
CAUSAL RELATIONSHIP BETWEEN FINANCIAL SECTOR LIBERALIZATION AND AGRICULTURAL SECTOR OUTPUT IN NIGERIA

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ABSTRACT

This study examines the Causal Relationship between Financial Liberalization and Agricultural Sector Output in Nigeria (AOG). Ex-post facto research design was employed and the annual time series data for various years were obtained from Central Bank of Nigeria (CBN) Statistical Bulletin. Unit Root Test, Engle –Granger Co- integration Test, Error correction Model (ECM) Test and Granger Causality Tests were employed in analyses. Prime Lending Rate, Deposit Rate, Exchange Rate, Money Supply as percentage of Gross Domestic Product and Liquidity Ratio are used as indicators of financial liberalization. Hence the study concluded that AOG leads financial liberalization in Nigeria and therefore recommends encouragement of privately owned cottage and micro firms that will be employing the skilled man power trained by the agricultural institutions and also make use of the agricultural sector output produced by the agro-firms as their raw materials.

KEYWORDS: Agricultural Sector Output, Prime Lending Rate, Deposit Rate, Exchange Rate, Money Supply as percentage of Gross Domestic Product, Liquidity Ratio.

1.1 Background to the Study

Financial liberalization is the removal of controls by the regulatory authorities in a nation, thereby deregulating the financial system. The intellectual platform for financial liberalization in developing countries was provided by the seminar work of McKinnon (1973) and Shaw (1973) which concludes that financial liberalization is the way forward in an economy especially a developing economy. Their argument gained too much popularity in the developing nations in particular and the world. In the work of Orji, Ogbuabor, and Orji,(2015) they opined that many developing economies liberalized their respective financial sectors following the direction of the Bretton Woods Institutions and the International Monetary Fund, and the World Bank also made it part of the economic policy prescription by developing a programme called “Structural Adjustment Programme (SAP) aimed at liberalizing distressed economies.

Since the introduction of the financial liberalization concept in the 1970s, many countries such as Angola, Burundi, Congo, Gambia, Kenya’s, Mozambique, Nigeria, Roranda, Tanzania, Zambia, Zimbabwe, India, China, Turkey, etc have made attempt at liberalizing their financial sectors by deregulating interest rates, eliminating or reducing credit controls, allowing free entry into the banking sector, giving autonomy to commercial banks, permitting private ownership of banks⁴⁴ and liberalizing international capital flows (Onwumere, Okoro, and Imo, 2012). Most of the works studied empirically also proved positive and significant effect of liberalization on studied variables

like gross domestic product, banks performance, investment, banks profitability, agricultural sector etc.

Every developing nation that is working towards the improvement of their economy is expected to increase the provision of financial services by embracing policies like financial deepening, financial inclusion, financial liberalization, efficient financial intermediation process and other reformation processes that enhance the financial development of the nation and also have positive effect on its economic growth.

Jringham (2005), believed in natural law in economic affairs. He regarded every human being as the best judge of his affairs and interest who should be left to pursue it to his own advantage. Thus, every human being if left free will like to increase his own wealth, therefore all individuals if left free, maximizes aggregate wealth. His hypothesis is against any government intervention in the financial market. He believed in the teaching of Laissez fair or the government of no restrictions.

Rose (1988), also noted that financial institutions are entrepreneurs, who when allowed to do their business freely, will readily pursue new opportunity for better services, stronger growth and improved earning whenever these opportunity appears. Numerous rules, regulations and polices especially the inflexible and dogmatic once could deny banks of their innovation and incentives to take risk and invest in business enterprise. It could also lead to problems such as loss of competitiveness and inefficiency, resource misallocation, etc among banks thereby hindering the growth of the nation's economy.

Mckinnon (1973) and Shaw (1973) presented the misdeeds of financial repression and to defend the founded good of financial liberalization. The second is Keynes-Tobin-Stiglitz (also called the Structuralist and Neostructuralist School) propagated in favor of certain sort of financial repression due to economic benefits and vulnerability to persistent market failure. Using various economic models, each provides background, rational and intellectual justification for financial liberalization vis a vis financial repression (Ahmed & Islam, 2010). Based on the theoretical works of keynes (1936) and Tobin (1965), they advocated government interference in the credit market. In the early 1980s the Neostructuralist, also criticized the Mckinnon-shaw school and predicted that financial liberalization would slow down growth. Their arguments are in the vein of those put forward by Keynes and Tobin. Stiglitz (1989) criticizes financial liberalization on the theoretical ground and market failures in financial market. Nigeria financial system in 1986 adopted Structural Adjustment Program (SAP) as a remedy to strict and harsh rules and regulations imposed on the financial intermediaries by the regulatory bodies in the financial system.

1.2 Statement of the Problem

Agricultural sector is very important to the Nigerian economy irrespective of its output decline from 1970s as a result of the oil boom. It is evident that despite notable allocation of funds to the Nigerian

agricultural sector and making financial policies that will favour the sector, agricultural output still declines.

The argument is whether financial sector liberalization relationship with agricultural sector output in Nigeria follows the “supply leading hypothesis”, “demand following”, “feedback” or “neutral” hypothesis. Empirical study of this work reveals that various studies came up with different results and conclusions on causality. Therefore, the issue of direction of causality between finance and growth remains unsettled between the four leading hypothesis. However, the core problem of the study is to examine the relationship between Financial sector liberalization and Agricultural Sector Output in Nigeria.

1.3 Objectives of the Study

The main objective of the study is to examine the causal relationship between Financial Development and Agricultural Sector output in Nigeria. The specific objectives are to:

- i. Examine the causal relationship between Prime Lending Rate and Agricultural Sector Output in Nigeria.
- ii. Determine the causal relationship between Deposit Rate and Agricultural Sector Output in Nigeria.
- iii. Investigate the causal relationship between Exchange Rate and Agricultural Sector Output in Nigeria.
- iv. Ascertain the causal relationship between Money Supply as percentage of Gross Domestic Product and Agricultural Sector Output in Nigeria.
- v. Examine the causal Relationship between Liquidity Ratio and Agricultural Sector Output in Nigeria.

REVIEW OF RELATED LITERATURE

2.1 Conceptual Framework

2.1.2 Financial Liberalization

The governments always have interest in the activities of the financial system, since it is a major determinant of a successful economy. Based on this, the government may decide to “control” or “not to control” the activities of the financial system depending on the objectives of the government at that particular period. Financial liberalization is the removal of controls by the regulatory authorities in a nation, thereby deregulating the financial system. Goldsmith –MCKinnon –Shaw School argued that financial liberalization is the only effective means to develop financial intermediation.

According to Kaminsky and Schimukker (2009), financial liberalization would be categorized into three main categories. There are domestic financial liberalization, capital account and stock market. In their analysis of financial liberalization, domestic financial liberalization includes interest rate liberalization (deport interest rate, lending interest rate). Credit controls (allocation of credit and elimination of credit control), and indirect instrument of monetary control. In general, domestic

financial liberalization would be created for increasing and improving the financial institution's operation in terms of interest rate control, credit control and so forth. The second is capital account liberalization that would be accounted for long term money flow (more than one year money flow), such as, off shore borrowing by domestic financial institutions, offshore borrowing by nonfinancial corporations, multiple exchange rate market, and controls on capital outflows. The capital account is implemented to improve and increase the participation of long term money flow, both inflow and outflow. The third is stock market liberalization that would be tracked by changing in the regulations on three variables, acquisition of shares in the domestic stock market by foreigners (capital inflows) repatriation of capital (capital inflow). The stock market liberalization would be set to increasing the participation of foreign investors in a country's stock market (Kaminskey & Schimukker 2001).

2.2 Theoretical Exposition

2.2.1 Financial Liberalization Policy and Agricultural Sector Output

The intellectual platform for financial liberalization in developing countries was provided by the seminar work of MCKinnon (1973) and Shaw (1973) which concludes that financial liberalization is the only way forward in an economy especially a developing economy.

The importance of financial liberalization can never be over emphasized in the economy of the developing nations in general and agricultural sector output in particular. Financial liberalization has been equated to a shift towards increased real interest rates of the financial institutions. Increased real interest rate can attract more loanable funds by positively influencing more household savings to bank deposits which in turn leads to greater investment and faster economic growth (MCKinnon & Shaw, 1973). The two authors emphasized the removal of financial control mostly as it concerns interest rate ceiling as a key measure of financial liberalization. They assumed that removal of such control will bring about higher interest rate that will lead to stimulation of savings. They also hypothesized that higher interest rates will increase the allocative efficiency of fund by shifting credits from unproductive investment to productive investments through efficient and effective intermediary sectors of the economy.

The argument of Mckinnon and Shaw, (1973) gained too much popularity in the developing economy in particular and the world. In the study of Orji, Ogbuabor; and Orji, (2015), they opined that many developing economies liberalized their respective financial sectors following the direction of the Bretton woods institutions and the International Monetary Fund (IMF), and the World Bank also made it part of the economic policy prescription by developing a programme called "Structural Adjustment Programme (SAP) aimed at liberalizing distressed economies. Since the introduction of the financial liberalization concept, in 1970s, many countries such as Angola, Burundi, Congo, Gambia, Kenya, Mozambique, Nigeria, Rovanda, Tanzania, Zambia, Zimbabwe, India, Chain, Turkey etc have made attempt at liberalizing their financial sector by deregulating interest rates, eliminating/reducing credit controls, allowing free entry into the banking sector, giving autonomy to commercial banks, permitting private ownership of banks and liberalizing international capital flows

(Onwumere, Okoro & Imo, 2012). The government removal of financial controls will allow the market force of demand and supply to fixed funds prices that will drive the efficiency of the financial system that leads to economic growth.

2.3 Empirical Review

2.3.1 Financial Liberalization and Agricultural Sector Output

Orji, Oguagbo and Orji (2015), studied on financial liberalization and economic growth in Nigeria: An empirical evidence. The variables used are Real Gross Domestic Product, Real Exchange Rate, Private Investment, and Real Lending Interest Rate. The method of analysis are Ordinary Least Square (OLS), Co-integration and ECM. The result reveals that the Financial Liberalization (FINDEX) and Private Investment (PINV) have significant positive input on economic growth in Nigeria.

Nicholas (2010) Investigated on Interest Rate Reforms and Credit Allocation in Tanzania. An application of ARDL Bounds Test Approach. The variables employed are Foreign Savings Incremental Output, Capital Rate, the Real Exchange Rate, Real Interest Rate. The method of analysis is ARDL-Bound Test Approach while the finding is that the coefficient of real interest rate in the investment efficiency function is found to be positively and statistically significant.

Orji, Mba and Orji (2015) worked on the topic “Financial Liberalization and the Output Growth in Nigeria, Empirical Evidence from Credit Channel. The variables used are Gross Domestic Products, Credit to Private Sector, Financial Deepening, Consumer Price Index, Real Interest Rate, Real Exchange Rate and Population. Ordinary Least Square Method is used in the analysis while the finding showed that Financial Liberalization Policy is negatively related to Output Growth in Nigeria within the period under review.

Stephen and Johanna (2016) researched on, “analyzing the Effects of Financial Liberalization on Zambia’s Economic Growth”. The variables employed are GDP, Financial Liberalization Index, Gross Fixed Capital Formation. The author used ADF Unit Root Test, Co-integration and Error Correction Method. The finding indicated that Financial Liberalization Index and Economic Growth are positively used in the long-run.

Agbaeze and Onwuka, (2014) investigated “Financial Liberation and Investments: the Nigeria experience”. The variables used are Investment, Public Sector Credit, Private Sector Credit, Liquidity Liabilities, Stock Market Capitalization .the Time Series Linear Multiple is used in the regression analysis. The finding is that empirical data from Nigeria shows that investment especially private sector investment has not improved following the financial liberalization in the country in the late 1980.

Owolabi, (2014) researched on Effect of Financial Sector Liberalization on Bank Performance in Nigeria (1971-2011). The variables used are Return on Equity, Return on Capital Employed, Earning Per Share, Interest Rate, Exchange Rate, Real Financial Savings. The finding is that the effect of financial sector liberalization on bank performance in Nigeria is significant for the period studied.

Osa-Afina and Kelikume (2015) studied the Impact of Banking Sector Reforms and Credit Supply on Agricultural Sector Evidence from Nigeria. The variables used are animal growth rate of agricultural growth, percentage ratio of broad money to gross domestic product, loans and advance to agricultural sector. The result revealed that both the banking sector reform and credit supply to agricultural sector have positively affected agricultural output on Nigeria.

Thmba and Bonu (2014), worked on the Impact of Liberalization on the Regulation of Banking Sector: Case Study of Botswana Banking Sector. The variables used by the study are Existing eight Commercial Banks evidence from other sources such as annual reports, observations. The method used is data screening process and the finding is that banking sector has grown considerably in size over the years as a result of liberalization measures.

Joseph, Robin and Peter (2010) studied Financial Liberation on the Access to Credit by Ghana Household. The authors employed these variables- household propensity to borrow, income, expenditure, employment, and the method used in the research is a survey method and the results are consistent with household credit decision being determined by life cycle considerations.

Awoyemi and Dada (2015) studied the Effect of Financial Sector Reforms on Nigeria Economic Growth. The variables used are Gross Domestic Product, Credit Allocations to Private Sector, Investment Rate and Prime Lending Rate. Ordinary Least Square Method was used in the analysis. The finding is that credit to private sector; investment and prime lending rate have significant positive impact on economic growth in Nigeria.

Onwumere, Okoro and Imo (2012) researched on the Impact of Interest Rate Liberalization on Savings and Investment Evidence from Nigeria. The variables employed Aggregate Savings Rate, Real Deposits Rate, Investment Rate, Real Lending Rate and the method used in analysis is Simple Linear Regression Model. The study reveals that interest rate liberalization has negative non-significant impact on investment in Nigeria.

Dada (2015), researched on the Effect of Financial Sector Reforms on the Growth of Manufacturing Sector in Nigeria. The study employed the following variables, Real Manufacturing Output, Credit to Private Sector, Real Rate of Interest, Real Market Capitalization, Real Total Deposit, Co-integration and Granger Causality Techniques were used in the analysis. The finding is that financial sector reform has direct effect on the growth of manufacturing sector in Nigeria.

METHODOLOGY

3.1 Research Design, Nature, Sources and Scope of Data

The study employs ex-post facto research design. Annual time series secondary data collected from CBN Statistical Bulletin are used for the analysis. The data used in the analysis cover the period 1986 to 2017.

3.2 Description of Variables

3.2.1 Financial Liberalization

Financial system is developed faster, when the rules and regulations, mostly as regards to the interest rate and credit allocations are liberalized or removed. Financial liberalization helps to improve the functioning of financial system by increasing the availability of funds and allowing risk diversification and increased investment. The indices of financial liberalization are as follow:-

3.2.2 Prime Lending Rate (PLR)

This is an interest rate at which bank lends to their favoured customers, that is those with good credit rating.

3.2.3 Deposit Rate (DR)

The term deposit rate refers to the amount of money paid out as an interest by bank or financial institution on deposits. Bank pay deposit rate on saving and other investment accounts.

3.2.4 Money Supply (% of GDP)

The money supply (or money stock) is the total value of monetary assets available in an economy at a specific time. They are several ways to define "money" but standard measure usually include currency in circulation and demand deposits.

3.2.5 Liquidity Ratio (LQR)

Liquidity ratio is the percentage of deposit liabilities which the commercial deposit money bank must hold in form of liquid asset. The liquidity ratio was fixed by act of 1962 . It is the percentage of CBN (amendment) deposit liabilities which the deposit money bank must hold in its form of liquid asset.

3.2.6 Exchange Rate (EXR)

Exchange rate is the rate one can offer currency for another. Exchange rate policy involves choosing an exchange rate at which foreign transaction will take place.

3.3 Model Specification

3.3.1 Financial Liberalization and Agricultural Sector Output Model

The model of this study depends on the work of Owolabi, (2014) who used exchange rate, real financial savings and nominal interest rate as the indicators of financial liberalization and was represented in econometric model as $ROE = \beta_0 + \beta_1 INTR + \beta_2 EXR + \beta_3 RFS + \mu$. This study therefore

sought to examine the causal relationship between the Financial Liberalization and Growth using Prime Lending Rate, Deposit Rate, Exchange Rate, Money Supply as Percentage of Gross Domestic Product and Liquidity Ratio. Therefore this study has the functional model for objective three as shown below.

$$AOG = F(PLR, DR, EXR, RMS, LQR) \dots \dots \dots (5)$$

The above function can be presented in mathematical equation form as

$$AOG = \beta_0 + \beta_1 PLR + \beta_2 DR + \beta_3 EXR + \beta_4 RMS + \beta_5 LQR + \mu \dots \dots \dots (6)$$

Where β_0 = constant, $\beta_1 - 6$ = coefficient of the regression, μ = error term, PLR = Prime Lending Rate, DR = Deposit Rate, EXR = Exchange Rate, RMS = Money Supply as percentage of Gross Domestic Product, LQR = Liquidity Ratio.

3.4 Estimation Techniques

This study employed time series data and this necessitated stationerity tests in order to avoid spurious regression. Sequentially, the Unit Root Test (Stationery) is followed by the Co-integration procedure to examine whether there is existence of long run relationship between variables of financial development. The Error Correction Model (ECM) was used to provide information on the long run and short run relationships as well as the speed of adjustment between the two variables. Causality Test was also employed to found out if there is evidence of causal relationship between the specific financial development variables and agricultural sector output in Nigeria.

4.0 PRESENTATION AND ANALYSES OF DATA

To investigate the Causal Relationship between Financial Liberalization Policy and Agricultural Sector Output in Nigeria.

Tables 1:- Nigeria Macroeconomic Variables on the Relationship between Financial Liberalization Policy Variables and Agricultural Sector Output in Nigeria

	LnAOG	PLR	DR	RMS	LQR	EXR
1986	8.001969705	10.50	9.50	11.8	36.4	51.89
1987	7.969590276	17.50	14.00	11.1	46.5	14.72
1988	8.062926718	16.50	14.50	12.0	45.0	12.97
1989	8.109509752	26.80	16.40	11.0	40.3	8.88
1990	8.150386022	25.50	18.80	10.6	44.3	7.72
1991	8.186140723	20.01	14.29	12.7	38.6	6.34
1992	8.209252038	29.80	16.10	12.2	29.1	3.74
1993	8.227820574	18.32	16.66	13.1	42.2	2.97
1994	8.253143124	21.00	13.50	13.1	48.5	2.96
1995	8.288379077	20.18	12.61	10.0	33.1	0.74
1996	8.326891448	19.74	11.69	9.2	43.1	30.17

1997	8.367690275	13.54	4.80	10.1	40.2	28.83
1998	8.406315569	18.29	5.49	10.6	46.8	28.32
1999	8.456092739	21.32	5.33	11.9	61.0	73.91
2000	8.48487064	17.98	5.29	12.7	64.1	77.21
2001	8.522089606	18.29	5.49	15.6	52.9	81.30
2002	8.964066937	24.85	4.15	13.3	52.5	88.95
2003	9.031791542	20.71	4.11	14.7	50.9	100.63
2004	9.092521843	19.18	4.19	12.3	50.5	107.07
2005	9.160834063	17.95	3.83	11.8	50.2	106.58
2006	9.232344005	17.26	3.14	13.3	55.7	105.02
2007	9.301867873	16.94	3.55	15.5	48.8	106.41
2008	9.362664039	15.14	2.84	20.5	44.3	79.69
2009	9.419816999	18.99	2.68	21.3	30.7	94.30
2010	9.476458566	17.59	2.21	20.2	30.4	96.74
2011	9.505200031	16.02	1.41	19.3	42.0	102.30
2012	9.570089978	16.79	1.70	19.4	49.7	98.08
2013	9.599033833	16.72	2.17	18.9	63.2	95.64
2014	9.640848557	16.55	3.38	19.9	38.3	94.05
2015	9.677353292	16.93	3.50	20.1	42.3	102.00
2016	9.717599885	17.08	4.18	21.3	46.0	131.30
2017	9.723888433	17.13	4.21	21.6	47.7	169.77

Source: CBN Statistical Bulletin of various years

Table 2:- Unit Root Test

The results of the Unit Root Test of Financial Liberalization Variables and Agricultural Sector Output in Nigeria

S/N	Variables	At level	At 1 st difference	At 2 nd difference	Order of ()	Results		
						At level	At 1 st different	At 2 nd difference
1	PLR	-	- 5.785241	-	1(1)	Not significant	Significant	Significant
2	DR	-	- 6.549942	-	1(1)	Not significant	Significant	Significant
3	RMS	-	- 4.838714	-	1(1)	Not significant	Significant	Significant
4	EXR	-	- 5.667904	-	1(1)	Not significant	Significant	Significant

5	LQR	-	- 6.090459	-	1(1)	Not Significant	Significant	Significant
6	LnAOG	-	- 5.201722	-	1(1)	Not significant	Significant	Significant
	At 5% l.s	-	- 3.574244	-				

Source: Authors computation using E-view 10 computer package

The figures from the above table are quite revealing that all the Financial liberalization variables are stationary at their first differencing at critical value of 0.05. It therefore become imperative to also examine if the variables could be Co-integrated at long run (have long run relationship). Using Engle and Granger Co-integration test, we have the below table.

Table 3:- Co-integration Test of Financial Liberalization Variables and Agricultural Sector Output

Null Hypothesis: RESID01 has a unit root		
Exogenous: Constant, Linear Trend		
Lag Length: 2 (Automatic - based on SIC, maxlag=7)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.744605	0.0356
Test critical values: 1% level	-4.323979	
5% level	-3.580623	
10% level	-3.225334	
*MacKinnon (1996) one-sided p-values.		

Source: Authors computation using E-view 10 computer package

The p-value of the ADF test is 0.0356 which is less than 0.05 critical value and the value of Augmented Dickey-Fuller (ADF) at -3.744605 > the value of critical values -3.580623 at 0.05 which is considered at absolute terms indicates the possibility of co-interaction of the financial liberalization variables and agricultural sector output at the long-run at 5% level of significant. Therefore, the null hypothesis which states that there is no long run equilibrium relationship between the variables is rejected.

Table 4: Error Correction Model of Financial Liberalization Variables and Agricultural Sector Output

Dependent Variable: D(LNAOG)				
Method: Least Squares				
Date: 05/12/18 Time: 04:24				
Sample (adjusted): 1986 2017				
Included observations: 30 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.008439	0.084382	-0.100008	0.9212
PLR	0.003266	0.004321	0.755961	0.4573
D(DR)	-0.012019	0.007136	-1.684211	0.1057
D(RMS)	-0.003011	0.008969	-0.335730	0.7401
D(EXR)	0.000905	0.000969	0.934074	0.3600
D(LQR)	-0.001096	0.001489	-0.736019	0.4692
ECM(-1)	-0.192145	0.079857	-2.406133	0.0246
R-squared	0.322027	Mean dependent var	0.057188	
Adjusted R-squared	0.245165	S.D. dependent var	0.076076	
S.E. of regression	0.070338	Akaike info criterion	-2.270059	
Sum squared resid	0.113789	Schwarz criterion	-1.943113	
Log likelihood	41.05088	Hannan-Quinn criter.	-2.165466	
F-statistic	1.820778	Durbin-Watson stat	1.884000	
Prob(F-statistic)	0.139239			

Source: Authors computation using E-view 10 computer package

Considering the result of ECM in the regression equation, we have $LnAOG = -0.008439 + 0.003266PLR - 0.012019DR - 0.003011RMS + 0.000905EXR - 0.001096LQR$. The signs of the coefficient of the independent variables, indicates that changes in DR, RMS and LQR are having negative effect on the dependent variables (AOG) while the changes in PLR and EXR are having positive effect on the Agricultural sector output. The P-value (0.0246) of the ECM shows the existence of short run relationship among the variables. The P-value of the independent variables indicates that none of the independent variables is having statistical significant effect on the dependent variables (AOG). Adjusted R-Squared with value 0.245165 indicates that the 25% of the changes that occur in the dependent variables (AOG) are influenced by the changes in the independent variables. The probability (F-statistic) value of 0.139239 shows that all the variables of financial liberalization put together have no statistical significant relationship with agricultural sector output growth in Nigeria. The Durbin-Watson value 1.884000 which is within the range of 1.5 and 2.5 indicates absent of positive first order serial correlation.

4.1 Model Estimation

The result of Pairwise Granger Causality test was used to address the objective three of the study. The model results were used to answer question three and hypothesis three.

Table 5:- Pairwise Granger Causality Test for hypothesis three: Financial Liberalization Policy Variables does not predict the Agricultural Sector Output in Nigeria.

Pairwise Granger Causality Tests

Date: 05/12/18 Time: 10:15			
Sample: 1986 2017			
Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Prob.
PLR does not Granger Cause LNAOG	30	0.00013	0.9911
LNAOG does not Granger Cause PLR		6.64953	0.0157
DR does not Granger Cause LNAOG	30	1.80831	0.1899
LNAOG does not Granger Cause DR		1.19468	0.2840
RMS does not Granger Cause LNAOG	30	0.43268	0.5162
LNAOG does not Granger Cause RMS		6.53499	0.0165
EXR does not Granger Cause LNAOG	30	3.58831	0.0689
LNAOG does not Granger Cause EXR		3.81056	0.0614
LQR does not Granger Cause LNAOG	30	1.68742	0.2049
LNAOG does not Granger Cause LQR		0.00018	0.9895

Source: Authors computation using E-view 10 computer package

The pairwise granger causality test on tables 14 is used to address objective three of the study. The aim is to investigate the relationship between the financial liberalization policy variables and agricultural sector output in Nigeria. The proxies used for Financial Liberalization are; Prime Lending Rate (PLR), Deposit Rate (DR), Money Supply as Percentage of Gross Domestic Product (RMS), Nominal Effective Exchange Rate (EXR), Liquidity Ratio (LQR). Hence, the objective three is presented in table 14 based on this following hypothesis

Demand-Following hypothesis

HO: P = 0, i.e, AOG does not granger cause PLR, DR, RMS, EXR, LQR

H1: P=1, i.e., AOG granger causes PLR, DR, RMS, EXR, LQR

Supply-Leading hypothesis

HO: P=0, i.e, PLR, DR, RMS, EXR, LQR do not granger cause AOG

H1: P=1, i.e, PLR, DR, RMS, EXR, LQR granger causes AOG.

The decision rule of the Pairwise Granger Causality test states that if the P- value of the estimate is higher than 0.05 critical value, we reject the alternative hypothesis and accept the null hypothesis. Also, when the F-statistic value is more than 3, the null hypothesis is rejected and vice versa.

The result of the equation one and two of this objective three are the same since their dependent and explanatory variables are the same.

The result of Pairwise Granger Causality test in equation three reveals the existence of unidirectional causality running from AOG to RMS. Therefore, there is existence of demand following hypothesis. Thus, agricultural sector output in Nigeria spurs the total money supply in Nigeria.

The result in the equation four (4) proves bi-directional causal relationship existing between EXR and AOG, in that Nominal Effective Exchange Rate (EXR) predicts Agricultural Sector Output in Nigeria (AOG) while causality also flows from AOG to EXR. Thus, there is feedback relationship from each of the variables.

The F- statistics and P- value of equation five (5) shows no evidence of casual relationship between the LQR and AOG. This indicates that liquidity Ratio (LQR) and agricultural sector output are independent of each other and therefore cannot cause change on each other.

The results of the Pairwise Granger Causality test are in accordance with the results of ECM of ordinary least square which revealed that PLR, DR, RMS, EXR and LQR with P-values of 0.4573, 0.1057, 0.7401, 0.3600 and 0.4692 respectively do not any significant effect on agricultural output in Nigeria. Thus, the prob. (F-statistic) value of 0.139239 showed that all the variables of financial liberalization put together have no significant relationship with the dependent variable and this gives a strong support to the model estimation of the Pairwise Granger Causality Test of the objective three.

4.2 DISCUSSION OF RESULTS

The figures of the results of Unit Root Test is quite revealing that the Prime Lending Rate (PLR), Deposit Rate (DR), Ratio of Money Supply (RMS), Exchange Rate (EXR), liquidity Ratio (LQR) and Agricultural Sector Output (AOG) are all stationary at their first orders at 5% critical value. While the result of the Co-integration test revealed that Financial Liberalization variables and Agricultural Sector Output have long-run equilibrium relationship.

Error Correction Model (ECM) result showed that changes in DR, RMS, LQR, will be having negative contributions to the dependent variables (AOG) while the changes in PLR, and EXR are having positive contributions to the AOG. Adjusted R-squared with value 0.245165 indicates that the 25% of the changes that occur in the AOG are influenced by the changes in the independent variables. PLR, DR, RMS, EXR and LQR are not having any significant effect in explaining the changes in the agricultural sector output in Nigeria. The Prob. (F-statistics) value 0.139239 shows

that all the variables of financial liberalization put together have no statistical effect on the agricultural sector output in Nigeria.

The result of Granger Causality test showed neutral causality hypothesis between the Deposit Rate (DR), Liquidity Ratio (LQR) and Agricultural Sector Output in Nigeria, hence, the dependent variables and independent variables (DR and LQR) are independent.

The causality between the Financial Liberalization variables and Agricultural Sector Output (AOG) in Nigeria between 1986 and 2017 provided more support for the demand following hypothesis. Hence, Agricultural Sector Output (AOG) predicts Prime Lending Rate (PLR), Exchange Rate (EXR) and Ratio of Money Supply to GDP (RMS). This is not in accordance with a priori expectation, though, it supports the conclusions of Robinson (1952), Lucas (1988), Odhiambo (2008), Omotor (2007), Kar and Pentecost (2000). The results of the Pairwise Granger Causality Test are in accordance with the results of ECM which revealed that PLR, DR, RMS, EXR, and LQR with P-values of 0.4573, 0.1057, 0.7401, 0.3600 and 0.4092 respectively do not have any significant effect in explaining the changes in agricultural sector output in Nigeria within the period of study. This may be contributed to the fact that Nigerian financial system is not well structured and not yet developed, though the causality running from the agricultural sector output to financial development is indicating that enhancement and improvement of agricultural sector output will lead to more standard and development financial system in Nigeria by improving on the Prime Lending Rate (PLR), Exchange Rate (EXR) and Total Money Supply (RMS) in the country.

5.0 SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary of Findings

The study had investigated the Causal Relationship between Financial Liberalization and Agricultural Sector Output in Nigeria. The results from Error Correction Model and Pairwise Granger Causality Test can be summarized according to the objectives of the study as follows:-

- The result of Co-integration analysis indicated that Financial Liberalization and Agricultural Sector Output have long-run significant effect on one another.
- The co-efficient of adjusted R-squared showed that Financial Liberalization explains 25% of changes in Agricultural Sector Output in Nigeria. Hence, it is a very poor financial tool for improving AOG.
- The P-value of ECM indicated that DR, PLR, RMS, EXR and LQR are not having statistical significant effect on the Agricultural Sector Output changes in Nigeria.
- Prob. (F-statistics) co-efficient of 0.139239 indicated that all the indicators of the independent variables put together have no significant effect in explaining the changes in dependent variable.
- Causality Test indicated that there is no causality between DR, LQR and AOG, hence the independent and dependent variables are independent of each other.

- The result of Granger Causality showed more support for demand following hypothesis. Thus, AOG predicts PLR, EXR, RMS.

5.2 Conclusion

Again, Financial Liberalization as an indicator of financial development has had both beneficial and adverse implications on the dependent variable, though the ECM implies that Financial Liberalization has no significant effect in explaining the changes that occurs in the AOG. The Granger Causality Test showed more support for demand following hypothesis, thus, this study concludes that AOG spurs Financial Liberalization. Therefore, Financial Liberalization is not a good financial policy to be used for improvement of Agricultural Sector Output in Nigeria.

5.3 Recommendations

The findings of this study informed the following recommendations:

(1) The establishment of functional practical agricultural institutions and agro-firms in Nigeria for production of agricultural products. Encouragement of privately owned cottage and micro firms that will be employing the skilled man power trained by the agricultural institutions and also make use of the agricultural sector output produced by the agro-firms as their raw materials. Encouragement of farmers through; soft credit facility, tax free at their early stage of establishment, reduce the total cost incurred by cottage farmers and firms through reducing the number of levies on them like; lending rate, power bills, bill board levy, minor industry levy, state development levy, sanitation levy, advertisement levy, business premises etc.,. When levies are eventually paid, the government should also ensure that the services paid for are rendered. Government should also ensure the provision of social amenities to farmers like; road, power supply, security, water. Policy makers should ensure monitoring of the policies and schemes meant for the agricultural sector to avoid diversion or politicizing by the leaders and officials.

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