

EMPIRICAL TREND ANALYSIS OF INTEREST RATE AND VALUE OF FORMAL AGRICULTURAL FUNDING IN NIGERIA (1986-2017)

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Abstract

The paper dealt on empirical trend analysis of interest rate and value of agricultural finance in Nigeria between 1986 and 2017. It was the specific objectives of the study to: describe trends of interest rate and value of formal agricultural funding in Nigeria for the period 1986– 2017; determine the path of progress of interest rate and value of formal agricultural finance in Nigeria for the period under review; compare rate of growth of interest rate and value of formal agricultural funding in Nigeria within the reference period; and analyze trend of interest rate in Nigeria within the reference period; explain the cause and effect relationship of interest rate and value of formal agricultural finance in Nigeria within the reference period. Secondary data was used for the study and these were subjected to descriptive statistics and econometric analysis. However, the trend revealed a persistent increase in the interest rate between 1986 and 1998 coinciding with the Structural Adjustment Policy era. The interest rate then dropped slightly between 2000 and 2006 and then began to trend upwards from 2007 to 2017. These are manifestation of volatility of interest rate to agricultural funding. In overall status, interest rate exhibited negative non-considerable trend while volume of formal agricultural finance exhibited positive trend within period 1986-2017 in Nigeria. The study therefore recommended that the monetary authorities in Nigeria should maintain a stable interest rate policy to ensure that adequate formal financing flow from banks to the agricultural sector. Commercial banks should concentrate on mobilizing savings by charging lower interest rate and providing handsome return to depositors which would increase funds flow and make it available for formal financing of agriculture.

Key words: formal credit supply, interest rate, agriculture, Nigeria

INTRODUCTION

Agriculture has played important roles in the development of Nigeria's economy justified by its relevance in provision of food for the teeming population, generation of employment, provision of industrial inputs and in generation of foreign exchange [4, 2]. Advancement of agriculture in the country requires judicious financing and investment of funds. One practical way of sourcing such funds is securing farm credit. Credit is an input and a catalyst in production as well as a "change factor" in agricultural production. The provision of this input is important because it functions more than just another resource (labour, land, equipment and raw materials) by determining access to the provision of the inputs. [7] observed that farm credit is a major input in development of the agricultural sector as it facilitates adoption of new and improved systems of farming.

Agricultural credit forms an integral part of the process of modernization of agriculture and commercialization of the rural economy [19]. It provides farmers with ample opportunity to increase their income and improve their living standard. Agricultural financing policy in the country had earlier advocated charging of concessionary interest rate on agricultural loans same as it was to loans to other real sectors of the economy. To encourage farmers, apply for loans for investment purposes, there was an understanding that they (farmers) being risk averse and not have the collaterals required often for loans by commercial banks, be charged concessionary interests [8]. Interest is the charge paid on loans or on debt securities, either at regular intervals or as part of a lump sum payment when the loan matures. In case of bank loans, interest is paid in instalments through the life of the loan based on agreed annual rate. It is an important economic price

determined by various factors and useful in gauging financial market conditions. The direction and magnitude of changes in market interest rate are primarily important to policy makers as it shows the growth path of the economy. The role and effect of interest rate can be determined following link between the financial sector and real sector of the economy. Interest rate has the problem of increasing cost of agricultural production which cause hike in domestic food price, and where the price of imported food items is cheaper than that of domestic production causes a downward shift in demand for domestic food products and lead to discouragement of farmers in going into food production [20]. Over the years, interest rate in Nigeria is managed by the monetary authority as a monetary and credit policy tool aimed at inflation control, investment inducement and economic growth [21]. Poor financing of the agricultural sector hampers agricultural development. Prior to the structural adjustment policy (SAP) era in Nigeria, there was consistent increase in lending portfolios of banks to the agricultural sector but at concessionary rates. The agricultural lending was considered riskier, problematic and unprofitable relative to other sectors. Then came the deregulation policy which however, erased the idea of concessionary lending by banks. Bank credit to the agricultural sector in nominal terms, over the years increased from about ₦230 million (then about \$233 million) in 1978 to over ₦262 billion (\$2.23 billion) in 2005 [1]. The growth rate of investment in agriculture was less compared with that in other economic sectors in Nigeria. With deregulation, interest charges on agricultural loans rose and volume of formal lending to the sector fell resulting in shortage of funds. Shortage of funds for agricultural financing and poor access to loans by farmers remained another problem in agricultural financing. Inability of farmers, especially small-scale farmers, to access credit for improved agricultural production, hampers their willingness and desire to adopt farming innovations, and thus establish executionary down turn effect on overall farm productivity

[6]. [5] earlier observed that continuous shortage of capital to fund investments in agriculture remained a major constraint in Nigeria's domestic food production. Considering willingness of the farmers to take loans, [17] was of the opinion that the rate of interest charges on loans by farmers was an implicating factor. It was in recognition of these facts that the Federal Government of Nigeria at various periods put in place credit policies and created multiplicity of credit institutions and schemes that have enhanced farmers' access to credit [13, 9, 12]. Other impressive agricultural financing policies include the establishment of Agricultural Credit Guarantee Scheme Fund (ACGSF) [12]; the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), now Bank of Agriculture (BOA), and Nigeria Export-Import Bank (NEXIM). These development institutions are preoccupied with macroeconomic policies which promote the agricultural sector and maintain continuous inflow of funds to sustain agricultural development. A broad understanding of implications of interest rate is quite essential. The need to empirically understand trend of interest rate and the value of agricultural finance in Nigeria cannot be overlooked especially now that there is a downturn in the economy. It was against this backdrop that this investigation specifically described trends of interest rate and value of formal agricultural finance in Nigeria for the period 1986– 2017; compared rate of growth of interest rate and value of formal agricultural finance in Nigeria within the reference period; measured and analyzed trend of volatility of interest rate in Nigeria; and explained the cause-and-effect relationship of interest rate and value of formal agricultural financing in Nigeria over the referenced period.

MATERIALS AND METHODS

Area of Study

This study was carried out in Nigeria, a country situated along the coast of West Africa between Latitudes 10° 00' North of Equator and between Longitudes 8° 00' East of Greenwich Meridian. It is bounded on the

West by Benin Republic, on the North by Niger Republic, on the East by Cameroon Republic and on the South by Gulf of Guinea. Nigeria occupies a land area of 923,768,622km² (98.3 million hectares) out of which 71.2 million hectares is suitable for cultivation. Nigeria is a geo-political and sovereign entity that is composed of 36 States and the Federal Capital Territory (FCT)-Abuja. In 2006, the total population of the country was 143 million people [15].

Data Collection

This investigation applied a mixed study approach and used secondary time series data from Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and Food and Agriculture Organization (FAO), covering the period 1986-2016 on many variables. Data collected among others included: Agricultural financing, Interest rate, Inflation rate, agriculture contribution to Gross Domestic Product, Foreign Direct Investment, Cash Reserve Ratio, Monetary Policy Rate, Liquidity Ratio, Loans and Advances to agriculture, Liquidity Ratio, and Real Money Supply.

Analytical Technique

Data obtained were analyzed using both descriptive statistics and econometric tool (Generalized Autoregressive Conditional Heteroscedasticity (GARCH)). In describing trend of interest rate and volume of formal agricultural finance in Nigeria for the period 1986 – 2017, time trend analysis was used. In investigating dynamic variation (acceleration, deceleration or stagnation) in growth of interest rate and volume of formal agricultural finance in Nigeria for the period 1986 – 2017 the logarithmic quadratic time trend analysis was used. The model:

$$Y_{it} = \exp^{(\beta_0 + \beta_1 T + e_i)} \quad \dots(1)$$

Linearized and applied by [10] and [17] as follows:

$$\ln Y_{it} = \beta_0 + \beta_1 T + e_i \quad \dots(2)$$

where:

Ln= Natural logarithm; Y_{it}= Interest rate in period t, or Volume of agricultural financing in period t. Agricultural financing or funding was measured as sum of Government (public) and private sector spending in agriculture (ie.

Domestic investment in agriculture). Government (public) spending in agriculture was proxied by government capital expenditure in agriculture in period t, while private sector spending in agriculture was proxied by commercial bank's loans and advances to agriculture in period t. T=Time trend variable (years); β_0 and β_1 were parameters estimated, and e_i , the error term was used in this analysis. In relating growth rate of interest rate with value of formal agricultural finance in Nigeria within the reference period the Z-test of difference in means of the variables was used. To measure and analyze trend of volatility of interest rate in Nigeria within the reference period, the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) was used; and to explain the cause-and-effect relationship between volatility of interest rate and volume of formal agricultural finance in Nigeria within the reference period this investigation used Granger causality test as used previously by [11, 14].

RESULTS AND DISCUSSIONS

Trend of Interest Rate in Agricultural Financing in Nigeria Between 1986 and 2017

The trend of interest rate is presented as Figure 1. The Figure shows that there was persistent increase in the trend of interest rate between 1986 and 1998. This increase was probably due to the Structural Adjustment Programme (SAP) policy implemented then and liberalized the financial system in 1986. The Figure also revealed that volatility of interest rate dropped slightly between 2000 and 2006 and then began to trend upwards from 2007 to 2017. The upward trending of interest rate over the period (2007 to 2017) could be attributed to the various economic crisis that hit Nigeria beginning from the global financial crisis of 2008 and the economic recession that began in the second quarter of 2016. This implies that the level of volatility of interest rate in Nigeria was very high over this period. This result gave credence to [24] who observed the upward trending of interest rate from 2010 to 2011.

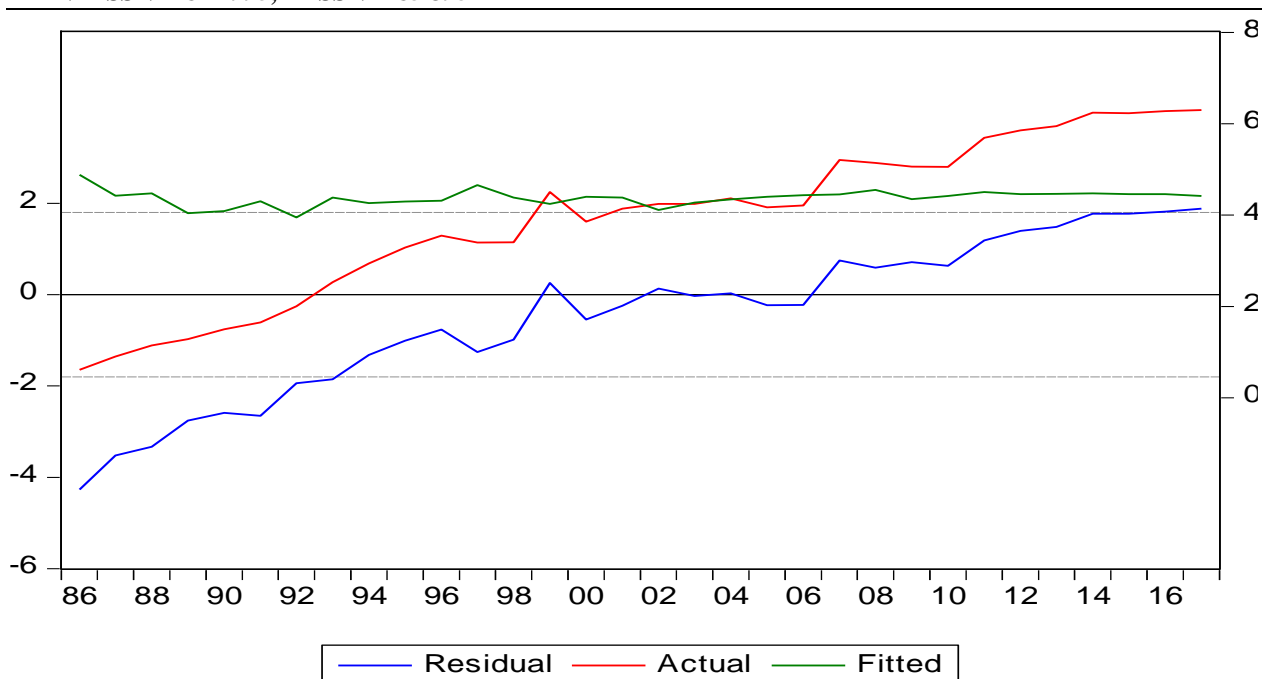


Fig. 1. Trend of interest rate in Nigeria from 1986 to 2017

Source: Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and Food and Agriculture Organization (FAO).

Relationship of Trend of Interest Rate and Value of Formal Agricultural Financing 1986-2017

The comparative estimated regression coefficients of time trend variables of interest rate and volume of formal agricultural funding

is presented as Table 1. The Table showed interest rate exhibiting negative trend while the volume of formal agricultural finance exhibited positive trend within period 1986-2017 in Nigeria.

Table 1. Regression Estimates of Trend in Interest Rate and Value of Formal Agricultural Finance in Nigeria from 1986- 2017

Variables	Constant (b_0)	b_1	R^2	R^2	F- value
Interest rate	1.301 (42.84)***	-0.002 (-1.34)	0.057	0.025	1.81
Volume of formal Agricultural finance	0.404 (6.90)***	0.078 (25.33)***	0.955	0.954	641.72***

Source: Output of Data from CBN (STATA Estimates, 2021).

Figures in parentheses are t-test values, ***, **, * represent significance at 1.0%, 5.0% and 10.0% probability levels respectively.

The coefficient of the trend variable for volume of agricultural finance was positive and significantly different from zero at 1.0% alpha probability level. The trend coefficient for interest rate was negative and not significant even at 10.0% alpha probability level of significance. The coefficient of volume of volume of formal Agricultural finance was 0.078 suggesting that there was about 7.8% increase in the volume of agricultural investment during the period under review. This positive trend of volume of formal agricultural finance was expected. The theory of demand for credit shows that

availability of financial resources drives economic growth. The cumulative combination of government and banking sector funds invested in agriculture gave a reasonable growth in productivity of food and fibre in the country.

Growth of Interest Rate and Value of Formal Agricultural Financing, 1986 -2017

The growth of interest rate and value of formal agricultural finance in Nigeria from 1986 -2017 is presented as Table 2. The Table showed that the volume of formal agricultural finance grew at a compound growth rate of 8.11% over the 21 years period. This was a

relatively slow growth in investment of productive funding to agriculture. The Central Bank of Nigeria (CBN) records confirm the low annual budgetary allocation to the agricultural sector and the high borrowing cost from the banking sector.

Table 2. Compound Growth of Interest Rate and Volume of Formal Agricultural Financing in Nigeria from 1986 -2017

Variables	Rate (%)
Interest rate	-0.20
Volume of formal Agricultural Financing	8.11***

Source: output of data from CBN (STATA Estimates, 2021).

*** significant levels at 1.0%

The [18, 16] reported that the percentage of agricultural bank credit to total credits was highest in 1995 (17.49%) and sharply reduced of less than 5.0% from 2000 to 2014, except for 2003 when it was 5.16%. This is an

evidence of neglect of the agricultural sector in terms of granting credit facilities from formal financial sources.

Dynamic Variation (Acceleration, Deceleration or Stagnation) in Interest Rate and Volume of Agricultural Finance

The quadratic estimates of interest rate and volume of Agricultural finance is shown as Table 3. The quadratic term (t^2) allows for the possibility of acceleration, deceleration or stagnation in interest rate and volume of agricultural finance growth process. The Table shows that the coefficient for value of formal agricultural finance was positive and significant implying an accelerated growth in agricultural funding during the period of study. According to [3], agriculture, fishing and forestry sectors had accelerated growth in Foreign Direct Investment (FDI) inflow during the period under study as its R^2 is positive and F ratio significant.

Table 3. Regression Estimates of Dynamic Variations of Interest Rate (Acceleration, Deceleration and Stagnation) and Value of Formal Agricultural Finance in Nigeria

Variables	Constant (b_0)	b_1	b_2	R^2	$R^{\wedge 2}$	F-value
Interest rate	1.249 (26.82)***	0.007 (1.08)	-0.000 (-1.46)	0.121	0.0607	0.1533
Value of Formal Agric. Finance	0.180 (2.38)*	0.118 (11.19)***	-0.001 (-3.87)**	0.9705	0.9685	477.75***

Source: Output data from CBN (STATA Estimates, 2021).

*, **, *** denote significant levels at 10.0%, 5.0%, and 1.0% respectively.

Testing for Auto Regressive Conditional Heteroscedasticity (ARCH) (1) Effect on Interest Rate

Interest rate volatility generated using ARCH model was presented as Table 4.

The output from ARCH model was divided into two parts; first part (upper part) gives the output of the mean equation and the second part (lower part) presents the result of variance equation.

Table 4.0 showed that the estimated means and variance equations were significant at 1.0% level. This suggests that Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) (1) model was well fitted in modeling interest rate volatility $\{\log(IV)\}$ in Nigeria from 1986 to 2017. Further, to check evidence or presence of

heteroscedasticity in the residuals, an ARCH (1) LM test revealed that, there was no evidence of ARCH effects. This was based on the insignificance of p-value of F-statistic which stood at 0.1939.

From the test results, it was concluded that, there was evidence of volatility in the interest rate. Hence, the Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) (1) model was suitable for modeling interest rate volatility over the period under study. Thus, the interest rate in Nigerian agricultural loans has been volatile. According to [23] GARCH (1,1) model is successful at capturing the volatility clustering behavior, as the coefficients for ARCH and GARCH terms have statistically significant z-values. The sum of the coefficients was less than 1, which

means that the volatility process was covariance stationary. Thus, the discrete-time

GARCH (1,1) model was good for conditional variance modeling.

Table 4. EView Test for ARCH (1) Effects in Interest Rate

Variable	Coefficient	Std. Error	z-Statistic	Prob.
LOG(IV)	-0.230716***	0.028149	-8.196394	0.0000
C	2.109698***	0.331160	6.370639	0.0000
Variance Equation				
C	-0.000102	0.000358	-0.285118	0.7756
RESID(-1)^2	-0.090110***	0.021446	-4.201664	0.0000
GARCH(-1)	1.128939***	0.054670	20.65018	0.0000
R-squared	0.992110			
Adjusted R-squared	0.989809			
Durbin-Watson stat	1.886827			
ARCH LM Test:				
F-statistic	1.768477			
P-value	0.1939			

Source: Data from CBN (EViews computations, 2021).

Where: IV= Interest Volatility; ARCH= Auto Regressive Conditional Heteroscedasticity; GARCH= Generalized Auto Regressive Conditional Heteroscedasticity.

Test For Stationarity

The test for stationarity of the data was carried out using Augmented Dickey Fuller (ADF) unit root technique to ensure that none of

series was integrated beyond order one i.e. I (1). The result obtained from the unit root tests was presented as Table 5.

Table 5. Summary of ADF Test Estimates

Variable	ADF @ Level: I(0)		ADF @ First difference: I(1)		Order of integration
	t-Statistic	P-value	t-Statistic	P-value	
Log(AF)	-2.756824	0.2227	-7.289810	0.0000***	I(1)
Log(IV)	-4.345105	0.0111	--	--	I(0)
Log(FIMP)	-2.707199	0.2407	-7.051485	0.0000***	I(1)
Log(INF)	-3.566793	0.0496	--	--	I(0)
Log(RGDP)	-1.984673	0.5865	-5.274833	0.0009***	I(1)
Log(CRR)	-2.594987	0.2849	-6.267966	0.0001***	I(1)
Log(NER)	-2.447840	0.3497	-5.758605	0.0003***	I(1)
Log(NS)	-0.722273	0.9623	-4.032982	0.0183**	I(1)
Log(MPR)	-3.198598	0.1032	-6.691258	0.0000***	I(1)
Log(LR)	-3.395145	0.0704	-6.235485	0.0001***	I(1)
Log(RMS)	-2.886399	0.1802	-6.976580	0.0000***	I(1)
ADF critical values:					
1% = -4.284580					
5% = -3.562882					

Source: CBN data (EViews computations, 2021).

Where: AF= Agricultural Financing; IV= Interest rate Volatility; INF= Inflation rate; RGDP=Real Gross Domestic Product; CRR=Cash Reserve Ratio; MPR=Monetary Policy Rate; LR=Liquidity Ratio; LA=Loans and Advances; LR=Liquidity Ratio; RMS=Real Money Supply.

The ADF test revealed that none of the variable series went beyond integration order of one i.e. I (1). The ADF test results showed that volatility of interest rate and inflation rate were all stationary at level value i.e. I (0), while other variables were stationary at first difference value i.e. I (1). This is because, in

absolute term, their actual values (t-Statistic) are greater than their respective critical values, which indicates that; null hypothesis which stipulates that, the series are not stationary was rejected. Consequently, with the combination of I (1) and I (0), the

Autoregressive Distributed Lag (ARDL) was applied.

Relationship between Interest Rate and Value of Formal Agricultural Funds in Nigeria.

For the analysis of cause-and-effect relationship between interest rate volatility

and value of formal agricultural finance in Nigeria, Granger causality test was used. The Granger causality test measures the direction of relationship between variables. The result of the pairwise Granger causality test is presented as Table 6.

Table 6. Granger causality test Estimates of Formal Agricultural funding and Interest rate in Nigeria (1986 – 2017)

Null Hypothesis:	Obs.	F-Statistic	Prob.
LOG(AF) does not Granger Cause LOG(IV)	30	4.58176	0.0202
LOG(IV) does not Granger Cause LOG(AF)		0.14430	0.8663

Source: CBN Data (EViews computations, 2021).

The Granger causality test between logged values of interest rate {LOG(IV)} and formal value of agricultural funding {LOG(AF)} reveals that there was a unidirectional relationship running from agricultural fund to interest rate changes. The p-value of the F-statistic (4.58176) associated with the nexus between log (AF) and log(IV) is significant based on the probability value (0.0202) which was less than 0.05 critical value. This implies that it was the mechanism of agricultural financing that cause interest rate to be volatile in Nigeria and not the other way round since the probability value (0.8663) of the causality from log (IV) to log (AF) was greater than critical value of 0.05, adjudged insignificant. A plausible reason for this could be the inverse relationship between the formal agricultural funding and volatility of interest rate; the fact that as the supply of funds increased, the price of borrowing (interest rate) decreased and vice versa. Thus, increased money supply brought about effective and efficient financial intermediation such that interest rate was lowered on obedience to the law of demand. This corroborated with findings of [22] that reported unidirectional causality of institutional credit to agricultural and economic growth.

CONCLUSIONS

This study concluded as follows:

(i)From 1986 to 2017 there was a recognized negative trend of interest rate regime in Nigeria. Within the same period in the

country, volume of formal agricultural funding exhibited positive trend.

(ii)There was a unidirectional relationship running from agricultural fund to interest rate changes. A test for Granger causality between interest rate and formal agricultural funding revealed that causation go from formal agricultural financing to interest rate rather than from interest rate to formal agricultural funding.

(iii)The orders of integration of macroeconomic variables (monetary policy rate, liquidity ratio, nominal exchange rate, inflation rate and real money supply) showed no mixed order of integration in Nigeria within the period.

(iv)Increase in interest rate caused formal agricultural finance to reduce.

The following recommendations were made in consequence:

(i)The study therefore recommended that the monetary authorities in Nigeria should maintain a stable interest rate policy. This is to ensure that adequate formal financing flow from banks to the agriculture sector.

(ii)Commercial banks should concentrate on mobilizing savings by charging lower interest rate and providing handsome return to depositors which would increase available funds for formal funding of agricultural sector.

REFERENCES

[1]Abedullah, N.M., Khalid, M., Kouser, S., 2009, The Role of Agricultural Credit in the Growth of Livestock Sector: A Case Study of Faisalabad Pakistan. Vet. Journal 29(2):81-84.

- [2]Adofu, I., Abula, M., Audu, S.I., 2010, An Assessment of the Effects of Interest Rate Deregulation in Enhancing Agricultural Productivity in Nigeria. *Journal of Economic theory* 2(2): 82-86.
- [3]Ajudua, E.I., Okonkwo, O.N., 2015, Interest rate determinants in a deregulated Nigerian economy. *International Journal of Business and Law Research* 3(1):81-88.
- [4]Arewa, A., Nwachukwu, U., Owoputi, J.A., 2013, Bank Credit Risk and Interest Rate Volatility-Granger causality vs VAR-GARCH Approach. *International Journal of Business and Management Review* 1(2):26-34.
- [5]Central Bank of Nigeria, 2007, Annual Report and Statement of Account. CBN Lagos, Nigeria.
- [6]Central Bank of Nigeria, 2011, CBN Reports (July 2011) Bullion, 36 (3): 96 –111.
- [7]Central Bank of Nigeria (CBN) Reports, 2014, Bullion, 37 (1).
- [8]Daramola, A.S., Ukeje, E.E., McIntire, J., 2007, Agricultural Export Potential. In Collier P. and Pattillo C. (eds). *Economic Policy Options for a Prosperous Nigeria*. London. Palgrave Macmillan.
- [9]Dayo, P.N., Ephraim, J.P., Omobowale, A.O., 2009, Constraints to Increasing Agricultural Productivity in Nigeria: A Review. *Journal of International Food Policy Research Institute*. (006):1 -72.
- [10]Duong, P.B., Izumida, Y., 2002, Rural Development Finance in Vietnam: A Micro Econometric Analysis of Household Surveys. *World Development*, 30(2):319-335.
- [11]Granger, C.W.J. (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica*. 37: 424-438.
- [12]Ijaiya, M.A., Abdulraheem, I.B., Abdullahi, M.A., Ijaiya, G.T., 2009, Agricultural Credit Guarantee Scheme and Food Security in Nigeria. *Journal of International Economic Review*, 2 (1-2): 167-176.
- [13]Ilavbarhe, K.O., 2007, An Assessment of Sources and Utilization of Credit by Small Scale Farmers in Benin Metropolis of Edo State. *Global Journal of Agricultural Sciences*, 6(2):153–157.
- [14]Mejeha, R.O., 2001, Institutional Financing of Agricultural Production in Nigeria: Problems and Policy Issues. *Proceedings of the 35th Annual Conference of the Agricultural Society of Nigeria held at university of Agriculture, Abeokuta, Nigeria on Sept.16-20, 2001*: 258- 265.
- [15]National Population Commission, (NPC), 2007, The 2006 Population Census of Nigeria. Abuja. National Population Commission.
- [16]Nnamerenwa, G.C., 2006, Effect of Devaluation on Rice Imports in Nigeria (1970-2002). B.Sc. Project, Department of Agricultural Economics, Michael Okpara University of Agriculture Umudike, Abia State, Nigeria.
- [17]Nnamerenwa, G.C., 2012, Analysis of Intra-Sectoral Credit Allocation under the Agricultural Credit Guarantee Scheme Fund in Nigeria (1978 – 2009). M.Sc. Thesis, Department of Agricultural Economics, Michael Okpara University of Agriculture Umudike, Abia State, Nigeria.
- [18]Nwosu, F.O., Oguoma, N.N.O., Ben Chendo, N.G., Henri-Ukoha, A., 2010, The Agricultural Credit Guarantee Scheme: Its Roles, Problems and Prospective in Nigeria's Quest for Agricultural Development. *Researcher* 2(2):1 -4.
- [19]Okafor, I.G., Ezeaku, H.C., Ugwuegbu, U.S., 2016, Relationship between Deposit Money, Bank Credit and Economic Growth in Nigeria under a VAR G-Causality Environment. *IOSR journal of Economic and finance* 7 (2): 41 – 46.
- [20]Onwumere, J.C., Ene, C.H., Nnamerenwa, G.C., 2017, Government credit, banks' credit and agribusiness sector performance under consolidation policy in Nigerian banking institutions (1995-2014): A trend analysis. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, 17(1):307 - 316.
- [21]Onyenweaku, C.E., 2004, Stagnation, Acceleration and Deceleration in Agricultural Production in Nigeria, 1970-2000. *Journal of Agriculture and Food Science* 2(2):131-140.
- [22]Rahji, M.A.Y., Adeoti, A.I., 2010, Determinants of Agricultural Credit Rationing by Commercial Banks in South western Nigeria. *International Journal of Finance and Economics* (37):7-34.
- [23]Selcuk, B., Gazanfer, U., 2014, Stochastic interest rate volatility modeling with a continuous – time GARCH (1, 1) Model. *Journal of Computational and applied mathematics* 259: 464 – 473.
- [24]Umechukwu, J. N., 2018, The growth rate of foreign direct investment inflow to Nigerian economy, 1970-2014. *Int'l journal of agric. And rural dev* 21(2): 3718-3723.