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Macroeconomic Policies and Cash Crop Production in Nigeria

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Abstract
This study examined macroeconomic instruments and cash crop production in Nigeria, from 1982 to 2020. Cash crop production were regressed on monetary and fiscal policies instruments. Following the stationarity and bounds cointegration tests results, the Autoregressive Distributed Lag method of analysis was applied. the results revealed that in the long and short runs, all the employed policies' instruments positively and insignificantly impacted on cash crop production except recurrent spending which was negative but significant only in the short-run, capital spending had only short-run significance while banks' loans and advances impacted negatively in the short-run. Therefore, the researcher recommended among others that government should increase expenditures on productive agricultural activities, ensure increase in deposit money banks' credits for agricultural investment and enforce special low interest rate to stimulate investments in the sector.

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I. INTRODUCTION

Macroeconomic policy instruments here refer to macroeconomic measures that can be directly controlled by economic policy makers. Macroeconomic policy instruments can be divided into two subsets: (a) Monetary policy instruments and (b) Fiscal policy instruments. The former refers to the use of interest rates / money supply in order to influence the level of economic activities in a country. The later refers to the use of government expenditure and taxation in order to influence the level of economic activities in a country. Cash crop production is the production of agricultural products for commercial purposes. In Nigeria, cash crop production is highly significant for farmers in terms of raising their income and improving their economic status. The major cash crops include cocoa, oil palm, cotton, groundnuts, ginger and sesame (Afolabi, 2015). Cash crops such as Cocoa are consumed almost entirely in high-income industrialized countries. In several developing countries, cocoa and coffee are the main determinants of aggregate exports and overall economic performance. According to United Nation Conference on Trade and Development (UNCTAD), African countries such as Burundi and Rwanda rely on coffee for more than 80 percent of their total exports earnings. In Ethiopia, coffee's share of total export is as high as 79 percent. The economy of Cote d'Ivoire is heavily specialized on cocoa and coffee. Cocoa alone represents 15 percent of Cote d'Ivoire's GDP and more than 35 percent of her total exports (Bamba & Reed, 2004). Lack of funding has made significant improvement in production of cash crops difficult. Though efforts have been made by the government and monetary authorities to encourage production of cash crops, much is still desired. Hence this study examines the effect of macro-economic policies on the production of cash crop in Nigeria. In the light of the foregoing, this paper is aimed at investigating the impact of macro-economic policies (including fiscal and monetary) on cash crop production in Nigeria. Specifically, the paper investigates the effect of:

i. government agricultural sector capital expenditure on cash crop production;
ii. government agricultural sector recurrent expenditure on cash crop production;
iii. deposit money banks' loans and advances on cash crop production;
iv. loan interest rate on cash crop production; and
v. exchange rate on cash crop production.

The following hypotheses were also tested in this paper:

H_{01}: Government agricultural sector capital expenditure has no significant effect on cash crop production.
H_{02}: Government agricultural sector recurrent expenditure has no significant effect on cash crop production.
H_{03}: Deposit money banks' loans and advances has no significant effect on cash crop production.

H_{04}: Loan interest rate has no significant effect on cash crop production.
H_{05}: Exchange rate has no significant effect on cash crop production.

II. REVIEW OF RELEVANT LITERATURE

2.1 Conceptual Literature

Cash Crop Often the terms "cash crops" and "export crops" are used synonymously. Strictly speaking, however, a cash crop may be sold at home or abroad and may be either a food or non-food commodity, whereas an export crop is a cash crop that is ultimately exported from the country producing it. The major non-food cash crops that are exported are cocoa, coffee, fibre crops, rubber, tea and tobacco. In contrast, the term "food crop" usually refers to domestic production of basic staples (cereals, pulses, roots and tubers) (Barbier, n.d). Cash crops (defined as farm output that is sold on a formal agricultural market) are an integral part of strategies to improve food security, both at the level of governments as well as farm households in developing countries with a substantial agricultural sector. Cash crops bring substantial wage and employment opportunities to the rural economy, even if these are characterised by rather strong income fluctuations. Over time, cash crops provide a stimulus to agricultural innovation, by raising capital for agricultural investment and accelerating the build-up of institutions that enable further commercialization (Achterbosch, van Berkum, & Meijerink, 2014).

Macroeconomic Policy Macroeconomic policy is concerned with the operation of the economy as a whole. In broad terms, the goal of macroeconomic policy is to provide a stable economic environment that is conducive to fostering strong and sustainable economic growth, on which the creation of jobs, wealth and improved living standards depend (Dolamore, n.d.). The key pillars of macroeconomic policy are: fiscal policy, monetary policy and exchange rate policy. Macroeconomic policies influence and contribute to the attainment of rapid, sustainable economic growth aimed at poverty reduction in a variety of ways. By pursuing sound economic policies, policymakers send clear signals to the private sector. The extent to which policymakers are able to establish a track record of policy implementation will influence private sector confidence, which will, in turn, impact upon investment, economic growth, and poverty outcomes (Ames, Brown, Devarajan & Izquierdo, 2001).

Review of Theoretical Literature

2.1 Fiscal Policy Theory

The earliest theory advanced on public expenditure is that of Adolph Wagner in 1876 which came to be known as "Wagner's law". He propounded the "law of increasing expansion of public and particularly states activities' which is referred to as the "law of increasing expansion of fiscal requirements". The law suggests that the share of the public sector in the economy will rise as economic growth proceeds, owing to the intensification of existing activities and extension of new activities. According to Wagner, social progress has led to increasing state activity with resultant increase in public expenditure. He predicted an increase in the ratio of government expenditure to national income as per capital income rises. It is the result of growing administrative and protective actions of government in response to more complex legal and economic relations, increased urbanization, and rising cultural and welfare expenditures (Okoh, 2015). According to Musgrave & Musgrave (1988), however, it is not fruitful to seek an explanation for the total expenditure. Tests carried out by various researchers have shown that the increase in expenditure is far more complex than is evident from the tests carried out on empirical data. Therefore, according to them, it may be far more rewarding to adopt a disaggregated approach (an approach which divides the study of expenditures of government) through a study of expenditures of government on capital formation, consumption and transfer payments. Irving (1968) used the law and came up with a different view (Akogwu, 2007). He opined that public expenditure (E) is an increasing function of per capita gross national product (GDP). Similarly, Essien (2005) carried out studies and employed modern econometric techniques, He posited that even though the variables public expenditure and economic growth were found to be stationary, that is, integrated of order (1), and they were not co integrated. Thus the long run tendency for public sector spending whether as a proportion of total output, its per capita value
or as its singular definition, to grow with income could not be established. He therefore concluded that he found no evidence to support Wagner's law using Nigeria data.

2.2 Monetary Policy Theory

There are the monetarist viewpoints represented by Friedman (1969), the Keynesian school and lastly the one represented by Raddiffe (1963) (Robbins, 1963). Friedman (1969) is of the view that changes in the stock of money are closely related to changes in the price level and through it, on other general economic aggregates. But, precision and rigidity in this relationship is distorted because of changes in output and the amount of money that the public desires to hold relative to its income. The effects of these changes are not to be seen as instantaneous as there is sometimes lag between the application of the monetary policy and its effectiveness. Keynesian viewpoint is that money plays a role in the determination of real output, general price

level and other Macro-economic variables. According to this school of thought, national income depends on the interplay between such variables as expected rate of profit and interest. The rate of interest is a function of the supply of and the demand for money. Equilibrium income depends on two conditions in this model, that is: planned savings must be equal to planned investment, and at any point in time, supply of money must equal demand for money. But both savings, investment, demand for and supply of money is influenced by changes in the rate of interest. Within this context, monetary policy will consist of altering the rate of interest to achieve the desired trend in the economy. The effectiveness of monetary policy will then depend on the interest elasticity of demand for money. This also dictate the effectiveness or otherwise, in combating depression as well as inflation. The third viewpoint represented by Raddiffe (1963) is a variant of the Keynesian school of thought. A distinction is made between the demand for money and the demand for liquidity. These two types of demand are not the same thing because there exist interest yielding money substitutes, which people can easily turn to cash whenever they want. As a result of this, whatever is done to change the demand for money may be less effective than expected. because it is the demand that will respond to interest rate changes. The amount of money desired may not increase, if the interest rate falls even though the amount of liquidity increases. Part of the accumulation of liquidity is likely to take the form of interest bearing near-money instead of non-interest yielding cash. The results obtained from changing the money supply depend on shifts in the demand for money and not on short-run interest elasticity of demand for money. Therefore, for monetary policy to be effective it has to address itself to the control of the volume, cost and direction of liquidity, rather than money supply in the economy. Traditionally, there are other three tools of control; they are (i) open market operations, (ii) the legal reserves ratio and (iii) the bank rate. The recent additions are special deposit and stabilisation security. They are called quantitative controls because their main aim is to regulate the quantity of money in circulation and the volume of credit that could be created by the commercial banking system, since these credits constitute part of the money supply.

2.2.3 Exchange Rate Policy Theory

In today's world with a rapidly increasing global economy and constantly changing international trade laws and technology, the exchange rate plays a role in valuing farm production and equipment. For many years, the role of exchange rates as an integral part of agricultural economics was overlooked. The seminal work on the role of exchange rates in agricultural trade was that of Edward Schuh. In 1974, he argued that the overvalued dollar caused the decline in agricultural exports due to their relative expense in other countries. The overvalued dollar led to depressed prices and lower farm profits, causing an undervaluation of farm resources and oversupply of output. Schuh called attention to the relationship between the exchange rate and agriculture product and factor markets. Schuh's view was that while many variables affect agriculture, the exchange rate plays a role in all aspects of agriculture (Kristinek, & Anderson, 2002). Paarlberg, Webb, Morey and Sharples (1994) detail the economic theory behind the impact of exchange rates on prices, production, and consumption. The authors report the research of other studies that have measured the effects of exchange rate movements on agriculture. The theoretical constructs and research results confirm that exchange rates are an important factor in determining prices, supplies, and demands. Tweeten (1992) also reviews the economic theory behind the impacts of exchange rate changes and various studies on exchange rates. He explains the impact of an appreciation of an exporter's currency is to raise the price of the good in the importing country. This, in his graphical analysis, is illustrated by the rotation of the excess supply curve, which decreases export quantities supplied at any given price. However, some disagreement persists on the magnitude of different effects between different commodities.

2.3 Review of Empirical Literature

Bamba and Reed (2004) posit that international market for the tropical cash crops (namely coffee and cocoa) is marked by high price instability. The authors' investigated whether monetary policy disturbances contribute to cocoa and coffee price instability. The econometric evidences point toward high flexibility of the prices of cocoa, Arabica coffee, and Robusta coffee relative to the industrial price and to the exchange rate. Money supply shock has persistent impact on the tropical crop prices and explains an economically significant proportion of their prices variability.

Akanni, Akinleye, and Oyebanjo (2009) investigated the free trade policy of the Federal Government, particularly as it affects the average market prices of the three traditional cash crop exports; cocoa, groundnut and palm kernels. Sectional data were obtained on the average producer prices of the crops, the production and export level of these crops before and during free trade policy era. Trend and regression analytical tools were employed to handle the collected data. Result showed that time variation, was a significant determinant of the aggregate level of export (tonnes) before and during the implementation of the free trade policy. The quantity of exported cocoa, and that of palm kernels were significant during the implementation of the policy. Value of exported cocoa was a significant determinant of the total value of exported agricultural cash crops before and

during the implementation of the trade policy. With reduced and stable exchange rate and duties or tariffs on exported cash crops the Nigerian agricultural sub-sector will improve. High level of consistency in export trade policy will help ensure a sustainable economy in Nigeria.

Ibekwe (2020) has examining the effects of exchange rate on agricultural sector output in Nigeria as the main objective of a study. To analyze the data, econometric techniques involving Augmented Dickey Fuller tests for Unit Roots and the Ordinary Least Square (OLS) were used. The result of regression indicate that nominal exchange rate and money supply has positive and significant effect on agricultural sector output while interest rate and inflation rate has negative and insignificant effect on agricultural sector output. The study therefore concludes that exchange rate have adverse effect on the performance of agricultural sector output and have not helped to improve the rate of investment in agriculture in Nigeria. Omojimite and Akpokodje (2010) found a negligible positive impact of exchange rate depreciation on non-oil exports and concluded that exchange rate reforms are not sufficient to diversify the economy. Yaqub (2013), found output of different sub-sectors responded to the exchange rate changes differently. While the exchange rate changes had negative effects on crop and fishery output, they had positive effects on livestock and forestry. Abiola (2017), showed that real exchange rate, average price of the agricultural commodity and degree of commercial openness were found to be positively related to agricultural supply. Also, nominal exchange rate was negatively related to agricultural supply. Wasiu and Ndukwe, (2018) investigated the possible asymmetric effect of real exchange rate dynamics on agricultural output performance in Nigeria over the period of 1981 to 2016. The study employed a combination of stationary and nonstationary variables as was found out through the ADF unit root test. Based on the Bounds test for cointegration, a long-run relationship was absent between real exchange rate and agricultural output, irrespective of specifications. The result of model estimation showed that the significant drivers of agricultural output are real exchange rate (log-levels), real appreciation and depreciation (after some lags), industrial capacity utilization rate, and government expenditure on agriculture (after some lags). ACGSF loan exerted positive and influence on agricultural output. Gatawa and Mahmud (2019) analyzed short and long-run impacts of exchange rate fluctuations on agricultural exports volume in Nigeria. ARDL was used as the method of analysis; the independent variables include official exchange rate, agricultural loans and relative prices of agricultural exports while the dependent variable is agricultural export volume. GARCH was used to estimate the volatility of exchange rates, and other diagnostic tests. The short-run results revealed that official exchange rate and agricultural loans have significant positive impact on agricultural export volumes which has the effect of expanding the dependent variable while, relative prices of agricultural exports has significant negative impact on agricultural exports volume which also has the effect of contracting the dependent variable. The long-run results revealed similar findings with the exception of official exchange rate which has statistically significant negative impact on agricultural exports volume. i.e. contrary to normal expectations. Dominic (2017) examined the impact of exchange rate on coca export in Nigeria. The Augmented Dickey Fuller Unit root, Johansen co-integration, ordinary least square, and diagnostic tests as well as error correction mechanism were adopted to analyzed the secondary time series data, between 1980 and 2013, generated from Food and Agricultural Organization (FAO), World Bank and the Central Bank of Nigeria (CBN). The ADF unit root test results showed that none of the variables was stationary at level I (0), whereas all the variables – cocoa export, agricultural export, exchange rate trade openness and world cocoa price became stationary after first difference or order one I(1). The Johansen co-integration test of the long run relationship revealed that both trace statistics and maximum eigen value had two cointegrating equations at 5% whereas the trace statistics alone had 1 co-integrating equation at 1%; implying the existence of long run relationship between coca export, agricultural export, exchange rate, trade openness and world price of cocoa. The positive sign of the error correction mechanism of 0.07 suggested that deviation from the long run equilibrium is adjusted over the following time period by 7%. The t-test showed direct relationship between cocoa export and Exchange rate cum agricultural export, but inverse relationship with trade openness and world cocoa price. The diagnostic test revealed non-existence of heteroskedasticity and serial correlation in the error term. The paper concluded that agricultural export, exchange rate, trade openness and world price of cocoa taken together affected cocoa export in Nigeria. Charles and Fortune (2019) examined the effect of exchange rate variation on Nigeria economy. The objective was to investigate how Naira exchange rate variations against key currencies affect the country's real gross domestic product. The ordinary least square method was used as data analysis techniques. The study used cointegration, unit root, and granger causality test and error correction estimate to study the dynamic effects of commodity currencies on financial market. The study found that naira exchange rate variation with the currencies can explain 65 percent variation on Nigerian real gross domestic products while the remaining 35 percent estimation can be traced to external variables not included in the model.

III. METHODOLOGY

3.1 Research Design and Data

This investigation adopted a quasi-experimental research design, which is often applied as a substitute for true experimental research to test hypotheses about cause-and-effect relationships. Time series data were utilized in this study. The data were collected from various issues of Central Bank of Nigeria Statistical Bulletin and annual reports (CBN, 2008; 2011) and National Bureau of statistics (NBS, 2010).

3.1 Model Specification

$$CCP_t = f(GCEA_t, GREA_t, DCA_t, EXR_t, INR_t) \quad 3.1$$

$$CCP_t = \alpha_0 + \beta_1 GCEA_t + \beta_2 GREA_t + \beta_3 DCA_t + \beta_4 EXR_t + \beta_5 INR_t + u_t \quad 3.2$$

Where;
CCP = Growth Rate of Cash Crop output (Contribution of cash crop output to Gross Domestic Product at 1990 Constant Basic Prices)
GCEA = Growth Rate of Government Capital Expenditure on Agriculture
GREA = Growth Rate of Government Recurrent Expenditure on Agriculture
DCA = Growth Rate of Deposit Money Banks' Loans and Advances to Agriculture
INR = Interest Rate (i.e., monetary policy rate)
EXR= Exchange Rate,
u_t = Error Term

α_0 = The constant parameter

$\beta_1, \beta_2, \beta_3, \beta_4$, and β_5 = The slope parameters

Apriori expectation: On the apriori $\beta_1 - \beta_4 > 0$, and $\beta_5 < 0$

3.2 Analytical Framework

Pre-estimation (unit root and cointegration) tests, model estimation (Autoregressive Distributive Lag), and post-estimation tests were all included in the analytical framework of this paper. Both the Augmented Dickey Fuller (ADF) and Phillip Perron (PP) unit root test were conducted on each of the time series variables included in the specified model. The model of the Augmented Dickey Fuller (ADF) with the constant term and trend is as follows:

$$\Delta Y_t = a_1 + a_2 t + \beta Y_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta Y_{t-1} + \varepsilon_t \quad 3.3$$

Where;

ΔY_t = first difference of Y_t

Y_{t-1} = lagged values of Y_t

ΔY_{t-1} = first difference of Y_t

β = test coefficient

ε_t = white noise

a_1 = constant

a_2 = coefficient of time variable

The null hypothesis $(H_0 : \beta = 0)$ of the ADF test indicates that the series is not stationary and the alternative hypothesis $(H_1 : \beta = 0)$ indicates that the series is stationary. If the absolute value of calculated ADF statistic (τ) 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 (Gujarati, 2003). The Phillip-Perron test was also conducted to support the findings of the ADF test. The ARDL Bounds test is the adopted cointegration test for this paper. To satisfy the bounds test assumption of the ARDL models, each variable must be I(0) or I(1).

Both the Error Correction Model (ECM) and Autoregressive Distributive Lag (ARDL) econometric technique were adopted for this study. While the ECM is estimated when all the time series in the model are non-stationary, the ARDL is estimated when a mixed order of integration is evident among the time series in the

model. If Y_t and X_t are cointegrated, we can express the relationship between Y_t and X_t with an ECM specification as:

$$\Delta Y_t = a_0 + b_1 \Delta X_t - \pi u_{t-1} + e_t \qquad 3.4$$

which will now have the advantage of including both long-run and short-run information. In this model, b_1 is the impact multiplier (the short-run effect) that measures the immediate impact a change in X_t will have on a change in Y_t. On the other hand, π is the feedback effect, or the adjustment effect, and shows how much of the disequilibrium is being corrected – that is the extent to which any disequilibrium in the previous period affects any adjustment in Y_t (Neusser, 2016).

The ARDL model is an ordinary least square (OLS) based model, which is applicable for both non-stationary time series as well as for times series with mixed order of integration. The selected ARDL(k) model long run equation is stated thus:

$$Y_t = \delta_0 + \sum_{i=1}^{k} \alpha_1 X_{1t} + \sum_{i=1}^{k} \alpha_2 X_{2t} + \ldots + \sum_{i=1}^{k} \alpha_n X_{nt} + \nu_{1t} \qquad 3.5$$

Where

$Xs(X_{1t}, X_{2t}, \ldots, X_{nt})$ = explanatory or the long run forcing variables

k = number of optimum lag order.

The best performed model provides the estimates of the associated Error Correction Model (ECM) (Nkoro & Uko, 2016).

Two key post-estimation residual diagnostic test were conducted on each of the estimated model. They are the serial autocorrelation test and heteroscedasticity. While the serial autocorrelation for the residuals tests for the presence of serial autocorrelation among the independent variables, the heteroscedasticity test will be conducted to determine whether the variance of the regression is constant or not over time. If the variance is not constant, there will be high standard error resulting to poor analytical use of the result.

IV. RESULTS AND DISCUSSION

4.1 Trend Analysis

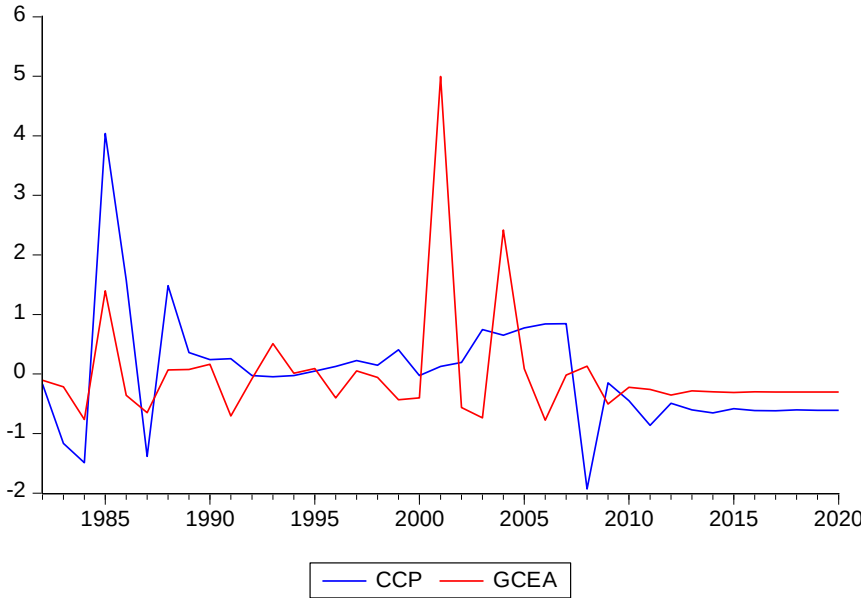

Figure 1: The Trend of Cash Crops Output and Government Capital Expenditure on Agriculture in Nigeria, 1982-2020

Source: Computed by the researcher using E-Views 9 (2020).

The graph of government capital expenditure on agriculture in Figure 1 reveals a spiral trend (increase) over the period of study. Government capital expenditure on agriculture recorded a double maximum increase in the year 2001 and 2004. Meanwhile, the graph in Figure 1 also shows that cash crops output recorded a spiral trend during the period of study. Its maximum was in 1985.

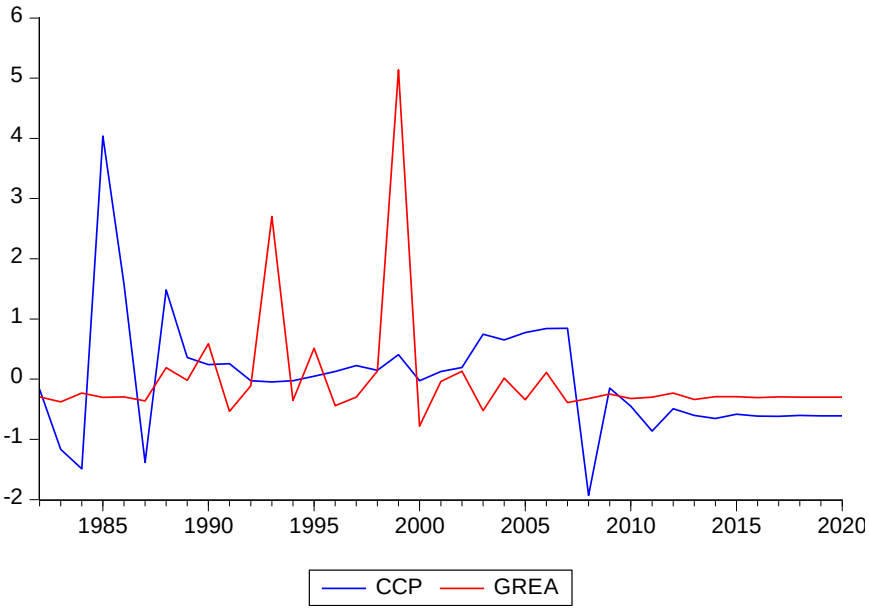

Figure 2: The Trend of Cash Crops Output and Government Recurrent Expenditure on Agriculture in Nigeria, 1982-2020
Source: Computed by the researcher using E-Views 9 (2020).

The graph in Figure 2 shows a spiral trend of government recurrent expenditure on agriculture over the period of study. It also reveals that government recurrent expenditure on agriculture has double maximum increase in the year 1993 and 1999. Furthermore, the graph in Figure 2 also shows that cash crops output recorded a spiral trend during the period of study. Its maximum was in 1985.

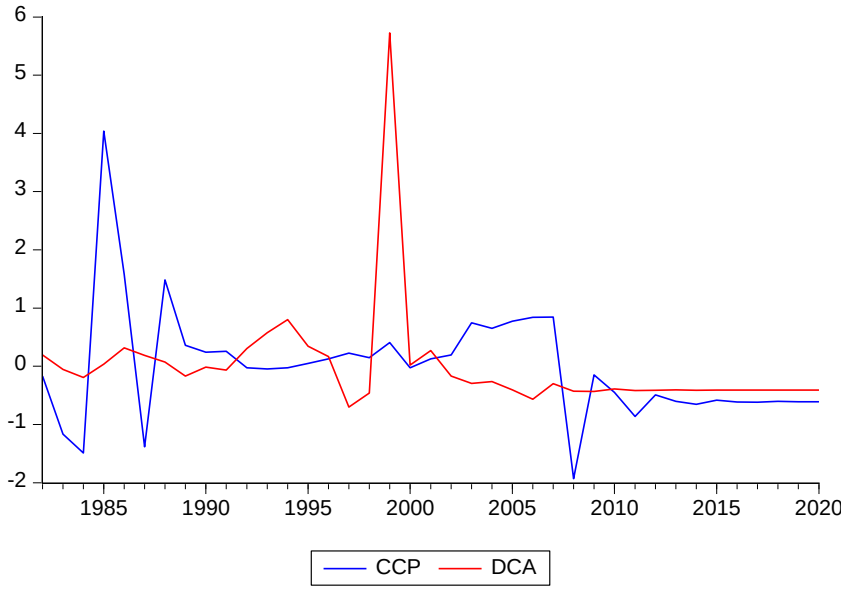

Figure 3: The Trend of Cash Crops Output and Deposit Money Banks' Loans and Advances to Agriculture in Nigeria, 1982-2020
Source: Computed by the researcher using E-Views 9 (2020).

The graph in Figure 3 shows a spiral trend of deposit money banks' loans and advances over the period of study. It also reveals that deposit money banks' loans and advances to agriculture has a single maximum increase in the year 1999. At the same time, the graph in Figure 3 also shows that cash crops output recorded a spiral trend during the period of study. Its maximum was in 1985.

The graph in Figure 4 shows that exchange rate was very low between 1980 and 1998. A spiral increase then occurred over the period of 1999 and 2020. The graph in Figure 4 also shows that cash crops output recorded a spiral trend during the period of study. Its maximum was in 1985.

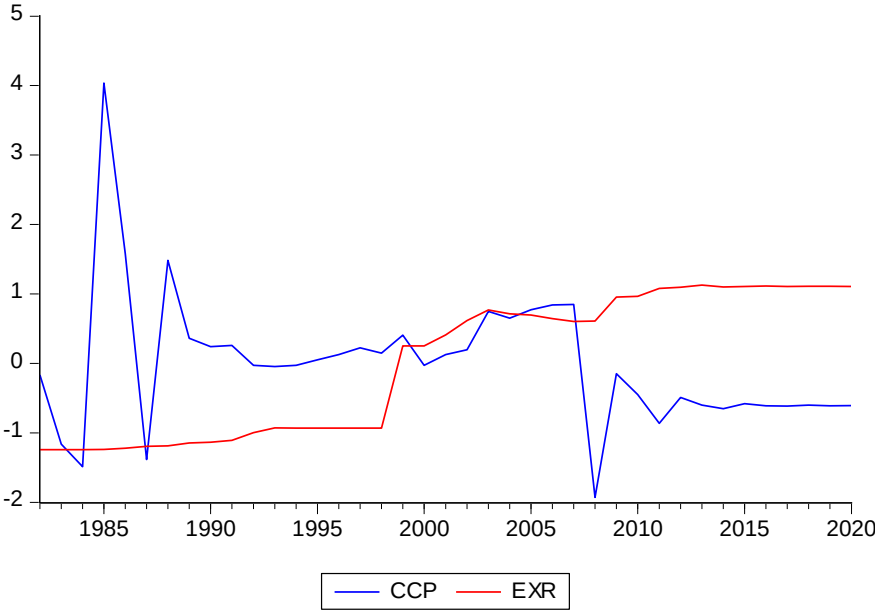

Figure 4: The Trend of Cash Crops Output and Exchange Rate in Nigeria, 1982-2020
Source: Computed by the researcher using E-Views 9 (2020).

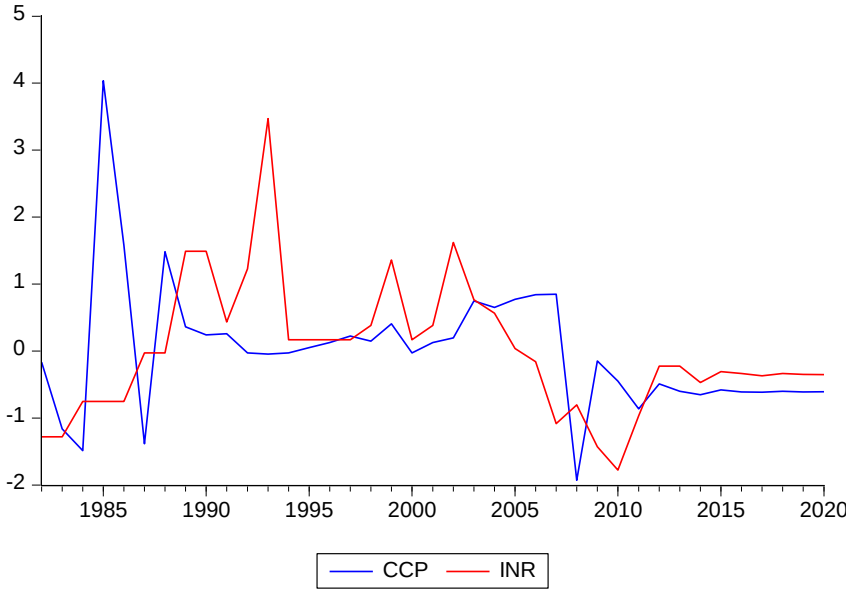

Figure 5: The Trend of Cash Crops Output and Interest Rate in Nigeria, 1982-2020
Source: Computed by the researcher using E-Views 9 (2020).

The graph in Figure 5 shows a spiral trend of interest rate over the period of study. It also reveals that interest rate has a single maximum increase in the year 1993. The graph in Figure 5 also shows that cash crops output recorded a spiral trend over the period of study. Its maximum was in 1985.

Table 1: Descriptive Statistics Result

	CCP	GCEA	GREA	DCA	INR	EXR
Mean	3.141026	51.67308	52.65436	22.46333	12.85615	85.03421
Median	3.000000	3.550000	0.470000	8.000000	12.25000	112.9400
Maximum	23.98000	904.5500	957.6700	336.0400	26.00000	161.5000
Minimum	-6.820000	-81.01000	-84.58000	-16.01000	6.130000	0.670000
Std. Dev.	5.161879	170.6582	176.1310	54.76304	3.787390	67.83822
Skewness	1.549858	3.707071	4.110796	4.982711	1.087273	-0.147456
Kurtosis	8.228308	17.92573	20.29442	29.07236	5.167843	1.195831
Jarque-Bera	60.03310	451.3387	595.8735	1266.001	15.32081	5.430749

Probability	0.000000	0.000000	0.000000	0.000000	0.000471	0.066180
Observations	39	39	39	39	39	39

Source: Computed by the researcher using E-Views 9 (2021)**.**

The descriptive statistics reported in Table 1 indicates that cash crop output (CCP), government capital expenditure on agriculture (GCEA), government recurrent expenditure on agriculture (GREA), deposit money banks' loans and advances to agriculture (DCA), interest rate (INR) and exchange rate (EXR) averaged 3.141026, 51.67308, 52.65436, 22.46333, 12.85615 and 85.03421 respectively. The standard deviation showed that interest rate and exchange rate converged around their mean. Meanwhile, cash crop output, government capital expenditure on agriculture, government recurrent expenditure on agriculture, and deposit money banks' loans and advances to agriculture did not converge around their respective mean. The Skewness test result showed positive values for cash crop output, government capital expenditure on agriculture, government recurrent expenditure on agriculture, and deposit banks' loans and advances to agriculture, meaning that they have high tails. However, the Skewness test result showed negative value for exchange rate. This means that it (exchange rate) does not have a high tail.

Furthermore, exchange rate is platykurtic relative to normal, since its value for kurtosis 1.195831 is less than 3. This suggests that the variable has short and thin tails, and it central peak is lower and broader. Moreover, cash crop production, government capital expenditure on agriculture, government recurrent expenditure on agriculture, deposit money banks' loans and advances to agriculture and interest rate have leptokurtic distributions relative to normal, since their values for kurtosis 8.228308, 17.92573, 20.29442, 29.07236 and 5.167843 respectively are more than 3. This indicates a flatter than normal distribution and the variables have large tails. That is, they have longer and fatter tails, and their central peaks higher and sharper.

The probability of Jarque-Bera statistics suggests that the alternative hypotheses of normal distribution for cash crop output, government capital expenditure on agriculture, government recurrent expenditure on agriculture, deposit money banks' loans and advances to agriculture and interest rate were accepted at 5% level while the alternative hypothesis of exchange rate was rejected at 5% level.

Arising from the above results of descriptive statistics, the statistical properties of the time series of all the variables were not normally distributed, which may have resulted from the problem of unit root.

4.2 Pre-estimation Test

4.2.1 Unit Root Test Results

Table 2 Augmented Dickey Fuller (ADF) Unit Root Test at Level and First Difference

Variables	ADF Test@ Level	Critical Value			ADF Test@ 1ST Diff	Critical Value			Order of Integra-tion
		1%	5%	10%		1%	5%	10%	
CCP	-5.394897	-3.615588	-2.941145	-2.609066					1(0)
GCEA	-7.071396	-3.615588	-2.941145	-2.609066					1(0)
GREA	-6.624953	-3.615588	-2.941145	-2.609066					1(0)
DCA	-5.761352	-3.615588	-2.941145	-2.609066					1(0)
INR	-3.091594	-3.615588	-2.941145	-2.609066					1(0)
		-3.615588	-2.941145	-2.609066		-3.621023	-2.943427	-2.610263	1(1)
EXR	-0.744841				-6.193544				

Source: Computed by the researcher using E-Views 9 (2021)**.**

The above results reveal that in Tables 2, all the variables were not stationary at level, considering the 1 per cent, 5 per cent and 10 per cent critical values. Therefore, the null hypothesis of the presence of unit root was accepted. In line with Granger and Newbold (1974), the variables were differenced. Thus, they became stationary at first difference (i.e., integrated of order one).

Hence, the entire variables in this study are stationary. The results of the variables being stationary at various levels makes it inappropriate for the application of the Ordinary Least Square (OLS) method, therefore the tests to determine the long run relationship for model one to four can be achieved with the aid of ARDL bounds testing approach as popularized by Pesaran and Shin (1999). Specifically, given that the variables were integrated of order 1(0) and 1(1). The requirement to fit in an ARDL model to test for long run relationship is satisfied.

4.2.2 Bounds Co-integration Tests

Table 3: ARDL Bounds Co-integration Test Result for Model IV

Model		**F-Statistic =** 5.890384
CCP = F(GCEA, GREA, DCA, INR, EXR)		K = 5
Critical Values	Lower Bound	Upper Bound

10%	2.26	3.35
5%	2.62	3.79

Source: Computed by the researcher using E-Views 9 (2021).

From the ARDL bounds test result presented in Table 4.3, it is clear that there is a long run relationship amongst the variables (CCP, GCEA, GREA, DCA, INR and EXR). This is because the computed F-statistic of about 5.890384 is higher than the upper critical bounds at 5% critical value. This provided evidence to reject the null hypothesis of no co-integration at 5% significance level for the Cash Crop Output (CCP) model (i.e., model three). It can therefore be concluded from the ARDL bounds test that there is a long-run relationship among the variables. Therefore, this study illustrates that government capital expenditure on agriculture (GCEA), government recurrent expenditure on agriculture (GREA), deposit money banks' loans and advances to agriculture, interest rate and exchange rate have long run relationship with cash crop production in Nigeria. Following the establishment of long-run co-integration relationship among the variables, the long-run and short-run dynamic parameters for the variables were obtained.

Table 4 Estimated ARDL Long Run Coefficients. Dependent Variable: CCP ARDL (4, 3, 3, 3, 3, 3)

Regressors	Coefficient	t-Statistic	P-Value
GCEA	0.005906	0.308578	0.7640
GREA	-0.028658	-1.405485	0.1902
DCA	0.136539	1.820344	0.0987
INR	0.534281	1.361829	0.2031
EXR	0.009424	0.583954	0.5722

Source: Computed by the researcher using E-Views 9 (2021)

The estimated ARDL long run coefficients reveals that government capital expenditure on agriculture, deposit money banks' loans and advances to agriculture, interest rate and exchange rate have positive relationship with cash crop output in Nigeria. However, government recurrent expenditure on agriculture has a negative relationship with cash crop output. Importantly, government recurrent expenditure on agriculture and interest rate do not conform to the apriori expectations. Meanwhile, government capital expenditure on agriculture, deposit money banks' loans and advances, as well as exchange rate conform to the apriori expectations. In addition, none of the variables is statistically significant.

Table 5: Error Correction Representation for the Selected ARDL Model

Regressors	Coefficients	t-Statistic	P-Value
GCEA	0.044575	5.361801	0.0003
GREA	-0.033101	-3.186563	0.0097
DCA	-0.040506	-1.686335	0.1226
INR	0.158016	0.701584	0.4989
EXR	0.203192	1.740152	0.1125
ECM (-1)			
R-squared = 0.926484	Durbin-Watson stat = 2.589808		
Adjusted R-squared = 0.750046	Akaike info criterion = 4.277226		
Schwarz criterion = 5.388188	F-statistic = 5.251041	Prob(F-statistic = 0.004712	

Source: Computed by the researcher using E-Views 9 (2021).

The error correction representation for the selected ARDL Model as shown in Table 5 suggests evidence of error correction. The coefficient of the ECM has the hypothesized negative sign (-1.176912) and is statistically significant. This implies that deviations from the short-term in cash crop output adjust quickly to long run equilibrium. That is, the long run equilibrium cash crop output can almost immediately be restored should there be short run distortion in the cash crop output. Moreover, the result revealed that disequilibria in the cash crop production in the previous year were corrected for in the current year. It therefore, follows that the ECM could rightly correct any deviations from short run to long-run equilibrium relationship between cash crop output and the explanatory variables (government capital expenditure on agriculture, government recurrent expenditure on agriculture, deposit money banks' loans and advances to agriculture, interest rate and exchange rate).

Furthermore, the R^2 value of 0.926484 % shows that the model is a good fit. Thus, about 93 percent variation in cash crop output is explained by the systematic changes in the independent variables (government capital expenditure on agriculture, government recurrent expenditure on agriculture, deposit money banks' loans and advances to agriculture, interest rate and exchange rate). Meanwhile, the remaining 7 percent is captured by

the error term. In addition, the reason why the R^2 is 93% and the error term captures 7% is because there are other explanatory variables that determine cash crop output which were omitted in the model. This happened because the number of variables that determine cash crop production is too long to be placed in a single model. In this study, variables were selected in line with the topic, conceptual, empirical and theoretical literatures reviewed. However, according to Chris (2008), R^2 never fall if more regressors are added to the regression. Therefore, the overall fit is satisfactory given the R^2 of 93%.

Moreover, the f-statistic value of 5.251041 with probability value of 0.004712 which is less than 0.05 critical value shows that all the explanatory variables (government capital expenditure on agriculture, government recurrent expenditure on agriculture, deposit money banks' loans and advances to agriculture, interest rate and exchange rate) are significant in explaining increase in the level of cash crop output in Nigeria during the period of study. At the same time, the Durbin Watson statistic value of 2.589808 suggests that the model has no autocorrelation problem. Hence, the explanatory variables in the model are not serially correlated. The result also showed that the Alkaike and Schwarz criterion for the model are 4.277226 and 5.388188 respectively.

4.3 Post-Estimation Diagnostic Test

4.3.1 Wald Test

Table 6: Wald Test for Coefficient of Restrictions

Test Statistic	Value	Df	Probability
F-statistic	247043.1	(6, 10)	0.0000
Chi-square	1482259.	6	0.0000

Source: Computed by the researcher using E-Views 9 (2021).

The result in Table 6 shows that the F-statistic is approximately 247043 and the probability value of 0.0000 is less than 0.05 at the conventional 5 per cent level. Therefore, all the explanatory variables (government capital expenditure on agriculture, government recurrent expenditure on agriculture, deposit money banks' loans and advances, interest rate and exchange rate) included in the estimated model (i.e., model four) are jointly significant in explaining the performance of cash crop output in Nigeria over the data period

4.3.2 Test for Serial Correlation

The Breusch-Godfrey Serial Correlation LM test is used as a higher order test statistic for testing the null hypothesis of no serial correlation against the inferred alternative hypothesis of serial correlation in the parsimonious ECM result at 5 per cent level of significance.

Table 7: Breusch-Godfrey Test for Serial Correlation

F-statistic	0.149941	Prob. F(2,18)	0.8623
Obs*R-squared	0.853333	Prob. Chi-Square(2)	0.6527

Source: Computed by the researcher using E-Views 9 (2021).

The result as displayed in Table 7 reveals that the parsimonious error correction model is not suffering from serial autocorrelation problem. This is because the chi-square value of about 0.853333 and the corresponding probability value of 0.6527 of the chi-square statistic surpass the 0.05.

4.3.3 Heteroscedasticity Test

Table 7: Autoregressive Conditional Heteroscedasticity Test Result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.538685	Prob. F(24, 10)	0.2426
Obs*R-squared	27.54184	Prob. Chi-Square(24)	0.2798
Scaled explained SS	6.031312	Prob. Chi-Square(24)	0.9999

Source: Computed by the researcher using E-Views 9 (2021).

The Breusch-Pagan-Godfrey test result in Table 7 confirms that the parsimonious error correction model (i.e. for model four) is free from heteroskedasticity, which suggests that the variance of the residual in the parsimonious ECM model is homoscedastic over the period covered in this study.

4.3.4 Normality Test

The Jarque-Bera statistic is applied to examine whether the error term in the ECM model is normally distributed at 5 per cent significance level.

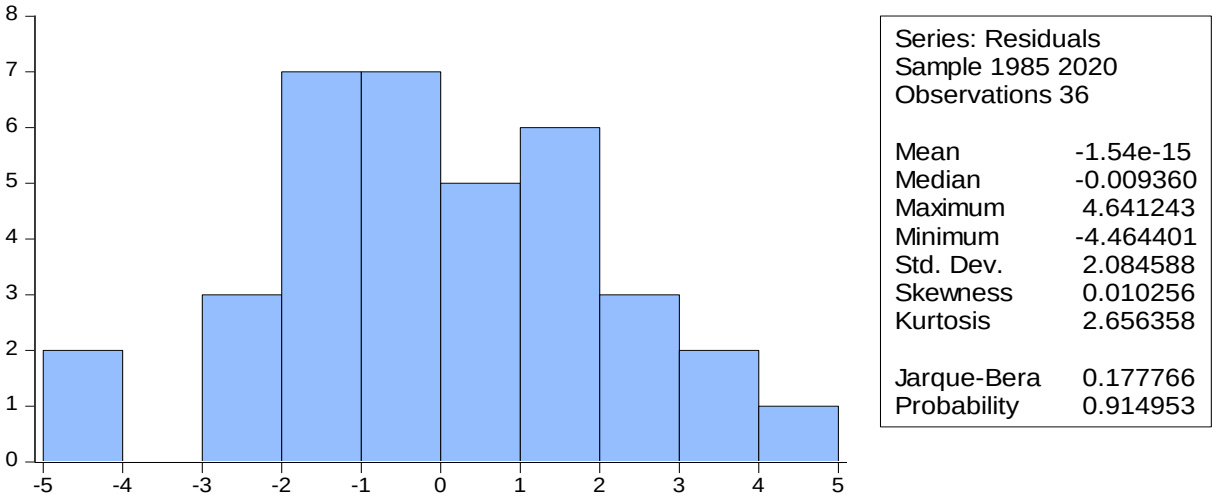

Figure 6: Normality Test Result for

Source: Computed by the researcher using E-Views 9 (2021).

The result shown in Figure 6 depicts that the error term is normally distributed at the conventional level (i.e., 5%). This is because the probability value of the Jarque-Bera statistic of approximately 0.915 is greater than the 0.05% conventional level. This implies that the Jarque-Bera statistic hypothesis of normally distributed residuals in the parsimonious ECM model is accepted.

V. CONCLUSION AND RECOMMENDATION

The ARDL result revealed that in the long run, government capital expenditure on agriculture, deposit money banks' loans and advances to agriculture, interest rate and exchange rate have positive and insignificant impact on cash crop output in Nigeria. Government recurrent expenditure on agriculture has negative and insignificant impact on cash crop production in Nigeria. In the short run, government capital expenditure on agriculture and government recurrent expenditure on agriculture have positive and negative impact on cash crop output respectively. Their impact on cash crop production is also significant. Deposit money banks' loans and advances to agriculture has negative and insignificant impact on cash crop output in Nigeria. Interest rate and exchange rate have positive and insignificant impact on cash crop output in Nigeria. From the findings of the study, some recommendations have been made by this study. First, it is recommended that government should generally cut down on her recurrent expenditure on governance and particularly in the agricultural sector to free up scarce investible resources for improving the hard and soft enabling environments which will stimulate private sector investments in the economy, especially in agriculture. To achieve this, government should provide conducive infrastructure, build human capital (education, health care and technological know-how); govern effectively in the public interest; and orient the economy towards diversified, export-oriented development based on national comparative advantage. This study also recommends that the apex monetary authority should specially direct the deposit money banks to see the agricultural sector as the buffer sector of the economy and that their loans and advances to the sector should be increased to stimulate investment in the sector.

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