsequent decade, except for the aberration in 1988, which was caused by the exceptional surge in cocoa exports (Chart 2). Virtually all the commodities contributed, in varying magnitudes, to the decline. Cocoa exports showed a continual decline except in 1988, while palm kernels and rubber exports were virtually halved after 1978. Exports of cotton, hides and skins, timber, groundnuts, palm oil, and groundnut oil disappeared by the close of the 1970s. The value of non-oil exports

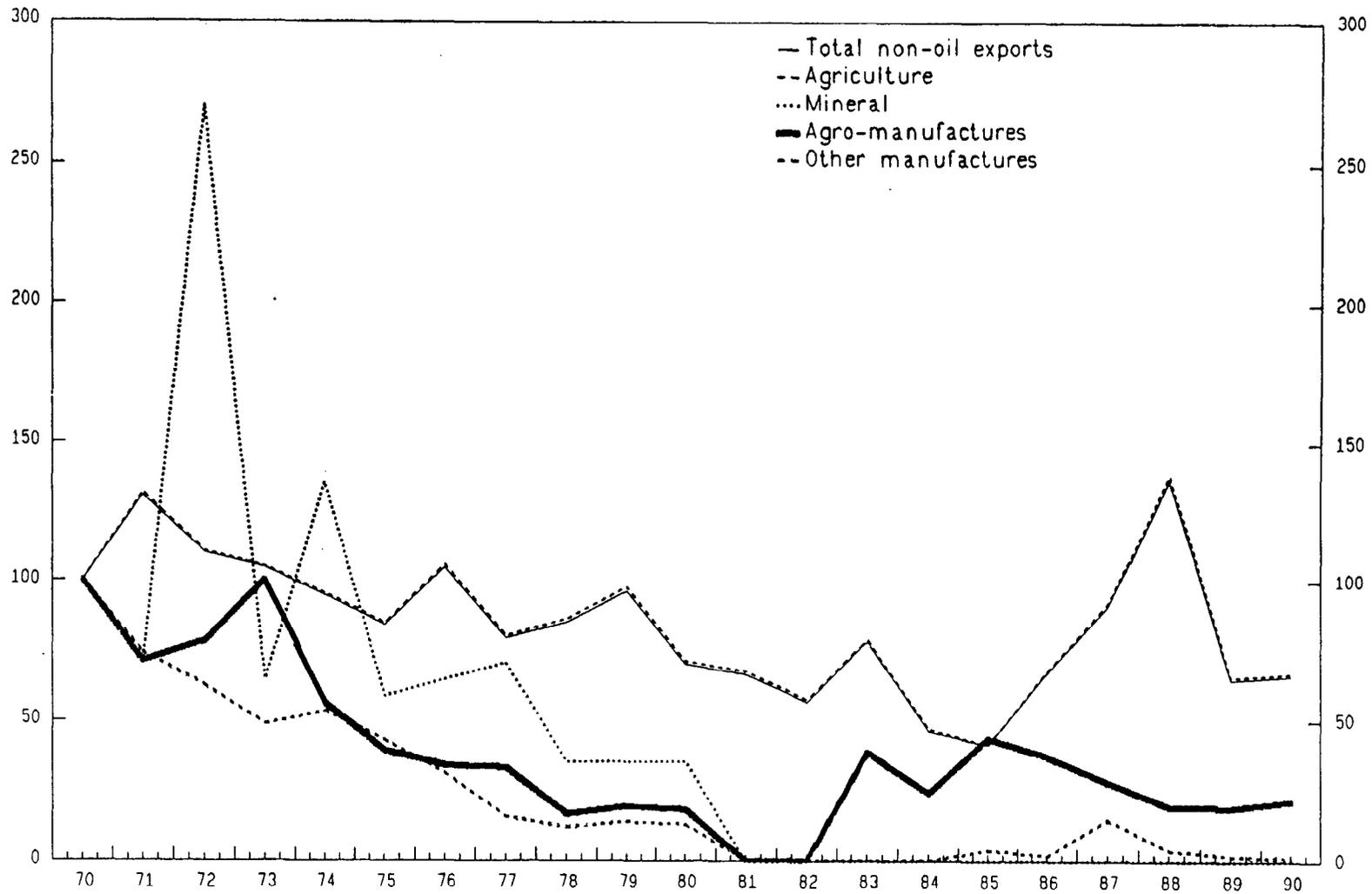
1/ A chronological account of quantitative restrictions on exports is provided in Section III.

CHART 1
 NIGERIA
 STRUCTURE OF NON-OIL EXPORTS, 1970-90
 (In percent)



Source: Central Bank of Nigeria, Annual Report and Statement of Accounts

CHART 2
 NIGERIA
 DEVELOPMENTS IN NON-OIL EXPORTS, 1970-90
 (Export Volume Index, 1970=100)



Source: Central Bank of Nigeria, Annual Report and Statement of Accounts



exhibited a similar trend, because world prices of most commodities were weak throughout most of the 1980s.

The decline in Nigeria's exports contrasts markedly with trends in world trade. It is also at variance with income growth in industrial countries during the 1970-90 period. Comparative figures on export growth rates show that, with the exception of palm kernels, world trade of corresponding commodities grew, while Nigeria's exports declined. Real GDP of industrial countries, Nigeria's major trading partners, also grew on average by 2.8 percent between 1970 and 1990.

Table 1. Comparative Growth Rates of Selected Commodities, 1971-90 1/

	Nigeria	World
Cocoa	-2.1	2.3
Palm kernels	-6.6	-8.8
Rubber	-0.5	1.8
Groundnuts	-40.2	0.2
Coffee	-9.1	1.6
Cotton	-15.9*	1.3
Hides and skins	-21.8	7.7
Palm oil	-14.6*	8.2
Groundnut oil	-16.9*	2.3

Sources: Central Bank of Nigeria, Annual Report and Statement of Accounts; and UNCTAD Commodity Year Book.

III. Determinants of Past Export Performance

A dominant theme in studies that examined the erosion of Nigeria's agricultural and other non-oil exports is that, unfavorable domestic terms of trade for exports, declining agricultural output, a loss in international competitiveness, and increasing domestic demand are the principal contributors to the dismal performance. 2/ These developments, in large measure, reflect the interaction of the oil boom and inappropriate domestic policies.

The oil boom created disincentives for agricultural exports through its impact on relative product and factor prices, including the appreciation

1/ These growth rates were obtained using the semi-log growth model, and therefore reflect trends that are not unduly influenced by exceptional values. Asterisks indicate that the outcome was not statistically significant, either because there is no discernible trend or available observations were insufficient.

2/ See for instance Olayide and Olatunbosun (1970), Ojo (1977), Scherr (1989), Okonkwo (1989), Oyejide (1986), and Nigeria's Ministry of Agriculture (1988).

of the exchange rate, the enhanced profitability of investments in non-tradable commodities and services, and rising wages in the public sector, which drained labor from rural areas and put an upward pressure on rural wages. Nigeria's real effective exchange rate appreciated by 63 percent between 1970 and 1980 and by a further 84 percent between 1980 and 1984 (Appendix II, Table 7 & 8). 1/ Concurrently, labor costs increased at an annual rate of 20.7 percent during 1970-82, compared with an average annual increase of the consumer price index of 17.5 percent a year, indicating that wages rose in real terms. 2/ The price-cost squeeze, resulting from a real effective appreciation of the Naira and the rising unit labor costs, adversely affected the profitability and competitiveness of exports. 3/

Another corollary of the oil boom is the high level of effective demand that it induced, which grossly curtailed exportable output. The oil boom during the 1970s enabled Nigeria's real per capita GDP to increase at an annual average of 1.2 percent between 1973 and 1980, while the population grew at an average rate of 2.4 percent between 1970 and 1990. In the absence of changes in population characteristics, such increases in per capita income accelerate the average per capita growth in demand for domestically consumed crops beyond that prescribed by the population growth rate, particularly for crops with an income elasticity of more than 1. 4/ Increases in incomes that are not matched by output increases lead to inflationary pressures that raise profit margins on domestic sales in relation to exports, and goods may be diverted to the home market, leading to a fall in export surpluses. The restrictive effect of increasing domestic demand on exports is pronounced in Nigeria's case, because most export commodities enter directly or indirectly into domestic consumption.

The overall growth in domestic demand, and the increase that is attributable to the growth in per capita income, is difficult to quantify in the absence of information on the size of the income elasticities of the commodities. However, to the extent that domestic demand, at a given period

1/ During the 1970s, exchange rate policy in Nigeria aimed at maintaining a stable nominal exchange rate in order to moderate the impact of external inflation on the domestic economy. This policy stance was reinforced by the presumption that cheap imports were essential to political stability, and that the benefits of higher agricultural exports were modest (Scherr 1989).

2/ No official data on rural wages are available. These estimates were computed by Duncan and Rouis (World Bank 1985, pp.21-22).

3/ There is evidence that wages in Nigeria's oil palm sub sector were well above average wages in other oil palm producing countries, including Ghana, Cameroon, Cote d'Ivoire, Indonesia, Malaysia, and Brazil. Assuming that these wages are representative of the agriculture sector in general, it is clear that Nigeria's agricultural exporters had a competitive disadvantage vis-à-vis their competitors. [See World Bank (1981); also quoted in World Bank (1982) Report No. 3771-UNI, page 12].

4/ The growth in demand for a commodity is expressed as $D = GZ + P$, where D = growth rate in demand, Z = income elasticity, G = GNP per capita growth rate, and P = population growth rate.

in time, is equivalent to domestic production and imports net of exports, developments in the magnitudes of these variables are indicative of the trends. Available data on exports and output show that, with few exceptions, domestic demand for consumption or industrial use exceeded output growth, resulting in a decline in the export to output ratio of most export commodities. In extreme cases, exports were completely eliminated, and imports were increased to supplement domestic output (see Chart 3, and Appendix II, Table 7 & 8). For example, the expansion of Nigeria's textile industry in the early 1970s led to the elimination of cotton exports, and the growth of cotton imports from US\$25,700 in 1970 to US\$45 million in 1984. 1/ Similarly, increasing domestic demand for derivatives of oilseeds resulted in the elimination of groundnut and groundnut oil exports; a decline in the export-to-output ratio of palm kernels from 62 percent in 1970 to 10 percent by 1990; a colossal increase in imports of oilseeds, nuts, and kernels; and the increase in imports of complementary products, including soya bean oil and other vegetable oils. Imports of oilseeds, nuts and kernels increased from almost nothing in 1970 to US\$26.7 million by 1984, while soya bean oil and other vegetable oils increased from US\$40,000 and US\$204,000 in 1970 to US\$26.2 million and US\$75 million in 1984, respectively. 2/

The adverse impact of increasing domestic demand was amplified by the stagnation in agricultural output. Although it is not possible to provide generally accepted figures that demonstrate the structure and performance of agriculture in a definitive way, 3/ there is general consensus that the trend in the output of export commodities has been declining. Available data show that aggregate crop production increased at an annual rate of 3.5 percent per annum between 1975 and 1990, and cash crops averaged 2.6 percent per annum, but the principal export crops generally grew less than the population growth rate. 4/ Cocoa, the major export commodity, declined at an average rate of 2.3 percent whereas groundnuts declined by 0.96 percent per annum. Production of rubber, palm oil, and palm kernels increased at respective annual rates of 0.18 percent, 0.64 and 3 percent.

The sluggish performance of agriculture exports also reflects the cumulative effect of the Nigerian Government's agricultural policies, including the explicit taxation of agriculture exports in the early 1970s,

1/ Disaggregated trade statistics were available for the years 1970 to 1984 only.

2/ The import figures were obtained from Nigeria Trade Summary, an annual publication of the Federal Office of Statistics of Nigeria.

3/ Nigeria's official production figures for exportable crops relate to purchases of commodity boards, and may therefore be underestimated, because the share of crops that are domestically consumed is not known with a reasonable degree of certainty.

4/ Estimates of growth were computed using the log-lin model, and are based on the index of agricultural production reported by the Central Bank of Nigeria. Estimating the average growth by the compound method produced lower estimates of 2.05 for aggregate crops and 2.1 for cash crops.

unfavorable marketing and pricing of agriculture exports by marketing boards, the "exportable surplus" approach to trade enforced primarily by export bans, and the relative neglect of the sector in Nigeria's overall development planning, particularly during the 1970s. Government intervention in Nigeria's agricultural marketing and pricing system makes a distinction between export and food crops, even though a number of agricultural commodities belong to both categories. Between 1970 and 1975, agricultural exports were taxed at rates ranging between 15 percent and 30 percent for cocoa, palm kernels, groundnuts and cotton, while the marketing and pricing of export crops was determined by marketing boards (until their abolishment in 1986). With the exception of palm kernels, domestic producer prices were far below their export parity prices for much of the 1970s, thus encouraging the smuggling of export commodities to neighboring countries. 1/

Restrictions on the export of selected commodities has been a recurrent phenomenon in the country's trade policy, in a bid to either avoid domestic shortages or to promote local processing that would permit export of higher value-added items. The exportation of groundnuts, groundnut oil, palm oil and timber was first banned in February 1976 to ensure an adequate supply for domestic use, while hides and skins were subsequently prohibited in April 1978 in order to promote the domestic tanning industry. In 1986, most bans were eliminated as part of the structural adjustment program, but were reintroduced shortly. Commencing with the ban on the export of timber in 1988, the export of maize rice, cassava, yams, beans and derivatives, and all imported foods were subsequently banned in 1989. Most recently, the list of prohibited exports was expanded to include raw hides and skins (in 1990), and unprocessed palm kernels (in 1991). 2/

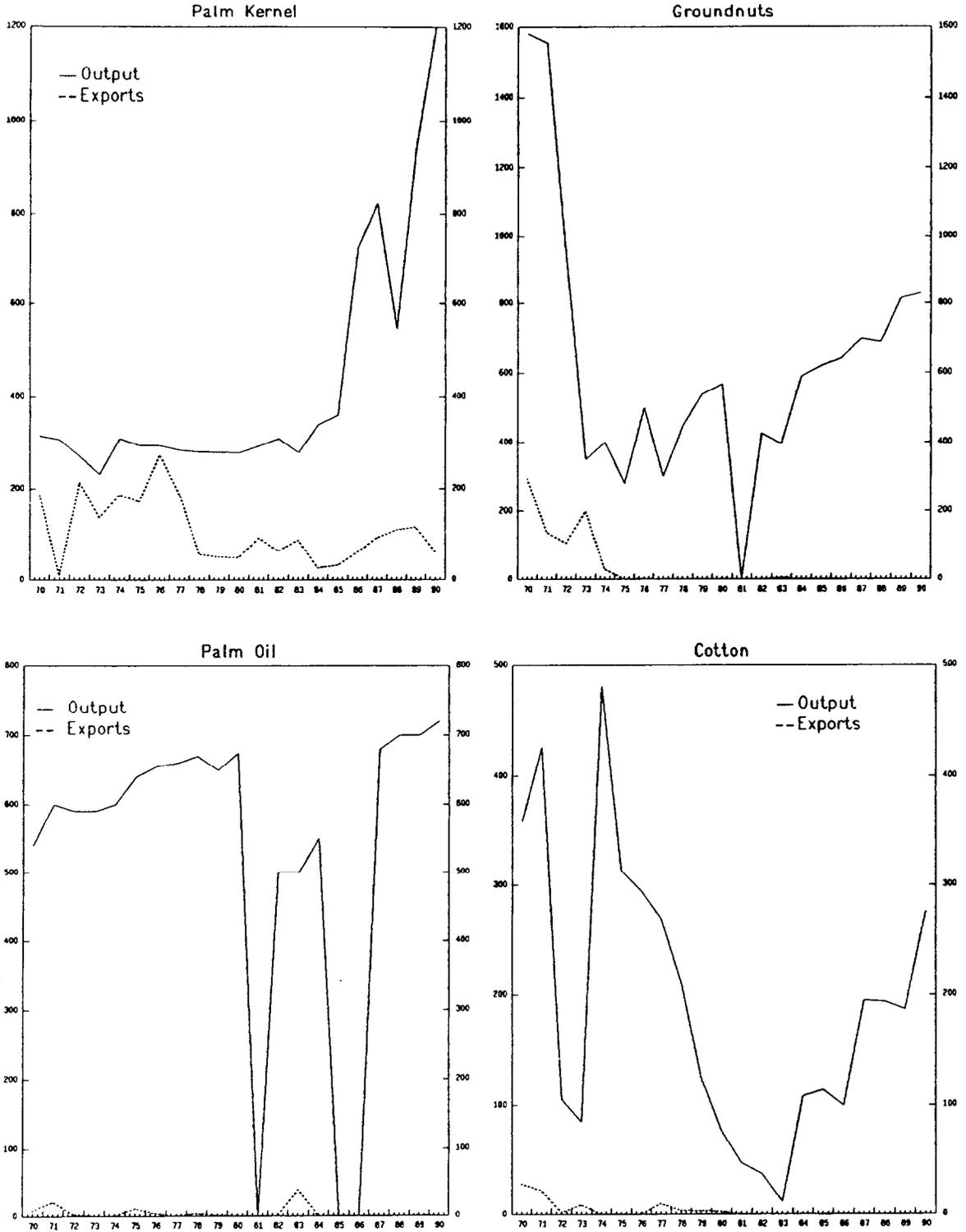
Finally, non price factors also play an important role in the determination of Nigeria's export performance. Insufficient productive investment in agriculture, unreliable supply of inputs, poor or non existent extension services, inadequate infrastructure, lack of well-developed credit institutions, and the traditional system of land tenure have all contributed somewhat to the below-potential performance of the sector. The predominance of agriculture and agricultural processed exports in the basket of non-oil

1/ No reliable estimates of the volume of smuggling are available, but there is evidence of large-scale smuggling of cocoa and other manufacturing exports, particularly to neighboring countries, part of which serves as capital flight. In 1985, the Nigerian Cocoa Board estimated that more than 20,000 metric tonnes of cocoa are smuggled out of Nigeria yearly, fueled by delays in the payment of farmers by licensed buying agents. Efforts to curb the illicit trade flows by closing the country's land borders from mid-1984 to March 1986 only terminated official trade with Nigeria's neighbors, while falling short of its objective.

2/ The ban on the export of cocoa beans announced in January 1991 was rescinded only because of opposition from domestic producers and exporters who pointed out that domestic processing capacity fell short of bean production.

CHART 3

NIGERIA
PRODUCTION AND EXPORT VOLUMES OF AGRICULTURE COMMODITIES, 1970-90
(Thousands of metric tons)



exports also renders their export performance vulnerable to the vagaries of climate, whereas the long lags between acreage adjustment and output supply, characteristic of tree crops, delay the export response. The Sahelian drought adversely affected the overall performance of the agricultural sector in the early 1970s. For Nigeria, climatic conditions only returned to more normal levels after 1983. These problems have been compounded by the deteriorating age structure in existing stocks, and other crop specific problems, including the black pod disease that affected cocoa.

IV. An Econometric Analysis Of Export Performance

To assess the relative importance of the individual factors discussed above, econometric techniques are applied to quantify important economic variables that are presumed to affect the export behavior of Nigeria's non-petroleum products. We begin by examining the main methodological issues in the specification of export supply functions, discuss the variables that ought, in theory, to be included and, the choices and compromises that have to be made in the measurement of the variables. We then derive a model that specifies both demand and supply side determinants of exports, measures the responsiveness of export volumes to these determinants, and distinguishes the long-term developments from short-term fluctuations.

1. Methodological issues

There is general consensus on the empirical forms of the demand and supply function of exports, 1/ even though the theoretical modelling of export supply still raises controversial issues, particularly in connection with the transparency of its micro foundations. 2/ The standard approach for specifying and estimating foreign trade equations is the imperfect substitutes model, in which the key assumption is that exports are not perfect substitutes for domestic goods. In this model, export demand is hypothesized to vary positively with world economic activity, and inversely with the export prices of the exporting country relative to the prices of foreign substitutes, while the export supply function is specified to depend

1/ Surveys of econometric work, on foreign trade price elasticities and their weaknesses, are available in Leamer and Stern (1970), Magee (1975) and, Goldstein and Khan (1985).

2/ The prominent controversial issues are outlined in Riveros (1989) and Faini (1988), and include the use of either partial or general equilibrium models, the definition of the prevailing market structure, the assumed degree of substitution between domestically consumed and exported goods, the treatment given to factor costs, and the role taken with regard to relative prices and productive capacity vis a vis more 'Keynesian' variables like domestic absorption.

positively on the price of exports, negatively on input prices, and positively on productive capacity. 1/

Demand and supply side determinants are estimated simultaneously, because the relationship between quantities and prices is, at least in theory, simultaneous. Nonetheless, most empirical studies estimate export demand functions by single equation methods, on the premise that, for an individual country, supply price elasticities for exports are infinite. Similarly, export supply functions are estimated independent of export demand functions, on the assumption that a typical developing country is a small supplier, facing an infinitely elastic foreign demand for the product it produces, and for which changes in foreign demand influence exports only through changes in world prices.

Although export supply is affected by forces that influence both domestic supply of and demand for the exported good, many of the studies natural focus on domestic supply responses, because there is little or no domestic demand for many export commodities, particularly primary products, or it is assumed that in a perfectly competitive market economy, the diverse factors affecting supply and demand are fully captured in price (see discussions in Bond (1984) and Riedel et al, (1984)). There is, however, theoretical and empirical support for including domestic demand in an export supply equation, inspite of the uncertainty regarding the precise relationship between domestic demand and exports. The traditional argument is that, an increase in domestic demand reduces the supply of export goods, to the extent that it creates strong competition for resources which would have been devoted to export, while the alternate view posits that domestic demand reduces the average cost per unit and induces technological progress, making it easier for exporters to compete with foreign producers. 2/ Empirical studies that explicitly incorporated domestic demand, also found it to be a significant explanatory variable of export supply. 3/

1/ Satisfactory results have been obtained in many studies that applied the model in its basic form, to both developed and developing countries, and for agricultural and manufactured exports. See for instance Goldstein and Khan (1978); Lundborg (1981), and Arize (1988); Balassa (1987, 1989, 1990); Okonkwo (1989); Lord (1989), and Ngeno (1991) applied the model to estimate the response of agricultural exports to real price changes, and yielded satisfactory results.

2/ The competing views on the impact of domestic demand on exports are discussed in Artus (1970) and Dunlevy (1980).

3/ See for instance the country studies for Brazil by Tyler (1973); Spain by Donges (1972); Israel by Pomfret (1975). The study by Islam and Subramanian (1989) are one of the few studies that estimated an export supply function for agricultural exports and incorporated domestic demand among the explanatory variables. The variable was, however, not found to be statistically significant even though it yielded the expected sign.

2. The equilibrium model

In an economy where governmental intervention is pervasive, the diverse factors affecting supply and demand cannot be adequately captured by relative price changes. In Nigeria's circumstances, the predominance of administrative controls in resource allocation and, the treatment of exports as a residual activity, indicate that the state of domestic demand could exert a negative, and far more powerful influence on export performance than marginal fluctuations in relative prices at home and abroad, particularly because export commodities enter directly or indirectly into domestic consumption. Similarly, the shift in the direction of economic policy since 1986, has potential to foster greater export consciousness and, thus increase the export growth rate.

The supply of Nigeria's exports is therefore assumed to depend positively on the price of exports, negatively on input prices, and positively on productive capacity. In addition, an increase in domestic demand is posited to curtail exportable surplus, while export promotion policies is expected to cause a shift in the supply function.

The relationship is presented in log-linear form as follows:

$$(1) \text{ Log } X_t = \beta_0 + \beta_1 \log(P_x/P_d) + \beta_2 \log Y_t^* + \beta_3 \log Dd_t + \beta_4 \log Dum$$

where

- X_t - quantity of exports supplied
- P_x - price of exports
- P_d - domestic price index
- Y_t^* - an index of domestic capacity
- Dd_t - domestic demand
- Dum - 0 for years prior to policy change,
1 for years after policy change

The supply function is specified independently of an export demand function, on the premise that Nigeria is a price taker in world markets and, primary commodities which constitute a large proportion of Nigeria's exports, are generally homogeneous in quality and are sold in perfectly competitive markets. 1/

The relative price variable incorporates the theory that the supply of export will increase with the profitability of producing and selling exports. 2/ The use of the domestic price as divisor to the export price

1/ The procedure adopted is fairly standard, see Stern and Zupnick (1962) Basevi (1973), Isard (1977). Besides, attempts to estimate the supply and demand functions simultaneously, yielded poor results, particularly for export demand.

2/ A detailed discussion on the rationale for including particular variables in the export supply function are available in Goldstein and Khan (1985).

serves a dual role. First, for a given level of export price, the profitability of producing exports falls when factor costs in the export industries increase, and since these factor costs are likely to move with the general level of domestic prices, domestic prices serve as a proxy. Second, to the extent that resources involved in exportable production can be transferred to other uses, the relative profitability of selling exports falls with an increase in domestic prices. Finally, besides capturing production substitution elasticities between exports and non tradables, use of a relative price avoids problems of multicollinearity, because the two prices tend to move together.

The capacity variable embodies the hypothesis that exports will rise, *ceteris paribus*, where there is an increase in the country's capacity to produce, and thus captures shifts in the supply function associated with productivity gains or technological changes. The dummy is designed to capture shifts in the intercept or slope of the function induced by policy changes, which are distinct from movements along the function that are captured by the relative price variable. The domestic demand variable accommodates the "exportable surplus" approach to export.

Equation 1 is presented in log-linear form because the relationship is assumed to be non-linear, and as such, the coefficients deriving thereof represent elasticities. Therefore, β_1 and β_2 are 'price' and 'capacity' elasticities, respectively and, are expected to be positive. β_3 , the elasticity of exports with respect to changes in domestic demand, is posited to assume a negative sign, while β_4 is expected to be positive.

Finally, the relationships specified above reflect a static equilibrium framework, according to which changes in the explanatory variables affect the dependent trade variable within the same period. To incorporate lags in the adjustment of actual to equilibrium values, a short run model, herein referred to as a disequilibrium model, is formulated below.

3. The disequilibrium model

The long gestation period of tree crops suggest that exports may respond to changes in the explanatory variables with a lag. ^{1/} Therefore, in the short-run model, we assume the supply of exports adjusts partially to the difference between desired exports in period t and the actual supply of

^{1/} For a detailed discussion of the sources and types of lags in adjustment see for instance Junz and Rhomberg [1973:413]; Goldstein and Khan [1985:1087]; Moran [1988:325].

exports in period X_{t-1} . 1/ Thus

$$(2) \Delta \log X_t = \gamma [\log X_t^* - \log X_{t-1}]$$

where γ , the coefficient of adjustment, is $0 < \gamma \leq 1$ and Δ is a first difference operator. Since, desired supply is not observed, but the determinants of export supply are known, we substitute equation (1) into equation (2), and derive the estimating equation as follows:

$$(3) \log X_t = c_0 + c_1 \log(P_x/P_d) + c_2 \log Y_t^* + c_3 \log D_d t \\ + c_4 \log Dum + c_5 \log X_{t-1}$$

where $c_0 = \gamma\beta_0$, $c_1 = \gamma\beta_1$, $c_2 = \gamma\beta_2$, $c_3 = \gamma\beta_3$, $c_4 = \gamma\beta_4$ and $c_5 = 1 - \gamma$.

The γ denotes the speed of adjustment of actual exports to the desired quantity that occurs in a year. The mean time lag for a complete adjustment is therefore equal to γ^{-1} , and can be calculated from the parameters of equation (3) as $(1 - c_5)^{-1}$.

4. Empirical results

The determinants of Nigeria's export performance were estimated for three commodities only: cocoa, palm kernels, and rubber. This is because aggregate relationships covering all commodities could produce misleading results, in view of the restrictions governing export trade of most commodities during the estimation period. 2/ In addition, aggregate relationships conceal inter-commodity variations in sensitivity to price and income.

Ordinary Least Squares estimation procedures were used to obtain the estimates. Where there was evidence of autocorrelation, the Maximum Likelihood iterative technique and Cochrane Orcutt iterative technique were used to correct for autocorrelation in the equilibrium and disequilibrium models, respectively.

(a) Equilibrium model

The model generally performs well in explaining the variation in export performance, yielding parameter estimates that are both of the

1/ The adjustment mechanism adopted has been used in other similar studies, including Goldstein and Khan (1978); Okonkwo (1989); Ngeno (1991).

2/ The export of groundnuts, cotton, hides and skins, timber, palm oil, groundnuts has been prohibited for several years and available data does not provide sufficient observations to permit some econometric analysis.

expected sign and are statistically significant, particularly for cocoa and rubber. The preferred equation includes a relative price variable lagged by one year. 1/

Table 2. Nigeria: Equilibrium Model, Export Supply
Elasticities for Selected Export Crops, 1970-90 2/

	Constant	Log (P_x/P_d)-1	Log Y*	Log Dd	LogDum1	R ²	SE	DW
Cocoa	13.75 (3.87)	0.56 (4.51)	-2.02 (-2.67)	-0.43 (-4.03)	0.27 (3.28)	0.76	0.21	2.1
Palm kernel	3.37 (0.39)	-0.09 (-0.26)	1.21 (0.65)	-0.83 (-2.44)	0.14 (0.59)	0.48	0.48	1.66
Rubber	4.4 (1.02)	1.02 (7.11)	-0.68 (-0.74)	-0.28 (-2.22)	0.34 (3.75)	0.9	0.26	2.2
Expected sign		+	+	-	+			

Cocoa and rubber yielded statistically significant price elasticities with the expected positive sign, indicating that the two commodities respond positively, albeit with a lag, to changes in relative prices. The coefficient for palm kernels, on the other hand, appeared insignificant with a wrong sign. The price elasticity marginally exceeds unity for rubber, but yielded coefficients below unity for both cocoa and palm kernel. Such a finding implies a fairly limited response of exports to changes in relative prices. Unfortunately, no estimates of export supply elasticities were found in the literature which could be compared to the estimates obtained here to draw inferences on their precise size. 3/

1/ Lagging the relative price variable allows for the possibility of delayed supply adjustment beyond the period of one year. This form of specification was also adopted by Bond (1987) and yielded equally good results.

2/ t values in parentheses

3/ In Arize's [1989] study, export demand and supply functions were estimated for Nigeria's aggregate exports. However, to the extent that oil exports account for over 90 percent of total exports, the results are technically incomparable and are of limited use for our purposes. Similarly, although Ngeno [1991] estimated export supply equations for Kenya's agricultural exports and for the individual commodities, coffee and tea, the results were of equal limited importance for our purposes because of the difference in the composition of the commodities and also because the commodity markets are constrained by the quota system.

The dummy yielded statistically significant coefficients with the expected positive sign in the cocoa and rubber equations, denoting a change in intercept and slope since 1986. Estimates of palm kernel exports carried the expected positive sign, but appeared statistically insignificant. These results provide prima facie evidence that the export promotion policies introduced as part of the structural adjustment program increased the export growth rate, and convincingly support the view that domestic market conditions strongly influence export behavior.

The weak relationship between the tonnage of palm kernel exports and the price incentives, indicated by the low coefficients for both relative prices and the dummy, is not surprising. Palm kernels and palm oil are joint products derived from the same fruit--"palm fruits." The former is primarily produced for export while the latter is wholly consumed domestically. In a subsistence economy based on the products of a single species of a tree, which are consumed locally and also exported, inducement to produce and export may be influenced by factors that bear little relationship to the export price.

The coefficient with respect to productive capacity indicates the degree of export bias associated with agricultural expansion, and our estimates lead to the conclusion that Nigerian agriculture is primarily oriented towards the domestic market. Cocoa yielded statistically significant coefficients carrying a wrong sign, while the capacity elasticity for rubber appeared insignificant with an incorrect sign. Estimates for Palm kernels yielded the correct sign but appeared statistically insignificant. These results denote a weak relationship between agricultural output and export trends.

Domestic demand appears as a central explanatory variable, yielding statistically significant coefficients that carry the expected negative sign for all three commodities. This result confirms the earlier assertion that domestic demand posed a major impediment to export during the estimation period, and is also consistent with the direction and size of the capacity elasticities obtained in the model, which indicate that Nigerian agriculture is primarily oriented towards domestic consumption. The outcome may be attributed to the government's interventionist and restrictive policies that accord priority to satisfying domestic consumption and local processing in order to promote the export of value added items.

(b) Disequilibrium model

The disequilibrium model captures the short-run response of exports to the explanatory variables. Overall, the results obtained bear semblance to the long run responses, in terms of direction, but the coefficients are generally lower in magnitude.

Table 3. Nigeria: Disequilibrium Model, Export Supply
Elasticities for Selected Export Crops, 1970-90

	Log						R ²	SE	Rho
	Constant	(Px/Pd)-1	LogY*	LogDd	LogX-1	LogDum1			
Cocoa	13.79 (3.77)	0.49 (3.69)	-2.2 (-2.92)	-0.41 (-3.77)	0.28 (1.45)	0.29 (3.53)	0.7	0.2	-0.57
Palm kernel	1.00 (0.10)	-0.07 (-0.18)	1.01 (0.44)	-0.53 (-1.05)	0.38 (0.66)	0.11 (0.47)	0.33	0.50	0.07
Rubber	5.09 (1.06)	0.97 (3.63)	-0.81 (-0.81)	-0.31 (-2.07)	0.07 (0.30)	0.36 (3.48)	0.87	0.28	-0.45
Expected sign		+	+	-	+	+			

Cocoa and rubber exhibit a positive response to relative price changes even in the short term, whereas the size of the elasticities were uniformly lower than those obtained in the long run model. Similarly, the coefficient with respect to the dummy appears with a correct sign in all equations and is statistically significant for cocoa and rubber. The negative effect of domestic demand on exports continues to feature prominently, yielding the expected negative sign for all commodities and appearing statistically significant in the equations for cocoa and rubber.

The equations perform relatively poorly with regard to the estimated elasticity to lagged exports, yielding coefficients with the expected sign, but of which none were statistically significant. The average lag computed thereof shows that the adjustment of export supply to changes in the explanatory variables, on average, occurs in less than 2 years.

Table 4. Nigeria: Average Time Lags

Commodity	Time lag (years)
Cocoa	1.38
Palm kernels	1.61
Rubber	1.07

V. Implications of Results

The empirical results generally support the view that domestic market conditions strongly influenced export behavior. Nigeria's supply of commodity exports is sensitive to relative price changes, even though the magnitude of response is fairly low, while export promotion measures generally accelerate the export growth rate. Commodity exports show greater sensitivity to prices in the long run than in the short run. These results provide evidence of, and support for, the usefulness of pricing policy in eliciting export supply, particularly for cocoa and rubber.

The restrictive policies of the Government adversely affected the export performance of agricultural products. The Government's unrelenting dedication to self sufficiency amplifies the restrictive effect of domestic demand, whereas the requirements to export only processed or manufactured products for which a comparative advantage may not have been established, negates the translation of output increases into corresponding export growth, and limits the positive effect of growth promoting policies on export performance.

The lag in the response of exports to changes in relative prices, estimated to average one year, is relatively short considering the long gestation period of the export crops in our sample. The short-term response indicated by these results, may therefore be attributed to improvements in yield, or the redirection of unrecorded exports into official channels, rather than an expansion of capacity arising from new plantings.

To a lesser extent, the results also reflect basic data inadequacies, such as the existence of large unrecorded exports. There is considerable disagreement among the different data sources about the actual amounts and growth rates of agricultural crops produced in Nigeria. Data problems in Nigeria's agricultural sector can be explained by the nature of the sector, which is dominated by small holders, shifting cultivation, fragmented farm holdings, and an enormous variety of inter-cropping systems, all of which combine to make record keeping difficult. The problems are compounded by severe weaknesses in the capacity of institutions charged with monitoring performance of the sector.

Data Definitions and Sources

(a) The sample

Data for the study consist of 21 observations pertaining to the years 1970-90. Annual observations are used because of the non availability of monthly or quarterly series.

(b) The dependent variable (X_s)

The dependent variable is represented by actual export volumes of the respective commodity exports, obtained from various edition of the Central Bank of Nigeria's Annual Report.

(c) Relative prices (P_x/P_d)

The choice of an export price is complicated in Nigeria's case, because until 1986 producers of export crops received the administratively determined "producer price" which diverged from the export price. Arguably, however, to the extent that producer prices accrue to agricultural producers, while the export price accrued to the exporters, the two prices constitute incentives to produce and export, respectively, and therefore export prices are the appropriate prices in modelling export supply.

In this study, like in previous studies, the numerator (P_x) represents world export prices of the respective commodities converted into domestic prices by the average exchange rate. Domestic costs are proxied by the CPI. Data on export prices were obtained from the Commodity Division of the IMF, whereas the average exchange rate and the CPI were extracted from the IFS.

(c) Productive capacity (Y^*)

The ideal construct, for our purposes, would be the index of agricultural production. This series was however only available commencing 1975 and therefore provided insufficient observation for regression analysis. As an alternative, domestic capacity is proxied by the value of agriculture in real GDP, at constant prices. Data was obtained from the World Bank's World Tables.

(d) Domestic demand pressure (D_d)

The index of manufacturing has been used as a proxy for domestic demand, on the grounds that Nigeria's export commodities are not consumed directly but are intermediate inputs in the manufacture of consumption goods. Data for this series was obtained from the Annual Report and Statement of Accounts of the Central Bank of Nigeria.

Table 1. Nigeria: Non-Oil Exports, 1970-80 1/

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
	(In millions of U.S. dollars)										
Major agricultural products	<u>371.4</u>	<u>343.3</u>	<u>261.4</u>	<u>380.1</u>	<u>438.1</u>	<u>374.4</u>	<u>437.2</u>	<u>582.8</u>	<u>649.3</u>	<u>766.6</u>	<u>622.5</u>
Cocoa	186.3	200.8	153.6	170.8	252.4	293.8	349.1	482.6	595.1	715.6	568.7
Palm kernels	30.5	36.2	23.9	28.7	69.4	30.0	43.1	50.5	20.0	19.5	25.8
Rubber	24.4	17.4	11.2	29.5	52.7	24.7	23.0	17.2	19.8	21.5	25.8
Groundnuts	61.1	34.2	29.0	69.1	10.8	--	0.3	--	--	--	--
Pineapples	--	--	--	--	--	--	--	--	--	--	--
Coffee	--	2.8	3.2	2.0	0.2	1.8	8.6	7.1	--	1.0	--
Fish and shrimps	--	--	--	--	--	--	--	--	--	--	--
Cashew nuts	--	--	--	--	--	--	--	--	--	--	--
Spices	--	--	--	--	--	--	--	--	--	--	--
Cotton and yarn	18.5	15.4	0.9	7.1	--	--	--	15.7	6.6	4.6	2.2
Hides and skins	7.8	6.7	10.3	19.0	16.8	14.3	10.8	8.8	6.0	4.3	--
Timber (log and sawn)	8.7	7.3	12.3	17.9	17.8	7.5	1.4	0.8	0.2	--	--
Palm oil	1.7	4.8	0.3	--	--	1.9	0.8	--	1.6	--	--
Groundnut oil	32.5	17.7	16.6	35.9	18.1	0.3	--	--	--	--	--
Other agricultural products	--	--	--	--	--	--	--	--	--	--	--
Mineral products	<u>2.8</u>	<u>1.4</u>	<u>1.7</u>	<u>2.1</u>	<u>6.5</u>	<u>3.6</u>	<u>4.8</u>	<u>9.9</u>	<u>1.1</u>	<u>1.7</u>	--
Columbite	2.8	1.4	1.7	2.1	2.2	2.4	4.0	9.8	0.9	1.5	--
Other	--	--	--	--	4.3	1.1	0.8	0.2	0.2	0.2	--
Manufactures and semi-manufactures of											
Agricultural products	<u>37.3</u>	<u>25.8</u>	<u>27.5</u>	<u>58.7</u>	<u>50.3</u>	<u>41.4</u>	<u>36.4</u>	<u>96.1</u>	<u>49.4</u>	<u>45.7</u>	<u>51.9</u>
Cocoa butter	18.5	11.5	15.3	22.8	33.3	33.1	23.1	59.7	27.7	34.4	36.6
Cocoa powder	0.3	2.0	--	0.3	1.3	0.5	2.9	6.4	7.1	9.1	7.9
Cocoa cake	3.1	2.8	3.2	8.2	8.1	6.8	4.9	28.5	14.6	2.2	7.5
Cocoa paste	--	--	--	--	--	--	--	--	--	--	--
Groundnut cake	15.4	9.5	9.0	27.4	7.6	1.0	5.4	1.6	--	--	--
Wood products	--	--	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	--	--	--
Manufactured exports	<u>47.3</u>	<u>33.9</u>	<u>29.0</u>	<u>23.6</u>	<u>41.9</u>	<u>33.1</u>	<u>24.7</u>	<u>20.6</u>	<u>14.8</u>	<u>17.9</u>	<u>26.0</u>
Textiles	--	--	--	--	--	--	--	--	--	--	--
Tin metal	47.3	33.9	29.0	23.6	41.9	33.1	24.7	20.6	14.8	17.9	26.0
Chemicals	--	--	--	--	--	--	--	--	--	--	--
Other exports	<u>56.3</u>	<u>55.3</u>	<u>53.6</u>	<u>106.8</u>	<u>127.0</u>	<u>126.8</u>	<u>170.0</u>	<u>141.9</u>	<u>298.7</u>	<u>250.7</u>	<u>259.2</u>
Total non-oil exports	<u>515.1</u>	<u>459.7</u>	<u>373.3</u>	<u>571.3</u>	<u>663.8</u>	<u>579.2</u>	<u>673.0</u>	<u>851.3</u>	<u>1,013.4</u>	<u>1,082.5</u>	<u>959.6</u>

Source: Central Bank of Nigeria, *Annual Report and Statement of Accounts*, various editions.

1/ Figures were converted from Naira into U.S. dollars using average exchange rates.

Table 2. Nigeria: Non-oil Exports, 1981-90 ^{1/}

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
(In millions of U.S. dollars)										
Major agricultural products	<u>288.7</u>	<u>295.1</u>	<u>357.7</u>	<u>271.2</u>	<u>214.9</u>	<u>232.1</u>	<u>395.5</u>	<u>394.5</u>	<u>248.9</u>	<u>283.8</u>
Cocoa	230.9	223.5	312.4	238.3	203.7	211.2	373.0	325.3	141.7	130.3
Palm kernels	29.0	16.6	22.9	11.0	6.9	4.3	7.5	15.0	15.7	11.8
Rubber	28.8	23.8	20.6	21.6	4.3	16.6	15.1	44.8	69.0	95.7
Groundnuts	--	--	1.8	0.3	--	0.0	--	0.3	0.2	--
Pineapples	--	--	--	--	--	--	--	0.4	0.4	0.4
Coffee	--	2.8	--	--	--	--	--	0.1	0.2	4.7
Fish and shrimps	--	--	--	--	--	--	--	--	--	12.1
Cashew nuts	--	--	--	--	--	--	--	6.9	0.6	1.1
Spices	--	0.4	--	--	--	--	--	1.0	0.4	0.5
Cotton and yarn	--	--	--	--	--	--	--	--	12	12.0
Hides and skins	--	--	--	--	--	--	--	--	--	--
Timber (log and sawn)	--	--	--	--	--	--	--	--	--	--
Palm oil	--	--	--	--	--	--	--	--	--	--
Groundnut oil	--	--	--	--	--	--	--	--	--	--
Other agricultural products	--	27.9	--	--	--	--	--	0.7	19.5	15.2
Mineral products	--	--	--	--	--	--	--	--	0.7	3.3
Columbite	--	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	0.7	3.3
Manufactures and semi-manufactures of										
Agricultural products	<u>138.5</u>	<u>6.8</u>	<u>58.4</u>	<u>51.4</u>	<u>63.9</u>	<u>30.9</u>	<u>15.3</u>	<u>18.1</u>	<u>15.5</u>	<u>16.7</u>
Cocoa butter	121.2	--	39.8	30.8	52.3	25.5	13.4	16.4	13.8	13.4
Cocoa powder	14.2	--	--	--	4.3	1.1	1.3	0.3	--	--
Cocoa cake	3.1	--	--	--	7.3	4.3	0.6	1.1	--	--
Cocoa paste	--	--	--	--	--	--	--	0.2	--	--
Groundnut cake	--	--	--	--	--	--	--	--	--	--
Wood products	--	--	--	--	--	--	--	--	1.7	3.3
Other	--	6.8	18.6	20.6	--	--	--	--	--	--
Manufactured exports	<u>43.4</u>	--	--	--	<u>4.6</u>	<u>0.7</u>	<u>7.5</u>	<u>1.9</u>	<u>18.2</u>	<u>31.8</u>
Textiles	--	--	--	--	--	--	--	--	17.4	12.8
Tin metal	43.4	--	--	--	4.6	0.7	7.5	1.9	0.8	0.6
Chemicals	--	--	--	--	--	--	--	--	--	18.3
Other exports	<u>165.0</u>	--	--	--	<u>272.7</u>	<u>50.8</u>	<u>117.5</u>	<u>195.3</u>	<u>117.9</u>	<u>69.9</u>
Total non-oil exports	<u>635.6</u>	<u>301.9</u>	<u>416.2</u>	<u>322.6</u>	<u>556.0</u>	<u>314.6</u>	<u>535.9</u>	<u>609.9</u>	<u>401.1</u>	<u>405.5</u>

Source: Central Bank of Nigeria, *Annual Report and Statement of Accounts*, various editions.

^{1/} Figures were converted from Naira into U.S. dollars using average exchange rates.

Table 3. Nigeria: Structure of Exports, 1970-80

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
	(Share in total exports; in percent)										
Major agricultural products	<u>28.3</u>	<u>18.3</u>	<u>11.4</u>	<u>10.1</u>	<u>4.6</u>	<u>4.7</u>	<u>4.1</u>	<u>4.9</u>	<u>6.8</u>	<u>4.3</u>	<u>2.4</u>
Cocoa	15.6	11.3	7.2	5.0	2.8	3.7	3.2	4.1	6.3	4.0	2.2
Palm kernels	2.6	2.0	1.1	0.8	0.8	0.4	0.4	0.4	0.2	0.1	0.1
Rubber	2.0	1.0	0.5	0.9	0.6	0.3	0.2	0.1	0.2	0.1	0.1
Groundnuts	5.1	1.9	1.4	2.0	0.1	--	0.0	--	--	--	--
Pineapples	--	--	--	--	--	--	--	--	--	--	--
Coffee	--	0.2	0.1	0.1	0.0	0.0	0.1	0.1	--	0.0	--
Fish and shrimps	--	--	--	--	--	--	--	--	--	--	--
Cashew nuts	--	--	--	--	--	--	--	--	--	--	--
Spices	--	--	--	--	--	--	--	--	--	--	--
Cotton and yarn	1.5	0.9	0.0	0.2	--	--	--	0.1	0.1	0.0	0.0
Hides and skins	0.7	0.4	0.5	0.6	0.2	0.2	0.1	0.1	0.1	0.0	--
Timber (log and sawn)	0.7	0.4	0.6	0.5	0.2	0.1	0.0	0.0	0.0	--	--
Palm oil	0.1	0.3	0.0	--	--	0.0	0.0	--	0.0	--	--
Groundnut oil	2.7	1.0	0.8	1.1	0.2	0.0	--	--	--	--	--
Other agricultural products	--	--	--	--	--	--	--	--	--	--	--
Mineral Products	<u>0.2</u>	<u>0.1</u>	<u>0.1</u>	<u>0.1</u>	<u>0.1</u>	<u>0.0</u>	<u>0.0</u>	<u>0.1</u>	<u>0.0</u>	<u>0.0</u>	<u>--</u>
Columbite	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	--
Other	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0	--
Manufactures and semi-manufactures of											
Agricultural products	<u>3.1</u>	<u>1.5</u>	<u>1.3</u>	<u>1.7</u>	<u>0.5</u>	<u>0.5</u>	<u>0.3</u>	<u>0.8</u>	<u>0.5</u>	<u>0.3</u>	<u>0.2</u>
Cocoa butter	1.5	0.6	0.7	0.7	0.4	0.4	0.2	0.5	0.3	0.2	0.1
Cocoa powder	0.0	0.1	--	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0
Cocoa cake	0.3	0.2	0.1	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0
Cocoa paste	--	--	--	--	--	--	--	--	--	--	--
Groundnut cake	1.3	0.5	0.4	0.8	0.1	0.0	0.1	0.0	--	--	--
Wood products	--	--	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	--	--	--
Manufactured exports	<u>4.0</u>	<u>1.9</u>	<u>1.4</u>	<u>0.7</u>	<u>0.5</u>	<u>0.4</u>	<u>0.2</u>	<u>0.2</u>	<u>0.2</u>	<u>0.1</u>	<u>0.1</u>
Textiles	--	--	--	--	--	--	--	--	--	--	--
Tin metal	4.0	1.9	1.4	0.7	0.5	0.4	0.2	0.2	0.2	0.1	0.1
Chemicals	--	--	--	--	--	--	--	--	--	--	--
Other exports	<u>4.7</u>	<u>3.1</u>	<u>2.5</u>	<u>3.1</u>	<u>1.4</u>	<u>1.6</u>	<u>1.6</u>	<u>1.2</u>	<u>3.1</u>	<u>1.4</u>	<u>1.0</u>
Total non-oil exports	<u>40.3</u>	<u>24.9</u>	<u>16.6</u>	<u>15.7</u>	<u>7.0</u>	<u>7.2</u>	<u>6.3</u>	<u>7.2</u>	<u>10.6</u>	<u>6.0</u>	<u>3.7</u>
Oil exports	<u>59.7</u>	<u>75.1</u>	<u>83.4</u>	<u>84.3</u>	<u>93.0</u>	<u>92.8</u>	<u>93.7</u>	<u>92.8</u>	<u>89.4</u>	<u>94.0</u>	<u>96.3</u>
Total exports	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Source: Central Bank of Nigeria, *Annual Report and Statement of Accounts*, various editions.

Table 4. Nigeria: Structure of Exports, 1981-90

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
(Share in total exports; in percent)										
Major agricultural products	<u>1.6</u>	<u>2.4</u>	<u>3.5</u>	<u>2.3</u>	<u>1.6</u>	<u>4.6</u>	<u>5.2</u>	<u>5.7</u>	<u>3.2</u>	<u>2.1</u>
Cocoa	1.3	1.8	3.0	2.0	1.6	4.2	4.9	4.7	1.8	1.0
Palm kernels	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1
Rubber	0.2	0.2	0.2	0.2	0.0	0.3	0.2	0.7	0.9	0.7
Groundnuts	--	--	0.0	0.0	--	0.0	--	0.0	0.0	--
Pineapples	--	--	--	--	--	--	--	0.0	0.0	0.0
Coffee	--	0.0	--	--	--	--	--	0.0	0.0	0.0
Fish and shrimps	--	--	--	--	--	--	--	--	--	0.1
Cashew nuts	--	--	--	--	--	--	--	0.1	0.0	0.0
Spices	--	0.0	--	--	--	--	--	0.0	0.0	0.0
Cotton and yarn	--	--	--	--	--	--	--	--	0.0	0.1
Hides and skins	--	--	--	--	--	--	--	--	--	--
Timber (log and sawn)	--	--	--	--	--	--	--	--	--	--
Palm oil	--	--	--	--	--	--	--	--	--	--
Groundnut oil	--	--	--	--	--	--	--	--	--	--
Other agricultural products	--	0.2	--	--	--	--	--	0.0	0.2	0.1
Mineral products	--	--	--	--	--	--	--	--	0.0	0.0
Columbite	--	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	0.0	0.0
Manufactures and semi-manufactures of										
Agricultural products	<u>0.8</u>	<u>0.1</u>	<u>0.6</u>	<u>0.4</u>	<u>0.5</u>	<u>0.6</u>	<u>0.2</u>	<u>0.3</u>	<u>0.2</u>	<u>0.1</u>
Cocoa butter	0.7	--	0.4	0.3	0.4	0.5	0.2	0.2	0.2	0.1
Cocoa powder	0.1	--	--	--	0.0	0.0	0.0	0.0	--	--
Cocoa cake	0.0	--	--	--	0.1	0.1	0.0	0.0	--	--
Cocoa paste	--	--	--	--	--	--	--	0.0	--	--
Groundnut cake	--	--	--	--	--	--	--	--	--	--
Wood products	--	--	--	--	--	--	--	--	0.0	0.0
Other	--	0.1	0.2	0.2	--	--	--	--	--	--
Manufactured exports	<u>0.2</u>	--	--	--	<u>0.0</u>	<u>0.0</u>	<u>0.1</u>	<u>0.0</u>	<u>0.2</u>	<u>0.2</u>
Textiles	--	--	--	--	--	--	--	--	0.2	0.1
Tin metal	0.2	--	--	--	0.0	0.0	0.1	0.0	0.0	0.0
Chemicals	--	--	--	--	--	--	--	--	--	0.1
Other exports	<u>0.9</u>	--	--	--	<u>2.1</u>	<u>1.0</u>	<u>1.6</u>	<u>2.8</u>	<u>1.5</u>	<u>0.5</u>
Total non-oil exports	<u>3.5</u>	<u>2.5</u>	<u>4.0</u>	<u>2.7</u>	<u>4.2</u>	<u>6.2</u>	<u>7.1</u>	<u>8.9</u>	<u>5.1</u>	<u>3.0</u>
Oil exports	<u>96.5</u>	<u>97.5</u>	<u>96.0</u>	<u>97.3</u>	<u>95.8</u>	<u>93.8</u>	<u>92.9</u>	<u>91.1</u>	<u>94.9</u>	<u>97.0</u>
Total exports	<u>100.0</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Central Bank of Nigeria, Annual Report and Statement of Accounts.

Table 5. Nigeria: Structure of Non-Oil Exports, 1970-80

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
	(Share in total non-oil exports, in percent)										
Major agricultural products	<u>70.2</u>	<u>73.7</u>	<u>68.6</u>	<u>64.3</u>	<u>65.0</u>	<u>64.6</u>	<u>65.0</u>	<u>68.5</u>	<u>64.1</u>	<u>70.8</u>	<u>64.9</u>
Cocoa	38.6	45.4	43.1	31.9	39.1	50.8	51.9	56.7	58.7	66.1	59.3
Palm kernels	6.3	8.2	6.7	5.4	10.7	5.2	6.4	5.9	2.0	1.8	2.7
Rubber	5.0	3.9	3.2	5.5	8.2	4.3	3.4	2.0	2.0	2.0	2.7
Groundnuts	12.7	7.7	8.1	12.9	1.7	--	0.0	--	--	--	--
Pineapples	--	--	--	--	--	--	--	--	--	--	--
Coffee	--	0.6	0.9	0.4	0.0	0.3	1.3	0.8	--	0.1	--
Fish and shrimps	--	--	--	--	--	--	--	--	--	--	--
Cashew nuts	--	--	--	--	--	--	--	--	--	--	--
Spices	--	--	--	--	--	--	--	--	--	--	--
Cotton and yarn	3.8	3.5	0.3	1.3	--	--	--	1.8	0.7	0.4	0.2
Hides and skins	1.6	1.5	2.9	3.5	2.6	2.5	1.6	1.0	0.6	0.4	--
Timber (log and sawn)	1.8	1.6	3.5	3.3	2.8	1.3	0.2	0.1	0.0	--	--
Palm oil	0.3	1.1	0.1	--	--	0.3	0.1	--	0.2	--	--
Groundnut oil	6.7	4.0	4.6	6.7	2.8	0.1	--	--	--	--	--
Other agricultural products	--	--	--	--	--	--	--	--	--	--	--
Mineral Products	<u>0.6</u>	<u>0.3</u>	<u>0.5</u>	<u>0.4</u>	<u>1.0</u>	<u>0.6</u>	<u>0.7</u>	<u>1.2</u>	<u>0.1</u>	<u>0.2</u>	<u>--</u>
Columbite	0.6	0.3	0.5	0.4	0.3	0.4	0.6	1.1	0.1	0.1	--
Other	--	--	--	--	0.7	0.2	0.1	0.0	0.0	0.0	--
Manufactures and semi-manufactures of											
Agricultural products	<u>7.7</u>	<u>5.8</u>	<u>7.7</u>	<u>11.0</u>	<u>7.8</u>	<u>7.2</u>	<u>5.4</u>	<u>11.3</u>	<u>4.9</u>	<u>4.2</u>	<u>5.4</u>
Cocoa butter	3.8	2.6	4.3	4.3	5.2	5.7	3.4	7.0	2.7	3.2	3.8
Cocoa powder	0.1	0.4	--	0.1	0.2	0.1	0.4	0.7	0.7	0.8	0.8
Cocoa cake	0.6	0.6	0.9	1.5	1.3	1.2	0.7	3.4	1.4	0.2	0.8
Cocoa paste	--	--	--	--	--	--	--	--	--	--	--
Groundnut cake	3.2	2.2	2.5	5.1	1.2	0.2	0.8	0.2	--	--	--
Wood products	--	--	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	--	--	--
Manufactured exports	<u>9.8</u>	<u>7.7</u>	<u>8.1</u>	<u>4.4</u>	<u>6.5</u>	<u>5.7</u>	<u>3.7</u>	<u>2.4</u>	<u>1.5</u>	<u>1.7</u>	<u>2.7</u>
Textiles	--	--	--	--	--	--	--	--	--	--	--
Tin metal	9.8	7.7	8.1	4.4	6.5	5.7	3.7	2.4	1.5	1.7	2.7
Chemicals	--	--	--	--	--	--	--	--	--	--	--
Other exports	<u>11.7</u>	<u>12.5</u>	<u>15.0</u>	<u>20.0</u>	<u>19.7</u>	<u>21.9</u>	<u>25.3</u>	<u>16.7</u>	<u>29.5</u>	<u>23.2</u>	<u>27.0</u>
Total non-oil exports	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Source: Central Bank of Nigeria, Annual Report and Statement of Accounts, various editions.

Table 6. Nigeria: Structure of Non-Oil Exports, 1981-90

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
	(Share in total non-oil exports, in percent)									
Major agricultural products	45.4	97.7	86.0	84.1	38.6	73.8	73.8	64.7	62.0	70.0
Cocoa	36.3	74.0	75.1	73.9	36.6	67.1	69.6	53.3	35.3	32.1
Palm kernels	4.6	5.5	5.5	3.4	1.2	1.4	1.4	2.5	3.9	2.9
Rubber	4.5	7.9	4.9	6.7	0.8	5.3	2.8	7.3	17.2	23.6
Groundnuts	--	--	0.4	0.1	--	0.0	--	0.1	0.1	--
Pineapples	--	--	--	--	--	--	--	0.1	0.1	0.1
Coffee	--	0.9	--	--	--	--	--	0.0	0.1	1.2
Fish and shrimps	--	--	--	--	--	--	--	--	--	3.0
Cashewnuts	--	--	--	--	--	--	--	1.1	0.1	0.3
Spices	--	0.1	--	--	--	--	--	0.2	0.1	0.1
Cotton and yarn	--	--	--	--	--	--	--	--	0.3	3.0
Hides and skins	--	--	--	--	--	--	--	--	--	--
Timber (log and sawn)	--	--	--	--	--	--	--	--	--	--
Palm oil	--	--	--	--	--	--	--	--	--	--
Groundnut oil	--	--	--	--	--	--	--	--	--	--
Other agricultural products	--	9.3	--	--	--	--	--	0.1	4.9	3.7
Mineral products	--	--	--	--	--	--	--	--	0.2	0.8
Columbite	--	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	0.2	0.8
Manufactures and semi-manufactures of										
Agricultural products	21.8	2.3	14.0	15.9	11.5	9.8	2.9	3.0	3.9	4.1
Cocoa butter	19.1	--	9.6	9.5	9.4	8.1	2.5	2.7	3.4	3.3
Cocoa powder	2.2	--	--	--	0.8	0.3	0.3	0.1	--	--
Cocoa cake	0.5	--	--	--	1.3	1.4	0.1	0.2	--	--
Cocoa paste	--	--	--	--	--	--	--	0.0	--	--
Groundnut cake	--	--	--	--	--	--	--	--	--	--
Wood products	--	--	--	--	--	--	--	--	0.4	0.8
Other	--	2.3	4.5	6.4	--	--	--	--	--	--
Manufactured exports	6.8	--	--	--	0.8	0.2	1.4	0.3	4.5	7.8
Textiles	--	--	--	--	--	--	--	--	4.3	3.2
Tin metal	6.8	--	--	--	0.8	0.2	1.4	0.3	0.2	0.2
Chemicals	--	--	--	--	--	--	--	--	--	4.5
Other exports	26.0	--	--	--	49.0	16.2	21.9	32.0	29.4	17.2
Total non-oil exports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Central Bank of Nigeria, Annual Report and Statement of Accounts.

Table 7. Nigeria: Agricultural Exports - Selected Indicators, 1970-80

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Incentive indicators 1/											
Real effective exchange rate Index (1985=100)	36.5	39.14	38.81	34.99	36.69	43.78	52.91	52.33	54.22	55.8	59.6
Annual change (in percent)	...	7.2	-0.8	-9.8	4.9	19.3	20.9	-1.1	3.6	2.9	6.8
Consumer price index (1985=100)	10.3	12	12.4	13	14.7	19.7	24.4	27.8	33.9	37.8	41.6
Ratio of producer price 2/ to international price											
Cocoa	61.7	75.7	57.7	50.5	62.5	72.2	66.0	45.2	49.2	60.6	91.3
Palm Kernels	45.8	61.0	72.7	108.3	51.6	150.0	130.4	64.7	68.7	63.3	95.4
Rubber	...	...	...	...	...	...	...	...	...	75.9	68.7
Groundnuts	62.1	45.6	43.3	34.9	49.8	83.3	108.7	71.1	81.0	108.6	168.2
Coffee	...	...	...	...	...	...	...	...	...	...	...
Cotton	...	...	49.2	42.5	22.3	38.9	31.2	74.3	31.5	30.2	30.6
Performance indicators											
Export volume index (1970=100) 3/											
Total non-oil exports	100.0	130.8	110.1	104.9	94.7	84.2	104.8	79.6	85.3	96.4	70.3
Cocoa	100.0	138.8	116.2	109.3	99.1	89.3	111.9	85.6	98.0	111.3	80.3
Palm kernels	100.0	130.1	114.5	74.2	100.2	92.5	146.8	100.4	30.7	27.5	26.8
Rubber	100.0	83.1	66.8	80.1	99.4	98.7	55.1	44.9	50.1	55.4	50.2
Groundnuts	100.0	47.0	36.3	68.0	10.4	--	0.5	0.3	--	--	--
Coffee	...	...	...	...	...	...	...	...	...	...	...
Cotton	100.0	79.1	3.5	29.1	--	--	--	32.6	11.3	9.2	8.5
Palm oil	100.0	265.8	25.0	--	--	140.8	43.4	--	42.1	9.2	--
Groundnut oil	100.0	45.9	44.1	123.1	26.1	--	--	--	--	--	--
Share in world trade 4/											
Cocoa	...	22.8	18.2	19.3	16.5	16.8	19.3	17.3	17.7	12.4	12.6
Palm kernels	...	49.0	52.7	44.9	51.7	55.3	69.2	66.2	63.4	40.1	47.9
Rubber	...	1.7	1.4	1.5	1.9	1.6	0.8	0.8	0.9	0.8	0.4
Groundnuts	...	15.6	11.5	20.7	3.5	0.2	0.2	0.1	0.3	0.3	--
Coffee	...	0.1	0.1	0.1	--	0.0	0.2	0.1	0.0	0.0	0.1
Cotton	...	0.6	0.0	0.2	--	--	0.2	0.2	0.2	0.5	--
Palm oil	...	13.6	15.5	19.0	12.5	8.5	5.0	5.3	14.0	15.1	12.8
Groundnut oil	...	11.9	7.5	21.9	6.0	--	--	--	--	--	--
Export/Output 5/											
Cocoa	64.2	105.7	94.4	99.5	90.7	80.9	120.9	86.0	122.1	144.2	102.7
Palm kernels	62.0	78.5	78.6	59.5	59.9	58.1	92.2	65.5	20.2	18.2	17.8
Rubber	94.9	82.7	72.3	74.8	78.6	89.6	64.2	46.9	53.3	61.1	68.9
Groundnuts	18.5	10.0	7.9	22.6	1.6	0.3	0.1	--	--	--	--
Coffee	...	...	...	...	...	...	...	...	...	...	...
Cotton	7.9	5.2	1.0	9.6	--	--	--	3.4	1.5	2.1	3.1
Palm oil	1.6	4.0	0.4	--	--	2.1	0.6	--	0.6	0.1	--
Share of agricultural exports in GDP	4.7	3.4	2.2	2.2	1.5	1.1	1.0	1.1	1.1	1.1	0.7
Share of non-oil exports in GDP	6.5	4.6	3.2	3.4	2.2	1.6	1.5	1.7	1.8	1.5	1.0
Share of Agricultural exports in total exports	31.0	19.3	12.2	11.1	4.8	4.7	4.1	4.9	6.8	4.3	2.4
Share of non-oil exports in total exports	43.0	25.8	17.4	16.7	7.2	7.3	6.3	7.2	10.6	6.0	3.7

Sources:

1/ IMF *IFS Yearbook* 1992.2/ Producer prices were obtained from the Central Bank of Nigeria, *Annual Report and Statement of Accounts*, (various editions); international prices were obtained from IMF, Commodities Special Division.3/ Central Bank of Nigeria, *Annual Report and Statement of Accounts*, various issues.4/ Nigeria's exports were obtained from Central Bank of Nigeria, *Annual Report and Statement of Accounts*, (various editions); World exports were extracted from UNCTAD, *Commodity Year Book*, various issues.5/ Export volumes were obtained from Central Bank of Nigeria, *Annual Report and Statement of Accounts*, (various editions); Output figures were extracted from Bank of Nigeria, *Statistical Bulletin*, volume 4, number 1.

Table 8. Nigeria: Agricultural Exports - Selected Indicators, 1981-1990

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Incentive indicators 1/										
Real effective exchange rate										
Index (1985=100)	66.0	67.7	80.1	110.1	100.0	42.7	17.8	22.4	20.9	18.0
Annual change (in percent)	10.7	2.6	18.3	37.5	-9.1	-57.3	-58.3	26.0	-6.9	-14.0
Consumer price index (1985=100)	50.3	54.1	66.7	93.1	100	105.7	117.7	181.8	273.5	293.7
Ratio of producer price 2/ to international price										
Cocoa	101.3	110.9	91.3	81.6	79.4	96.4	93.6	152.6	110.1	83.2
Palm kernels	102.0	129.0	86.9	98.6	153.6	161.0	116.7	83.6	96.5	132.1
Rubber	77.2	82.9	91.7	104.4	111.1	85.7	25.1	28.5	28.6	20.1
Groundnuts	123.1	168.1	--	--	--	--	--	--	--	--
Coffee	---	---	---	---	---	---	---	---	---	---
Cotton	40.2	48.6	--	--	--	--	--	--	--	--
Palm oil	128.7	151.8	91.2	75.4	121.8	197.7	70.1	61.4	37.7	43.2
Performance indicators										
Export volume index (1970=100) 3/										
Total non-oil exports	66.6	56.7	78.5	46.5	41.5	67.3	91.2	136.6	64.9	66.3
Cocoa	99.4	64.0	88.8	52.8	47.5	75.8	103.0	155.3	67.1	70.8
Palm kernels	49.8	34.3	47.7	14.5	17.5	33.1	49.9	59.6	62.1	33.5
Rubber	39.5	43.3	31.3	44.7	9.7	53.5	62.6	109.2	166.9	171.5
Groundnuts	--	--	1.7	0.3	--	0.0	--	0.1	0.0	--
Coffee	--	--	--	--	--	--	--	--	--	--
Cotton	--	--	--	--	--	--	--	--	--	--
Palm oil	--	--	513.2	--	--	--	--	--	--	--
Groundnut oil	--	--	--	--	--	--	--	--	--	--
Share in world trade 4/										
Cocoa	14.5	10.9	17.1	9.7	6.7	9.5	6.3	12.3	6.1	7.0
Palm kernels	32.8	40.4	45.2	31.7	32.6	64.6	76.8	76.6	65.9	51.3
Rubber	0.7	0.9	0.8	0.8	0.8	0.9	0.9	1.1	1.4	2.1
Groundnuts	--	0.4	--	--	--	0.0	--	--	--	--
Coffee	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Cotton	--	--	--	--	--	--	--	--	0.0	0.1
Palm oil	11.6	8.4	7.2	2.4	1.0	1.1	0.2	1.1	0.2	0.1
Groundnut oil	--	--	--	--	--	--	--	--	--	--
Export/Output 5/										
Cocoa	105.5	80.3	124.1	68.9	84.5	148.4	191.9	132.1	51.3	62.7
Palm kernels	47.6	20.5	31.7	7.9	9.0	17.5	26.2	20.3	19.2	10.0
Rubber	124.4	53.4	42.9	47.6	10.3	55.0	68.9	99.1	128.8	120.2
Groundnuts	--	--	1.3	0.2	--	0.0	--	0.0	0.0	--
Coffee	---	---	---	---	---	---	---	---	---	---
Cotton	---	---	---	---	---	---	---	---	---	---
Palm oil	---	---	7.8	--	---	---	---	---	---	---
Groundnut oil	---	---	---	---	---	---	---	---	---	---
Share of agricultural exports in GDP	0.4	0.4	0.5	0.3	0.3	0.6	1.5	1.2	0.8	0.9
Share of non-oil exports in GDP	0.8	0.4	0.5	0.4	0.7	0.8	2.0	1.9	1.3	1.3
Share of agricultural exports in total exports	1.6	2.4	3.5	2.3	1.6	4.6	5.2	5.7	3.2	2.1
Share of non-oil exports in total exports	3.5	2.5	4.0	2.7	4.2	6.2	7.1	8.9	5.1	3.0

Sources:

1/ IMF, *IFS Yearbook 1992*.2/ Producer prices were obtained from the Central Bank of Nigeria, *Annual Report and Statement of Accounts*; International prices were obtained from IMF, *Commodities Special Division*.3/ Central Bank of Nigeria, *Annual Report and Statement of Accounts*, various issues.4/ Nigeria's exports were obtained from Central Bank of Nigeria, *Annual Report and Statement of Accounts*; World exports were extracted from UNCTAD, *Commodity Year Book*, various issues.5/ Export volumes were obtained from Central Bank of Nigeria, *Annual Report and Statement of Accounts*, Various issues; Output was extracted from Central Bank of Nigeria, *Statistical Bulletin*, volume 4, number 1, 1993.

Table 9. Nigeria: Export Volumes, Export Prices, Consumer Price Index, GDP at Factor Cost and Index of Manufacturing, 1970-90

Period	Export volumes 1/			Export prices of Nigeria's commodities 2/			Nigeria, CPI 3/	Agriculture at factor cost 4/	Index of Manufacturing 1/
	Cocoa	Palm kernels	Rubber	Cocoa	Palm kernels	Rubber			
	(In thousands of metric tonnes)			(U.S. dollars per metric tonne)			(1985 = 100)	(In millions of 1987 Naira) (1972 = 100)	
1970	195.7	185.3	61.7	673.9	167.6	407.2	10.3	38,023	81.0
1971	271.7	241.1	51.3	538.6	144.9	332.5	12.0	40,004	82.8
1972	227.5	212.2	41.2	642.6	116.1	331.8	12.4	37,092	100.0
1973	213.9	137.5	49.4	1,130.8	258.6	678.0	13.0	40,401	123.0
1974	194.0	185.6	61.3	1,560.2	464.3	751.6	14.7	44,589	119.5
1975	174.7	171.4	60.9	1,245.9	206.8	560.9	19.7	39,958	147.7
1976	218.9	272.0	34.0	2,045.8	229.9	773.7	24.4	39,332	182.2
1977	167.5	186.0	27.7	3,791.1	326.3	814.7	27.8	42,017	193.5
1978	191.7	56.8	30.9	3,404.6	363.7	985.6	33.9	38,385	221.0
1979	217.8	50.9	34.2	3,292.8	499.5	1,262.1	37.8	37,223	327.5
1980	157.1	49.6	31.0	2,603.4	344.5	1,424.6	41.6	39,061	344.7
1981	194.6	92.2	24.4	2,076.6	317.3	1,122.8	50.3	32,630	394.9
1982	125.2	63.5	26.7	1,741.8	264.8	857.7	54.1	33,459	447.0
1983	173.8	88.4	19.3	2,118.7	365.3	1,064.2	66.7	33,361	319.0
1984	103.4	26.8	27.6	2,395.7	524.8	957.7	93.1	31,747	280.8
1985	92.9	32.4	6.0	2,254.6	284.7	758.7	100.0	37,076	336.5
1986	148.4	61.3	33.0	2,068.3	141.4	806.5	105.7	40,495	323.5
1987	201.5	92.4	38.6	1,997.8	181.4	984.7	117.7	39,204	432.3
1988	303.9	110.4	67.4	1,583.8	264.0	1,185.0	181.8	43,051	505.3
1989	131.3	115.1	103.0	1,242.2	268.0	969.9	273.5	45,088	537.8
1990	138.5	62.0	105.8	1,268.0	188.4	864.7	293.7	46,922	544.9

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