EFFECT OF EXCHANGE RATE VARIATION ON SOME SELECTED NIGERIAN AGRICULTURAL EXPORT COMMODITIES (1986-2002)

BY

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Reg. No. Msc/Soc. Sc/51235/2005-2006

A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL
IN
AHMADU BELLO UNIVERSITY,
ZARIA NIGERIA

IN PARTIAL FULFILMENT FOR THE AWARD OF MASTER OF SCIENCE (M.SC) DEGREE IN ECONOMICS

DEPARTMENT OF ECONOMICS
AHMADU BELLO UNIVERSITY,
ZARIA NIGERIA.

SEPTEMBER, 2006

DECLARATION

I declare that the work in the thesis entitled "Effect of Exchange Rate Variation on some selected Nigerian Agricultural Export Commodities (1986 – 2002) has been performed by me in the Department of Economics under the supervision of Dr. (Mrs) P. S. Aku and Dr. G. D. Olowononi.

The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at any university.

Name of student	Signature	Date

CERTIFICATION

This thesis titled "Effect of Exchange Rate Variation on some Selected Nigerian Agricultural Export Commodities (1986-2002)" written by AKILU MUSA KUTA meets the regulation governing the award of Master of Science Degree (M.SC) in Economics of Ahmadu Bello University, Zaria and is hereby approved for its contribution to knowledge and literacy presentation.

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DEDICATION

This thesis is dedicated to my Parents and Family who contributed immensely to my educational carrier. Above all, this thesis is dedicated to Almighty Allah the Lord of the world.

ACKNOWLEDGMENT

Thanks and glory be to Allah the Lord of the world, the beneficent the merciful.

My appreciation goes to my supervisor Dr. (Mrs) P.S. Aku and Dr. G.D Olowononi. I am greatly indebted to them for their contribution and useful advice that enriched the quality of this work. I particularly appreciate their constructive criticism towards the completion of this research work.

I wish to also acknowledge the contributions of the entire lecturers in Economics Department for their encouragement and moral support all through the years of my studies. I would particularly express my appreciation to Dr. M. C. Duru, Head, department of Economics, Ahamdu Bello University, Zaria for his fatherly advice.

I owe it a duty to acknowledge and place on record the contribution of my friends both at home and school most especially Salihu Audu, Isah Imam, C.K Dauda, Bala U. Sanda, Alh. Ibrahim A. Matane, and all my colleagues in the place of work.

Special thanks also goes to my relations who contributed immensely in one way or the other to make this dream come true. I appreciate the moral support of my Uncle and brothers, Ahaji Salihu D. Gomna, Yahaya Musa, Nasiru Musa, Hadiza Musa, Sa'adu Musa, and Mohammadu Musa. I thank them all, May Almighty Allah shower his blessings on them (Amen).

I cannot end this acknowledgement without mentioning the support and contributions of my darling Wife, Hajiya Fatima, whose prayers, moral and financial support remains indelible in my life. In addition, to mention now, are my children Aminu and Bilyaminu, May Allah in his infinite mercy continue to bless them.

ABSTRACT

There has been controversy among economists on whether or not exchange rate variability since the breakdown of the fixed exchange rate has had a negative effect on trade. The most common assertion has been that the risk associated with such exchange rate variation has reduced the level of exports. This is countered by the argument that the use of forward markets could ameliorate risk in the short to medium term effect. Based on the aforementioned, there have been several empirical studies on this issue. Despite this renewed interest, however, the studies have concentrated on aggregated trade flows and short run effect with little emphasis on particular crops. In a similar vein, other factors like interest rate and weather condition were not taken into consideration. The focus of this study therefore, is to examine the effect of exchange rate variation on some selected Nigerian agricultural export commodities (i.e. Cocoa, Rubber, Cotton and Cocoa butter).

In studying the effect of exchange rate variation, it is important to look at the short, medium and long run effects with particular emphasis on some crops. Therefore, in this study, the long run effect of exchange rate variation on the above mentioned Nigerian agricultural export commodities were examined. The work was within the context of recent econometric work most especially the pioneering model discussed and applied by Nerlove (1958), and later Philip

(1989, 1996) in which various measures of some selected export crops production were regressed on suitable variables for farmers' expected commodity prices.

The results obtained suggest that exchange rates are significant in determining Nigerian agricultural exports. Based on this, the study recommends that the monetary authority should adopt a mechanism that will lead to the stability of the exchange rate. Erratic changes in the exchange rate have a long term negative effect on production of agricultural exports.

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CHAPTER ONE

1.0 GENERAL INTRODUCTION

1.1 Background to the Study

There has been controversy among economists on whether the high level of exchange rate variation characterizing the world economy since the breakdown of the fixed exchange rate system has had a negative effect on international trade. Empirical observations show that daily or monthly nominal exchange rate movements have since become much volatile. The most common assertion has been that the risk associated with this exchange rate variation has reduced the level of exports, (Hooper and Kohlhgan (1978). This is countered by the argument that use of forward markets could ameliorate risk in the short to medium- run. Many empirical studies have attempted to shed light on this issue, but the econometric evidence is inconclusive. For example in early research, Cushman (1988) found negative effect, while Klein (1990) found positive effect. Both of these studies focused only on U.S aggregate trade. Other notable studies include Thursby (1957). Frenkel and wei (1993), lrwin (1995) among others, all of which focused on world trade and found a negative impact of exchange rate variation on trade.

More recently, one of the most dramatic events in Nigeria in the last two decades was the devaluation of the Nigerian Naira with the adoption of a Structural Adjustment Program

(SAP) in 1986. A Cardinal objective of the S A P was to effectively alter and restructure the consumption and production patterns of the economy as well as eliminate price distortions and heavy dependence on oil exports and imports of consumer and producer goods (Annon, 1986). The foreign exchange reforms that facilitated a cumulative depreciation of the effective exchange rate were adopted to increase the domestic prices of agricultural exports and therefore boost domestic production.

Significantly, this depreciation resulted in changes in the structure and volume of Nigeria's agricultural exports empirically determined by many researchers (Oyejide, 1986. Ihimodu, 1993; Osuntogun et al, 1993; World Bank, 1994.).

The depreciation of the Naira also increased the price of agricultural exports over the years. However, the variation, frequency and instability of the exchange rate movement since the beginning of the floating exchange rate raise a concern about the impact of such movements on agricultural trade flows. Despite this renewed interest, recent studies used aggregate data, ignoring the fact that the impact of exchange rates may vary across crops. As noted by Maskus (1986), the effect of exchange rate variation may vary across crops, because different crops have different degrees of openness to international trade, and/or because different crops have different industrial concentration levels and make different use of long–term contracts. Peridy (2002), who found considerable

variation in the effect of exchange rate variation across sample agricultural crops, has confirmed this in a recent paper.

The above analysis signifies that ambiguities still exist in an attempt to proffer solutions to agricultural production and exports.

1.2 Statement of the Research Problem

Changes in income earning of export crops producers comes as a result of either increase/decrease in international world prices of exports or devaluation of the currency and the subsequent increase or decrease in producer prices. Such exchange rate changes, however, may lead to a major decline in future output if they are unpredictable and erratic. Fluctuation whether positive or negative is not desirable as it increases risk and uncertainty in international transactions and thus discourages trade. In a sense, trade will be reduced following an increase in transportation costs.

An International Monetary Fund (IMF) study (1984) showed that despite the declining trends in U.S Dollar prices of Nigeria's agricultural export commodities in the world market, the exchange rate depreciation has resulted in substantial increases in the Naira equivalent of the world prices and consequently in local producer prices. Indeed, since the introduction of Structural Adjustment Program (SAP), producer prices of all export commodities have risen far above what the commodity boards used to pay to farmers. This has

gone a long way to boost domestic production through improved husbandry of existing farms and the cultivation of increased hecters.

On the part of import, exchange rate devaluation has resulted in dramatic increase in the Naira price of imports and this has discouraged importation of food items, by raising the level of effective protection for domestic production. On the other hand, the Naira costs of imported items have also rising astronomically making most of the food items almost out of the reach of many consumers. The sharp rise in the cost of imported inputs has discouraged new investments in commercial ventures while the maintenance and rehabilitation of existing equipment has posed a serious financial strain on modern entrepreneurship.

There has been some research on the effect of exchange rate variability on agricultural exports. Reflecting various researches in the general literature, empirical research relating to (short-run) exchange rate viability and agricultural trade flows has given conflicting results. For example, Maskus (1986) found that aggregate bilateral agricultural trade (the United States and its major western trading collaborators) is particularly sensitive to exchange rate uncertainty. In Nigeria, Ajayi (1985) and Osagie (1985), while taking the structuralism approach in their study of external trade flow, opposed the adoption of a more flexible exchange rate policy in Nigeria. Results obtained from different studies showed that it is

difficult to reach uniform conclusions about the effect of exchange rate variation in Nigerian agricultural export crops.

Several criticisms can be made of the current literature on exchange rate variability and agricultural trade. First, empirical studies that have addressed these issues are still very sparse. Second, the emphasis has typically been on aggregated agricultural trade flows with few studies considering the effect of exchange rate variability on some trade flows of other crops. Third, attention has been, almost exclusively on short-run exchange rate variability. The effect of the medium run exchange rate variability has been ignored even though this is arguably more likely to have a more significant impact on trade. Fourthly, there is the pioneering effort in Nigeria to determine the effect of exchange rate variation on exports. However, their model did not take into consideration other factors like weather condition. Further more, estimates of the exchange rate variation obtained are not standard and are sensitive to the measure of exchange rate variation proxy that is used. The present work apart, from introducing dynamism into the study, uses a standard measure of exchange rate variation that has been refined. In this work, the effect of medium to long-run exchange rate variation on agricultural trade is examined with particular emphasis on some selected crops.

1.3 Objective of the Study

The main objective of this work is to determine the Effect of Exchange Rate Variation on some Selected Nigerian Agricultural Export Commodities. This has been within the context of recent econometric work most especially; the pioneering model discussed and applied by Nerlove (1958) and later Philip (1989, 1996) in which various measures of some selected export crops production have been regressed on suitable variables for farmers expected commodity prices.

Another objective of this study has been to evaluate different agricultural export promotion policies of the Federal Government.

Furthermore, to make appropriate recommendations where necessary for effective implementation of agricultural policies in Nigeria.

1.4. Hypothesis

This study hypothesizes that

Exchange rate variation has a significant effect on Nigerian agricultural export commodities (null hypothesis).

Exchange rate variation has no significant effect on Nigerian agricultural export commodities (alternative hypothesis).

1.5. Scope and Limitation

This thesis covers a period of sixteen years (16) i.e. from 1986 - 2002. The period is considered relevant and adequate

for optimal time lag and analysis as it covers SAP period. In addition, the study concentrated on some selected crops i.e. Cocoa, Rubber, Cotton and Cocoa butter. Other limitation surrounding this study is quality and accuracy of the data because the data were sourced from different agencies like the Federal Office of Statistics, Central Bank of Nigeria (CBN), World Bank and International Monetary Fund (IMF), which gave conflicting data.

1.6 Outline of Chapters

The thesis is divided into Five (5) chapters:

Chapter1: which is the general introduction contains Background information of the study, statement of research problems, objectives of the study, hypothesis, scope and limitations of the study.

Chapter 2: This chapter contains theoretical frame and literature review, Approaches to Exchange Rate Management and the Case for Exchange Rate Union.

Chapter 3: This chapter Covers an over view of Nigerian agricultural sector, export promotion, exchange rate policies/incentives, the Structural Adjustment Program period and Agricultural Performance during this period. This chapter also covers exchange rate subsidy through fiscal incentives.

Chapter 4: This chapter dwells on methodology, Model

Specification, estimation, and analysis of result. The chapter contains an econometric model for measuring the sensitivity of export growth of selected crops to variation in the effective exchange rate. The results and findings of this thesis, explanations of their significance and implication for policies are presented in this chapter.

Chapter 5: This chapter provides Summary, Conclusions, and Recommendations.

CHAPTER TWO

2.0 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 The Concept of Foreign Exchange

Exchange rate has been defined as the price of one currency in terms of another. It can be expressed in one of two ways: as unit of domestic currency per unit of foreign currency; or unit of foreign currency per unit of domestic currency. However, since transactions are often carried out in national currencies, the former is generally applied for exchange. Therefore, Foreign exchange resources are derived and expended in the course of effecting economic transactions between the residents of the country and the rest of the world. The influence of the fluctuating value of a currency on export trade has been acknowledged, especially since the demise of the Breton-Woods system of fixed exchange rate. Following Schuh's (1974: 1-3) pioneering article linking exchange rates to country performance in the global market, several attempts were made to quantify the effects of nominal and real exchange rates movements on the trade. Recently, another body of literature emerged aimed at quantifying the effects of exchange rates on external trade. However, there seems to be a consensus in the literature that adjustment in the foreign exchange rate influences international transaction either through relative prices or through changes in income. In the light of the above, we shall examine the issue of devaluation

largely on two theoretical approaches, namely, the elasticity approach and the absorption approach.

2.1.1 The Elasticity Approach

Exchange rate has been defined as the price of one currency in terms of another. Therefore, it is a vital instrument in an economy which influences most other prices and, indeed the general level of prices. According to this approach, the main policy instrument to expand export is a change in the exchange rate i.e. devaluation or revaluation of domestic currency. The immediate effects of say, devaluation are change in relative prices. The assumption is that, if a country devalues her currency, for instance by about 20 percent, it means that, import prices will increase by 20 percent counted in home prices, which lead to a fall in demand for imports. Exports will receive 20 percent more in home currency for every unit of foreign currency earned. They can therefore, lower their prices counted in foreign currency and will become more competitive. By how much they are to expand sales abroad depends primarily on the foreign demand elasticity of their exports.

The core of this traditional view is contained in the so-called Marshall-Lerner condition which states that the sum of the elasticity of demand for a country's exports and its demand for imports has to be greater than unity for devaluation to have a positive effect on a country's trade

balance. If the sum of elasticity is smaller than unity, a country can instead improve its export trade by revaluation. We can express this condition in terms of a formula.

$dB = kx_f (e_1m + e_{2m-1}$----------(5)

where

dB = change in the trade balance.

K = the devaluation in percentage

x_f = the value of export expressed in foreign currency.

e_1m = the first (devaluing) country's demand elasticity of imports , and e_2m = the second country's (ie the rest of the world demand elasticity for Exports from the devaluing country.

It is easy to see from equation (5) that the two sum of the critical elasticity has to be larger than unity for exports to improve because of devaluation. If the sum is less than unity, an appreciation should instead be used to improve export trade.

When exporters, because of devaluation, receive more for every unit of foreign currency they earn, they can lower their prices quoted in foreign currencies. When prices of exports are lowered, they should be able to sell more. By how much the quantity exported increases, depends on the elasticity confronting the county's exporters. Again, it depends to a large extent on the types of goods the country export as well as the market conditions. If a country exports raw materials, for instance, and is the sole or main supplier of the produce, the

foreign demand elasticity for its exports may be low. On the other hand, a country exporting industrial products in close competition with other supplies from industrial countries will probably have high demand elasticity for its products.

The implication of a low elasticity is that a policy instrument of liberal type, such as devaluation, which presupposes a minimum of interference with trade, can hardly work but that a more direct means such as, trade controls have to be used.

Most of the literature seems to take the view that the relevant elasticity for most countries are now probably quite high, at least substantially higher than unity. Devaluation should then work according to the traditional elasticity approach (Soderstern. 1980-355). However, devaluation is viewed in the devaluing countries with suspicion and it seems as if some economists and politicians are of the view that, it should be used as a last resort. To support this point, some side effects of devaluation are pointed out. This includes the inflationary impact of devaluation on the economy and the effects of devaluation on income distribution.

The Marshall-learner's condition set out in equation (5) is built on some drastic implication. The approach is based on rigid assumption of mass unemployment of resources, perfect elastic supplies, an initial balanced growth and the assumption that the elasticity of foreign demand for export exceeds unity (TMF 1977-149). Thus, devaluation per se may

not be adequate in influencing exporters in the developing counties where relative prices are not the sole determinants of export trade.

However, the elasticity approach prescribed complementary fiscal and monetary policies, which could be adopted in place of devaluation to achieve the same result. In this case, there is the direct attempt to manipulate the major items of external trade rather than relative prices to stimulate export. Prior to the inception of the SAP in Nigeria, a passive exchange rate mechanism was maintained. Although the exchange rates were not static, they were not active. The policy of gradual approach of the naira from 1982 was not informed by underlying market situations. The prevalence of exchange controls during this period relegated to the background the application of the prescription of policies under the elasticity approach. Exchange controls rather than relative prices adjustment was the focus of export policies.

2.1.2 The Income Absorption Approach

An alternative approach to the effects of devaluation formulated in macroeconomic terms is the so-called absorption approach. In the realization that the elasticity includes price and income influence, shifted emphasis to the development of a framework, that relates income to expenditure by introducing income into the partial analysis of the elasticity approach. Absorption approach lies on the fact that the balance of trade can be stated below:

B = Y – E ……(6)

Where

B = Balance of trade

Y = Total income received

E = Total expenditure

If we call total expenditure or total demand as total absorption A. we can rewrite.

B = Y - A ----------(7)

Total absorption includes the demand for consumption and investments purposes. Using a simple national income identity, we say that:

A = C + I + G ----------(8)

Total absorption can be decomposed into two parts. First, we say that any change in real income will induce a change in absorption. How great absorption will change depends on the propensity to absorb, which we shall call C. second, we say that devaluation has a direct effect on absorption depending among other things, on the level of real income at which devaluation takes place. This effect we shall call direct effects absorption. D. This can be written:

dA – cdy + dD---------- (9)

Combining equation (8) and (9) we have

dB = (I – C) dy – dD ---------- (10)

Equation (10) is useful because it direct our attention to the three basic factors important for the outcome of

devaluation. It shows that the effect of devaluation on export trade depends first, on how devaluation affects real income Y. second, on propensity to absorb C; and third on the effect on direct absorption.

If there are unemployed resources when the country devalues, then production can expand in the short run. We will expect the expansionary process to start by an increase in export, giving rise to an increase in national income via the familiar multiplier process. By now, how much export will expand depends greatly on whether export prices in the devaluing country rises, and on the capacity (and willingness) of the rest of the world to absorb export from the devaluing country. In a situation in which the economy is already fully employed or the marginal propensity to absorb is larger than unity, the principal favorable effect of devaluation on export trade is through the direct effect on absorption.

The popular identity of the absorption approach relates trade to total output and total absorption. For devaluation therefore, to improve exports output must be greater than absorption. This is because devaluation is supposed to reduce the external value of domestic money supply (Stern. 1973: 124). However, direct absorption depends on a number of factors. This includes changes in the price level, change in income distribution, the presence of money illusion and changes in government expenditures.

2.2 Approaches to Exchange Rate Management

The currencies of various economies are traded continuously against one another on the foreign exchange markets. The amount of the domestic currency required to obtain a unit of foreign currency is called the exchange rate (e). The exchange rate is a principal trade variable in the determination of import and export at any point in time.

The exchange rates are expected in principle to be left with the vagaries of the market forces of demand and supply. In practice, however, government never really hands off completely the determination of exchange rate. It is common for authorities to fix the exchange rate (e) at some level (say e^x), which is often different from the competitive market rate (e^{xx}). In some cases, the temptation has been to revalue the domestic currency (ie, fix e^x to be less than e^{xx}). This policy, which often stems from domestic political pressure, leads to persistent excess demand for foreign exchange, to meet increased demand for the relatively cheap imports.

Exchange rate devaluation by economy conceptually creates both substitution effect and income effect. The devaluation of a domestic currency reduces the prices of domestic tradable goods relative to the prices of foreign goods. This induces increased demand by foreigners for the products of the country (substitution effect). The increase in the exchange rate reduces the real income of the domestic consumer and increases the real income of the foreign

consumers (income effect). The real income effect thus reinforces the substitution effect to stimulate export response when a country devalues its currency.

The condition under which export earnings from foreign exchange devaluation can be increased and sustained is now briefly examined. The total value of foreign currency earned from export, V may be represented by;

$$V = \frac{P(N)}{e} x, \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (i)$$

Where (P(N) is the domestic price of unit of export and

$$X = g(e), \; g1\,(e) > 0 \quad \ldots\ldots\ldots\ldots\ldots \quad (ii)$$

Is the export response function

eq (i) can further be simplified, without loss of generality, by setting P(N) equal to

$$V = i \; g \; (e) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (iii)$$

The relationship between the exchange rate, and export earning, V, is not immediately obvious from equation (iii). This is because when the exchange rate e increase, export will tend to increase in real terms, given that g1 (e) >0. However, the value of the foreign exchange required to fulfill this higher export response; ie g(e)/e may not necessarily increase since the foreign exchange price per unit of exports (i/e) declines (Meyer, 1980). Thus, the result of a change in the exchange rate on export earning depends on the elasticity of response of

an economic export. If we explore eq (iii) a little further by differentiating it with respect to e, we obtain:

$$Dv/de = 1/e \{dg(e)/de - g(e)/e\} \text{---------- (iv)}$$

Then rearranging terms in eq 4, gives

$$Dv/de = g(e)/e^2 \{K - 1\} \text{ ----------(v)}$$

Where K { = de (e)/de. e/g(e) is interpreted as the elasticity of response of domestic exports. This coefficient must exceed unity (ie, K>1) if increased exports earnings are to follow from exchange rate devaluation. In other words, it is required that export be elastic to change in the exchange rate for the relevant set or group of tradable agricultural commodities.

2.3 The Case for Exchange Rate union

There are two types of exchange rate union (a) pseudo-exchange rate union and (b) a complete exchange rate union. In the pseudo exchange rate, union member countries agree to maintain fixed exchange rate relationship within the union but there is no explicit integration of economic policy. There is no common pool of foreign exchange reserves and no single central bank. The union members determine what reference currency should be (ie one of their currencies might be used or alternatively they might establish a new accounting currency for the purpose). Then each of the other member partners agree to keep its exchange rate fixed, relative to this reference currency. Each country has its own foreign exchange reserve and conducts its own monetary and fiscal policies to achieve

its macroeconomic objectives. For effective monetary integration, the required exchange rate system is the complete exchange rate union. This is needed because of the problems associated with the pseudo exchange rate. For example, the finance minister of each member country may fight for that common exchange rate that would be most appropriate to his balance of payment situation. This could lead to disagreement among the representatives of the possibility of the reference currency floating relative to out side currencies, or even fluctuating within a band. It is possible that a complete exchange rate system will help alleviate these problems.

In the complete exchange rate union, there is a complete pooling of foreign exchange reserves of the union currency. The community balance of payment is regulated at the community level with the outside world. A single member nation will no longer be able to compute its balance of payments with outside world. A union central bank is then established to manage the common fund. This common reserve fund would have the incidental by-product of economizing foreign exchange reserves, since not all the countries could tend to be in deficit and surplus at the same time and surplus countries would automatically be helping deficit countries. (Gorden, 1972, Robson 1980). The union central bank would operate in the market to maintain permanently the exchange rate relationships among the various union currencies.

2.4 Empirical Literature

Since the adoption of floating exchange rates in the developing countries in 1973, the questions of whether exchange rate change /uncertainty have independent adverse effects on exports and trade has attracted a lot of attention in the literature. The introduction of structural adjustment programs by many countries and the attendant liberalization of exchange rate have brought about the discussion of this issue further in to global focus. For example, Lastrapes and Koray (1990), Cushman (1988), Caballaro and Corbo (1989) indicated a significant depressive effect of exchange rate risk. On the other hand, International Monetary Fund (I.M.F 1984), Gotur (1985), Chambers and Just (1991) supported a contrary view.

There is also a vast body of empirical literature on exchange rate effects on external trade and it is reasonable to focus on the most relevant ones. Much of this research concentrated on the manufactured goods trade and also produced inclusive results (Hooper and Kohlhagen , 1978, Gotur, 1985, Lastrapes and Koray (1990).

Maskus (1986) however, provided a link between his study and previous work by comparing the effects of exchange rate risk across major sectors of the economy, e.g. manufactured goods, agriculture, chemicals and others. He found that aggregate bilateral agricultural trade (the United States and its major western trading partners) is particularly sensitive to

exchange rate uncertainty. Maskus argued that agriculture, compared with manufactured goods trade is more responsive to exchange rate changes because.

(a) Agricultural trade is relatively open to international trade where openness is measured by the ratio of exports and imports to domestic agricultural output) and

(b(Agriculture exhibits a low level of industry concentration in Nigeria. Ajayi (1988) and Osagie (1985) while taking the structuralism approach in their study of external trade flow, opposed the adoption of a more flexible exchange rate in Nigeria. Their argument were based on the structuralism thesis that exchange rate devaluation would be stagflationary and have no significant effects on the external trade balance in the less developed countries. This is because of low elasticity generally associated with the excess import and export demand functions (Taylor and Krugman, 1977). The findings of Ajayi (1988) and osagie (1985) support an earlier study by Ojo (1978), who suggested that exchange rate need not to play any significant role in the explanation of Nigerian import – export balance.

Two other studies that are relevant to our work are Egwaikhide (1993) and Osutogun et al (1993). Egwaikhide worked on determinants of import in Nigeria using a dynamic specification. The study concentrated on imports alone, however, and left out the exports. The effects on domestic disappearance were also not examined. Osuntogun et al (1993)

in their analysis of strategic issues in promoting Nigeria's non-oil exports determined the effects of exchange rate uncertainty on Nigeria's non-oil export performance as a side analysis. Theirs is the pioneering effort in Nigeria to determine the effect of exchange rate risk in exports. However, their model did not take into consideration the cross price effects. Furthermore, estimates of the exchange rate risk obtained are not standard and are sensitive to the measure exchange rate risk proxy that is used. As pointed out by Pick (1990), the measure of risk as postulated by Caballaro and Corbo (1989) is faulty as it over-exaggerates the risk measure. Nevertheless, this was the risk measure used in Osuntogun et al.

In a broader perspective, since the early 1950s, Schuh (1974) first studied the effect of exchange rates variation in agricultural trade flow. He claimed that the exchange rate has been a crucial, yet, neglected variable in past explanations of U.S. agricultural exports. More specifically, his analysis attempted to incorporate the over valuation of the Dollar into past interpretations of the U.S agricultural exports. The consequence of the over valuation of a country currency is a rise in the price of the product in terms of foreign currency, thus lowering the demand for the product and lowering the price of the product in the domestic market, in turn raising the quantity demanded domestically. Schuh (1984) argued that an over-valued currency is equivalent to a tax on exports and a subsidy on imports. In addition, Kost (1976) found that

when demand and supply are inelastic, devaluation had only a small impact on agricultural exports.

Chambers and Just (1979) used a simple two-country excess demand and excess supply model to examine the impact of devaluation on the agricultural market. Their model implied that a devaluation by the exporter country cause an increase in price in terms of the exporter's currency. If the elasticity of excess supply with respect to price is zero, devaluation will have no impact on exports but prices rise. If the excess supply is perfectly elastic, however, devaluation has no effect on prices; all adjustment occurs in exports. Therefore, the response of exports depends upon the elasticity of excess supply.

Although, exchange rates have been generally recognized as an important factor affecting agricultural exports, the magnitude of the effects of exchange rate has been mixed. Numerous efforts have attempted to quantify the effect of exchange rate on a variety of Nigerian exports as previously highlighted.

Childs and Hamming (1984) used the Granger causality to test the hypothesis of a causal relationship between exchange rates and various U.S agricultural commodity exports. Although U.S. agricultural exports were inversely related to the real exchange value of the Dollar, exchange rate movements had their full effect only over considerable time. At the same time, Hudson, Lins and Seger (1989) examined the

effect of interest rates and exchange rates on U.S. agricultural exports to Japan by using Granger causality. They found little evidence of a relationship between these two variables and agricultural exports.

Recently, two studies focused on the impact of exchange rate risk on agricultural trade flows. Anderson and Garcia (1989) found that the quantity of U.S soybeans exports was sensitive to shot-term variation in nominal bilateral exchange rates. The effects vary across countries. In Pick's (1990) article suggested that the real exchange rate was an important factor in determining U.S agricultural exports, but exchange rate risk is not always an important factor

Philip (1996), specifically within Nigerian context, estimated the responsiveness of selected agricultural export commodities to changes in the exchange rate in Nigeria over the 1974-92-sample period. He adopted the pioneering model discussed and applied by Nerlove in which various measures of crop production was regressed on suitable proxies for farmers expected commodity prices. The result obtained suggested that with the exception of natural rubber, the export elasticity for the commodities studied (cocoa, palm kernels, and pressed/semi processed products) were generally of low order even in the long run. The low elasticity estimates limited volume of agricultural export earnings in response to the devaluation of the local currency (the Naira).

Ojo and Akanji (1996), identified the outstanding issues in Nigeria's agricultural policy in the context of the macroeconomic policy reforms adopted in some years. Beset partly by macroeconomic policy distortions, agricultural sector performance was grossly inadequate in the 1970s and up to 1986. They observed that the macroeconomic policy reforms adopted in 1980 were aimed at removing the distortions to enhance macroeconomic stability and sectoral performance. A major finding in their study was that agricultural sector performance improved significantly especially during the initial phase of the policy reforms. However, the improved agricultural sector performance has not been sustained in recent years owing to poor policy implementation, lack of complementary policy measures to support the core-policy initiatives such as the exchange rate adjustment and an impressive agricultural development strategy during the period of reforms. The policy implication of their analysis include the need to strengthen and streamline the economic policy framework for agricultural development during deregulation, enhance policy analysis and implementation, design viable strategies for the delivery of services to producers, as well as institute a more viable public expenditure program on the basis of well defined public sector activities.

Dipo and Kolawole (1999), examines the effectiveness of stabilization policy in Nigeria under alternative exchange rate regimes. A sample version of mundell-fleming model was

adopted. The results indicated that the exchange rate regime has implications for the outcome of any stabilization measure adopted, and further, they observed that the success of debt management strategies would depend on the exchange rate regime. The study argued that the impact of fiscal policy on current account balance also depends on the exchange rate regime. They arrived at these conclusion based on certain assumptions such as static expectations and by ignoring price movement. In sum, the study supports the use of flexible exchange rate regime by an indebted but reforming economy like Nigeria.

Trivedi and Akiyama (1992) developed a flexible computational model while evaluating pricing and tax policies with specific reference to cocoa and coffee production in Cote d` voire over a short and medium (7 to 15 years). The model was used to calculate the trade-offs in terms of discounted net revenue that would accrue to cocoa producers, coffee producers and the government under alternative hypothetical pricing policies. Results of the study revealed that the base scenario was characterized by massive deficit in the government cocoa account, rising cocoa production, and declining coffee production.

This indicated a need for policy changes if the scenario was to be avoided by the government of Cote d` voire. At an unchanged exchange rate, reducing the cocoa price about 40 percent and the coffee price about 10 percent would eliminate

the government deficit on cocoa and coffee. Consequently, to generate positive tax revenue, the price cuts would have to be large. Finally, the devaluation of the CFA franc proved to be a powerful way to reduce government deficits. In conclusion, the study indicated the desirability of a lower tax on coffee than cocoa based on the assumption about the future time paths of world cocoa and coffee prices as the projected outlook, for cocoa price was poor.

Obadan (1993), with the aid of an econometric model which was empirically estimated, examined the impact of the structural adjustment programme(SAP) on Nigeria's natural Rubber export supply. The policy instrument of SAP that were examined were the institutional reform entailing the abolition of the commodity board and exchange rate adjustment. The result confirmed that the SAP policies of exchange rate adjustment and abolition of the natural Rubber Board are important factors that positively affect National Rubber export supply as the coefficient of the real exchange rate variable was correctly signed (positive) and highly significant. This meant that a real depreciation of the Naira, for example, induces farmers to supply more rubber, for export. The world price of rubber was also found to be an important determinant of rubber supply as the average world price variable had the correct sign (positive) in all the equations and statistically significant are six of the nine equations

Tegene (1990), examined the export performance of 30 countries which are primary commodities exporters. Using a regression model, he fitted equations with variables such as world demand factor and concentration factor. The result obtained indicated that the world demand condition is an important determinant of export performance .In 28 out of 30 cases; the coefficient of the world demand variable was significant at 99% or better. The result further suggested that export of oil exporting counties like Gabon, Libya, and Nigeria are dependent on external demand condition than internal supply factors.

The organization for economic cooperation and development (DECD) in association with the World Bank carried out a study to asses the implication of trade reforms as proposed under the General Agreement on Tariff and Trade (GATT). A model of global production and trade known as the Rural/Urban; North/South model, or RUNS was used to trace the implications of policy reforms in a constant manner. Under the partial reform scenario, World Bank prices for many commodities increased, including those for meat, coarse grains, vegetable oil, sugar, and dairy products. On the other hand, the world prices of rice, coffee, and cocoa decreased while the price of wheat is virtually unchanged. The world price of cocoa and coffee were said to have decreased significantly, as the producers of these products were also taxed and they responded positively to an increase in the

producer price. The implication of partial reforms on agricultural production using RUNS model indicated that the structure of production changes significantly, allowing each regions comparative advantage to take precedence over artificial barriers.

Sanusi (2001), observed that in spite of the virtues of the new policy, there were some obvious problems. First, exchange rate depreciation affected the prices of imported inputs that rose substantially. While the removal of subsidies implied high input prices that reduced profit margins. Secondly, there have been complaints about the deteriorating of produce quality that was taken for granted under the commodity system. Thirdly, individual farmers/merchants were exposed to sharp fluctuations in the world commodity prices without any legal marketing arrangements to enable them hedge against these risks.

2.5 Conclusion

From the various studies, some empirical propositions can be derived. That there has been controversy among economists on whether exchange rate devaluation since the breakdown of the fixed exchange rate system has had a negative or positive effect on trade. It has been observed that the risk associated with such exchange rate devaluation has reduced the level of exports. This is countered by the argument that the use of forward markets could ameliorate

risk in the short – medium term. For example, in early research, Cushman (1988) found a negative effect, while Klein (1990) found a positive effect. Just of recent, in Nigeria, several researches have taken effect with ambiguous results. For example, Philip (1996) estimated the responsiveness of selected agricultural export commodities of changes in the exchange rate in Nigeria. The work showed that with the exception of natural rubber, the export elasticity for the commodities studied were generally of low order even in the long- run. While Obadan (1993), examined the impact of Structural Adjustment Program (SAP) on Nigerian agricultural exports, the result confirmed that the SAP policies of exchange rate adjustment and abolition of the commodity boards are important factors that positively affect agricultural export trade.

CHAPTER THREE

3.0 AN OVER VIEW OF THE NIGERIAN AGRICULTURAL SECTOR

3.1 Introduction

Nigerian is endowed with huge expanse of fertile agricultural land, rivers, streams, lakes forests and grassland as well as a large active population that can sustain a highly productive, profitable agricultural sector. This enormous resource base if well managed could support a vibrant agricultural sector capable of ensuring self-sufficiency in food and raw materials for the industrial sector as well as providing gainful employment for the teeming population and generating foreign exchange through exports. In spite of these endowments, the sector has continued to stagnate or decline because of diminishing productivity. The agricultural sector despite its weakness constitutes the dominant sector of the Nigerian economy contributing on the average about 55 percent of the gross domestic product (GDP) in 1960 – 1970 and about 35 percent thereafter. A relatively small modern sub-sector, relying on the use of hybrid seeds/seedlings, exotic bread of livestock, and mechanization has emerged in mainly the last two decades.

3.2 Agriculture in Nigeria's Economic Development

The colonial government recognized the potentials of agriculture for propelling Nigeria's economic development

when policies were put in place to encourage output growth and to extract the surpluses there from. A notable policy then was the creation of marketing boards for the major cash crops at the time. On attainment of self-rule, regional government took advantage of the operations of the boards to generate financial resources to finance their development program.

In terms of contribution to GDP, Agriculture was the leading sector in the 1950s and 1960s. In the period 1960-64, agricultural output accounted for 63 percent of GDP, and in 1965-69 for 54 percent CBN (1993). As Table 3.1 shows, the share declined significantly from the 1970s. In 1970-74 it declined to 33 percent, a period that marked the watershed in Nigeria's economic history through the 1973/74 crude oil price shocks. During the period also, the share of food imports in total import was low, being 9.6 and 8.6 percent in 1962-65 and 1967-71 respectively. This being an indirect measure of agriculture's contribution to food supply, it has been argued that agriculture was able to supply most of the food needs of the economy (Adubi, 2000). The share averaged 11 and 15 percent respectively. In 1971-77 and 1981-86, it declined to 8 percent in 1988-93, before it rose to 12 percent in 1994-98.

Table 3.1: percentage of Distribution of Nigeria's GDP

At 1984 Constant Factor Cost (%)

Period/Year	GDP (N billion)	Crude Petroleum	Manufacturing	Agriculture	Retail & Wholesale Trade	Others
1960-69	26.8	1.6	6.1	58.8	N.A	83.6
1970-74	58.2	17.4	2.5	33.2	11.0	85.
1975- 79	73.7	24.3	5.0	30.2	12.1	33.4
1980	73.2	22.0	8.1	30.8	12.4	26.7
1981	70.4	14.0	9.9	34.7	13.0	23.4
1982	70.2	12.5	11.2	35.8	13.6	26.9
1983	66.4	12.8	8.4	37.7	14.0	37.1
1984	63.0	15.2	7.8	37.8	13.6	25.6
1985	68.9	14.1	8.6	40.3	13.0	23.0
1986	71.1	13.8	8.0	42.7	13.0	22.5
1987	70.7	12.5	8.4	41.5	13.9	23.7
1988	79.8	12.3	8.7	41.5	13.8	23.7
1989	83.5	13.2	8.2	40.6	13.4	24.6
1990	90.4	12.8	8.2	39.0	12.7	27.3
1991	94.5	12.4	8.3	39.0	12.5	27.8
1992	97.4	13.4	7.9	38.3	12.5	27.9
1993	100	13.1	7.3	37.8	12.0	20.2
1994	101	12.6	7.2	37.3	12.5	30.4
1995	103.3	12.6	6.7	34.0	12.2	34.5
1996	107	13.1	6.5	39.0	11.8	29.6
1997	110	12.8	6.3	39.4	11.7	29.8
1998	112	11.9	5.9	40.4	11.8	30.0
1999	116	11.7	5.9	40.6	11.7	30.0

3.2 Legend of the Average

Year	Crude Cil	Manufacturing	Agriculture	Retail & Wholesales	Others
1960-69	1.6	6.1	58.8	N.A	33.6
1970-74	17.4	2.5	33.2	11.0	35.9
1975-79	24.3	5.0	30.2	12.1	28.4
1980-85	15.3	9.0	36.2	13.3	26.3
1986-92	12.9	8.2	40.4	13.3	25.4
1993-99	12.5	6.5	38.4	12.0	30.5

Source: CBN Annual Reports and Statistical Bulletins.

As mentioned above, regional governments derived much of their development finances from agriculture. Between 1954 and 1957, N144 million or 42 percent of the marketing boards surplus were disbursed as grants to regional governments, and another N24 million as loans to regional governments. Between 1962 and 1966 13 to 34 percent of regional government finances depended on marketing boards surpluses (Adubi, 2000).

In terms of export earnings, agricultural exports accounted for 86 percent of total exports in 1955-59, 80 percent in 1960-64 and 57 percent in 1965-69. Part of the decline in 1965-69 may have been due to disruptions in production caused by the civil war of 1967-70. However, from 1970 the decline became very dramatic, and this coincided with the prominence of petroleum as the country's main export commodity. In 1970-74 agriculture accounted for 26 percent of total exports, it thereafter accounted for less than 10 percent being 5.7 percent in 1975-79; 2.7 and 5.6 percent in 1980-85 and 1985-89 respectively. In 1990-93 it nose dived to its lowest at 1.8 percent, before some recovery in 1994-98 to 8.6 percent.

Table 3.3 and 3.4 clearly demonstrate the decline of agricultural exports. As a proportion of total exports, non-oil exports of when agricultural export is dominant, has since 1975 been less than 10 percent. Since 1980, except for the period 1986-89, it has been less than 5 percent (see Table

3.3). of non-oil exports, e.g. cocoa has been dominant, it accounted for over 50 percent in the 1970s. For much of the 1980s it accounted for over 60 percent. However, since the 1990s its share has steadily decline, from 49 percent in 22 percent in 1998. Rubber has been the second major agricultural export crop. From its share of below 10 percent in the 1970s and 1980s, it rose to between 13 and 22 percent in the 1990s. Palm produce has similarly decline in term of its contribution to non-oil exports. It has contributed less than 5 percent since 1984. Cotton made negligible contributions in the 1980s and tend to have reviewed somewhat in the 1990s. Groundnut, on the other hand, has made very negligible contributions since the mid- 1970s.

The dramatic decline in agricultural exports is worrisome, right from the first National Development plan, which have been re-echoed in the Structure Adjustment Program document and the Rolling plans include increased production and processing of export crops with a view to increasing their foreign exchange earning capacity and further diversify the country's export base and sources of foreign exchange earnings.

Table 3.3: Nigeria's Oil and Non Oil Exports (1970- 1998)

Year	Total Exports (Nm)	Oil Exports	Non-Oil Exports (Nm)	Cocoa (Nm)	Ground nut (Nm)	Palm produce (Nm)	Rubber (Natural) (Nm)	Cotton (Nm)
1970-74	2,237.2	1979.6	257.6	129.9	27.9	25.2	17.8	29.5
1975-79	7,242.3	6755.6	486.7	324.7	0.2	19.0	13.1	17.1
1980	14,186.7	13632.3	554.4	311.1	-	14.1	14.1	1.2
1981	11,023.3	8003.2	342.8	142.7	-	17.9	17.8	-
1982	8,206.4	7201.2	203.2	150.4	-	11.2	16.0	-
1983	7,502.5	9131.2	301.3	226.2	1.3	16.6	14.9	-
1984	9,088.0	8840.6	247.4	182.8	0.2	8.4	16.6	N.A
1985	11,720.8	11223.7	497.1	182.1	1.5	6.2	3.8	N.A
1986	8,920.5	8368.5	552.0	370.7	0.1	7.5	20.1	0.0
1987	30,360.6	28208.6	2,152	1,497.8	0.0	30.2	60.5	0.0
1988	31,192.8	28435.4	2,754.4	1,475.9	1.4	67.9	203.2	0.0
1989	58,061.2	55016.8	2.954.4	1,452.6	0.0	112.8	372.6	10.8
1990	109,886.1	106626.0	3.256.6	1,319.1	0.0	84.1	544.7	161.6
1991	121,533.7	116850.5	4,677.2	2,000.9	0.0	47.9	669.3	194.2
1992	205,611.7	201383.9	4,277.8	1,557.0	0.0	88.1	875.4	79.0
1993	218,770.1	213778.8	4,991.3	1,683.8	0.0	137.2	875.5	119.7
1994	206,059.2	200713.3	5,349.0	1,816.2	0.0	131.3	689.7	232.4
1995	950,661.4	929712.8	23.096.1	6,227.4	0.0	102.7	4,717.5	1,309.8
1996	1,309,543,5	1286.215.9	23,327.6	7,351.5	0.0	489.6	5,094.6	1,692.6
1997	1,241,662.7	1212499.4	29.163.3	7,818.1	0.0	1,282.6	4,067.1	3,3592.6
1998	751,856.7	717,786.5	34,070.2	7,459.3	0.0	338.4	1,024.1	3,583.3
Legend of production in Table (%)								
1970-74			11.5	5.8	1.2	1.1	0.8	1.3
1975-79			6.7	4.5	0.0	0.3	0.2	0.1
1980-35			3.4	2.0	0.0	0.1	0.2	0.0
1986-92			5.1	2.8	0.0	0.1	0.4	0.1
1993-98			2.5	0.7	0.0	0.1	0.3	0.2

Source: CBN (1999, 2000) figures for 1970-74 and 1975-1979 are annual averages (indicates a very negligible or non-available figure).

Table 3.4: Nigeria's Non-Oil and Agricultural Exports 1970-98

Year	Non-oil Export (% total Export)	Cocoa	Palm produce	Rubber	Cotton	Groundnut
		(% of Non-Oil Export				
1970-74	11.5	50.4	9.8	9.8	11.5	10.8
1975-79	6.7	66.7	3.9	2.7	6.6	-
1980	3.9	56.1	2.5	2.5	-	-
1981	3.1	41.6	5.2	5.2	-	-
1982	2.5	74.0	5.5	7.9	-	-
1983	4.0	75.1	5.5	5.0	-	0.4
1984	2.7	73.9	3.4	6.7	N.A	-
1985	4.2	36.7	1.3	0.8	N.A	0.3
1986	6.2	67.2	1.4	5.3	0.0	-
1987	7.1	69.6	1.4	2.8		0.0
1988	8.8	53.6	2.5	7.4	5.0	5.1
1989	5.1	49.2	3.8	12.6	0.0	0.0
1990	3.0	40.5	2.6	16.7	0.0	0.0
1991	3.9	42.8	1.0	14.3	0.45.0	0.0
1992	2.1	36.4	2.1	20.5	5.2	0.0
1993	2.3	33.7	2.8	17.5	.9	0.0
1994	2.6	34.0	2.5	12.9	2.4	0.0
1995	2.4	27.0	0.5	20.4	2.4	0.0
1996	1.8	31.5	2.1	21.8	5.7	0.0
1997	2.4	26.8	4.4	14.00	7.3	0.0
1998	4.5	21.9	1.0	3.0	0.	0.0

Note:- Indicates negligible

Source: Computed from CBN Annual Report various years.

3.3 REVIEW OF AGRICULTURAL POLICIES

For purpose of discussion, three sub-periods were identified, namely: 1960-69, 1970-85, and 1986 to date. The discussion however, shall focus more on the last two sub-periods i.e. 70-85 and 86 to date.

3.3.1 Agricultural Policy 1970-85

The period 1970-85 witnessed more direct government intervention in agriculture. In the face of noticeable decline in the sector's performance, varieties of policies were introduced during this period. Being the period that marked the upsurge in oil revenue accruing to government, macroeconomic policies became expansionary, including direct government involvement in agricultural production. Fiscal incentives were introduced which included low tariff on importation of agricultural inputs.

With finance identified as one of the constraints the sector was then facing, finance institutions were created. The Nigerian Agricultural and Co-operative Bank (NACB) were established in 1973. The Agricultural Credit Guarantee Scheme Fund (ACGSF) was established in 1978. More would be said about these institutions operations below.

During the period World Bank-assisted Agricultural Development Projects (ADPs) were introduced in a number of States. The programs were designed to provide an integrated approach to agricultural and rural development. River Basin

Development Authorities were also established to provide all year round water through irrigation to farmers. More research institutes were established during this period and there was a re-organization of marketing boards, which gave rise to the Grains Boards.

3.3.1.1 Export Subsidy Policies

In 1976, the government established the Nigerian Export Promotion Council (NEPC) to promote non-oil exports from Nigeria. The Council administers incentive programs, including a duty drawback program, the export development fund, tax relief and capital assets depreciation allowances, and a foreign currency retention program. The duty drawback or manufacturing in-bond program is designed to allow the duty free importation of raw materials to produce goods for export, contingent on the issuance of a bank guarantee. The performance bond is discharged upon evidence of exportation and repatriation of foreign exchange. Though meant to promote industry and exportation, these schemes have been burdened by inefficient administration, confusion, and corruption, causing great difficulty and, in some cases, losses to those manufacturers and exporters who opted to use them.

The NEPC also administers the export expansion grant program, a fund that provides grants to exporters of manufactured and semi-manufactured products. Grants are awarded based on the value of goods exported, and the only

requirement for participation is that the export proceeds be repatriated to Nigeria. Though the grant amounts are small, ranging from two to five percent of total export value, they may constitute subsidies as defined by the WTO and raise questions about compliance with WTO obligations. In the 1999 budget, the government announced that the incentive schemes will be replaced by a non-cash incentive scheme termed "negotiable duty credit certificate" (NDCS), under which exporters' claims are credited against future imports. This measure will save the government from making annual budgetary allocations to the scheme and is in conformity with the WTO.

3.3.2 Agricultural Policy 1986-99

During the period 1986-99 which combines both SAP and post SAP era, market-oriented and not-so-market-orientated agricultural development policies and programs were introduced, River Basin Authorities were restructured from 21 to 11; the Directorate for Food Roads and Rural Infrastructure (DFRRI) was established as well as the National Agricultural Insurance Corporation, and Peoples Bank. Farm inputs supply policy was actively pursued during this period.

Trade liberalization was an important aspect of policy reforms under SAP. Abolition of import and export licensing and exchange control measures took place. With these reforms, export earners became entitled to 100 percent of their foreign exchange earnings provided these are kept in a

domiciliary account. Thus, agricultural producers had an incentive to boost their exports.

The Export Incentive and Miscellaneous provisions Decree of 1986 was enacted through which CBN could provide refinancing and discounting facilities to commercial and merchant banks to encourage them to provide credit and risk bearing facilities in support of exports CBN (1993). This consequently, led to the establishment of the Nigerian Exports Credit Guarantee and Insurance Corporation in 1988 that was subsequently renamed the Nigerian Export Import Bank. The institution actually started operation in 1991.

Perhaps the most pervasive policy under SAP is the naira exchange rate devaluation. The rate which in 1981 was No. 639 and No.9996 in 1985 to the US dollar in 1986 averaged 3.3166. By 1992 it had depreciated to N19.6609 and N91.83 in 1999. (See Table 3.5). Economic theory suggests that exchange rate devaluation is good for exports as it makes export prices more competitive.

Nevertheless, the theory also suggests that devaluation makes import more expensive. Therefore, for an economy dependent on import of inputs, devaluation could be a double-edged sword.

An assessment of the effect of the trade policy reforms suggests that these have indeed been beneficial to agricultural exports. While exchange rate devaluation boosted export, liberalization of export and pricing mechanism brought about

convergence of export prices. The implicit taxation of exports by the Commodity Boards was thus eliminated (See Table 3.5). For example, the ratio of producer prices to export prices for cocoa and palm kernel converged significantly and sometimes above 100 percent, indicating that exporters were paying farmers prices that were above world market prices. This however, was until 1994. From 1995 to 1999 the prices began to diverge noticeably, to the extent that the implicit tax was above 50% (i.e- 0.56 to – 0.80), particularly for rubber, cotton, groundnut, and palm kernel. Some may attribute the latter trend to the reversal in effective implementation of SAP from 1994.

There is no doubt that the tremendous boost in producer prices was due to naira devaluation. For example, the naira value of the world market prices of cocoa, rubber, cotton, and groundnut rose from N2,135.3, N5,169.9, and N824.5 per tone in 1985 to N7,388.6, N16,738.8 and N7,908.5 in 1991, representing 246, 967.1, 1331.2 and 859.2 percent increases respectively; (See Table 3.5).

The increase in naira value of world market prices similarly translated to increase in producer prices of cocoa, rubber, cotton and groundnut, from N1.500, N750, N700 and N1750 per ton in 1985 to N12.745, N5692, N3, 778 and N6, 843 in 1992. Moreover, as table 3.5 shows, the increase continued in the 1990s. Cocoa, rubber, and palm kernel

respectively enjoyed 502.3, 549.1 and 469.3 percent increases in 1991-94, and 40.2, 68.3 and 33.1 percent in 1994-99.

Table 3.5: Average Producer Prices of Major Agricultural Crops, 1988-99

Year	Cocoa	Palm Kerinel	(N'000 tone) Rubber	Cotton	Ground-nut	Palm Oil	Exchange
1988	7500	1000	1500	4500	2250	1500	5.3530
1989	1010	1800	2000	2433	4795	1310	7.6560
1990	8500	2000	1395	2600	4320	1160	9.0001
1991	10158	2525	5300	4163	6280	N.A	9.7545
1992	12745	5692	12520	3778	6842	12472	19.6609
1993	25278	10567	24091	N.A	12958	20836	22.6361
1994	61180	14374	34400	45000	13500	98630	21.8561
1995	73104	31730	34979	45232	200064	66190	21.8851
1996	80222	22185	51917	37757	24125	55858	81.2000
1997	89687	16554	56722	35833	17757	48477	81.0000
1998	79600	21000	61833	32953	21509	59280	82.4000
1999	85766	19129	57892	40208	36097	51536	91.8000

Source: 1988-95 is an official exchange rate; 1996-99 is Average AFEM rate CBN Annual Report, various years.

The question then is why, despite the boost in agricultural world market and producer prices, has the contribution to total exports by agriculture been very low and declining? The reason is that growth in agricultural export earnings in recent decades has merely been a price effect, with little output effect even when allowance is made for time lags in output changes relative to price changes. The latter effect is what is required to have a sustained real growth in agricultural export.

The ACGS, which was established in 1978 to provide guarantee in respect of loans and advances granted to the sector, was designed to encourage banks to increase their credit facilities to farmers. The scheme, funded by the FGN/CBN on the ratio of 60:40, has N100 million capital base. The fund is required to repay 75 percent of loans where beneficiary farmers failed to banks under the scheme.

Available data show that an average of only 25 percent of lending under the scheme during the first five years of operations had maturity of 24 months and above. Lending under the scheme represents about 20 percent of overall agricultural lending. However, from 1985, the CBN is required to stipulate grace periods for agriculture loans – one year to four years for small-scale farmers producing cash crops, and five years for medium and large scale mechanized farmers.

Available evidence suggests that the scheme may have done very little to ease credit constraints smallholder farmers face. In 1978, its first year of operation, only N10.4 million was guaranteed as loans. In 1981 and 1984 the figure was N32.2 million and N24.7 million respectively. The figure has not been stable ever since. The bulk of guaranteed farmers and co-operatives have availed of loans, while the loans received by small farmers always represent an insignificant percentage in the scheme (see CBN Annual report). Specifically for major export cash crops, table 6 shows that in the early 1990s those receiving loans guarantee for loans of N20, 000 and above

formed the greater proportion of beneficiaries. From the mid 1990s guaranteed loans for agricultural exports became really insignificant. With such a development, commercial banks, being naturally risk averse, would be further hesitant in their lending to relatively smallholder farmers who usually do not have adequate security to cover such loans.

Table3.6.:Loan Guaranteed By Agricultural Credit Guaranteed Scheme Fund By Size Major Export/Cash Crops, 1990-99 (%)

Year	N5.00		N5,000 N20,000		N20,001 N50,000		N50,001 N100,00		Above N100,000	
	No	Amount	No	Amount	No	Amount	No	Amount	No	Amount
1990	7.2	6.5	9.9	10.5	16.9	16.4	22.9	23.2	6.7	15.9
1991	8.9	8.6	4.5	4.3	7.2	7.7	14.5	15.2	21.1	20.2
1992	7.4	5.6	0.2	0.4	0.0	0.6	0.1	1.1	0.0	0.9
1993	5.4	3.6	0.7	1.1	0.1	0.6	0.0	0.5	0.0	0.0
1994	4.0	2.3	0.5	0.8	0.1	0.5	0.1	0.9	0.0	0.1
1995	2.8	1.4	1.4	1.7	0.2	0.9	0.3	2.3	0.0	0.2
1999	0.6	0.2	1.5	1.0	0.1	0.3	0.1	0.4	0.0	0.1

Source: CBN Annual Report various years.

Direct lending by banks to agriculture is from commercial and publicly sponsored specialized banks. Merchant banks, which do more on long-term lending than the conventional commercial banks, would be expected to see agricultural investment as falling within their portfolio. However, smallholder export crops farmers have benefited very little from them. For example, 90 percent of merchant banks loans for agriculture in 1994-99 went to corporate entities.

NACB has two types of lending, direct and indirect lending. The latter is usually to states ministry of Agriculture for onward lending to small farmers. The former is direct

lending to beneficiaries by the bank. However, NACB's lending is mostly to large-scale farmers securing loans of N26, 000 and above. It has been observed that the bank's disproportion at allocation of loans in favor of large borrowers may indicate the bank's recognition for economies of scale and the reduction of transaction costs associated with large-scale borrowing.

Rural infrastructure inadequacies as well as inadequate extension services have also been a source of constraint to agriculture exports output growth; Economic theory suggests that whatever raise the cost of production is likely to reduce output. Lack of basic rural infrastructure such as roads raised the cost of acquiring basic farm inputs by rural smallholder farmers. DFRRI and ADP projects were intended to address the problem of rural infrastructure. The failure of DFRRI to make much impact on rural infrastructure is well known, through the causes may include the politicizations of its administration.

Similarly, the ADPs, in addition to making little sustained impact on rural infrastructure, provision of extension services, which is an important component of the program, has also suffered. Provision of extension services has been likened to a factor of production in that it enhances entrepreneurial skill in peasant farmers. It performed this function reasonably well in the 1960s. With rapid development of new varieties of most crops since the 1980s by research institutes, the need for

extension service to enlighten farmers on their adoption and management is perhaps more pressing than ever before. However, most ADPs were not able to provide needed services to farmers in their zones due to the lack of funds for extension services. This development has been attributed to the phasing out of World Bank's ADP loan facilities, as the federal and state governments were not able to contribute their matching funds for their sustainability.

3.4 Constraint to Agricultural Export Growth

This portion highlights the major constraints to agricultural output growth in Nigeria. Output need to first grow before exports can take place. As mentioned above, naira devaluation-induced producer prices were largely nominal but not in real terms. For example, an effort made to estimate the real producer prices for agricultural crops found that real producer prices had not increased significantly in recent decades, since consumer price indices seemed to increase in consonance with nominal producer price for the crops. For example, in 1986-89, real producer prices for cocoa, rubber, palm kernel, cotton, and groundnut was respectively N547.6, N80.5, N64.8, N264.6 and N191.3 per tonne, compared to the nominal prices reported above (CBN/NISER, 1992). In other words, observed price increases were not sufficient to induce output growth.

To further, demonstrate this insufficient output effect, table 5 shows that between 1988 and 1991 cocoa output grew by 16.5 percent, rubber by 23.8 and palm kernel by 120.7 percent. In 1991/94 it was by 20.5, 7.0 and minus 58 percent, respectively. In 1994-99 it was by minus 49, 15.2 and 19.3 percent respectively. The corresponding increases in producer prices are 35.4, 253.3 and 52.5 percent respectively in 1988-91; 502.3 549.1, and 469.3 percent in 1991-94. In 1994-99 the figures were 40.2, 68.3, and 33.1 percent respectively (See Table3.6).

Table 3.7: Average Annual Output of Major Agricultural Crops, 1970-99

Year	Cocoa	Palm Kernel	(000 tonnes)Rubber	Cotton	Groundnut	Palm Oil
1970-74	246	287	66	291	1427	473
1975-79	180	287	59	242	559	547
1980-85	154	310	81	845	540	558
1988	230	545	65	194	686	700
1989	256	939	132	187	1017	770
1990	244	1190	147	276	1166	730
1991	268	1203	215	309	1361	760
1992	292	1321	220	346	1297	792
1993	306	491	225	192	1416	825
1994	323	503	230	218	1453	837
1995	158	543	255	251	1579	687
1996	155	548	245	301	2078	778
1997	145	550	250	309	2101	780
1998	160	572	255	349	2227	792
1999	165	600	265	315	2307	825

Sources: CBN Annual report, various years

There is ample evidence to suggest that policy-induced constraints rank high among the obstacles to export crops in particular and agricultural output growth in general. It is sometimes argued that lower export growth could be attributed to government's emphasis on local processing of some of these produce. However, besides this, Garba (2000) shows that the implementation deviation was persistent and volatile, in addition to being consequential. It was then concluded that the concern that private agents have about government not keeping its word is legitimate and that their concern about policy discontinuities is valid. Agricultural production faces uncertainties due to weather variations. To add policy-induced uncertainties may therefore be an explanation for low output growth.

Two other aspects of policy-induced constraints may be noted. One relates to naira exchange rate policy, and the other relates to input prices policy. Fertilizer use by farmers provides a meeting point for these two policies.

A prominent element in government's agricultural policy since the 1980s is fertilizer procurement and distribution policy. Recognizing fertilizer as a key farm input, government has continued to pursue a policy to ensure its use by farmers. Its supply has been increased virtually annually. For example, between 1989 and 1990 it increased by 33 percent, in 1991 by 14 percent, in 1993 by 15 percent. To increase access by farmers, the numbers of depots were increased and the federal

government took up the responsibility of bearing the cost of transportation from domestic plants and seaports to the depots. In addition to allowing states to monitor the delivery from the depots, an allocation formula of 80:20 ratio for allocation of the commodity between local and state governments was introduced in 1994.

Input price subsidy was also an aspect of government's agricultural policy. This is to ensure its affordability to smallholder farmers. However, following SAP the subsidies were steadily reduced. A natural outcome of this has been low usage of fertilizers. Yearly nation-wide survey of agriculture shows that increase in price of inputs made it difficult for farmers to procure them in required quantities. This has been attributed to naira depreciation, increased cost of policy utilities, reduction of subsidy on fertilizer, fuel, agro-chemicals and seeds, (CBN Annual Report). For example, a 50kg bag of fertilizer sold in 1999 at N1, 800 in most parts of the county, as against the recommended N800 subsidized price.

Thus, naira exchange rate devaluation and continued depreciation that on the one hand boosted export and producer price on the other, combined with subsidies policy to raise the cost of input prices, and thus limited their use by smallholder farmers who constitute the bulk of agricultural producers.

Capital is a key factor in production. Agricultural finance has been of concern to policy makers and researchers. As mentioned above, for government to facilitate credit to agriculture, it established some financial institutions. Government policy towards agricultural finance could be grouped into five categories namely: Credit guidelines by the CBN, concessional interest rate, rural banking scheme, agricultural credit guarantee scheme, and direct lending institutions.

Starting from 1972 fiscal year, CBN prescribed the size of credit allocation by bank designated sectors. Banks were required to lend a minimum proportion of their loan portfolio to agriculture. Penalty was attached in the form of the amount in default being given interest free to the NACB by any bank that fails to comply with the guidelines. The mandatory sectoral allocation requirement was abolished in October 1996. Studies have found that while it lasted, the guidelines were not really adhered to by banks, with agriculture being one of the sectors most affected.

Before the deregulation of interest rate in July 1987, lending to agriculture by financial institutions was at concessional rate. Between 1980 and 1986, it was put at below or in line with CBN MRR. Early in 2000, banks submitted their proposals for a lower interest rate to farmers under the ACGS to the CBN in view of the high rate of loan repayment default by beneficiaries of the scheme; this was

rejected. Thus, high cost of capital posed a constraint to agricultural output growth, including agricultural export crops.

Rural banking program was introduced in 1977, designed to mobilize rural savings and channel it into rural productive activity. By June 1992, 765 bank branches had been opened in 766 centers. The ratio of locally mobilized funds that should be channeled to rural lending was stipulated. In 1977, it was 30 percent and by 1993, it had been raised to 50 percent. The mandatory credit allocation was abolished in October 1996. Again, while it lasted the effectiveness of the policy remains contentious.

3.5 Policy Issues in Resuscitating Agricultural Export

One may conclude by highlighting policy issues that need to be seriously and urgently addressed if agricultural production for exports is to be resuscitated these issues derive from the evidence provided in the points raised above.

First, agricultural output has been recording decline since the advent of crude petroleum as Nigeria's main export commodity. The decline was associated with mass migration from agriculture to urban area in search of non-farm jobs (white-collar job). With ageing farm population and plantations, productivity has been declined.

The situation was, however, exacerbated by exchange rate induced high cost of farm inputs, given Nigeria's import

dependence. Therefore, to boost production through cost reduction, the naira exchange rate policy of government would need to be re-examined. Since the period covered in this section, naira exchange rate has further depreciated to as much as #130 to the dollar. If not arrested this would further aggravate the problem of production cost in agriculture. It is not enough to expect that depreciation would boost export price.

Second, the bulk of agricultural export crop producers are smallholder farmers. Studies have found that a large percentage of them are among the poor (FOS, 1999). What this suggests is that a majority of them may not be able to afford SAP-induced or exchange rate- induced farm input prices. It is in this respect government's input price subsidy, would go some way to reduce production cost faced by these farmer. In this respect, it is not sufficient to re-introduce input price subsidy; small farmers should strengthen the mechanism to ensure access to such inputs. The mechanism at present encourages many leakages to non- intended beneficiaries.

Third, high costs of capital and low coverage of public-sponsored financial institutions have made access to capital by small farmers difficult. Thus, defeating government's objective of availing credit facilities to farmers. Some of the institutions themselves, e.g. NACB, have their constraints, which limit their ability to perform effectively. Some of these induced inadequate human, financial, and material resources

for the scope of their operations. Also worrisome is the tendency towards non-optimal employment of the staff in many of these institutions.

Fourth, agricultural production technology is dynamic. Much of the technology employed in the hey day of agricultural export output growth are no longer efficient today. Adoption and management of model technologies, including new seed varieties, depends on adequate knowledge about them. Smallholder farmers, who are largely illiterates, would need much enlightenment to see the economic benefits of model technologies. It is in this regard provision of extension services would need to be reinvigorated, both in term of quantity and quality. Fund is the bottom line, and with World Bank support this could be revived, if the political will is there on the part of government.

3.6 The SAP Period

Under the deregulation system, the marking of cash crops is undertaken in the open market. All the commodity boards have been abolished and the market is characterized by operations of private individual exporters. Most of the agents who operated in the government-controlled market are still operating, however, but with different linkages and modified functions.

3.7 The Agricultural Cash Crops Marketing Channels During SAP Period

One of the most dramatic events in Nigeria over the past decade was the devaluation of the Nigerian Naira with the adoption of a structural adjustment program (SAP) in 1986. A cardinal objective of the SAP was the restructuring of the production base of the economy with a positive bias for the production of agricultural exports. The foreign exchange reforms that facilitated a cumulative depreciation of the effective exchange rate were expected to increase the domestic prices of agricultural exports and therefore boost domestic production.

Significantly, this depreciation resulted in changes in the structure and volume of Nigeria's agricultural export as empirically determined by many researchers (oyejide, 1986; Ihimodu, 1993; Osuntogun et al., World Bank 1994. The depreciation also increases the prices of agricultural export and studies have shown a marked increase in volume of agricultural exports over the years. However, the volatility, frequency, and instability of the exchange rate movement since the beginning of the floating exchange rate raise a concern about the impact of such movements on agricultural trade flows.

3.8 Structural Adjustment Program (SAP) and Agricultural Performance

Among other measures, the Structural Adjustment Program (SAP), which started in 1986, abolished the Commodity Board, the body that had since 1960 been responsible for organization and purchase of agricultural exports. As a result farmers could sell their products directly to foreign buyers and local processors without any intermediary, thus obtaining higher prices for their products. This was expected to remove the excessive taxation on farmers' products by the erstwhile marketing boards and leave producer prices to be determined by market forces. Given that agricultural output is influenced by prices among other factors, the depreciation of the naira and abolition of the commodity boards were expected to result in an overall increase in production of exports. Table 1 confirms this expected trend in agricultural output. A major increase in five major agricultural export crops has been on the decline since the 1970s. By 1985, only 37% of the 1970 output was achieved, but 1988 and 1989 respectively, output reached 79% and 86% of the 1970 level.

Table presents the output performance of the produce groups during the SAP period as compared with the pre- SAP period of 1983-1985. The crops included in each produce group accounted for at least 60% of all the crops in the group. A comparison of the two periods shows that export crops

performed best, with the average output of the group increasing by about 42% over SAP period. The staple crops group recorded about 38% increase, while forestry and livestock groups were hardly influenced and the output of fishery fell by about 15%. Because of very high increases in the nominal producer prices during the SAP era, coupled with the moderate output increase of most crops during the 1986-1994 period the nominal incomes of producers rose substantially, as shown in table 3.7.

The table also indicates the pattern of the increase in income over the years. While there was a consistent increase for cocoa producers, the same cannot be said for producers of cottonseed and palm oil. Generally, the rate of change in prices and output is also not predictable. According to Kwanashie et al., (1994) degree of fluctuation in prices is a major determinant of the changes in earnings given the trend in output over the years. This shows that despite the declining trends in the U.S dollar prices of Nigeria's agricultural export commodities in the world market, the exchange rate depreciation has resulted in substantial increases in the naira equivalent of the world prices and consequently in local producer prices. Indeed, since the introduction of SAP, producer prices of all export commodities have risen far above what the commodity boards used to pay farmers. This has gone a long way to boost domestic production through

improved husbandry of existing farms and the cultivation of increased hectares.

On the part of imports, exchange rate devaluation has resulted in dramatic increase in the naira price of imports and this is expected to discourage importation of foreign food items, by raising the level of effective productive protection for domestic goods and services. On the other hand, the naira costs of imported items have also risen astronomically, taking most of these goods almost out of the reach of many consumers. The sharp rise in the costs of imported inputs could discourage new investments in commercial ventures while the maintenance and rehabilitation of existing equipment would also pose a serious financial strain on modern entrepreneurship.

3.9 Conclusion

This chapter has studied agricultural performance, exchange rate policies and incentives that have been used in Nigeria. The study observed that, agriculture has been recording decline since the advent of crude oil as Nigeria's main export commodity. It was also observed that the situation was exacerbated by exchange rate-induced high cost of farm inputs, given Nigeria's import dependence. Even though the exchange rate policies have affected agricultural exports positively, the devaluation of exchange rate has directly or indirectly affected exports through various

government incentives and liberalization of the exchange rate market. This invariably indicates that an increase in exchange rate (i.e, an appreciation of the local currency has a negative effect on export.

Based on the above, policy consistency and macroeconomic stability are still quite important and this needs to be checked. Rural infrastructure inadequacy needs to be checked after many years of neglect. Government input price subsidy requires strengthening to reduce production cost faced by farmers.

CHAPTER FOUR

4.0 METHODOLOGY, FINDINGS AND POLICY IMPLICATION

4.1 Methodology

The methodology adopted in this work included both descriptive and econometrics analysis. The descriptive analysis used tables and averages while the econometrics employed regression analysis to investigate the relationship between exchange rate and agricultural exports commodities. To further establish an acceptable result, the study examined the time series characteristics of the model variables using the Dickey Fuller (DF) and the Augmented Dickey Fuller (ADF) approach. The idea was to ascertain the order of integration of the variables as to whether they are stationary or non-stationary.

4.2 Data Sources

The model was estimated using annual time series data covering the period 1986 to 2002 and the choice of the model has to do with data availability. The basic data used for the study were both quantitative and qualitative for the period 1986-2002. Here various measures of crop production were regressed on suitable variables for farmers expected commodity prices. The data were estimated using published data from Central Bank of Nigeria annual report and statement of accounts (various issues) C B N statistical

bulletin Federal Office of Statistical bullions, International monetary fund (l M F) and World Bank publications, Journals, Bullions, and Statistical Bulletins. Other sources include textbooks, seminar papers, articles and magazines. The E-views (4.0) econometric software was used in the estimation.

4.3 Model Specification

The specification of the model involves the determination of the dependent and explanatory variables, which will be included in the model, the mathematical form of the model and the a priori expectations about the signs and sizes of parameters to be estimated.

Following the model applied by Nerlove, Pihilip, and Abalu discussed earlier, the study used the specification below to examine the relationship between exchange rate and agricultural export commodities. The regression model was formulated to assess the effect of exchange rate on some selected agricultural export commodities. Included in the model were interest rate, weather condition, and prices of some commodities.

The model was expressed in the following functional form:

$$X_{it} = f(X_{it-1}, e_t, W_t, r_t, p_t) \quad \text{.....(1)}$$

Where X_{it} = level of export commodity in period t.

X_{it-1} = lag of commodity export in period t_{-1}.

e_t = exchange rate

w_t = Weather condition

r_t = interest rate

p = price of commodity.

Here the export variable was expressed in physical terms, which is in agreement with the nature of data employed and tested. For empirical investigation, the study assumed that the level of export in period t was linearly dependent on the level of commodity export. The functional form of the model estimated was modified and specified in order to formulate regression equation for each variable as seen below:

$$\ln x_{it} = b_1 + b_2 \ln X_{it-1} + U_t \text{ ----------(2)}$$

$$\ln x_{it} = b_1 + b_3 \ln e_t + U_t \text{ ---------- (3)}$$

$$\ln x_{it} = b_1 + b_4 \ln r_t + U_t \text{ ---------- (4)}$$

$$\ln x_{it} = b_1 + b_5 \ln w_t + U_t \text{ ----------(5)}$$

$$\ln x_{it} = b_1 + b_6 \ln p_t + U_t \text{ ---------- (6)}$$

where b_1 = elasticity to be estimated.

U_t = error term.

The random error term was assumed to have constant variance and uncorrelated with explanatory variables. The apriori expectations of the parameters to be estimated which are b_1 and b_2 were expected to be greater than zero (0). While b_3 was expected to carry a positive sign given the equation above, b_3 gives short run elasticity of export with respect to e_t while the estimate of $b_3 / (1-b_2)$ measured the long run elasticity of export. The entire model variables were lagged for ease of analysis.

To verify the effect of exchange rate variation on some selected agricultural export commodities, the following functional relationship were hypothesized using different crops.

$$lnco_t = b_1 + b_2 lnco_{t-1} + b_3 lne_t + u_t \text{ ---------- (7)}$$

Where co_t = value of cocoa export in period t.

$lnco_{t-1}$ = lag of cocoa export in period t.

e_t = exchange rate

u_t = error term.

$$lnru_t = b_1 + b_2 lnru_{t-1} + b_3 lne_t + u_t \text{ ---------- (8)}$$

Where ru_t = value of rubber export in period t.

$lnru_{t-1}$ = lag of rubber export in period t.

e_t = exchange rate

u_t = error term.

$lnc_t = b_1 + b_2 lnc_{t-1} + b_3 lne_t + u_t$ ---------- (9)

Where c_t = value of cotton export in period t.

lnc_{t-1} = lag of cotton export in period t.

e_t = exchange rate

u_t = error term.

$lncb_t = b_1 + b_2 lncb_{t-1} + b_3 lne_t + u_t$ ---------- (10)

Where cb_t = value of cocoa butter export in period t.

$lncb_{t-1}$ = lag of cocoa butter export in period t.

e_t = exchange rate

u_t = error term.

$lnco_t = b_1 + b_2 lnco_{t-1} + b_3 lne_t + b_4 lnr_t + b_5 lnw_t + u_t$----------(11)

Where co_t = value of cocoa as a major export in period t.

$lnco_{t-1}$ = lag of cocoa as a major export in period t.

r_t = interest rate

w_t = weather condition

e_t = exchange rate

u_t = error term.

$\ln co_t = b_1 + b_2 \ln e_t + b_3 \ln cp_t + b_4 \ln sp_t + u_t$---------- (12)

Where co_t = value of cocoa export in period t.

e_t = exchange rate

cp_t = cocoa prices in period t

sp_t = soyabeans prices in period t

u_t = error term.

4.4 Estimation Procedure, Stationarity Test and Cointegration

The study examined the time series characteristics of the model variables using the Dickey Fuller (DF) and the Augmented Dickey Fuller (ADF) approach. The idea was to ascertain the order of integration of the variables as to whether they are stationary or non-stationary and therefore the number of times each variable has to be differentiated to attain stationarity.

Engel and Granger (1987) stated that a homogenous non –stationary series, which can be transformed to a stationary series by differencing **d** times is said to be integrated of order **d**. thus $\mathbf{Y}_t$ a time series is integrated of order **d** ($\mathbf{Y}_t \sim 1$ (**d**)) If

$\mathbf{Y}_t \sim \mathbf{1}$ (**0**), then no differencing is required as $\mathbf{Y}_t$ is stationary. The test proposed by Dickey Fuller is called the Unit Root Test denoted by DF. The regression equation for the DF class of Unit root is,

$\Delta\mathbf{Yt} = \varphi y_{t-1} + \varepsilon t;\ \varepsilon t \sim N(0, \sigma^2),\ Yo = o$ --------- ix

The simple Unit Root test above is valid only if the series is an **AR** (**1**) process. If the series is correlated at higher order of lags, the assumption of white noise disturbance is violated. The ADF test uses a different method of control for higher – order serial correlation in the series. The ADF test makes a parametric correction for higher–order correlation by assuming that **Y** series follows an **AR** (**P**) process and adjusting the test methodology. It is identical to the standard DF test and the test procedures are the same but are constituted with a regression model of the form;

$\Delta Y_t = \alpha\ Y_{t-1} + \Sigma_{\omega i}\ \Delta Y_{t\ -1} + \varepsilon t$ ---------- X

Where the lag **K** is set so as to ensure that any autocorrelation in ΔY_t is absorbed and that a reasonable degree of freedom is pervasive and also that the error term is white noise.

Next was to test for the existence of co integrating relationship, which requires conducting a Unit Root test on the residual series derived from the long –run static equation. The concept of co integration derives from the fact that if two

series $\mathbf{X_t}$ and $\mathbf{Y_t}$ are **1** (**d**) the $\mathbf{X_t}$ and $\mathbf{Y_t}$ are said to be co integrated if there exist a unique value **b** which ensures that the residuals, ($\mathbf{Y_t} - \boldsymbol{\beta}\mathbf{X_t}$) is **1** (**o**) testing for co integration therefore amounts to testing for a Unit Root in the residuals of a first regression equation (viii) if the residuals are stationary then the series are co integrated. The equation of the regression for this test is thus,

$\Delta \varepsilon t = \boldsymbol{\beta}\, \varepsilon t_{-1} + \Sigma\, \boldsymbol{\beta}_i\, \Delta\, \Sigma_{t-1} + \mu_t$ ---------- Xi .

Where εt is the residual from our static regression and **β** is the coefficient in the regression. Stationary of the residual implies co integration of the series.

4.5 Empirical Result and Analysis

4.5.1 Analysis of the Regression Results

The results of the empirical regression were estimated using the econometric view soft ware package for the variables 1986 -2002.

1. $lnco_t = 5.18 - 0.40lnco_{t-1} + 0.18ln_{et}$

   ` (-1.48) (2.25)

   $R^2 = 0.29$

   $\acute{R}^2 = 0.18$

   DW = 1.84

   F stat = 2.70

2. $lnru_t = 5.62 - 0.94lnru_{t-1} + 0.13ln_{et}$

   (-3.29) (1.91)

   $R^2 = 0.52$

   $\acute{R}^2 = 0.59$

   DW = 2.20

   F stat = 2.25

3. $lnct_t = 0.84 + 0.12lnct_{t-1} + 0.37ln_{et}$

   (0.84) (2.70)

$R^2 = 0.55$

$\acute{R}^2 = 0.57$

DW = 1.61

F stat = 8.08

4. $lncbt_t = 1.37 + 0.34lncbt_{t-1} + 0.14ln_{et}$

(-1.29) (0.88)

$R^2 = 0.15$

$\acute{R}^2 = 0.02$

DW = 1.59

F stat = 1.16

5. $lnco_t = 4.32 - 0.42lncot_{t-1} + 0.16ln_{et} + 0.11lnr_t + 0.09lnw_t$

(-1.42) (1.64) (1.23) (1.28)

$R^2 = 0.53$

$\acute{R}^2 = 0.56$

DW = 1.99

F stat = 1.20

6. $lnco_t = 3.35 + 0.04\ ln_{et} + 0.05lncp_t + 0.03lnsp_t$

(0.35) (0.45) (0.15)

$R^2 = 0.19$

$\acute{R}^2 = 0.01$

DW = 2.71

F stat = 1.03

4.5.2 Interpretation of Results

The t statistics were in parenthesis under their respective coefficients and gave the statistical significance of their various coefficients at different significant levels. The coefficient of determination R^2 and the adjusted $\acute{R}^2$ gave the explanatory power of the regression. The F statistics were used for testing the significance of R^2 in a multiple regression model. Durbin- Watson statistics on the other hand measured the correlation coefficient between errors. The Durbin – Watson statistics test involved the calculation of a test statistics based on the residuals of the multiple regressions.

In one above, the last year production of cocoa was significant in affecting the production of cocoa in the current year. Though the sign of the parameter did not conform with the apriori expectation. This could be as a result of higher production in the previous year leading to an increase in supply in the market which might have been higher than the demand there by bringing down the prices of cocoa. This possibly might have discouraged the farmers from production

in the current year. Exchange rate on the other hand explains about 18% of the production of cocoa. The variable is equally significant in the model. The positive sign of the parameter conforms to the aprori expectation. The R^2 which was 29% revealed that the model had no good fit. In other words, there are other variables that explain better the dependent variable. The Durbin-Watson statistics indicated lack of serial correlation in the model.

The second equation explains the relationship between rubber exports, lag of rubber production and exchange rate. The last year production of rubber was also significant in explaining the production and exportation of rubber in the current year even though the sign of the parameters did not conform to the aprori expectation. Judging from the value of R^2, it can be concluded that the explanatory variable explains 52% of the variation in rubber export during the period studied. The $\acute{R}^2$ which was 59% further revealed the goodness of fit in the model. The D-W statistics showed that the model lack serial correlation.

Equation 3 dwelled on the relationship between cotton production, lag of cotton production and exchange rate variation. All the variables were positively signed and as well conformed to the apriori expectation in the model. Looking at the value of R^2 it can be concluded that the explanatory variable specified in the model accounted for 55% of the

variability in the observed cotton exports. The $\acute{R}^2$ showed that the model has good fit which indicates that the variable has explained the dependent variable. The D-W statistics showed lack of serial correlation.

A look at equation 4 equally showed a positive relationship between cocoa butter and exchange rate as theoretically expected. The explanatory variable accounted for 15% variation in cocoa butter export. This shows a weak fit in the model. However, the signs of the coefficients were correct and statistically significant. The D-W statistics shows no serial correlation. While the $\acute{R}^2$ shows that the model has no good fit because of the weak explanatory variable.

Equation 5 explains the combined effect of the explanatory variables of cocoa as a major export crop. The positive values of the explanatory variables conformed to the a priori expectation, which shows that the equation was statistically significant. The R^2 shows that 53% of the variation in cocoa export is also explained by other variables like interest rates and weather condition. The D-W statistics shows lack of serial correlation.

Finally an error correction specification, which captured the long run dynamic between the relevant variables, was carried out and the variables were found to be co integrated. This section began with the result of the Unit Root tests conducted on all the variables to determine the order of

integration at which they are stationary. The results of the relevant test were summarized in table 1 below.

Table4.1 RESULT FROM THE STATIONARY TESTS

Variables	ADF	Order of integration	Max lag
Lir	-4.2819 @1%	1(0)	1
Lwe	-5.2841 @1%	1(1)	1
Lex	-4.3040 @1%	1(1)	1
Lco	-4.1331 @1%	1(0)	1
Lru	-4.9577 @1%	1(0)	1
Let	-4.6863 @1%	1(1)	1
Lcb	-5.0344 @1%	1(0)	1
Lcp	-4.8864 @1%	1(2)	1
Lsp	4.5533 @1%	1(1)	1
ECM	-8.1048 @1%	1(0)	1

From the table above, it is evident that some of the variables were non-stationary at their levels. Those that were non-stationary followed the random walk hypothesis. By these results, some of the variables may not be used at their levels in the regression model developed, except in the case of co integration relationship.

The residuals of the static regression were computed and tested for the existence of long run relationship among the variables using the unit root testing procedure. From the test results, the residual (ECM) was found to be stationary at the

levels (see table 1 above), giving rise to the rejection of the null hypothesis of no co integrating relationship between the variables. Thus, the need to develop an over parameterized error correction model of an Auto regressive Distributed Lag (ADL) form. The model was then reduced to a more desirable specifications and parsimony was achieved. The results are presented in table 2 below.

Table4.2

PERSIMMONS MODEL REGRESSION RESULT

Dependent variable: Lco
Method: Least Squares
Sample (adjusted): 1988-2002
Included observations: 15 after adjusting end points

Variables	Coefficient	Std. Error	t. Statistic	Prob.
C	-3.230914	1.146967	-2.816918	0.0226
LEX	1.269442	0.152641	8.316516	0.0000
LEX(-1)	-0.938321	0.125245	-7.491886	0.0001
LIR	-0.932700	0.233628	-3.992245	0.0040
LWE(-2)	1.628683	0.258897	6.290853	0.0002
LCP (-1)	0.326014	0.120401	-2.707725	0.0268
ECM (-1)	-0.42817	0.004770	-8.976751	0.0000

R-Squared	0.935360	Mean dependent Var	4.104363
Adjusted R-Squared	0.886880	S.D dependent Var	0.341842
SE of regression	0.114973	Akaike info Criterion	-1.183520
Sum Squared resid.	0.105750	Schwarz criterion	-0.853097
Log likelihood	15.87640	F- Statistic	19.29382
Durbin –Watson Stat.	2.023457	Prob. (F-Statistic)	0.000236

The result of the Econometrics analysis revealed that exchange rate, interest rate, weather condition and price were significant in explaining agricultural export commodity in Nigeria over the years. The model R^2 was 93.5 percent while the adjusted $\acute{R}^2$ was 88.6 percent. The F- statistics and the

standard error of estimates all indicated that the model fit the data relatively well. The error correction variable (ECM) was found to be largely negative and significant. The speed of adjustment to the long-run export was found to be approximately four years. The entire model variables carried the correct signs and were significant in the error correction model.

Meanwhile, the effect of exchange rate to agricultural export in the current year was found to be positive. The result confirmed that exchange rate adjustment is an important factor that positively affect agricultural export as the coefficient of the real exchange rate variable was correctly signed (positive) and highly significant. This result was found to be consistent with the case for exchange rate made earlier in this study Nerlove (1958), Philip (1989, 1996), and (Obadan, 1993) on exchange rate devaluation.

In addition, the positive effect of exchange rate was confirmed in the model. This is because exchange rate is central to the determination of agricultural exports as it conceptually creates both substitution effect and income effect. The devaluation of a domestic currency reduces the prices of domestic tradable goods relative to the prices of foreign goods. This induces increase demand by foreigners for products of the country (substitution effect). While increase in the exchange rate on the other hand, reduces the real income of the

foreign consumers (income effect). The real income effect thus reinforces the substitution effect to stimulate export response when a country devalues its currency.

Closely related to the above-mentioned factor was weather condition and agricultural export prices for Cocoa. Weather condition and the Cocoa price were found to be important determinants of agricultural exports as the average weather condition and price variable, had the correct sign (positive) in all the equations and statistically significant. These findings were found to be consistent with the empirical research of Obadan (1993) in which, with the aid an Econometric model, explained the impact of the Structural Adjustment Program (SAP) on Nigeria's natural rubber export supply. The result confirmed that the world price of rubber was found to be an important determinant of rubber supply as the average world price variable had the correct signs.

Meanwhile, the empirical model showed a highly negative relationship between interest rate and the one-year lag of exchange rate (-0.938321, -0.932700). In particular, increasing the interest rate by any rate can reduce the volume of agricultural commodity exports. Likewise, reduction in the interest rate can increase the volume of agricultural commodity export. This result confirms the Federal Government interest rate policy and is consistent with many empirical works cited by this study (ACGS, 1977, NACB, RBP1977, Kwanashie 1994, Aigbokan, 2001 etc). The same

thing is applicable to one-year lag of exchange rate. That is, any changes in last year exchange rate definitely affect the current year export negatively. The real problem therefore does not lie with the exchange rate itself but the exposure of the farmers to sharp fluctuations in the world commodity prices without legal marketing arrangement to enable them hedge against those risks.

4.6 Findings and Policy Implication

The study was able to establish that exchange rate devaluation has favorable effect on agricultural export commodities. Thus, the more a country devalues its currency, the higher the income earnings of the farmers; which subsequently lead to an increase in agricultural output and export. The implication is that if the country devalues its currency, it reduces the prices of domestic tradable goods relative to the prices of foreign goods. This induces increased demand by foreigners for the product of the country (substitution effect). The increase in exchange rate reduces the real income of the domestic consumer and increases the income of the foreign consumer (income effect). The real income thus reinforces the substitution effect to stimulate export response when a country devalues its currency. However, the impact of other factors need to be examined in a complete trade model, especially direct government

interventions, which could lead to distortions both in the exchange rate and in trade flows.

This study further suggests that although the sensitivity of commodity exports varies among commodities, it does not vary across regions. One period lagged exchange rates yield the most significant relationship with commodity exports even though the study suggests government monitoring, for policy reasons; these results suggests that commodity export respond to exchange rate changes with a one year lag. This indicates that commodity markets respond quickly to changes in exchange rates. On the other hand, other factors like interest rate and weather condition (rain fall) were examined and the result suggest that there was a positive relationship between weather condition and agricultural exports while interest rate had a negative relationship with agricultural exports.

4.7 Conclusion

The available data for the study was limited to SAP period. However, indications were provided on the effect of exchange rate variation on some agricultural export commodities in Nigeria. The result revealed that exchange rate variation was significant in explaining export commodities in Nigeria over the years even though other factors were found also found to be significant.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary and Conclusion

The work analyzes the effect of exchange rate variation on some selected Nigeria agricultural export commodities namely cocoa, rubber, cotton and cocoa butter for the period 1986-2002. The study was within the context of the recent econometric works in which various measures of some selected export crops have been regressed on suitable variables for farmers expected commodity prices. This gave a large panel data set to which we could apply Dickey Fuller (DF) and the Augmented Dickey Fuller (ADF) approach to ascertain the order of integration of variables as to whether they are stationary or non-stationary. The model was estimated and the econometric analysis revealed a high coefficient of determination (R^2). The model R^2 was 93.5 percent and the adjusted R^2 confirmed it with 88.6 percent. The finding agrees with Nerlove (1958), that exchange rate variation creates both substitution effect and income effect. That is, the devaluation of a domestic currency reduces the prices of domestic tradable goods relative to the prices of foreign goods. This induces increased demand by foreigners for the product of the country.

On the part of interest rate, the empirical model showed a highly negative relationship between the interest rate and the one-year lag of exchange rate. In particular, increasing the

interest rate by any rate can reduce the volume of agricultural commodity exports and vice versa.

Although, the sensitivity of commodity exports varies among commodities, it does not vary across regions. One period lagged exchange rate yield the most significant relationship with commodity exports. For policy reasons, these results suggest that commodity export respond quickly to changes in exchange rates.

5.2 Recommendations

The result obtained from the econometric analysis suggests that the effect of exchange rate devaluation was found to be very significant in explaining some Nigerian agricultural export commodities (Cocoa, Rubber, Cotton and Cocoa butter). Based on these findings, the study recommends that the monetary authorities should adopt mechanism that will lead to the stability of the exchange rate. Erratic changes in the exchange rate have a long-term negative effect on production of agricultural exports. In addition, the government should monitor the marketing system of agricultural exports to ensure that farmers are paid fully by the buying agents so that the full benefit of production increase, resulting from liberalization, can be reaped. In a similar vein, Community exchange programs should be explored as a plausible mechanism for assisting farmers and exporters to hedge against a sudden increase in the marketing system in both prices and exchange rates.

Further studies would be needed to obtain similar estimates for the other agricultural commodity groups (e.g. Cassava, beniseed, etc) for which data availability was a problem during the present work.

Studies have found that a large percentage of Nigerian farmers are poor (FOS,1999). What this suggests is that majority of them may not be able to afford exchange rate induced farm input prices. It is in this respect that

government's input price subsidy would go some way to reduce production cost faced by these farmers. In this respect, it is not sufficient to re-introduce input price subsidy, mechanism that should be strengthened to ensure access to such inputs by small farmers.

Finally, it will be useful to update the current estimates as more samples period become available on the set of commodities investigated in the thesis.

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