

**EFFECTS OF EXCHANGE RATE REGIMES ON AGRICULTURAL
GROWTH IN NIGERIA (1970-2014)**

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TITLE PAGE

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**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL
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ANALYSIS**

SUPERVISOR: DR. B.C. OKPUKPARA

DECEMBER, 2017

CERTIFICATION

OKORIE ULOMA STELLA, a postgraduate student of the Department of Agricultural Economics with registration number PG/M.Sc/15/78157, has satisfactorily completed the requirements for the award of Master of Science (M.Sc) Degree in Agricultural Economics (Agricultural Finance and Project Analysis). The work embodied in this project is original and has not been submitted in part or full for any other Diploma or Degree in this University or any other University.

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DEDICATION

This research work is dedicated to my Late Father, Mr. Cyril Okorie and to my wonderful family.

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My sincere thanks go to Almighty God, for the inspiration for this work, for giving me the grace to drink from His fountain of wisdom, knowledge and understanding. My special thanks also go to my erudite supervisor Dr. B.C. Okpukpara for his patience and expert guidance in the production of this work.

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ABSTRACT

Exchange rate policy in Nigeria has changed over time from fixed to flexible exchange rate regimes. There have been debates over which type of exchange rate can best stimulate growth. Different regimes have been accompanied by instability and uncertainties, this necessitated this study to examine the relationship between exchange rate regimes and agricultural growth in Nigeria in different periods from 1970 to 2014. The objectives of this study were to describe the trend in exchange rate regime and agricultural growth; ascertain the effect of the fixed exchange rate regime on agricultural growth; assess the effect of flexible exchange rate regime on agricultural growth; and determine the causal relationship between exchange rate regime and agricultural growth. The study area is Nigeria. This research work covered a period of 45 years from 1970 to 2014. This was purposively chosen due to availability of data. Data were collected from Central Bank of Nigeria and Worldwide Governance Indicators (WGI). The data were grouped into three periods. The whole period (1970 -2014), the period of exchange rate fixed regime (1970-1985) and flexible regime (1986-2014) since exchange rate policy in Nigeria. This study tested the effect of the two basic exchange rate policies, namely, the fixed and flexible regimes on Agricultural growth in Nigeria, using the Ordinary Least Square Method. However, before the Ordinary Least Test was applied, the time series characteristics of the variables used in this study were tested, using Augmented Dickey-Fuller Unit Root Tests and Johanssen co integration Tests. The result showed that there exist a long run equilibrium relationship between the dependent and independent variables. Trend analysis showed increasing trend in agricultural GDP during the fixed exchange rate regime i.e. from 1970-1985 and also the agricultural gross domestic product during the flexible exchange rate regime i.e. from 1986-2014. In addition, exchange rates remained stable during the fixed exchange rate regime. Exchange rates during the flexible regime were not stable except from 1994 to 1998. Results of the regression analysis on the effect of exchange rate regimes on agricultural growth showed that inflation had positively and significantly affected agricultural growth during fixed exchange rate regime while results during the flexible exchange rate regime showed that macroeconomic instability index was found to have positively influenced agricultural growth and government expenditure on agriculture was found to have positively influenced agricultural growth. Political instability index in contrast was found to have negatively influenced agricultural growth. Results of the Regression analysis for the whole period showed that exchange rate, government expenditure on agriculture and macroeconomic instability were also found to have positively influence agricultural growth. The results of the Granger Causality Test showed that exchange rate does granger cause Agricultural GDP. This study showed that no matter the exchange rate regime, whether fixed or flexible, what matters is the effectiveness of the management. Nigeria can substantially improve on its growth performance through improvements in the overall management of its exchange rate policy.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Growth in agricultural production and productivity are essential in achieving sustainable economic growth and reduction of poverty in Nigeria. One sector that has a critical role to play in poverty reduction in Nigeria is the agriculture sector as over 40% of the GDP comes from the sector and it employs about 60% of the working population (Nwafor, Ehor, Chukwu & Amuka, 2012). Economic growth in Nigeria has largely been accounted for by resilient agricultural growth associated with performance in four constituent sub-sectors: crops, livestock, fisheries and forestry (Eboh, Oduh & Ujah, 2012). One of the most effective ways to achieve rapid growth in the agricultural sector is via well managed exchange rate policy. The exchange rate thus, is an important economic measurement because it reflects the economic strength and competitiveness with other economies (Akonji, 2013; Asinya & Takon, 2014).

Kenneth, Jonathan and Kenneth (2014) asserted that an exchange rate, as a price of one country's money in terms of another's, is among the most important prices in an open economy. It influences the flow of goods, services and capital in a country, and exerts strong pressure on the balance of payments, inflation and other macroeconomic variables such as: domestic price indicator, profitability of traded goods and services, allocation of resources and investment decisions, which explains why the monetary authorities and private sectors seek stability in these variables. Therefore, the choice and management of an exchange rate regime is an essential aspect of economic management to safeguard competitiveness, macroeconomic stability, and economic growth.

In Nigeria, exchange rate has changed within the time frame from fixed to flexible regimes. Ewa (2011) agreed that the exchange rate of the naira was relatively stable between

1973 and 1979 during the oil boom era and when agricultural products accounted for more than 70% of the nation's gross domestic products (GDP). The main objectives of exchange rate policy in Nigeria are to preserve the value of the domestic currency, maintain a favorable external reserves position and ensure external balance without compromise the need for internal balance and the overall goal of macroeconomic stability. The use of the exchange rate as an instrument of control in the Nigerian economy has been rather limited (Gatawa & Mahmud, 2016). Despite the adoption of these policies at various stages to maintain a stable exchange rates which proved abortive, exchange rate fluctuates widely especially after the Structural Adjustment Programme (post-SAP era). Therefore, the downward trend of the country's currency impacted greatly on agricultural product. Consequently, exchange rate fluctuations discourage firms from undertaking investment, innovation and trade, it may also deter firms from entering into export markets, thereby weakening investors' confidence in the sector, and also raises the price of imported inputs such as seeds, fertilizers, pesticides, and capital equipment thereby reducing the agricultural commodities and income of farmers, and exchange rate risk which leads to capital reversal considered unfavorable for the economy at this trying times.

Klein and Shambaugh (2010) reported that the choice of regime may influence growth through its indirect effect on investment, productivity, and international trade. A pegged exchange rate regime may increase confidence and reduce uncertainty and transaction costs, thus boosting investment, productivity, and trade, while uncertainty about exchange rates, under floating regimes, may create a damper to investment. However, if a peg is not credible or leads to overvaluation and black market premiums, as was observed in Nigeria, then it may lead to lower investment, productivity, and trade, and hence weaker growth and competitiveness. Countries with more developed financial markets may be better able to contain exchange rate volatility associated with a flexible exchange rate, and thus are able to

achieve the benefits of flexible rates in terms of enhancing the ability to adjust to real shocks without sacrificing the stability that a credible peg may entail (Ghosh, Gulde, & Wolf, 2014).

1.2 Problem Statement.

It has been a challenge to identify a direct correlation between exchange rate regimes and economic growth. One of the most important issues left unanswered in international finance is the debates over which type of exchange rate can best stimulate economic growth. Stable exchange rate systems are an important component to stable and prosperous economic growth. Stability is the main advantage of a fixed exchange rate, because the exchange rate between the currency and its peg does not fluctuate based on market conditions. Therefore, it can create a steady business climate favourable for trade and investments. On the other hand, floating exchange rate allows the central banks to exercise more independent monetary policy, which is crucial to control the economy.

There has been a controversy as regards output of goods and services under the flexible exchange rate system and under the fixed exchange rate system. While Eme and Johnson (2012) insist that flexibility in exchange rates does not have any relationship either directly or indirectly on the growth of output in Nigeria, Edwards and Levy-Yeyati (2003) and Rano-Aliyu (2009) contend that countries with more flexible exchange rate systems grow faster than countries with fixed exchange rate regimes. Available studies in Nigeria where exchange rate regime and growth were captured include that of Eze and Okpala (2014) and (Oleka & Okolie, 2016). These studies, however, focused on the general economy. The relevance of agricultural sector, a leading sector in the Nigerian economy, in terms of its contributions to income, employment, foreign exchange earnings and domestic food supply (Omojimate, 2012), therefore necessitated the assessment of the effects of exchange rate regimes on agricultural growth.

Kenneth, Jonathan and Kenneth (2014) in their study examined the impact of exchange rate regime on economic growth in Nigeria, but did not assess the effect on agricultural growth. This study seeks to identify how various exchange rate regimes influence agricultural growth.

Thus, the following questions necessarily arose as guide for the study:

- i. What effect does the fixed exchange rate regime have on the Nigerian economy especially on agricultural growth?
- ii. What effect does the flexible exchange rate regime have on the Nigerian economy in general especially on agricultural growth?
- iii. Is there any causal relationship between exchange rate regimes and agricultural growth?

1.3 Objectives of the study

The main objective of this study was to assess the effect of exchange rate regimes on agricultural growth in Nigeria. The specific objectives of the study are to:

- i. describe the trend in exchange rate regime and agricultural growth;
- ii. ascertain the effect of the fixed exchange rate regime on agricultural growth;
- iii. assess the effect of flexible exchange rate regime on agricultural growth; and
- iv. determine the causal relationship between exchange rate regime and agricultural growth.

1.4 Hypothesis of the Study

HO₁: Fixed exchange rate regime does not have any significant effect on agricultural growth.

HO₂: Flexible exchange rate regime does not have any significant effect on agricultural growth.

HO₃: There is no causal relationship between exchange rate and agricultural growth.

1.5 Justification of the Study

Exchange rate is the price of one country's currency expressed in terms of some other currency. It determines the relative prices of domestic and foreign goods, as well as the strength of external sector participation in the international trade. In Nigeria, exchange rate has changed within the time frame from fixed to flexible regimes. The fact that exchange rate policies vary across countries and time suggests that the causes and effects of exchange rate regimes can be understood both empirically and the theoretically.

Exchange rate policies in developing countries are often sensitive and controversial, mainly because of the kind of structural transformation required, such as reducing imports or expanding non-oil exports, which invariably imply a depreciation of the nominal exchange rate. Such domestic adjustments, due to their short-run impact on prices and demand, are perceived as damaging to the economy. Ironically, the distortions inherent in an overvalued exchange rate regime are hardly a subject of debate in developing economies that are dependent on imports for production and consumption.

The study is of relevance to the Nigerian economy in the following ways: It serves as a future guide to the policy makers in the formulation of better and efficient policy options for managing exchange rate fluctuations in Nigeria. Also, the research is of immense help to the general economy, as it provides possible measures that monetary authority could adopt in order to maintain stability in exchange rate so that, it can influence importantly agricultural growth, consumption, resource allocation, employment and private and foreign investments as research has shown. Above all, it adds to the existing literature thus, provides relevant information that could guide further researchers on the subject.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Conceptual Framework

Conceptual framework

Conceptually, an exchange rate implies the price of one currency in terms of another; in the Nigerian context, it is the units of naira needed to purchase one unit of another country's currency e.g. the United States dollar (Campbell, 2010). The management of any country's foreign exchange market is carried out within the ambit of a foreign exchange policy, which according to Obaseki (2001) is the sum total of the institutional framework and measures put in place to gravitate the exchange rate towards desired levels in order to stimulate the productive sectors, curtail inflation, ensure internal balance, improve the level of exports and attract direct foreign investment and other capital inflows. Exchange rate policy also determines the mechanism for channeling foreign exchange to end-users and therefore, reflects the institutional framework, system of exchange rate determination and allocation of foreign exchange as well as the policy options for managing the exchange rate.

Exchange-rate regime

An exchange-rate regime is a structure that each state's monetary authority implements in order to establish the exchange-rate of its own currency in the foreign-exchange market. Each state has the ability to freely adopt the exchange-rate regime that it deems optimal, and will do so typically, but not exclusively, using monetary policy. The regime type a country chooses should depend on the current economic situation, size of the economy, the types of exchange rates other countries are using, and the long term economic policy goal. For example, price stability with trade partners is crucial for an open economy that has a large portion of its GDP dependent on exports. Therefore, this country will be less likely to adopt a freely floating exchange rate where price volatility is potentially high and

can discourage international trade. According to their degree of flexibility, the distinction amid these structures is generally made between fixed, intermediate and flexible exchange-rate regimes (Oleka & Ngini, 2017)

Fixed exchange-rate regime

A fixed exchange-rate, commonly referred to as a peg, can be defined as a regime that holds a fixed currency, either to the currency of another country, a currency basket or any other measure of value. The exchange-rate is determined by the monetary authority of that country, which commits to buy (sell) the home currency at a specific price. The central bank maintains this predetermined price level by intervention in the foreign-exchange market and/or adapting the interest rates. The main goal of this system is to achieve stability in the value of currency through fixing it against a stronger and more stable currency (or currencies). The main advantage of this system is that the currency does not fluctuate according to market conditions, and therefore creates a stable and predictable business climate for investments and trade between the two currencies. However, the main drawback of pegged exchange rates is that it is very difficult for government to conduct independent monetary policy and to liberalize capital markets at the same time (Thirlwall, 2003). For instance, capital outflows will result in currency depreciation. In order to tackle this, the central bank needs to raise domestic interest rate which eventually depresses the domestic economy. The reverse situation occurs with capital inflows. Therefore, the only way for an economy to maintain domestic and external equilibrium is either to control capital movements or to allow the exchange rate to float.

Intermediate exchange-rate regime

Crawling bands, crawling pegs and horizontal bands are often referred to as intermediate exchange-rate regimes. These regimes attempt to combine flexibility and stability by implementing a rule based system for adjusting the par value, typically through a

band of rates or as a function of inflation discrepancies. The IMF provides the following explanation of crawling pegs “The currency is adjusted periodically in small amounts at a fixed rate or in response to changes in selective quantitative indicators, such as past inflation differentials vis-à-vis major trading partners, differentials between inflation target and expected inflation in major trading partners.”

Flexible exchange-rate regime

A flexible exchange-rate entails a currency with an exchange-rate that is determined exclusively by the global market forces of supply and demand, and are not pegged nor controlled by any monetary authority. There are two different types of flexible exchange-rates, pure floats and managed floats. The former exists when there is no an official purchase or sales of currency under a flexible exchange-rate regime. The later occurs when there is evidence of some official intervention. One of the advantages of floating regime is the automatic adjustment of balance of payments, whose deficit or surplus is corrected by appreciation or depreciation of the currency (Ettah, Akpan, & Etim, 2011). The main disadvantage of this system is the stability factor. Exchange rate can appreciate wildly and therefore be disruptive for tradable goods sector.

When the currency depreciates, it can lead to extreme inflation by raising the domestic price of imports. Therefore, many countries that adopt floating exchange rate practice managed floating by intervening in some level in order to maintain their macroeconomic stability and minimize volatility impact. In reality, the implementations of exchange rate regimes are not always about choosing the other end of spectrum. The main disadvantage of this system is the stability factor. Exchange rate can appreciate wildly and therefore be disruptive for tradable goods sector. When the currency depreciates, it can lead to extreme inflation by raising the domestic price of imports. Therefore, many countries that adopt floating exchange rate

practice managed floating by intervening in some level in order to maintain their macroeconomic stability and minimize volatility impact.

Agricultural Growth

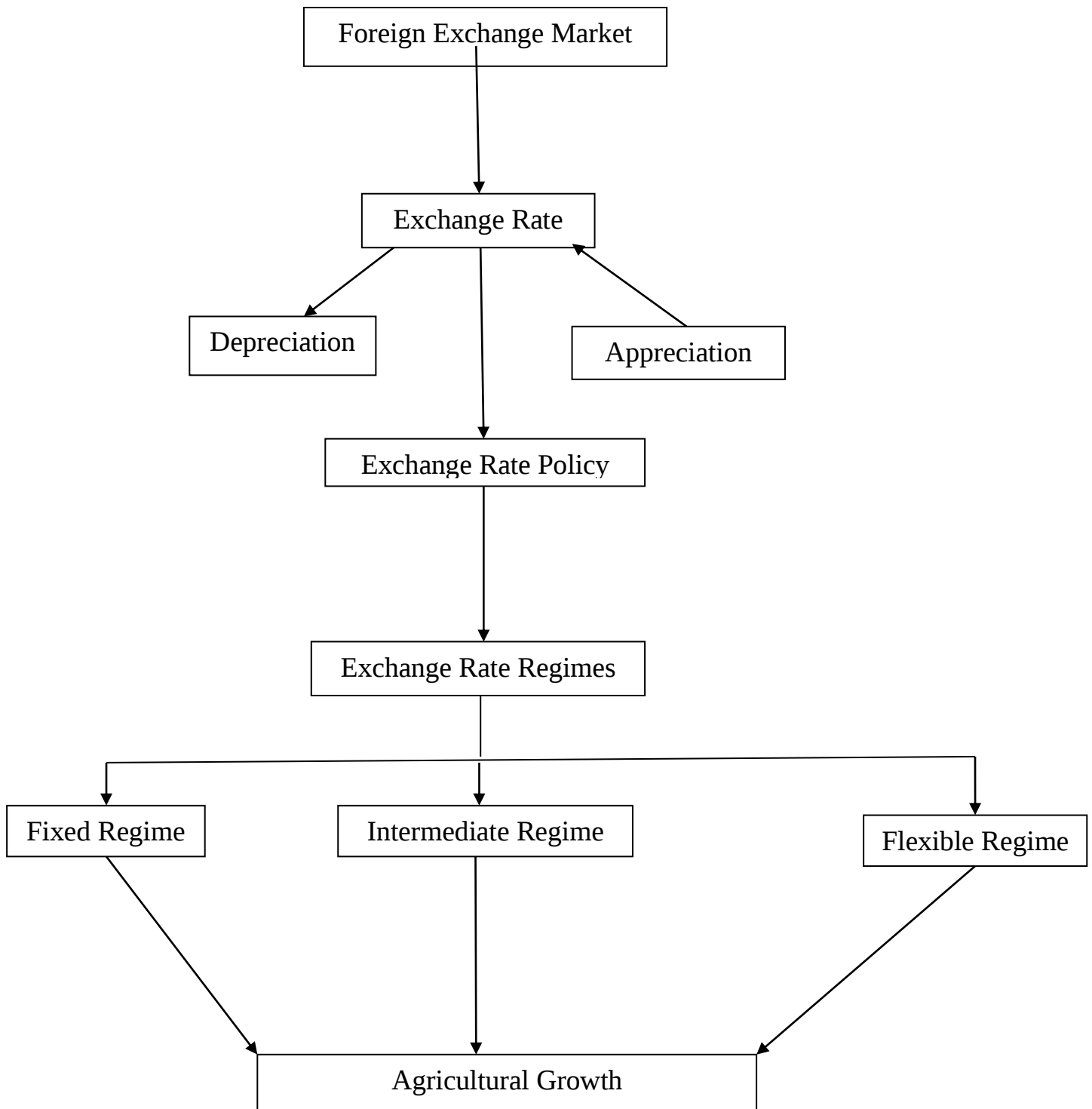
Agriculture contributes 40% of the Gross Domestic Product (GDP) and employs about 70% of the working population in Nigeria (CIA, 2012). Agriculture is also the largest economic activity in the rural area where almost 50% of the population lives.

The agriculture sector has been the mainstay of the economy since independence and it remains a resilient sustainer of the populace. In the 1960s, Nigeria was the world's largest exporter of groundnut, the second largest exporter of cocoa and palm produce and an important exporter of rubber, cotton (Sekunmade, 2009). More recently, agriculture employs about two-thirds of Nigeria's labour force, contributes significantly to the GDP and provides a large proportion of non-oil earnings (CIA, 2013; Sekunmade, 2009).

The subsectors of the agriculture sector in Nigeria have potentials that give the sector opportunity for growth. According to CBN (2012), between 1960 and 2011, an average of 83.5% of agriculture GDP was contributed by the crops production subsector making it the key source of agriculture sector growth. The food production role of the agriculture sector depends largely on this subsector as all the staples consumed in the nation comes from crop production, 90% of which is accounted for by small-scale, subsistent farmers. The major crops cultivated include yam, cassava, sorghum, millet, rice, maize, beans, dried cowpea, groundnut, cocoyam and sweet potato. The second largest is the livestock subsector contributing an average of 9.2% between 1960 and 2011. This sector is the largest source of animal protein including dairy and poultry products. Anyawu, Ibekwe & Adesope (2010) using correlation matrix find that production of major staples in Nigeria contributed significantly to GDP growth (except wheat) between 1990 and 2001.

With 75% of the world's poor in rural areas and most of them dependent on farming, agriculture must be part of world economic growth, poverty reduction, and environmental sustainability (United Nations Development Programme, 2012). Agriculture is critical to achieving global poverty reduction targets and it is still the single most important productive sector in most low income countries, often in terms of its share of Gross Domestic Product and almost always in terms of the number of people it employs (International Development Association, 2009). In countries where the share of agriculture in overall employment is large, broad-based growth in agricultural incomes is essential to stimulate growth in the overall economy, including the non-farm sectors selling to rural people. Hence, the ability of agriculture to generate overall GDP growth and its comparative advantage in reducing poverty will vary from country to country (FAO, 2012). The majority of the poor and food insecure in Africa live in rural areas, and most of them depend on agriculture for their livelihoods. To support broad-based poverty reduction and food security in Africa, smallholder agriculture must be a central investment focus (Garvelink . Wedding & Hanson, 2012).

Agriculture's contribution to poverty reduction is sometimes thought to be small, because its relative economic importance usually falls when low-income countries successfully develop and this view is misleading (Department for International Development, 2005). Strong agricultural growth, particularly increased productivity, has been a feature of countries that have successfully reduced poverty. Agriculture contributes to poverty reduction because it provides employment to the poor, who have also generally low skills and education.

Figure 2.1: Conceptual Framework

Source: Author's conceptualization (2018)

Foreign Exchange Rate Management in Nigeria

Exchange rate policy in Nigeria has undergone a good number of changes. It has developed from a fixed parity in 1960 when it was solely tied with the British Pound Sterling. By 1967, following the devaluation of the Pound Sterling the US dollar was included in the parity exchange. In 1972, the parity exchange with the British Pound was suspended as a result of the emergence of a stronger US dollar.

In 1973, Nigeria reverted to a fixed parity with the British Pound following the devaluation of the US dollar. In 1974, in order to minimize the effect of devaluation of a single individual currency, Nigerian currency was tied to both the pound and dollar. Almost throughout the 1970s there was persistent appreciation of the nominal exchange rate of the naira occasioned by increases in the price of oil in the international market. These appreciations in the nominal exchange rates gave rise to over-reliance on imports with its accompanying capital flight, discouraging non-oil exports which ultimately led to Balance of Payments problems and depletion of external reserves. The increase in the marginal propensity to import collapsed the agricultural sector in Nigeria (Osaka, Mashe & Adamgbe 2003). In 1978, the naira was pegged to a basket of 12 currencies comprising Nigeria's major trading partners. However, the 1978 policy was jettisoned in 1985 in favour of quoting the naira against the dollar.

Before 1986, the prevailing exchange rate policies encouraged over-valuation of the naira. To solve the problems associated with the over-valuation the naira was deregulated in September 1986 under the Structural Adjustment Programme Package. To enhance the implementation of the Structural Adjustment Programme was the introduction of the Second-tier Foreign Exchange Market (SFEM). SFEM was expected to usher in a mechanism for exchange rates determination and allocation in order to ensure short term stability and long term Balance of Payments equilibrium.

As stated by Mordi (2006) the essential objectives of SFEM include to achieve a realistic naira exchange rate through the market forces of demand and supply, more efficient allocation of resources, stimulation of non-oil efforts, encourage foreign exchange in flow and discourage outflow, eliminate currency trafficking by wiping out unofficial parallel foreign exchange market, and lead to improvements in the Balance of Payments.

Several modifications were made in order to achieve the objectives of SFEM, from Foreign Exchange Market (FEM) to Autonomous Foreign Exchange Market (AFEM), to Dutch Auction System and, to the wholesale Dutch Auction System. The FEM was introduced as a result of the problem arising from the first and second tier market rates in July 1987. Bureau de change was introduced in 1989 with a view to enlarging the scope of FEM. In 1994, the fixed exchange rate system was reintroduced. In 1995 there was a policy reversal of guided deregulation referred to as the Autonomous Foreign Exchange Market (AFEM). In 1999 was the reintroduction of the interbank foreign exchange market (IFEM). This brought about the merger of the dual exchange rate, following the abolition of the official exchange rate from January 1, 1999. In 2002 was the reintroduction of the Dutch Auction System (DAS) as a result of the intensification of the demand pressure in the foreign exchange market and the persistence in the depletion of the country's external reserves. Finally, was the introduction of wholesale DAS in 2006, which further liberalized the market in an attempt to evolve a realistic exchange rate of the naira. Up till now, exchange rate regime in Nigeria is characterized as oscillating between fully managed and freely floating regimes.

2.2 Theoretical Framework

The Optimal Currency Area (OCA) theory

It was developed by Mundell (1961) and McKinnon (1963). This literature focuses on trade and stabilization of the business cycle. It is based on concepts of the symmetry of shocks, the degree of openness, and labor market mobility.

According to the theory, a fixed exchange rate regime can increase trade and output growth by reducing exchange rate uncertainty and thus the cost of hedging, and also encourage investment by lowering currency premium from interest rates. However, on the other hand it can also reduce trade and output growth by stopping, delaying or slowing the necessary relative price adjustment process. According to the theory, a fixed regime can increase trade and output growth by providing a nominal anchor and the often needed credibility for monetary policy by avoiding competitive depreciation, and enhancing the development of financial markets.

The Balance of Payments Theory

This theory stipulates that under free exchange rates, the exchange rate of the currency of a country depends upon its balance of payment. According to Brooks (2014), a favourable balance of payments raises the exchange rate, while an unfavourable balance of payments reduces the exchange rate. Thus the theory implies that the exchange rate is determined by the demand for and supply of foreign exchange. According to this theory, adjustments in the balance of payments can be made through devaluations and revaluations of some currencies in the case of deficits and surpluses, respectively, in the balance of payments.

The Solow's growth theory

Solow's theory of economic growth provides a useful framework for analyzing growth drivers. According to Spence (2009), Solow's theory relates to explanation of the sources of (determinants) of growth and supply (production) side of an economy. It starts with the idea of production functions, namely, that the quantity of output (Q) in any sector is a function of the amounts and qualities of inputs or factors of production (Solow, 1987). These typically are land and natural resources (R), labour (L) and physical capital, such as buildings and machines (K):

$$Q = f(R, L, K)$$

The theory postulates that with detailed data for an economy's sub-sectors, it should then be possible to explain the growth of output by the growth in quantities and qualities of inputs. Any residual is attributed to technological change, that is, shift in the production function not due to factor inputs. Solow's result challenged economist who thus far had seen savings and capital accumulation as the main determinants of economic growth.

2.3 Empirical Literature

2.3.1 Empirical Review of the Effect of Exchange Rate Regime on Output

Many scholars have conducted empirical research in order to examine the effect of exchange rate regime on growth. For instance,

Moreno (2001) in his study, using descriptive statistics, measured how the regime (actual behaviour) affected GDP growth and volatility on a sample of 98 developing countries and East-Asian countries, respectively, over the period 1974-1999. His work supports the view that real growth used to be higher under a peg by 1.1% and 3% respectively. The difference is robust to excluding the periods of currency crises preceded by a peg and excluding the top 1% high-inflation episodes. However, Moreno accounts for the so-called survivor bias (excludes sharp devaluation episodes which could be attributed to policies adopted while pegging) and finds that then growth difference between regimes significantly narrows. The study do not provide sufficient evidence that growth is a causal effect of the exchange-rate regime; in addition, as the growth of investment and output are opposite under certain regimes, the study prescribes the result on productivity, which is the residual. However, there are no any figures to confirm neither this nor an explanation of how the exchange-rate regime effect might be channelled to productivity.

Levy-Yeyati and Sturzenegger (2003) in their study of to float or fix: evidence on the impact of exchange rate regime on growth using a new de facto classification of regimes

based on the actual behaviour of the relevant macroeconomic variables found out that for developing countries, less flexible exchange rate regimes are associated with slower growth, as well as with greater output volatility and for industrial countries, regimes do not appear to have any significant impact on growth.

Eichengreen and Leblang (2003) in their panel study showed the existence of a strong negative relationship between exchange rate stability and economic growth for 12 countries over a period of 120 years. They finally concluded that the results of such estimations strongly depend on the time, people, and the sample.

Miles (2006) in a study titled to float or not to float? Currency regimes and growth argue that the effect of fixed exchange rates on growth in emerging markets is not direct, but rather contingent on the existence of macroeconomic imbalances and other distortions in place in the domestic economy. For him these results seem to conform more closely with exchange rate theory, which posits mostly positive, and few negative channels for pegged currencies to impact growth over the long run.

Rogoff, Husain, Mody, Brooks and Oomes (2003) study the evolution and performance of exchange rate regimes using recent advances in the classification of exchange rate regimes. Their study finds no support for the popular bipolar view that countries will tend over time to move to the polar extremes of free float or rigid peg. Rather, intermediate regimes have shown remarkable durability. The analysis suggests that as economies mature, the value of exchange rate flexibility rises. For countries at a relatively early stage of financial development and integration, fixed or relatively rigid regimes appear to offer some anti-inflation credibility gain without compromising growth objectives. As countries develop economically and institutionally, there appear to be considerable benefits to more flexible regimes. For developed countries that are not in a currency union, relatively flexible exchange rate regimes appear to offer higher growth without any cost in credibility.

Huang and Malhorta (2004) examine the relationship between exchange-rate regime and growth by paying attention on two aspects: exchange-rate-regime classification and differentiation between developing and developed economies. The study uses 12 developing Asian countries and 18 advanced European economies over the period 1976-2001. It utilizes descriptive statistics and regression variables such as per capita growth, financial crisis; openness; government consumption; initial GDP; fertility rate; secondary school enrolment ratio; and exchange rate dummies. Findings suggest that the exchange-rate regime matters for developing economies: fixed and managed floating regimes outperform the others in terms of growth. However, for advanced economies, no significant regularity is discovered.

The study of Bleaney and Francisco (2007) also pays attention to the regime classification. It utilizes de-facto classification carried out by previous studies, including 91 developing countries over the period 1984- 2001. They regress the growth rate on its lagged value, exchange-rate dummies and time dummies and exclude high inflation-periods. Findings are that pegs are associated by significantly slower growth than soft pegs or floats. However, no theory-consistent growth framework is applied; there are many insignificant variables, suggesting that the specification might suffer from high level of colinearity; endogeneity is not considered; robustness checks are not offered. It could be argued, the study cannot see the forest from the trees: it pays too much attention on the classification schemes and too little to other important issues.

Bahmani-Oskooee and Kandil (2007) using annual data on real and nominal measures of the effective exchange rate for Iran between 1959 and 2003 examined the effects of exchange rate fluctuations on output in oil-producing countries: the case of Iran over time adopting a new test for co-integration. The study found no evidence of co-integration between output growth and the parallel real-dollar exchange rate, both real and nominal and that currency appreciation is contractionary in the long run and expansionary in the short-run.

Yougbaré (2008) carried an empirical reappraisal of the linkages between growth, volatility and the exchange rate system. The results reveal that fixed exchange regimes raise growth in a heterogeneous manner, the impact being concentrated at lower growth rates. As regard the second goal, pegged exchange systems are shown to amplify the negative direct and indirect growth-effects of volatility. All in all, the findings suggest that fixed exchange rates constrain the ability of the economy to adjust to shocks and volatility.

Lloyd and Tokunbo (2005) in their study, they examined determinants of the choice of the exchange rate regime in Nigeria using a time series approach. Both multinomial logit and simultaneous limited-independent models were estimated using time series data from 1960 to 2000. The study found that when domestic inflation was relatively high with respect to world inflation, a fixed exchange rate regime was preferred.

In their study of exchange rate movements in Nigeria for the sample period 1986 to 2010, Eme and Johnson (2010), examined the possible direct and indirect relationships between exchange rate and GDP growth, using a simultaneous equation model within a fully specified (but small) macroeconomic model, coupled with a generalized method of moment (GMM) technique. The empirical results suggest that there is no evidence of strong direct relationship between changes in exchange rate and output growth. Rather they concluded that Nigeria's economic growth had been directly affected by monetary variables and that improvements in exchange rate management were necessary but not sufficient to revive Nigerian economy.

Bakare (2011) carried out an empirical analysis of the consequences of the foreign exchange rate reforms on the performances of private domestic investment in Nigeria adopting the ordinary least square multiple regression analytical method. The multiple regression results showed a significant but negative relationship between floating foreign exchange rate and private domestic investment in Nigeria. The findings and conclusion of the

study support the need for the government to dump the floating exchange regime and adopt purchasing power parity which has been considered by researchers to be more appropriate in determining realistic exchange rate for naira and contribute positively to macroeconomic performances in Nigeria.

Fapetu and Oloyede (2014) examined foreign exchange management and the Nigeria economic growth from 1970 to 2012 using the ordinary least square estimation techniques within the error correction model (ECM) framework. The study reveal that managing the economy's foreign exchange rate does affect quite a number of economic variables, which in turn affects growth in the economy.

Eze and Okpala (2014) carried out a quantitative analysis of the impact of exchange rate policies on Nigeria's economic growth: a test of stability of parameter estimates using the Chow test procedure to determine the structural stability of the relationship between exchange rate and output of goods and services. Their study revealed that, apart from government expenditure (GEX), both exchange rate (EXR) and money supply (M2) are highly significant in the determination of Nigeria's economic growth performance. Also, the conducted Chow test showed that the relationship between exchange rate and economic growth performance in Nigeria have not undergone any significant structural changes. The implication is that no matter the exchange rate regime, whether fixed or flexible, what matters is the effectiveness of the management. Nigeria can substantially improve on its economic growth performance through improvements in the overall management of its exchange rate policy.

Adelowokan, Adesoye and Balogun (2015) in their of the effect of exchange rate volatility on investment and growth in Nigeria using the vector error correction method found out that exchange rate volatility has a negative effect with investment and growth while exchange rate volatility has a positive relationship with inflation and interest rate in Nigeria.

Kenneth, Jonathan & Kenneth (2015) in their study examine the relationship between exchange rate regimes and output growth in Nigeria in different periods from 1970 to 2014. The study employs the Generalized Method of Moments (GMM) to estimate economic growth equation as a result of endogeneity problem. In contrast with previous findings, our study strongly suggest that exchange rate regimes indeed matter in terms of real economic performance in Nigeria as the results reveal that deregulated exchange rate regime spur economic growth in Nigeria as against the whole period and fixed exchange rate regime. All in all, the findings suggest that fixed exchange rates constrain the performance of the Nigerian economy as real exchange rate depicts inverse relationship with economic growth during the whole period and period of fixed exchange regime.

2.4 Analytical Framework

The analytic tools that have been applied to this study to the best of my knowledge are: unit root test, co-integration test, ordinary least square method analysis and pairwise Granger causality test.

Pre – estimation procedure

The properties of the time series data have been examined by different researchers in order to avoid spurious results and inaccurate predictions emanating from the non-stationarity of variables. Bashier and Wahban (2013) noted that when dealing with time series data, a number of econometric issues can influence the estimation of parameters when using OLS. Egbo (2011) suggested that in order to avoid a number of these challenges or sort out issues such as subjectivity and bias responses and the inability to incorporate such biases in econometric models that normally crop up when qualitative methods are used in the analysis of time series data, the unit root and co-integration tests are usually employed to test for stationarity.

2.4.1 Unit root test

Macroeconomic time series data are generally characterized by stochastic trend which can be removed by differencing. The unit root test can be carried out using different types of test which includes the Dickey- Fuller GLS, Augmented Dickey Fuller (ADF) test, Kwiatkowski- Philips-Schmidt-Shin (KPSS) test, Philips-Perron approach and Ng-perron.

Why do we need to test for Non-Stationarity?

- The stationarity or otherwise of a series can strongly influence its behaviour and properties e.g. persistence of shocks will be infinite for non stationary series
- Spurious regressions. If two variables are trending over time, a regression of one on the other could have a high R^2 even if the two are totally unrelated
- If the variables in the regression model are not stationary, then it can be proved that the standard assumptions for asymptotic analysis will not valid. In other words, the usual “ t -ratios” will not follow a t -distribution, so we cannot validly undertake hypothesis tests about the regression parameters.

Majagaiya and Quinglang (2010) stated that the objective of the unit root test is to empirically examine whether a series contains unit root or not. They further stated that if the series contains a unit root, this means that the series is non- stationary, if otherwise, and the series will be termed as stationary. Akande and Biam (2013) reported that the advantage of the method lies in its robustness to handle both first order and higher order autoregressive processes. The ADF test is used to determine the order of integration, which is the number of times a variable has to be differenced before it becomes stationary.

The testing procedure is specified in the equation below;

$$\Delta Y_t = \alpha_1 + \alpha_2 t + \beta Y_{t-1} + \gamma_1 \Delta Y_{t-1} + \varepsilon_t \quad 2.1$$

where:

$$\Delta Y_t = \text{first difference of } Y_t$$

Y_{t-1} = lagged values of Y_t

ΔY_{t-1} = first difference of Y_{t-1}

β = test coefficient

ε_t = white noise

α_1 = constant

α_2 = coefficient of time variable

The ADF test was used by Eze and Okpala (2014), Eme and Akpan (2010) and Oyakhilomen, Falola and Grace (2014) to check for stationarity of data in their studies.

2.4.2 Co- integration test

Co-integration test is carried out using different methods. This methods can be categorized into two broad groups: residual -based (Engel and Granger Two – step test) and maximum likelihood estimation- based (Johansen maximum likelihood procedure). Co-integration test is used to show whether the linear combination of non stationary time series is stationary. Economically speaking, two variables will be co-integrated if they have a long term or equilibrium relationship between them (Koutsoyiannis, 1957).

Engle and Granger (1987) formulated one of the first tests of co-integration (or common stochastic trends). This test has the advantage that it is intuitive, easy to perform. The weakness of this test is that it assumes a common factor in the dynamics of the system and second, the test is based on the assumption of one co-integrating vector, captured by the co-integrating regression. The EGTS test is thus specified:

$$Y_t = \alpha X_t + \varepsilon_t \quad 2.2$$

Where Y_t = the dependent series

X_t = the independent series

ε_t = co-integrating residual series

The Johansen (1991) maximum likelihood test is used to test the co-integration between variables. This is a test which has all desirable statistical properties. The weakness of the test is that it relies on asymptotic properties, and is therefore sensitive to specification errors in limited samples.

The test statistic is thus specified as follows;

$$\Delta Y_t = \mu + \sum_{i=1}^{q-1} \Gamma_i \Delta Y_{t-i} + \Pi X_{t-q} + \varepsilon_t \quad 2.3$$

The Johansen approach specifies the rank of matrix π and can be further formulated as $\pi = \alpha\beta$ where α denotes the adjustment parameters entering each equation of the VECM while β contains information about the long-run matrix of coefficients with α and β matrices dimensioned $n \times r$. When π has a full rank (that is $r = n$), then our variables in Y_t would be stationary. However, when the rank of π is zero (that is non existence of linear combination of the variable in Y_t), then they would be no co-integration. Meanwhile, when π has a reduce rank $0 < r < n$, then there would be r co-integrating relationships.

2.4.3 Ordinary Least Square Method (OLS)

The OLS method has been used in a wide range of economic relationship with satisfactory result. The method employs a sound statistical technique appropriate for empirical problems; and it has become so standard that its estimates are presented as a point of reference even when result from other estimation technique are used. More so, the reliability of this method lies on its desirability properties which are efficiency, consistency and unbiased. This implies that its error term has a minimum and equal variance. The conditional mean value is zero and normally distributed (Gujarati, 2004). Koutsoyiannis (2008) indicated that the reasons of using this method are many, amongst which are:

- i. The parameter estimates obtained by OLS have some optimal properties such as unbiasedness, least variance, efficiency etc
- ii. The computational procedure for OLS is fairly simple as compared with other econometric techniques and the data requirements are not excessive.
- iii. The least squares method has been used in a wide range of economic relationships with fairly satisfactory results.
- iv. The mechanics of least squares are simple to understand.
- v. OLS is an essential component of most other econometric techniques.

Limitations of using OLS

- i. Regressing a time series variable on another time series variable using the OLS estimation can obtain a very high R^2 .
- ii. Non stationarity of variables will result to the loss of the desirable properties of efficiency, consistency and unbiasedness of the variables if ordinary least square technique is used to estimate the model.
- iii. It does not consider endogeneity problem of variable.

Eze and Okpala (2014) in their study they tested the impact of the two basic exchange rate policies, namely, the fixed and flexible regimes, using Ordinary Least Squares (OLS) technique.

2.4.4 Pairwise Granger causality model

The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. Granger (1969) proposed a time-series data based approach in order to determine causality. In the Granger-sense x is a cause of y if it is useful in forecasting y . In this framework “useful” means that x is able to increase the accuracy of the prediction of y with respect to a forecast, considering only past values of y .

There are three different types of situation in which a Granger-causality test can be applied:

- In a simple Granger-causality test there are two variables and their lags.
- In a multivariate Granger-causality test more than two variables are included, because it is supposed that more than one variable can influence the results.
- Finally Granger-causality can also be tested in a VAR framework; in this case the multivariate model is extended in order to test for the simultaneity of all included variables.

The Granger causality has two assumptions which are:

- i. the future cannot cause the past. The past causes the present or future; and
- ii. a cause contains unique information about an effect not available elsewhere.

The Granger causality test assumes that the information relevant to the prediction of the respective variables, X and Y, is contained solely in the time series data on these variables. The test involves estimating the following pair of regressions

$$X_t = \beta_0 + \sum_{i=1}^p \beta_i X_{t-i} + \sum_{j=1}^p \alpha_j Y_{t-j} + \mu_{1t} \quad 2.4$$

$$Y_t = \gamma_0 + \sum_{i=1}^p \gamma_i Y_{t-i} + \sum_{j=1}^p \alpha_j X_{t-j} + \mu_{2t} \quad 2.5$$

Where:

X_t, Y_t = regressed of model 1 and 2

β_0, γ_0 = constant terms of model

β_i, α_j = coefficient of the regressor

γ_i, δ_j = coefficient of regressors of model

μ_{1t}, μ_{2t} = error terms of model

It is assumed that the disturbances μ_{1t} and μ_{2t} are uncorrelated. Thus, there is unidirectional causality from X to Y if $\alpha_j = 0$ and $\delta_j \neq 0$. Similarly, there is unidirectional causality from Y to

X if $\delta_j = 0$ and $\alpha_j \neq 0$. The causality is considered as mutual (bilateral causality) if $\delta_j \neq 0$ and $\alpha_j \neq 0$. Finally, there is no link between X and Y (independence) if $\delta_j = 0$ and $\alpha_j = 0$

To determine the relationship between exchange rate deregulation and agricultural share of gross domestic product in Nigeria, Oyakhilomen, Falola and Rekwot (2014) used the pairwise granger causality test.

2.4.4 Generalized Method of Moments (GMM)

GMM estimation was formalized by Hansen (1982), and since has become one of the most widely used methods of estimation for models in economics and finance. The GMM estimator is a generalized instrumental variable technique whose coefficient estimates possess the desirable properties of consistency, asymptotic efficiency and asymptotic normality. To overcome the issue of endogeneity, the Generalized Method of Moments (GMM) is used to estimate economic growth.

GMM estimation technique has the inherent ability to produce unbiased estimators even with lagged dependent variables acting as instruments. It is capable of avoiding biased results due to correlation between the error term and the lagged endogenous variables. In addition it has the potential of obtaining consistent parameter estimates even in the presence of measurement error and endogenous right-hand side variables in a system equation estimation procedure (Eme & Akpan, 2012).

Bond, Hoeffler and Temple (2001) argue that utilizing system-GMM approach in a growth framework has at least four advantages:

- i) it produces estimates not biased by omitted variables (like the initial efficiency);
- ii) produces estimates which are consistent even in presence of measurement error;
- iii) accounts for the endogenous right-hand-side variables (like investment in growth-context); and

- iv) exploits an assumption about the initial conditions to obtain moment conditions that remain informative even for persistent series (i.e. series that contain unit root, like the output).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study Area

The study area is Nigeria. The country is situated on the Gulf of Guinea in the sub-Saharan Africa. Nigeria lies between Latitudes 40° and 140° North of the Equator and between Longitude 30° and 150° East of the Greenwich and a population estimate of about 167 million (National Bureau of Statistics (NBS), 2011). Administratively, Nigeria is made up 36 states and a Federal Capital Territory, Abuja. It is bounded on the West by the Republic of Benin, on the East by the Republic of Cameroun, on the North by Niger and Chad Republic and on the South by the gulf of guinea. It has a total geographical land area of 923, 768, 62 square kilometers and a population estimate of about 167 million (National Bureau of Statistics, 2011).

Nigeria has a financial service sector comprising of the banking system, financial institutions and financial markets with the Central Bank of Nigeria (CBN) as the apex bank. The CBN has responsibility for the promotion of a sound financial system that would ensure effective conduct of monetary policy. This is necessary for mobilization of resources for investment, economic growth and development (CBN, 2009). This mobilization covers all sectors including agriculture. Nigeria has a highly diversified agro-ecological climatic condition and hence, agriculture constitutes one of the most important economic sectors of the economy. The agricultural sector is particularly important in terms of its employment opportunities creation, its contributions to GDP and export earnings.

3.2 Data Collection

This research work covered a period of 45 years from 1970 to 2014. This was purposively chosen due to availability of data. In order to generate the necessary data for this study, which include agricultural contribution to GDP, exchange rate, government

expenditure on agriculture and inflation rate the Central Bank of Nigeria Statistical Bulletin of various years and publications was used. Data on political instability and macroeconomic indicator would be obtained from Worldwide Governance Indicators (WGI).

3.3 Data Analysis

The data were grouped into three periods. The whole period (1970 -2014), the period of exchange rate fixed regime (1970-1985) and flexible regime (1986-2014) since exchange rate policy in Nigeria, as observed by Sani (2006) has gone through many changes but spanning between two major regimes, namely, the fixed and flexible exchange rate regimes. Objective I was achieved using descriptive statistics, Objective ii and iii were achieved using OLS method and objective four was achieved using granger causality test. Hypothesis 1 and 11 were tested using T- test while hypothesis 111 was tested using granger causality. Furthermore, estimation tests for time series data which are unit root test and co- integration test were carried out.

3.3.1 Unit root test

This study subjected the variables of interest to stationarity test adopting the unit root Augmented Dickey – Fuller (ADF) test and the Phillip-Perron Test (PP). In general, the ADF and PP tests are consistent with each other; however we include both as to ensure accuracy regarding the unit root conclusion. The equation for the ADF is given below:

$$\Delta Y_t = \alpha_1 + \alpha_2 t + \beta Y_{t-1} + \gamma \Delta Y_{t-1} + \varepsilon_t \quad 3.1$$

where:

ΔY_t = first difference of Y_t

Y_{t-1} = lagged values of Y_t

ΔY_{t-1} = first difference of Y_{t-1}

β = test coefficient

ε_t = white noise

α_1 = constant

α_2 = coefficient of time variable

The unit root test is then carried out under the following hypothesis:

H_0 : Variable contains unit root and hence is non – stationary

H_A : Variable does not contain unit root and hence is stationary

Once a value for ADF test statistics below is computed, it is compared with the relevant critical value for the Dickey-Fuller test.

$$F_r = \frac{\tilde{y}}{SE(\tilde{y})} \quad 3.2$$

Decision rule: If the absolute value of calculated ADF statistic is higher than the absolute value of the critical values, we reject the hypothesis which shows that the series is stationary.

However, if this value is lower than the critical values, the time series is not stationary.

In addition, a robustness check would be carried out using the PP test. The PP test used by Nwosu and Okafor (2014) was carried out under the same hypothesis as the ADF test. The decision rule employed was the same as that of the ADF.

3.3.2 Co - integration test

The Johansen co – integration method was adopted in this study to find out the long term relationship between the two variables, that is, exchange rate regimes and agricultural growth. The test statistic is thus specified as follows;

$$\Delta Y_t = \mu + \sum_{i=1}^{q-1} \Gamma_i \Delta Y_{t-1} + \Pi X_{t-q} + \varepsilon_t \quad 3.3$$

The Johansen approach specifies the rank of matrix π and can be further formulated as $\pi = \alpha\beta$ where α denotes the adjustment parameters entering each equation of the VECM while β contains information about the long-run matrix of coefficients with α and β matrices dimensioned $n \times r$. When π has a full rank (that is $r = n$), then our variables in Y_t would be stationary. However, when the rank of π is zero (that is non existence of linear combination of the variable in Y_t), then they would be no co-integration. Meanwhile, when π has a reduce rank $0 < r < n$, then there would be r co-integrating relationships.

3.3.3 OLS Model for Agricultural Growth

In this study, OLS technique was used to ascertain the effect of exchange rate regime on agricultural growth. Following the works of Eze and Okpala (2014), the model is specified thus:

$$1970 - 2014: AGDP = \beta_0 + \beta_1 EXCR + \beta_2 GEXA + \beta_3 INF + \beta_4 PINS + \beta_5 MINS + \mu_t \quad 3.4$$

$$1970 - 1985: AGDP = \alpha_0 + \alpha_1 EXCR + \alpha_2 GEXA + \alpha_3 INF + \alpha_4 PINS + \alpha_5 MINS + \mu_t \quad 3.5$$

$$1986 - 2014: AGDP = \theta_0 + \theta_1 EXCR + \theta_2 GEXA + \theta_3 INF + \theta_4 PINS + \theta_5 MINS + \mu_t \quad 3.6$$

Where:

AGDP = agricultural sector contribution to GDP (proxy for agricultural growth)

EXR = current exchange rate %

GEXA = government expenditure in agriculture (₦)

INF = average inflation rate (%)

PINS = political instability index

MINS = microeconomic instability captured by the standard deviation of GDP

β_1, α_1 and θ_1 = parameters to be estimated

β_0, α_0 and θ_0 = constant of the relationship estimated

μ_t = stochastic error terms

Apriori expectations:

$$\beta_0 > 0, \beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 < 0, \beta_5 < 0;$$

$$\alpha_0 > 0, \alpha_1 < 0, \alpha_2 > 0, \alpha_3 < 0, \alpha_4 < 0, \alpha_5 < 0;$$

$$\theta_0 > 0, \theta_1 > 0, \theta_2 > 0, \theta_3 < 0, \theta_4 < 0, \theta_5 < 0.$$

3.3.3 Granger causality test

To determine the causal relationship between exchange rate and agricultural growth, the pairwise Granger causality model was employed.

$$EXR_t = \alpha_0 + \sum_{i=1}^p \alpha_i EXR_{t-i} + \sum_{j=1}^p \psi_j AGDP_{t-j} + \varepsilon_{it} \quad 3.7$$

$$AGDP_t = \beta_0 + \sum_{i=1}^p \beta_i AGDP_{t-i} + \sum_{j=1}^p \psi_j EXR_{t-j} + \varepsilon_{2t} \quad 3.8$$

Where:

EXR= exchange rate regime

AGR GDP= agricultural growth

E1t and E2t are assumed to be uncorrelated error terms.

The two null hypotheses for the Granger causality test are:

Ho₁: EXR does not Granger cause AGDP

Ho₂: AGDP does not Granger cause EXR

The Granger causality testing procedure employed in this study is stated below:

$$F = \frac{((SSR_{UR} - SSR_R) / m)}{(SSR_{UR} / (n - k))} \quad 3.9$$

Where SSR_R = restricted sum of squared residual obtained under the Ho, SSR_{UR} = residual sum of squares of the unrestricted model, m is the number of lagged M terms, k is the number of parameters estimated in the unrestricted regression and n is the number of observations.

Decision rule: If the prob(F-stat) < 0.05, the null hypothesis is rejected and the alternative accepted otherwise the null hypothesis is accepted.

3.3.4 Test of Hypothesis

Hypothesis 1 and 2 were tested using t-test. It is shown mathematically below:

The z-values from the regression results were compared with the z-critical values to test the significance of each variable.

Decision rule: If $z\text{-Cal} > z\text{-tab}$, reject the null hypothesis otherwise accept the null

Hypothesis 3 was tested using Granger causality test. It is shown mathematically below:

$$F = \frac{((SSR_{UR} - SSR_{UR}) / m)}{(SSR_{UR} / (n - k))}$$

Where SSR_R = restricted sum of squared residual obtained under the H_0 , SSR_{UR} = residual sum of squares of the unrestricted model, m is the number of lagged M terms, k is the number of parameters estimated in the unrestricted regression and n is the number of observations.

Decision rule: If the $\text{prob}(F\text{-stat}) < 0.05$, the null hypothesis is rejected and the alternative accepted otherwise the null hypothesis is accepted.

CHAPTER FOUR

RESULTS AND DISCUSSION

The results of this study were discussed under the following subheadings; trend in agricultural growth and exchange rate regime, ascertain the fixed exchange rate regime on agricultural growth; assess the flexible exchange rate regime on agricultural growth and determine the causal relationship between exchange rate and agricultural growth.

4.1 Trend in agricultural growth and exchange rate

Agricultural growth

The trend in agriculture and its growth rates during the fixed and flexible exchange rate regimes in Nigeria were presented in Figure 4.1.

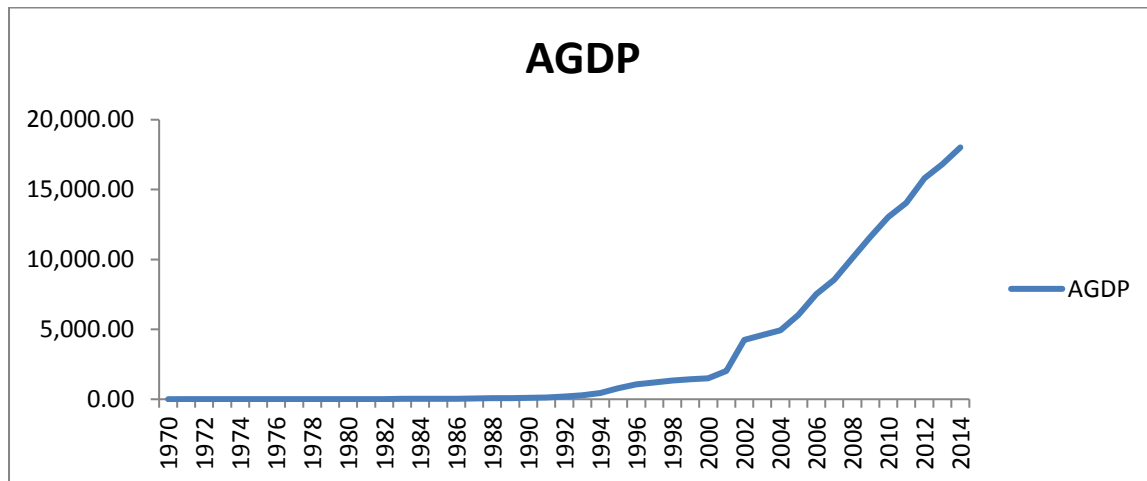


Figure 4.1: Trend in Agricultural Growth (N/\$), 1970-2014

The result showed the analysis of agricultural GDP during the fixed exchange rate regime and the flexible exchange rate regime. It shows an increasing trend in agricultural GDP during the fixed exchange rate regime i.e. from 1970-1985 and also the agricultural gross domestic product during the flexible exchange rate regime i.e. from 1986-2014.

Exchange Rate

The trend in exchange rates during the fixed and flexible exchange rate regimes in Nigeria were presented in Figure 4.1.

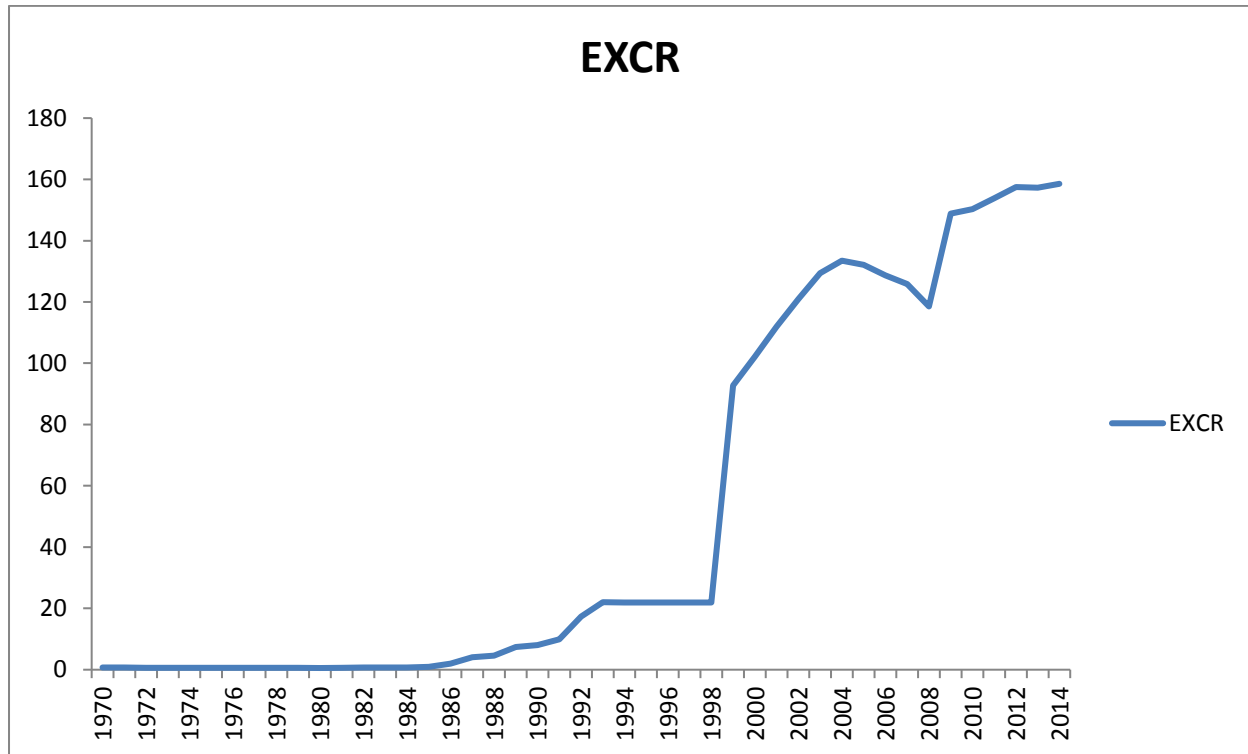


Figure 4.2: Trend in Exchange Rate (N/\$), 1970-2014

It can be observed from Figure 4.2 exchange rates were stable during the fixed exchange rate i.e. from 1970- 1985. Exchange rates during the flexible regime were not stable except from 1994 to 1998 when the rates were stable at ₦ 21.8861. Exchange rates during this period fluctuated or floated in keeping with the flexible exchange rate regime in which market forces rather than government (through the CBN) fixed exchange rates between national currencies.

Stationarity test

The data analysis begins with the application of the augmented dickey-fuller technique in testing the unit root property of the series and the application of the co integration test for the existence of long run relationship amongst the variables. Recent studies suggest that most macroeconomic time series are non-stationary in their levels, that is,

they have unit roots. They can only be made stationary through differencing. Using ADF (augmented dickey-fuller) test, the time series considered in this study have been tested for unit roots to check their stationarity. Co-integration test was also employed to test for long run relationship existing among the variables. Finally, the ordinary least square (OLS) method is employed to ascertain if there is a significant relationship between exchange rate regimes and agricultural growth.

Unit root test result

The Table 4.1 presents the summary of unit root test result gotten at levels, first difference and second difference

Table 4.1: Results of Unit Root Tests Based on Augmented Dickey-Fuller

ADF Test				
Variable	Level	First Diff.	Prob	Order of Integration
AGDP	7.750937	3.822375*	0.0005	1(2)
EXR	0.333310	-6.081037*	0.0000	1(1)
INF	-3.301346	-6.544608*	0.0000	1(1)
GEXA	-3.124817	-7.862891*	0.0000	1(1)
PINS	-3.119152	-7.121488*	0.0000	1(2)
MINS	0.677805	-8.861113*	0.0000	1(1)

Source: Authors computation from stata

Note: * indicates significance at 1% level respectively

Where, AGDP = Agricultural sector contribution to GDP; GEXA = Government expenditure on agriculture; INF = Inflation rate; PINS = political instability; MINS = macroeconomic instability Index

. The Augmented Dickey Fuller test were conducted on all the variables and the result gotten, showed that inflation, government expenditure on agriculture and political instability were integrated of order ($\Delta = 0$), exchange rate and micro economic instability were stationary at first difference. However, agricultural GDP and political instability were stationary at their second difference. As a result of their different order of integration, long-run relationships among the variables were ascertained.

Co-integration test result

The Johansen co-integration test was used to determine if there exists long-run equilibrium relationship among the variables under study.

Table 4.2 Johansen Cointegration test

	Eigen value	Max. EV	0.05 Critical Value	Prob. **
None *	0.771463	63.47048	40.07757	0.0000
At most 1 *	0.647237	44.80421	33.87687	0.0017
At most 2 *	0.501040	29.89485	27.58434	0.0248
At most 3	0.350531	18.55880	21.13162	0.1103
At most 4*	0.296055	15.09539	14.26460	0.0369
At most 5	0.000497	0.021393	3.841466	0.8836

Source: Author's computation from stata

Maximum Eigen value indicates 3 co –integrating eqns at 5% signifincance level

*** denotes the rejection of the hypothesis at 0.05 level**

**** Mackinnon- Haug – Michslis (1999) p- value**

The result above, showed four co - integrating variables at 5% critical value as the Eigen value of these variables in table was greater than their 5 percent critical value. That is 63.47048, 44.80421, 29.89485 and 15.09539 is greater than 40.07757, 33.87687, 27.58434 and 14.26460. We therefore, reject the null hypothesis and conclude that there exists long run equilibrium relationship between the dependent and independent variables.

(see Table 4.2).

Having established the existence of co integrating relationship among the variables we no longer run the risk of arriving at spurious estimates using the ordinary least squares technique.

4.2 Regression result under the fixed exchange rate regime

Table 4.3 Regression result under the fixed exchange rate regime 1970-1985

Variable	Coefficient	Std. Error	t- Statistics	Prob
EXR	-0.706296	2.767728	-0.255190	0.8037
GEXA	0.033725	0.022925	1.471117	0.1720
INF	0.030487	0.015918	1.915297***	0.0845
PINS	0.728628	0.468668	1.554681	0.1511
MINS	6.62E-05	4.03E-05	1.641811	0.1317
R-squared	0.615442			
Adjusted R-squared	0.423163	Durbin Watson stat	1.448955	
F-Statistics	3.200772	Prob(F-Statistics)	0.055394	

Source: Authors computation from stata

Note: * indicates significance at 10%**

Where, AGDP = Agricultural sector contribution to GDP; GEXA = Government expenditure on agriculture; INF = Inflation rate; PINS = political instability; MINS = macroeconomic instability Index

Inflation Rate

Between the two models fitted, semi-log function was chosen at 10% based on its high R^2 value and has a significant variable. A positive and significant relationship was found between inflation rate and agricultural growth. It produces an increase in agricultural growth as indicated by the estimated coefficient of positive sign thus; 1.915297 (Inflation rate). Sani (2012) in his study noted that inflation may be positively correlated with growth, but at higher levels inflation is likely to be inimical to growth. Onunze (2012) in his work on the impact of Agricultural Development on Nigeria Economic Growth found out that there is a positive relationship between inflation rate and the real GDP. Also, Mesike, Okoh and Inoni

(2010) also found out that inflation has a significant positive impact on relative price variability in the short-run and long-run and that those policies that would protect the agricultural sector from the impact of inflation in the short-run should be encouraged.

The observed influence of inflationary trend on agricultural production can be attributed to the persistent rise in the cost of farm inputs over the years leading to an increase in the cost of agricultural production activities. The inability of the agricultural sector to attain self-sufficiency in food production has led to a situation of aggregate demand for food exceeding aggregate supply leading to demand pull inflation in the economy. Despite the inability of the agricultural sector to attain self-sufficiency in food production, it has been significant in influencing economic growth over the years. As noted by CBN (2011), the agricultural sector contributes the largest share of the gross domestic product of Nigeria.

Results on Table 4.3 gave the estimated R^2 to be 0.615442. This means explanatory variables accounted for 62% of the total variation in agricultural growth. This also showed that the model possess a good fit. The Durbin- Watson statistic of 1.448955 indicated the model is free from positive first order autocorrelation and estimation bias emanating from misspecification of model.

The null hypothesis which stated that fixed exchange rate does not have any significant effect on agricultural growth in Nigeria was rejected. T-values given by the regression analysis were compared with t-critical values to test the hypothesis, variable by variable. The result showed that inflation was significant at 10% level while the other variables were not significant. This led to the acceptance of the alternative hypothesis which stated that there is significant relationship between exchange fixed rate regime and agricultural growth. (see Table 4.3)

4.4 Regression Result under the Flexible Exchange Rate Regime

Table 4.4 Regression Result under the Flexible Exchange Rate Regime 1986-2014

Variable	Coefficient	Std. Error	t-Statistics	Prob
EXR	15.17135	19.06428	0.795800	0.4343
GEXA	0.067869	0.036654	1.851621* * *	0.0770
INF	-9.202390	31.31213	-0.293892	0.7715
INS	-6081.994	2419.613	-2.5136238* *	0.0194
MINS	-6081.994	0.019173	2.329637* *	0.0290
R-squared	0.841369			
Adjusted R-squared	0.806884	Durbin Watson stat	0.863423	
F-Statistics	24.39809	Prob(F-Statistics)	0.000000	

Source: Authors computation

Note: ** and* indicates significance at 5% and 10% respectively**

Where, AGDP = Agricultural sector contribution to GDP; GEXA = Government expenditure on agriculture; INF = Inflation rate; PINS = political instability; MINS = macroeconomic instability Index

Independent variables were regressed, with agricultural growth as the dependent variable. These independent variables were exchange rate, government expenditure on agriculture, inflation rate, political instability and macro economic instability. The regression result above indicates that the variables were not significant at 5% level.

Political Instability (PINS)

A significant and negative relationship was found between political instability index and agricultural growth. This result agrees with apriori expectation as well as finding of Ifiorah (2016). Political instability may increase the risks and uncertainty regarding the policy environment, thereby leading to a negative growth by 6081.994 units (Table 4.5). This may be attributed to the reduced cross – border trades in Nigeria due to border closures in the Northern region in 2011 (United Nations Conference on Trade and Development (UNCTAD), 2013). Also, according to UNCTAD (2013), Nigeria's foreign direct investment

inflow dropped by 23% between 2011 and 2012 and this has been attributed to the activities of Boko Haram and Ansaru insurgence. In addition, the decrease in agricultural growth could have been due to reduced farm labour as a result of attack on farmers which led to decreased agricultural output (Kimenyi et al. 2014).

Government Expenditure on Agriculture

A positive and significant relationship was found between government expenditure and agricultural growth. A major finding of this study is that government spending on agriculture plays a significant role in achieving food security in Nigeria. This underscores the fact that agricultural investment requires huge resources in terms of manpower development through extension service, provision of seed varieties, chemicals, research and development for innovation as well as social infrastructures. This implies that more government investment would greatly enhance agricultural output. This is in agreement with the work of Ebere. Osundina and Kemisola (2012) government expenditure and GDP are positively related. It was found that a significant relationship exist between government expenditure in the agricultural sector and the economic growth in Nigeria.

Macroeconomic Instability

The macroeconomic instability index showed a positive and statistically significant effect on the agricultural sector. It implies that macroeconomic instability variables such as higher taxes and tax – like distortions (exchange rate devaluation) increased return. This result disagrees with the study of Ndikumana and Boyce (2003), whose work reported a negative relationship between macroeconomic instability and economic growth in Nigeria. Also, Usman and Arene (2014) found a negative and significant effect of macroeconomic instability on agricultural growth in Nigeria.

Macro economic instability tool like exchange rate devaluation leads to real exchange rate appreciation. In order to correct the over valuation, when a currency devaluation is expected,

investors usually move their domestic assets and invest in foreign countries, in order to avoid capital loss that will result from devaluation. Exchange rate devaluation encourages the growth of our local industries and locally made or produced goods. People will patronize locally produced food or product and this will enhance growth. This is in line with the work of Momodu and Akanni (2014) they stated that a significant short term relationship exists between growth and currency devaluation.

Results on Table 4.4 gave the estimated R^2 to be 0.841369. This means that the explanatory variables accounted for 84% of the total variation in agricultural growth. This showed that the model possesses a good fit. The Durbin-Watson statistic of 0.863423 indicated that the model is free from positive first order autocorrelation and estimation bias emanating from misspecification of model.

The null hypothesis which stated that flexible exchange rate does not have any significant effect on agricultural growth in Nigeria was rejected. T-values given by the regression analysis were compared with t-critical values to test the hypothesis, variable by variable. The result showed that government expenditure on agriculture, political instability, and macro economic instability were significant at 10% and 5% respectively. This led to the acceptance of the alternative hypothesis which stated that there is significant relationship between exchange fixed rate regime and agricultural growth. (see Table 4.4).

4.5 Regression Result for the whole period

Table 4.5 Regression Result for the whole period 1970-2014

Variable	coefficient	Std. Error	t-Statistics	Prob
EXR	37.56104	11.19043	3.356531*	0.0018
GEXA	0.063370	0.031303	2.024397**	0.0498
INF	-12.14252	22.71053	-0.534665	0.5959
PINS	-1300.686	975.2203	-1.333735	0.1900
MINS	0.053129	0.015871	3.347541*	0.0018
R-squared	0.844438			
Adjusted R-squared	0.824494	Durbin Watson stat	0.856573	
F-Statistics	42.34070	Prob(F-Statistics)	0.000000	

Source : Authors computation from Stata

Note: * and ** indicates significance at 1% and 5%

Major independent variables were regressed, with agricultural growth as the dependent variable. These independent variables were exchange rate, government expenditure on agriculture, inflation rate, political instability and macro economic instability.

Exchange Rate on Agriculture

From the regression result showed a positive and significant relationship with agricultural growth. This means that an increase in exchange rate has led to an increase in agricultural growth. This result suggests that a unit increase in exchange rate will increase the agricultural share of gross domestic product by 37.56104. This results shows that exchange rate are highly significant in determination of agricultural growth. Also this finding is in line with the results from the works of Eze and Okpala (2014) which established that exchange rate has positive and significant impact on economic growth. Also, in their study on the effect of exchange rate on agricultural growth

Government Expenditure on Agriculture

A positive and significant relationship was found between government expenditure and agricultural growth. A major finding of this study is that government spending on agriculture plays a significant role in achieving food security in Nigeria. This underscores the fact that agricultural investment requires huge resources in terms of manpower development through extension service, provision of seed varieties, chemicals, research and development for innovation as well as social infrastructures. This implies that more government investment would greatly enhance agricultural output. This is in agreement with the work of Ebere. Osundina and Kemisola (2012) government expenditure and GDP are positively related. It was found that a significant relationship exist between government expenditure in the agricultural sector and the economic growth in Nigeria.

Macroeconomic Instability Index (MINS)

The macroeconomic instability index showed a positive and statistically significant effect on the agricultural sector. It implies that macroeconomic instability variables such as higher taxes and tax – like distortions (exchange rate devaluation) increased return. This result disagrees with the study of Ifiorah (2016) whose work reported a negative relationship between macroeconomic instability and economic growth in Nigeria. Also, Usman and Arene (2014) found a negative and significant effect of macroeconomic instability on agricultural growth in Nigeria.

Macro economic instability tool like exchange rate devaluation leads to real exchange rate appreciation. In order to correct the over valuation, when a currency devaluation is expected, investors usually move their domestic assets and invest in foreign countries, in order to avoid capital loss that will result from devaluation. Exchange rate devaluation encourages the growth of our local industries and locally made or produced goods. People will patronize locally produced food or product and this will enhances growth. This is line

with the work of Momodu and Akanni (2014) stated that a significant short term relationship exists between growth and currency devaluation.

Results on Table 4.5 gave the estimated R^2 to be 0.844438. This means that the explanatory variables accounted for 82% of the total variation in agricultural growth. This showed that the model possess a good fit. The Durbin-Watson statistic of 0.856573 indicated that the model is free from positive first order autocorrelation and estimation bias emanating from misspecification of model.

4.4 Causal relationship between Exchange rate regime and Agricultural Growth

The Granger Causality was used to check if there exists a relationship of dependence of one variable on another variable. This test relies upon the assumption that the relevant information for the prediction of the respective variables is contained purely in the time series data on these variables.

To interpret the result from the table 4.6, the probability value is considered. For the first hypothesis (Exchange Rate Regime does not granger cause Agric GDP), since the probability value is less than 0.05 (5%), the null hypothesis will be rejected. It can be concluded that Exchange Rate Regime does granger cause Agric GDP during the period under consideration. Looking at the second hypothesis (AGDP does not granger cause Exchange rate Regime), the probability value of 0.0679 (6.79%) is greater than 0.05 (5%). Thus, the null hypothesis will be accepted. That is, AGDP does not granger cause EXCR during the period under consideration.

Table 4.6: Pairwise Granger Causality Test Result

TESTS: Series: Exchange Rate and Agricultural Growth

Null hypothesis:	Obs.	F-statistics	Prob.
EXCR does not Granger Cause AGDP	43	12.3067*	8.E-05
AGDP does not Granger Cause EXCR	43	0.06798	0.9344

*implies 1% level of significance

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The broad objective of the study was to evaluate the effect of exchange rate regimes on agricultural growth in Nigeria from 1970 to 2014. Specifically, the study (i) described the trend in exchange rate and agricultural growth in Nigeria; (ii) ascertain the effect of the fixed exchange rate regime on agricultural growth; (iii) assess the effect of flexible exchange rate regime on agricultural growth; (iv) determine the causal relationship between exchange rate regime and agricultural growth.

The study area is Nigeria. This research work covered a period of 45 years from 1970 to 2014. This was purposively chosen due to availability of data. Data were collected from Central Bank of Nigeria and Worldwide Governance Indicators (WGI). The data were grouped into three periods. The whole period (1970 -2014), the period of exchange rate fixed regime (1970-1985) and flexible regime (1986-2014) since exchange rate policy in Nigeria. Statistical tools used for the data analysis were descriptive statistics, pre-estimation tests (unit-root and co-integration tests), OLS regression technique and pairwise Granger causality model.

Trend analysis showed an increasing trend in agric GDP during the fixed exchange rate regime i.e. from 1970-1985. There was relative stability in the dynamics of exchange rate from 1970 to 1985 with the highest exchange rate value of 0.8938 during the fixed exchange rate regime. Under the flexible exchange rate the analysis showed that agricultural gross domestic product during this period were mostly on the increase but were relatively stable from 1986-1994. Exchange rates during this period were not stable except from 1994 to 1998 when the rates were stable at ₦ 21.8861.

Results from the regression analysis on the effect of fixed exchange on agricultural growth showed that inflation rate has positive influence on agricultural growth. The t-test showed that the fixed exchange rate had statistically significant effect on agricultural growth in the country.

Results from the regression analysis on the effect of flexible exchange rate regime on agricultural growth showed that macroeconomic instability had positive influence on agricultural growth and also government expenditure on agriculture while political instability had a negative influence on agricultural growth. The t-test showed that the flexible exchange rate regime had statistically significant effect on agricultural growth in Nigeria.

Results from the regression analysis on the effect of exchange rate regime on agricultural growth from the whole period showed that exchange rate, government expenditure and macroeconomic instability had positive influence on agricultural growth.

The result of the Granger causality test showed that exchange rate Granger- cause agricultural growth ($p < 0.01$) with no reverse causality on exchange rate on agricultural growth.

5.2 Conclusion

The statistical significance of inflation on fixed exchange rate regime might be an indication that fixed exchange rate regime has a significant effect on agricultural growth. Also, considering the different variables analyzed in this study for (exchange rate, government expenditure on agriculture, inflation rate, political instability and macroeconomic instability). The statistical significance of government expenditure, political instability and macroeconomic instability this therefore conclude that flexible exchange rate has great impact on agricultural growth.

5.3 Recommendations

The following recommendations were made based on the findings of the study:

1. Exchange rate has always been a crucial factor in the determination of Nigeria's growth performance; that whatever may be the adopted regime, whether fixed or flexible, the important thing is effective management in order to yield the desired results.
2. Government should provide conducive environment, adequate security, effective fiscal and monetary policy, as well as infrastructural facilities should be provided so that foreign investors will be attracted to invest in the agricultural sector in Nigeria.
3. Adequate financing of agriculture will improve the sector; likewise government should restructure and make new policy that will encourage farmers to produce more than the present situation.
4. Government should make policies that would encourage domestic production (agriculture) and hence create more employment opportunities and boost incomes of the citizens.

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APPENDIX

FIXED EXCHANGE RATE REGIME

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.348358	2.318362	1.012938	0.3350
EXCR	-0.706296	2.767728	-0.255190	0.8037
GEXA	0.033725	0.022925	1.471117	0.1720
INF	0.030487	0.015918	1.915297	0.0845
PINS	0.728628	0.468668	1.554681	0.1511
MINS	6.62E-05	4.03E-05	1.641811	0.1317
R-squared	0.615442	Mean dependent var		2.440345
Adjusted R-squared	0.423163	S.D. dependent var		0.705904
S.E. of regression	0.536132	Akaike info criterion		1.871126
Sum squared resid	2.874380	Schwarz criterion		2.160846
Log likelihood	-8.969004	Hannan-Quinn criter.		1.885962
F-statistic	3.200772	Durbin-Watson stat		1.448955
Prob(F-statistic)	0.055394			

FLEXIBLE EXCHANGE RATE REGIME

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7220.155	2756.418	-2.619397	0.0153
EXCR	15.17135	19.06428	0.795800	0.4343
GEXA	0.067869	0.036654	1.851621	0.0770
INF	-9.202390	31.31213	-0.293892	0.7715
PINS	-6081.994	2419.613	-2.513623	0.0194
MINS	0.044665	0.019173	2.329637	0.0290
R-squared	0.841369	Mean dependent var		5037.949
Adjusted R-squared	0.806884	S.D. dependent var		5883.628
S.E. of regression	2585.559	Akaike info criterion		18.73526
Sum squared resid	1.54E+08	Schwarz criterion		19.01815
Log likelihood	-265.6613	Hannan-Quinn criter.		18.82386
F-statistic	24.39809	Durbin-Watson stat		0.863423
Prob(F-statistic)	0.000000			

REGRESSION RESULT FROM 1970-2014

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1580.793	1082.453	-1.460380	0.1522
EXCR	37.56104	11.19043	3.356531	0.0018
GEXA	0.063370	0.031303	2.024397	0.0498
INF	-12.14252	22.71053	-0.534665	0.5959
PINS	-1300.686	975.2203	-1.333735	0.1900
MINS	0.053129	0.015871	3.347541	0.0018
R-squared	0.844438	Mean dependent var		3251.750
Adjusted R-squared	0.824494	S.D. dependent var		5286.142
S.E. of regression	2214.547	Akaike info criterion		18.36705

Sum squared resid	1.91E+08	Schwarz criterion	18.60794
Log likelihood	-407.2586	Hannan-Quinn criter.	18.45685
F-statistic	42.34070	Durbin-Watson stat	0.856573
Prob(F-statistic)	0.000000		
