



THE IMPACT OF GOVERNMENT MACROECONOMIC POLICIES ON FOOD PRODUCTION IN NIGERIA (1980– 2010)

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ABSTRACT

Purpose: An empirical analysis into the nexus between food production proxied by agriculture output, and government macroeconomic policies which encompasses the following explanatory variables; inflation rate (INFR), interest rate (INTR), exchange Rate (EXCR), credit to agriculture sector (CREAGR), government spending on agriculture sector in Nigeria (GOVEXPAGR) and foreign private investment in agriculture sector in Nigeria.

Method: The study adopted the Ordinary Least Square estimation technique to examine the relationship between agriculture food production (i.e agric output), exchange rate, inflation rate, credit to agriculture sector, foreign investment in agriculture sector and government expenditure on agriculture. The hypotheses were verified with the use of T-test and Fisher F-test of significance. Pre-estimation tests such as Unit Root test, Auto-correlation test (Durbin Watson test), Cointegration test, Causality test, Correlation test were carried to ascertain suitability of formulated models for robustness. Similarly, post-estimation tests such as Cumulative Sum of Squares of the residual (CUSUM Squares) Tests were carried out to ascertain the stability of the models for forecasting purposes.

Results: The findings showed that inflation rate in Nigeria is mild and increase agricultural productivity, although not statistically significant in the short run and not relevant in the long run. Also exchange rate and interest rate have direct relationship with food production which signifies that is the higher the exchange rate the higher would be the domestic agricultural output. In the same vein, government spending on agricultural sector and foreign private investment in agriculture sector have positive impact on the agricultural output and by implication, on food production in Nigeria. However, in the long run both foreign private investment in agriculture sector and government spending on the sector have inverse relationship which implies diversification of government fund and repatriation of profit and/or capital by foreign investors in the agriculture sector in Nigeria.

Implications: Current macroeconomic policies does not attract foreign direct investment in the Agriculture sector of Nigeria thus the sector experience deficit in project growth rate despite favourable government spending and macroeconomic policies.

Recommendation: Government should therefore engage agricultural stakeholders and put in place sound policies that would encourage foreign experts in the agriculture sector so that they can partner with Nigeria and Nigerians in order to enjoy the technological know-how in the sector. Exchange rate policy should be put in place to encourage exportation of agriculture output as well as to conserve foreign currency.

Keywords: food production, Government expenditure, Exchange rate, Interest rate, inflation rate, macroeconomic variables



INTRODUCTION

Agricultural development is essentially the provision of food, raw materials for manufacturing, investment and generates government revenue so as to maintain the growth of other sectors of the economy, to receive an additional international exchange, and provide local producers with a rising marketplace. The increased global need for food is a problem for humanity (Osabohien et al., 2020; Jacobsen et al., 2013). Increasing food production to feed the teeming world population will continue to be a difficult task due to fewer arable land, high cost of farm implements needed for production as a result of inflation, less credit access to farmers, the land competition of food production with bio-fuel production and rural-urban migration among others (Jacobsen et al., 2013). As a result of this, there is a strong on-going deliberation on the best approach to gain speed with world population growth and increasing food production to meet the United Nations (UN) Sustainable Development Goal 2 (which is to achieve food security at all level, improve nutrition for all, and promote sustainable agriculture) by 2030 (Osabohien et al., 2020; Osabohien et al., 2019).

Nigerians are gifted with lands, streams, rivers, grassland, forest, and lakes, and most prominently a large vigorous population that can produce an industrious and productive agricultural sector. Even with all these endowments the agricultural sector endlessly delivered below potentials. Agriculture hires almost three-quarters of the workforce of Nigeria, as in the instance of sub-Saharan Africa (SSA) (Inam & Oscar, 2017) and it contributes significantly to the Gross Domestic Product (GDP) (Matthew et al., 2019). In the same way, the production of food across the African continent, especially in Nigeria, agriculture represents a crucial proportion of activities engaged and captures about 80% of total industry size with livestock, forestry and fishing accounting for the balance of 20% (Osabohien et al., 2019). Irrespective of its crucial role, its contribution to GDP has currently dropped as a result of low yields resulting from constrained or limited access to credits by farmers. The sector's contributions to GDP dropped from 31% (113.64 billion USD to 78 billion USD between 2013 and 2017 (Nevin et al., 2019). Low food production is one of the major issues that require urgent attention in Nigeria, with over 50% of the people depending on subsistence farming, coupled with low production as their sole means of survival (Bachewe et al., 2018). Food production is significant, because, shortage in the production of food leads to the deterioration of household's means of livelihood and food security (Omordi, 2019).

To improve food production, various strategies have been envisaged by government and stakeholders at all levels; one of such strategies is hinged on the need to increase farmers access to agricultural finance (credit) to increase productivity, while others focus on agricultural diversity (Osabohien et al., 2020).

Monetary policies play a key role in the development of the key sectors of the economy. Monetary policy constitutes the major policy thrust of the government in the realization of various macroeconomic objectives (Ogar et al., 2014). According to Abata et al. (2012), the objectives of monetary policies in Nigeria are wide ranging. These include increase in gross domestic product growth rate, reduction in the rates of inflation and unemployment, improvement in the balance of payments, accumulation of financial savings and external reserves as well as stability in naira exchange rate. The policy as well as instruments applied to attain these objectives however have been until recently been far from adequate as undue reliance has been placed on fiscal policy rather than monetary policy in Nigeria. The agricultural sector is due to its relevance in the provision of raw materials for industries and most importantly the



provision of food for the teeming Nigerian population and also serving as a source of foreign exchange for the economy (Adofu, Abula & Audu, 2010).

Different scholars have argued on the impact of selected macroeconomic variables and economic growth in Nigeria. In the same vein, Achegebe et al. (2018) asserted that a multitude of macroeconomic variables influence Nigeria's trajectory, with some playing particularly pivotal roles. Additionally, while a stable exchange rate fosters a culture of business confidence and attracts foreign investment and invigorated growth, volatility in the exchange rate management disrupts this harmony, creating discord and discouraging investment, thus impeding sustainable economic activity. Managing the exchange rate effectively therefore requires striking a delicate balance between export competitiveness and import affordability.

Interest rate constitutes a very important factor affecting the productivity of agriculture. A real interest rate is an interest rate that has been adjusted to remove the effects of inflation to reflect the real cost of funds to the borrower and the real yield to the lender or to an investor. Anyawu et al. (2010) observed that one of the purposes of the policies of agricultural credit over the years was the provision adequate credit to the agricultural players at an affordable cost and at the right time.

Inflation is undeniably one of the most leading and dynamic macroeconomic issues confronting most economies of the world as its effects penetrate more deeply into nation's life due to prevailing increase in prices (Olatunji et al., 2010).

The rate-of-exchange policy influences prices paid domestically to producers of export goods. Exchange rate is very useful in valuing agricultural production and equipments according to Schuh (1974), as cited by Kristinek and Anderson (2002); changes in exchange rates, nonetheless, will have effect on output of the agricultural sector. Since Nigeria depends largely on importation of capital goods used in agriculture production process, it can be argued changes in exchange rates will have implications on agricultural sector output. Therefore, it becomes pertinent to empirically determine whether exchange rate appreciation or depreciation fosters agricultural sector output via food production in Nigeria.

Understanding the complex background of these key macroeconomic variables and their historical context equips policymakers with the knowledge to orchestrate a symphony of sustainable and inclusive growth as regards food production and food security in Nigeria. Effective policies in areas like fiscal management, monetary policy, exchange rate management, and investment promotion are crucial for tackling existing challenges and unlocking Nigeria's full economic potential. By carefully regulating these instruments and fostering harmonious collaboration between various stakeholders, the nation can move towards a future where the score of economic growth reaches new heights of prosperity and inclusivity.

1.2 Statement of the Problem

Government policies concerning food production in Nigeria has really been an issue of serious concern in the more than fifty years since independence. Currently, food production in Nigeria has attained a worrisome dimension which has prompted scholars in agriculture and economics to get time-tested data in order to project into the future of food production in Nigeria and probably arrive at a conclusion where a veritable barometer will be designed for the government as a roadmap in designing her agricultural policies for food production.

A lot of research has been carried out on the effect of government policy on food production in Nigeria but the works are not broad enough to capture these impacts especially when some important part of agriculture, the aquatic life is not taken into consideration. This research work

therefore went further by analysing the various contributions of fish production and livestock \ animal husbandry, as part of the supply chain, in order to broaden the scope of the empirical analysis and have better basis to develop future agricultural outlook in terms of having a well-directed and engaging policy of food sufficiency in Nigeria. The main problem of the study was to find out how the independent variables so highlighted have individually affected the dependent variable and also determine the magnitude of the impact and suggested possible solutions to policy makers in the agricultural sector.

1.3 Objectives of the Study

The main objective of this study is to examine past government agricultural policies and their various contributions to food production in Nigeria.

The specific objectives include the following among others:

1. To determine the relationship between food production and exchange rate movement in Nigeria.
2. To establish relationship between food production and government expenditure on agricultural sector in Nigeria.
3. To examine the effect of inflation on food production in Nigeria.
4. To examine the impact of credit to agriculture sector on food production in Nigeria.
5. To determine impact of foreign direct investment on agriculture sector on food production in Nigeria.

1.4 Research Questions

The study was guided by the following research questions:

1. What relationship exists between food production and exchange rate movement in Nigeria?
2. What relationship exists between food production and government expenditure on agricultural sector in Nigeria?
3. What are the effects of inflation on food production in Nigeria?
4. What impact does credit to agriculture sector have on food production in Nigeria?
5. What impact does foreign direct investment in agricultural sector have on food production in Nigeria?

1.5 Research Hypotheses

This study was guided by the following hypotheses:

H2₀: No relationship exists between food production and government expenditure on agricultural sector in Nigeria.

H2₁: Relationship exists between food production and government expenditure on agricultural sector in Nigeria.

HYPOTHESIS THREE

H3₀: Inflation has no effect on food production in Nigeria.

H3₁: Inflation has effects on food production in Nigeria.

HYPOTHESIS FOUR

H4₀: There is no relationship between credit to agriculture sector and food production in Nigeria.

H4₁: There is relationship between credit to agriculture sector and food production in Nigeria.

HYPOTHESIS FIVE

H5₀: Foreign direct investment on agriculture sector has no impact on food production in Nigeria.

H5₁: Foreign direct investment on agriculture sector has impact on food production in Nigeria.

2.0 Literature Review

2.1 Concept of Exchange Rate

Exchange rate is the price at which a unit of country's currency is exchanged for another country's currency at any point in time. The price at which the Nigerian N1 is exchanged for \$1 is exchange rate. Ibenta (2012) defined exchange rate as the price of the unit of one country's currency quoted in terms of another country's currency, it is the mathematical, qualitative or quantitative expression of one country's currency in terms of another. Uddin et al., (2014) sees exchange rate as the domestic price of a unit of foreign currency and exchange rate can be called the conversion factor that determines the rate of change of currencies. For Danladi and Uba (2016), exchange rate is the price of one country's currency in relation to another country, or the required amount of units of a currency that can buy an amount of units of another currency.

The management of exchange rate system has been on the ladder of every government today owing to its great influence on the external sector performance. A favourable exchange rate is expected to lower cost of living, especially for developing countries who rely heavily on imports for consumption like Nigeria, for instance, the exchange rate of the Nigerian Naira against the US dollar affects and sharpens the production activities in Nigeria. Any fluctuation in the value of the US dollar would transfer such shock to Nigeria due to our reliance on dollar for importations. The depreciation of Nigerian Naira against the US dollar have made some financial experts and analyst to calling on the government to form an alliance with the Chinese to ease over dependent on the US dollar and improve the strength of the Naira. In lieu of the significance of exchange rate on domestic and foreign economic activities, business owners appear convinced that its fluctuations have real effects especially on oil prices and economic performance of a country (Osigwe, 2015).

Interest Rates

Interest rates, inflation and exchange rates are interrelated. Central banks can influence inflation and exchange rates by affecting interest rates. Higher interest rates provide a greater yield to creditors than other countries some interest rate increase allows the country's monetary value to rise, as higher interest rates lead to higher rates for borrowers, thereby generating more foreign capital, leading to higher exchange rates.

Inflation Rate

Inflation refers to the persistent and the continuous rise in the general level of prices of goods and services in an economy (Omosho & Doguwa, 2013). It is no gainsaying the fact that different economies in different parts of the world experience inflation. Maybe the differences lie in the timing, causes, duration and in their prevailing economic conditions. Suffice to say then that, be it developed, developing or underdeveloped; economies of countries of the world does witness rise in price. For some economies it could be mere fluctuations, while for some others, it is consistent and continuous rise in price. Inflation is defined as a generalised increase in the level of price sustained over a long period in an economy (Fasewa & Aderinto, 2023), that is, a persistent rise in the price levels of commodities and services, leading to a fall in the currency's purchasing power.

2.2 Theoretical Review

Monetary Policy Transmission Mechanism:

This theory as explained by Berg, Portillo & Unsal (2010) stated that variables like the interest rate and the exchange rate can drive output growth if the policy environment is accommodative

for growth to occur. An accommodative period would be a period of low-interest rate which allows manufacturers to borrow for purpose of production and consumers for purpose of consumption thus reducing the financial constraint for both economic agents. A weak exchange rate can boost export demand which leads to expansion in agricultural yield. Output tends to respond to interest rate and exchange rate changes in the short run.

2.3 Empirical Review

Okeke and Okeke (2022) investigated the effect of macroeconomic variables on agricultural output in Nigeria. The agricultural output growth represented the explained variable while money supply, commercial bank loan on agriculture, exchange rate, interest rate, recurrent government expenditure on agriculture and inflation rate represented the explanatory variables which served as the selected macroeconomic variables under study. The OLS analysis was computed which shows that the model is statistically significance, judging with the p-value of the F-statistic. The analysis also presented that money supply, exchange rate and inflation have a positive relationship with agricultural output within the given period of study while commercial bank loan on agriculture, interest rate and recurrent government expenditure on agriculture have a negative link with the explained variable. Based on the findings, the researcher made its recommendation in the work.

Akpan and Umoren (2021) examined the relationship between agricultural production indicators and some key macroeconomic fundamentals in Nigeria. The Autoregressive Distributed Lag Model (ARDL) was used to establish the existence of the cointegration among the specified series. The empirical results revealed that, the per capita real GDP, land density and consumer price index are the determinants of crop production gross index in the long run, whereas, per capita income, lending rate, land density and total import are the short run determinants. Also, the per capita income, land density, consumer price index and the nominal exchange rate influence the agricultural gross production index in the long run; while the per capita income and land density were the short run determinants. Moreover, land density, per capita income and balance of trade were found to determine the livestock gross production index in the long run; while the lending rate, land density and inflation rate were the short run determinants. Based on the findings, it is recommended that, specific policy to focus on the improvement of the per capita income, restricted trade policy and reduction and or stabilization of inflation rate in the country are inevitable.

According to the studies of Udensi, Orebiyi, Ohajianya, & Eze (2012), there existed a negative connection between real exchange rates and demand-side agricultural exports. Also, Studies by Antonia (2008) and Adeniran, Yusuf, & Adeyemi (2014) also found a negative relationship between real exchange rates and non-oil exports (including agricultural exports) for Nigeria.

Okafor and Isibor (2012) investigated the impact of some macroeconomic variables like exchange rate and inflation on the development of the Nigerian agricultural industry. Annual time series secondary data covering a period of 33 years (1986- 2020) was utilized in the study while the Ordinary Least Square (OLS) was the estimation technique used to analyze the data. Findings revealed that the exchange rate was positively significant in impacting the dependent variable while the inflation rate was negatively significant. The interest rate was insignificant in impacting the agricultural sector. From the findings, one recommendation arrived at was that the monetary authorities should make policies that would reduce inflation. Reduced inflation would positively impact the development of the agricultural sector as it would boost and increase the consumption of agricultural products.

In another study conducted by Ajobo & Oguntade (1996), Akpan (2015), and Olomola (1994), it was further explained that unforeseen domestic currency appreciation increased supply-side agricultural output, although it depends on the combined effect of demand and supply elasticity. But the weak bargaining power of primary goods in developing countries, therefore, outweighs the elasticity of supply that of foreign demand.

Oriavwote & Oyovwi (2012) used the Vector Error Correction Model (VECM) to examine the link between the deregulation of exchange rates and Nigeria's agricultural share of GDP and found a long-run relationship.

Chichi & Camir (2014) used a two-stage least square method to analyze the effect on aggregate exports of the real exchange rate and found a significant effect between both variables.

Husain, Mody, & Rogoff (2005) used the Auto-regression Distributed Lag (ARDL) model to investigate the effect of the volatility of exchange rates on selected agricultural exports in Iran and found the exchange rate to be highly volatile. Finally, a study carried out by Chuba (2015) estimated the impact of exchange rate fluctuations on Nigerian agricultural exports.

2,4 Research Gap

An extensive review of empirical research indicate that there are quite a lot of studies on the impact of macroeconomic variables on agricultural production or the prices of agricultural products in Nigeria. However, the focus of most of these studies have been on exchange rate, interest rate an inflation rate, very few have assessed agricultural sector performance via food production and/or food security, hence, this is the research gap this study intend to fill. The study will show how monetary policies have fared in stimulating food production to meet local demand as a means to forecasting the possibility of attaining huge foreign exchange from the sub-sector of the Nigerian agricultural economy.

3.0 Methodology

The study adopted a quasi-experimental design using ARDL regression modelling Pre-diagnostic tests such as descriptive statistics, unit root test for stationarity of variables, and cointegration test for the determination of long run relationship among the variables of the study were employed to determine the suitability of the model formulated for ARDL Modelling. ARDL modelling was used to estimate the long run and short run relationship of the variables in the model. Pairwise Granger Causality Test was conducted to test for the direction of causation between pair of all included variables. Post diagnostic tools such as Breusch-Godfrey test for Autocorrelation, Breusch-Pagan-Godfrey test for Heteroskedascity and CUSUM tests for structural breaks were employed.

The data is made up of annual time series on Annual Food Production (FP), a proxy for Food Production, which served as the dependent variable while the explanatory variables in the model are Exchange Rate (EXR), Inflation Rate (INFR), Nominal Interest Rate (INTR), Credit to the Agricultural Sector (CREAGR), Government expenditures on agriculture (GOVEXPAGR) and Foreign private investment on agriculture (FINAGR), which serves as the control variable. The data ranges from 1980 to 2020, a period of fourty-one (41) years.

The data for the study are essentially time series secondary data to be sourced from the World Bank Development Indicators (WDI) data base and the Central bank of Nigeria Database.

The model for this study is $FP = F(EXR, INTR, CREAGR, GOVEXPAGR, INFR, FPINAGR)$. The explicit form of the model is provided in econometrics form in order to capture the stochastic error term U_t .



$$\text{Thus: FP} = a_0 + a_1(\text{EXR}) + a_2(\text{INTR}) + a_3(\text{CREAGR}) + a_4\text{Ln}(\text{GOVEXPAGR}) + a_5\text{Ln}(\text{INFR}) + a_6\text{Ln}(\text{FPINAGR}) + U_t$$

To apply the ARDL approach and keeping in view the theoretical framework the general form of the regression model is given in a log-linear modeling specification as follows:

$$\text{Ln}(\text{FP}) = \beta_0 + \beta_1\text{Ln}(\text{EXR}) + \beta_2\text{Ln}(\text{INTR}) + \beta_3\text{Ln}(\text{CREAGR}) + \beta_4\text{Ln}(\text{GOVEXPAGR}) + \beta_5\text{Ln}(\text{INFR}) + \beta_6\text{Ln}(\text{FPINAGR}) + \mu_t \quad \dots \quad (1)$$

Where:

- FP = Food Production
- EXR = Exchange rate
- INFR = Inflation rate
- INTR = Interest rate
- CREAGR = Credit to the Agricultural Sector
- GOVEXPAGR = Government expenditures on agriculture
- FPINAGR = Foreign private investment on agriculture
- μ_t = Stochastic error term

Moreover, $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the respective parameters.

4.0 Results

4.1 Presentation of Augmented Dickey Fuller Unit Roots Tests

For clarity and ease of understanding the results from the ADF unit root tests are hereunder tabulated:

Table 1: ADF Unit Root Test with Intercept

VARIABLES	@ LEVEL	@ 1 st DIFF	ORDER OF INTGR.
CREAGR	-1.281030	-7.390841***	I(1)
EXR	-1.458705	-5.818368***	I(1)
GOVEXPAGR	-3.820642**	-----	I(0)
INFR	-3.323023**	-----	I(0)
INTR	-2.976811	-7.108415***	I(1)
FP	-2.980159	-4.999521***	I(1)
FPIAGR	-2.450123	-5.6703201***	I(1)

Source: Author’s Computation using E-views

Augmented Dickey Fuller (ADF) test showed that while inflation rate (INFR) and Government Expenditure on Agriculture (GOVEXPAGR) were integrated of order zero (0); Credit to the Agricultural Sector (CREAGR), Exchange Rate (EXR), Interest rate (INTR), Food Production (FP) and Foreign Private Investment on Agriculture (FPIAGR) became stationary at first difference, consequently, the Johansen cointegration test was applied to estimate long run relationship.in the model developed.

4.2 Johansen Cointegration Test

Now, we apply the cointegration test developed by Johansen to determine the existence (or not) of a long-term relationship between the variables. Since the dataset is relatively small, we choose a lag length of one. The cointegration test results are reported in Table 2.



Table 2: Johanssen Test Results

Sample (adjusted): 1982 - 2010

Series: FP INTR EXGR LOG(FPIAGR) LOG(GOVEXPAGR) LOG(CREAGR) INFR

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.780734	202.5210	125.6154	0.0000
At most 1 *	0.715050	143.3397	95.75366	0.0000
At most 2 *	0.649311	94.37743	69.81889	0.0002
At most 3 *	0.413627	53.51110	47.85613	0.0134
At most 4 *	0.305913	32.69292	29.79707	0.0226
At most 5 *	0.293830	18.45175	15.49471	0.0174
At most 6 *	0.117700	4.883703	3.841466	0.0271

Trace test indicates 7 cointegrating equations at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.780734	59.18134	46.23142	0.0013
At most 1 *	0.715050	48.96224	40.07757	0.0039
At most 2 *	0.649311	40.86633	33.87687	0.0062
At most 3	0.413627	20.81818	27.58434	0.2874
At most 4	0.305913	14.24116	21.13162	0.3456
At most 5	0.293830	13.56805	14.26460	0.0642
At most 6 *	0.117700	4.883703	3.841466	0.0271

Max-eigen value test indicates 3 cointegrating equations at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values.

Source: Author’s computation from e – view

The results in the table above confirmed the long run relationship among all included variables which could be further verified from comparison between Eigen statistics value and (or) trace statistics value and the critical value at 5% level of significance. With these results, none of the variables is non-stationary and therefore has a long-term relationship, hence the model will be estimated using the Error Correction Model.

4.3 Correlational Analysis

Table 3 below is a correlation matrix of the variables under study.

Table 3: Correlation Matrix

	FP	CREAGR	EXGR	GOVEXPAGR	INFR	INTR
FP	1.000000	0.870781	0.904681	0.685963	-0.025282	0.697968
CREAGR	0.870781	1.000000	0.980270	0.783191	-0.245338	0.392541
EXGR	0.904681	0.980270	1.000000	0.768397	-0.209551	0.482985
GOVEXPAGR	0.685963	0.783191	0.768397	1.000000	-0.135784	0.306913
INFR	-0.025282	-0.245338	-0.209551	-0.135784	1.000000	0.302768
INTR	0.697968	0.392541	0.482985	0.306913	0.302768	1.000000

Source: Author’s computation from e – view

The result of the correlation matrix above showed that inter relationship among all included variables can be used to test multicollinearity among explanatory variables. To a large extent, the relationship between food production proxied by agriculture output(Y) and CREAGR, EXGR, GOVEXPAGR and INTR are positive and represent 87%, 90%, 68%, and 70% respectively.

Also there is evidence of collinearity among: CREAGR < EXGR < and GOVEXPAGR.

4.4 Error correction Regression Modelling

Table 4: The Overparameterized Error Correction Model

Dependent Variable: D(Y)

Sample (adjusted): 1984 2010

Included observations: 27 after adjustments

Variable	Coeffic	Std. Error	t-Statistic	Prob.
D (Y (-1))	0.212314	0.170698	1.243800	0.2256
D (INTR (-1))	-0.482299	0.373920	-1.289847	0.2094
D(EXGR)	-0.080383	0.129939	-0.618619	0.5420
D (EXGR (-1))	0.134649	0.200202	0.672567	0.5076
INFR (-1)	-0.015794	0.108883	-0.145058	0.8859
D(INFR)	-0.006169	0.106705	-0.057810	0.9544
LOG(CREAGR)	4.106753	2.421339	1.696067	0.1028
D (LOG (CREAGR (-1)))	-14.81092	9.636978	-1.536885	0.1374
D (LOG (GOVEXPAGR (-1)))	-0.216515	2.027545	-0.106787	0.9158
LOG(GOVEXPAGR)	-7.606287	2.470614	-3.078704	0.0051
LOG(FPIAGR)	5.328378	3.514708	1.516023	0.1426
D (LOG (FPIAGR (-1)))	-10.62472	5.545441	-1.915937	0.0674
ECM (-1)	-0.086314	0.033888	-2.547042	0.0177
R-squared	0.455963	Mean dependent var		5.509229
Adjusted R-squared	0.183944	S.D. dependent var		9.404483
S.E. of regression	8.495617	Akaike info criterion		7.386816
Sum squared resid	1732.212	Schwarz criterion		7.952815
Log likelihood	-123.6561	Durbin-Watson stat		2.203692

Source: Author’s computation through E-view

This is basically the process of arriving at the parsimonious model through editing of variables that are not statistically significant among the explanatory variables until finally a parsimonious model is established.

Table 5: The Parsimonious Error Correction Model

Dependent Variable: D(Y)

Method: Least Squares

Date: 18/01/13 Time: 16:31

Sample (adjusted): 1984 2010

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.39051	8.489495	1.459511	0.1545
D (INTR (-1))	-0.460585	0.350977	-1.312292	0.0991
LOG(CREAGR)	6.199670	1.640107	3.780040	0.0007
LOG(GOVEXPAGR)	-7.964553	2.409565	-3.305391	0.0024
D (LOG (FPIAGR (-1)))	-10.44840	4.874451	-2.143502	0.0400
ECM (-1)	-0.035897	0.029839	-1.203003	0.0381
R-squared	0.653943	Mean dependent var		5.509229
Adjusted R-squared	0.649740	S.D. dependent var		9.404483
S.E. of regression	8.145932	Akaike info criterion		7.180308
Sum squared resid	2057.042	Schwarz criterion		7.441538
Log likelihood	-126.8357	F-statistic		3.396675
Durbin-Watson stat	1.764426	Prob(F-statistic)		0.014609

Source: Author's computation via E-view

The result above represented the long run inter relationships among all included variables and showed that the interest rate is negatively (inversely) related to the agriculture output meaning that at the higher the cost of loan, the lower became the sector output due to scarcity of loan. Therefore, for any 100% reduction in agriculture output, interest rate contributes 46% of such reduction and it is statistically significant at 10% level. This finding is in line with the findings of Iliyasu (2019) and Asekome & Ikojie (2018), they observed that deposit interest rate had a positive impact on agricultural investment but lending interest rate impacted negatively on agricultural production and growth.

Credit to the agriculture sector is directly related as expected in the long run meaning that the more loan is made available to the sector, the higher would be the level of output. This findings was in contrast with that of Anetor, Ogbechie, kelikume and Ikpesu (2016), who observed that government sponsored agricultural credit scheme performed poorly in boosting agricultural production. They observed lack of proper planning and corruption as the bane of agricultural credit schemes in Nigeria.

On the other hand, government spending on agriculture sector in Nigeria is inversely related to the sector output meaning that most government effort in growing food production via improvement in agriculture productivity are either mostly thwarted by sycophants or the government is not too keen on program implementation. This is in line with the findings of Kanu (2017) who observed that current levels of government expenditure on agriculture does not granger cause any improvement in food production.

FPIAGR is also inversely related to agriculture productivity such that for any 10% reduction in agriculture output, foreign private investment contributed also 10% in the long run. This, could be in form of profit or capital repatriation therefore the government should be at alert to redress this possible action of the expatriates. This is in line with the findings of Effiong, Eke, Uzoho et al., (2016) who observed that current level of external capital funding were incapable of boost food production, however, Abu, Ekpebu and Okpe (2011) had reported a strong strong positive relationship between FPI and agricultural production. This implies that over time government monetary and fiscal policy as well as security concerns have driven out foreign direct investment in the agricultural sector as observed in the manufacturing sector. Thus a change of policies is required to attract external capital funding and investment in food production in Nigeria, an argument several scholar have made over time as it is generally believed that agriculture can only become a viable source of income and economic growth if huge external capital is introduced continuously into the sector.

The negative sign of the ECV (error correction variable) implies disequilibrium in the short run that could be adjusted for in the long run through its speed of adjustment (coefficient of the error correction variable). The error could be corrected within a space of approximately thirty years.

On the statistical ground, 65% variation in the agriculture output is explained jointly by all included explanatory variables as indicated by the values of R-Squared and adjusted R-squared. The Durbin Watson statistics showed the absence of serial autocorrelation while the F-statistics still confirmed the robustness of the entire model.

5.0 Conclusion

Domestic food production in Nigeria is largely insufficient and this has been augmented with importation of food. One of the reasons for this is the rural-urban drift (i.e. movement of people from agrarian rural settings to urban area in search of white-collar job). However, there has been different government policies to combat food shortage and reduce importation of food (i.e. policies put forth to attain food security). Some of these policies included provision of loan to farmers guaranteed by government, fertilizer distribution to farmers at subsidized prices and other relevant policies.

From the foregoing, it can be deduced that government of Nigeria is only paying lip service and is not determined enough to put the agriculture sector on the right track and as such many factors have been militating against the successful implementation of various policies measure that have been put forth to develop the sector. Food production on the other hand is a subset of the agriculture sector whose efficient and effective performance is largely dependent on sound agricultural sector which is yet to be achieved in Nigeria due to several reasons ranging from policy inconsistencies to corruption and embezzlement which has be like a recurring decimal and has negatively impacted the major drivers of the economy. However as established empirically in this work, much still must be done in terms of massive rural development to reduce the rural-

urban drift and increased food production. Simultaneously, exchange rate policy measure should be adequately investigated as well as interest rate policy. In conclusion, government should try as much as possible to strengthen the specialized banking institution that has to do with the agriculture sector in Nigeria.

1. Exchange rate policy should be put in place to encourage exportation of agriculture output as well as to conserve foreign exchange.
2. A policy or collection of policies that would ensure a level playing ground for all players in the sector should be encouraged.
3. Government should not only give loans but should as a matter of fact do a follow up to know that the loans are not diverted to other areas which could militate against the success of the program.
4. Nigerian (farmers) should also be trustworthy for once to assist the government in achieving her desired objectives.

6.0 Policy Recommendations

It is noteworthy that any empirical study on causal effect and relationship between variables is to have policy implication and necessary recommendation showing the way forward. However, from the foregoing and as concluded, the following is recommended among others:

1. That government, as a matter of urgency, should take policy implementation very seriously and always check for feedback to know whether the policy yield desired outcome or not and make available corrections or redress. This means that for every policy or decision there are also alternative decision. This therefore implies that for any government policy or pronouncement that are against the welfare of the people, government should as a matter of fact revert to peace and harmony in the country.
2. Laws are made by the government for the people. Unpopular laws should either be discarded or amended to fit-in to what the people want.
3. CBN should monitor commercial banks closely to make sure that loans are disbursed (made) to the priority sectors of the economy and that the commercial banks too should closely monitor their customers to ensure that the money disbursed is used for the project it was meant for.
4. Government should put in place sound policies that would encourage foreign experts in the agriculture sector so that they can partner with Nigeria and Nigerians to enjoy the technological know - how in the sector

7.0 Suggestions For Further Studies

In carrying out a time series analysis of this nature using government policy instruments so mentioned, it is necessary to expand the scope using a data input of at least a hundred observations (for example 100 years data) which were not readily available to the researcher. This has the benefits of:

1. Giving a clearer picture of the impact of these policy instruments on food production in Nigeria.
2. Giving a convincing inference as well as a better understanding of the connection between government policy instruments and its impact on the agricultural sector with a specific reference to food production in Nigeria.



3. Showing a better understanding of the agricultural sector in colonial times and growth per sub – sector in terms of staple food items, livestock and animal husbandry.

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