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Financial deepening and agricultural sector output in Nigeria

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Abstract
This study examines the Causal Relationship between Financial Deepening 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 the analyses. In the model, Financial Deepening is proxied by Prime Lending Rate, Deposit Rate, Ratio of Financial Savings to GDP, Ratio of Private Sector Credit to GDP, Ratio of Money Supply to GDP, Results of the analyses revealed that, The adjusted R-squared indicated that Financial Deepening explains 25% of changes in Agricultural Sector Output in Nigeria, Prob. (F-statistics) of 0.325377 and the result of Granger Causality showed that AOG, granger causes PLR, RFS, RPSC, RMS indicating evidence of demand following hypothesis (AOG leads Financial Deepening). The study therefore recommends establishment of functional agro-firms and encouragement of private owned cottage and micro firms that will employ the skilled labour and also make use of the agricultural sector output as their raw materials.

Keywords: financial deepening, ratio of financial savings to GDP, ratio of private sector savings to GDP, ratio of money supply to GDP, agricultural sector output

1. Introduction

1.1 Background of Study

Financial deepening is to improve economic performance through increased competitive efficiency within financial market thereby indirectly benefitting nonfinancial sector of the economy (Torruan, Chiawa & Abur 2003). Thus, there is a correlation between financial development and enhancement of life of people in the society. According to Nobuhiro and Moore (2005) [24], economists have long held the view that the development of the financial system (financial deepening) and economic development are closely intertwined. Nzotta and Okereke (2009) [25] ascertained that financial deepening is the ability of financial institutions in an economy to effectively mobilize savings for investment purposes. Therefore, financial development vigorously attract the reservoir of savings and idle funds and allocate same to entrepreneurs, business owners, household and government for investment, project and other purposes with a view of return which form the basis for economic growth.

1.2 Statement of the Problem

Over the years, the growth of the agricultural sector in Nigeria declined despite the various efforts and policies of the government at revamping the financial system of the nation. Yet, it is then obvious that the financial deepening has a close relationship with the various sectors of the economy, more especially, the agricultural sector in a developing nation like Nigeria. In the traditional sense, financial deepening generally means an increased ratio of money to GDP or some other price index. Another point of view contend that financial deepening refers to liquid money and generally, the more the availability of liquid money, the more the growth potentials of the economy (Nzotta, 2014) [26]. Therefore, providing of funds to agricultural sector and the impact of the fund on the sector has been an area of controversy. It is evident that despite notable allocation of funds to the Nigeria agricultural sector and making financial policies that will favor the sector, agriculture output still declines, no improvement on economic growth and poverty remain inherent for many years. Despite this paradoxical scenario, there is need to conduct the empirical researches to examine the relationship of various policies that are meant to improve the economy and enhanced the growth of agricultural sector in Nigeria in particular.

The argument is weather financial deepening relationship with the growth of agricultural output in Nigeria follows the "supply leading hypothesis", "demand following ", "feedback" or "neutral" hypothesis.

The issue of direction of causality between finance and growth remains unsettled between the four leading hypothesis. In other way, empirical findings revealed that different researchers came up with varieties of findings and conclusions depending on their environment and background of their studies. It thus calls for empirical studies to further explain the relationship between the financial deepening and growth in the developing nation like Nigeria.

1.3 Objectives of the Study

The broad objective of the study is to examine the relationship between financial deepening and agricultural sector output in Nigeria. The specific objectives are to:

1. Examine the relationship between prime lending rate and the growth of agricultural sector output in Nigeria.
2. Ascertain the relationship between deposit rate and the growth of agricultural sector output in Nigeria.
3. Determine the relationship between the ratio of financial savings to GDP and the growth of agricultural sector output in Nigeria.
4. Investigate the relationship between the ratio of private sector credit to GDP and the growth of agricultural sector output in Nigeria.
5. Ascertain the relationship between the ratio of money supply to GDP and the growth of agricultural sector output in Nigeria.

2. Review of Related Literature

2.1 Conceptual Framework

2.1.1 Financial Deepening

Most often, the government improves on its financial system through its intervention by promulgating of law, regulations and policies. The main emphasis of financial policies lies on the financial development of a country (Shrestha, 2005) [32]. Hence a highly developed financial system is regarded as a catalyst to economic growth and development. Some of these processes, concept and policies have been put in place by Nigerian government in the cause of trying to achieve an effective financial development; financial deepening, financial inclusion, financial liberalization, financial intermediation cashless policy and various financial reforms

Financial deepening is the ability of financial institutions in an economy to effectively mobilize savings for investment purposes. Therefore, financial deepening attracts the reservoir of savings and idle funds and allocates same to entrepreneurs, businesses, households and government for investments, projects and other purpose with a view of returns which form the basis for economic growth (Nzotta & Okereke, 2009) [25]. It is to improve economic performance through increased competitive efficiency within financial market thereby indirectly benefiting non – financial sectors of the economy (Torruan, Chiawa & Abur, 2003). There is correlation between financial deepening and enhancement of life of people in the society. Economists have long held the view that the development of the financial system (financial deepening) and economic development are closely intertwined (Nobuhiro & Moore, 2005) [24]. Interestingly, the level of financial development is not measured by its contribution to GDP but rather by outstanding credit to the private sector relative to GDP. Certainly an imperfect measure of financial intermediation, but the one that gets closer to the functions of finance, as described by Ross Levine and others include: (i) Easing the exchange of goods and services (ii) mobilizing and pooling savings from a large number of depositors, (iii) allocating society's saving to its most productive use, and (iv) diversifying and reducing liquidity and inter temporal risk (Thorsten, 2009) [35].

2.2 Theoretical Framework

2.2.1 Financial Development Theory

The development theory is anchored on supply-leading hypothesis which states that financial development drives the economic growth rate and also the demand-following hypothesis that posits growth leading the financial development. According to Agu and Chukwu (2008) [2], the leading proponent of the supply-leading hypothesis is Schumpeter (1911), supported by Calderon and Liu (2003) [6], Gurley and Shaw (1967), King and Levine (1993) [17] and MCkinnon (1973) [21], among others. The other hypothesis which states that financial development respond to change in the real sector and growth (demand-following hypothesis) was argued out by Robinson. According to Robinson (1952) [29], the economic development promotes financial system and services. He reveals that it is the necessity from high economic growth that creates demand in the financial sector. Thus, in his view, it is the improvements in the economy that influences higher demand for the use of money.

2.3 Empirical Review

2.3.1 Financial Deepening and Agricultural Sector Output Nexus

Sanni (2012) examines Foreign Capital Inflows, Financial Deepening and Economic Growth in Nigeria for the period 1986-2009. The independent variables used for the study are real gross domestic product, total capital inflows, and money supply. in the research, he used Johnsan-Juselius Co-integration Test and in his result, he suggests that foreign capital inflows, financial deepening, and economic growth are positively co-integrated and that there exits at least one co-integration vector at 5% level of significance which shows that there is a long run causality between the variables. The empirical result reveals that foreign capital inflows and financial deepening contribute to economic growth in Nigeria; hence, economic policy should focus on issues that will improve foreign capital inflows and the depth of the financial system. The direction of Causality between Financial Development and Economic Growth as examined by Calderon and Liu (2003) [6], in their study, they used Geweka decomposition test on pooled data of 109 developing and industrialized countries from 1960 to 1994. The result of the analysis shows that financial development generally drives the economic growth; the Granger causality from financial development to economic growth and granger causality from economic growth to financial development are bidirectional. The study posits that the financial deepening contributes more of causality to economic growth of developing nations than that of developing economies. Sunde (2012), studied the Nexus between Financial Sector Development and Growth in South Africa. The study made use of co-integration and error connection modeling and Granger Causality Test. The result of the analysis indicates that economic growth is led by the financial sector variables showing that there is generally bidirectional causality between economic growth and financial sector development which shows that if the economy grows, the financial sector will be afflicted positively and vice versa. Adelekuu (2010) empirically researched on the "Relationship between Financial Development and Economic Growth" using Annual Growth of Gross Domestic Product (GDP), Real Interest Rate (R), the Ratio of Gross Domestic Savings to GDP(S), the Ratio of Domestic Credit of Private Sector to GDP (P), the Ratio of Liquidity Liabilities to GDP (M), the Ratio of Gross Fixed Capital formation to GDP(I), and Trade Openness (T).The analysis was done using Ordinary Least Squares Estimation Method (OLSEM). The result showed that there is a sustained positive effect on financial development on economic growth in Nigeria. The average casualty test showed that financial development promotes economic growth, but there is evidence of causality from economic growth to the development of financial intermediary. Fatima (2004) investigates "The Causal Relationship between Financial Deepening and Growth in Morocco for the period, 1920-2000". Some of the variables used to proxy financial deepening in the study are the Ratio of Domestic Credit provided by the Banking Sector to GDP, the Ratio of Liquid Liabilities (M_3) to GDP and Domestic Credit. The study found a short run relationship between financial deepening and economic growth using granger

causality test. Jayaratna and Strahan (1996) [15] studied "the Financial Growth Nexus. Evidence from Bank Branch Deregulation" affirmed that financial development impact positively on economic growth but with a clause that there is an improvement in the quality of bank lending. Using the bank deregulation reform in the United State (US) as a case study, it was established that the rate of real per –capital growth in income increased significantly. This impact of the reform in the financial system on economic growth was attributed to the improvement in the quality of bank lending, and not the increase in volume of bank lending. In contrast to the supply – leading hypothesis, many researchers have proved that the financial system develops in response to the improved economic growth. Omoto (2007) [28] in his study, used annual data for Nigeria over the period 1970-2002 to construct a Multivariate Vector Auto-Regression (VAR) Model and Granger Causality Tests using Real GDP, Net Domestic Credit, Net Investment Trade, Openness and Human Capital Investment. He established that financial development and economic growth exhibit one way causality. The empirical result indicates that the direction of relationship between financial development and economic growth is running from growth to financial development. Torruam, Chiawa and Abur (2013) examined "the Impact of Financial Deepening and Economic Growth in Nigeria" trying to find the casual relationship between financial deepening and economic growth in Nigeria for the period of 1990-2011. The tests employed were ADF, Co-integration and Granger Causality Tests. The result suggests that there is unidirectional causality running from economic growth to financial deepening in Nigeria. The study concludes that financial deepening has an impact on economic growth in Nigeria. Similarly there are some other studies that neither support the supply leading view nor demand following hypothesis of causality and some of them are Unalmis (2002) [37] who studied Causality between the Financial Deepening and Economic Growth in Turkey. Granger Non- causality in the Context of Vector Error Correction was used. The researcher found out that there exit bidirectional causality between financial deepening and economic development. Financial Development and Economic Growth in Nigeria was studied by Audu and Okumoko (2013) [4]. The study covered the period between 1970 and 2012. They estimated the long-run relationship between financial development and growth using the Johansen Full Information Maximum Likelihood Method. Empirical results show that all the variables used except Ratio of Money Supply to GDP (MGDP) and the Ratio of Credit issued to Non-financial Private Firms to Total Domestic Credit (CNFPF) positively influenced financial development and economic growth. The granger causality results indicated that there is unidirectional causality running from Lending Rate to Gross Domestic Product, Financial Depending to GDP. There is also a bi-directional causality exists between LCNFPF and LGDP as well as between RDEP and MGDP. A unidirectional causality also runs from Bank Credit to the Private Sector via GDP, MGDP, and the Ratio of Commercial Bank Deposit to Gross Domestic Product (RDEP).

2.4 Research Gap

2.4.1 Causality Hypothesis

The issue of direction of causality between Financial Development and Growth Nexus remains inconclusive between the four leading hypothesis.

2.4.2 Dependent Variable

It is evidenced from the empirical study that none of the studies used Agricultural Output Growth as dependent variable

2.4.3 Time Frame

None of the previous works studied empirically covered time frame and scope up to 2017.

3. Methodology

3.1 Research Design

The study employs ex-post facto research design. According to Kerlinger (1973) [16], ex-post facto design is a systematic empirical inquiry in which the investigator does not have direct control over the value of the variables included in the study.

3.2 Nature, Sources and Scope of Data

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. The period covered is informed by the availability of data of the main variables as well as the period structural adjustment programme was introduced in Nigeria.

3.3 Description of Variables

The variables specified in the sources of data above are defined below and their models and a priori relationship are also highlighted.

3.3.1 Financial Deepening (FID)

The financial system is developed when its services and products are deepened. Thus, it is the increase of financial assets supply in the economy targeting the improvement of the life of people in the society and the economy in general. The indicators of financial deepening are defined as follow:-

Prime Lending Rate (PLR)

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

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.

Financial Saving (% of GDP)

The term financial saving refers to income not used for immediate consumption. Such saving are typically place on deposit as savings and, or fixed term deposit in a bank.

Private Sector Credit (% of GDP)

Domestic credit to the private sector by deposit money banks represents the financial resources provided to the private sector by other depository corporations (deposit taking corporations except central bank), such as through loans, purchase of nonequity securities, and trade credit and other accounts receivables, that establish a claim for repayment.

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.

3.4 Model Specification

The model of financial deepening (M_2/GDP) depends on the work of Nzotta & Okereke (2009) where they used these proxies for financial deepening: - Financial saving /GDP ratio, private sector credit/GDP, value of cheques cleared to GDP ratio, value of cheques cleared to money supply, Rate of inflation, prime lending rate, currency out bank to money supply and Dummy which was represented in econometric modelas $\log MS_2/GDP=C_0+C_1(PLRA)+C_2.\log(FS/GDP)+C_3\log(CHEQ/GDP)+C_4\log(CHEQ/MS_2)+C_5\log(INF)+C_6\log(PSC/GDP)+C_7\log(DMBA/GDP)+C_8\log(COB/MS)+DUM$

Hence, this study sought to examine the relationship between Financial Deepening and Growth using Financial Deepening Index; Prime Lending Rate (PLR), Deposit Rate (DR), Ratio of Financial Savings to GDP(RFS), Ratio of Private Sector Credit to GDP (RPSC) and Ratio of Money Supply to GDP (RMS). However, the present study has the functional model for objective one as shown below.

$$AOG = F(PLR, DR, RFS, RPSC, RMS) \quad \ldots\ldots (1)$$

The above function can be rewritten in equation form as

$$AOG = \beta_0+\beta_1 PLR, + \beta_2 DR + \beta_3 RFS + \beta_4 RSC + \beta_5 RMS + \mu \quad \ldots\ldots (2)$$

Where β_0 = constant, β_{1-6} = coefficient of the regression, μ = error term, PLR = Prime Lending Rate, DR = Deposit Rate, RFS = Ratio of Financial Savings to GDP, RPSC = Ratio of Private Sector Credit to GDP and RMS = Ratio of Money Supply to GDP.

3.5 Estimation Techniques

3.5.1 Testing for Stationery/Unit Root

Prior to identifying any possible long run relationship, it will be important to test time series data for stationerity as the key concept underlying time series processes. According to Hlanganani (2012), (Brooks 2002), most economic variables are non-stationery in nature and yet the stationary properties can influence the behavior and properties of a series. Employing regression analysis on non- stationary series may lead to spurious (meaningless) results and useless conclusion (Gugerati, 2013).

3.5.2 Co - integration Test

Co – integration Test is a follow up to Unit Root Test in order to establish whether or not there exists any long – run relationship between the variables.

Though, there are so many ways to test co-integration but the concept of Co-integration was first introduced by Granger (1981). Two time series are said to be Co-integrated if a linear combination of the two variables in stationery. The need for Co-integration test arises, when all the series of interest should be integrated of the same order, at least I (1) from stationery test.

3.5.3 Engle – Granger Co-integration Approach

The sequence of this approach starts by conducting a test between two non – stationery time series to determine if they are co – integrated of the order I (1). The test requires conducting Ordinary Least Squire (OLS) Regression. Saving the residuals and then running the ADF or PP tests on those residuals in order to determine whether or not it is stationery. If it is stationary at level, it indicates that there is existence of long run relationship and a follow up test will be conducted.

3.5.4 Error Correction Model (ECM)

According to Gujarati (2003) [11], Error Correction Mechanism (ECM) was first used by Sargan and later popularized by Engle and Granger corrects for disequilibrium. If variables X and Y are co-integrated; that is, there is a long-term or equilibrium relationship between the two variables of course in the short run there may be disequilibrium. Therefore, one can treat the error term as the "equilibrium error". The existence of long run co-integration equilibrium provides for short run fluctuation, in order to straighten out or absolve these fluctuations was made to apply the Error Correction Model (ECM) (Ibenta, 2008) [13].

3.5.5 Granger Causality

The next test to be employed in this study is the Granger Causality Test. Once the variables are found to be Co-integrated, this indicates that a long – run equilibrium relationship exists between growth and financial deepening. Therefore it is imperative to test the existence and direction of relationship between these variables. Granger Causality Test is needful in testing whether changes in one variable are a cause of change in another.

4. Presentation and Analyses of Data

Table 1: Nigeria's Macroeconomic Variables on the Relationship between Financial Deepening and Agricultural Sector Output presented below

	LnAOG	PLR	DR	RFS	RPSC	RMS
1986	8.00197	10.50	9.50	5.67472526	7.5	11.8
1987	7.96959	17.50	14.00	6.04905211	8.5	11.1
1988	8.062927	16.50	14.50	5.74322845	8.5	12.0
1989	8.10951	26.80	16.40	4.24939252	7.3	11.0
1990	8.150386	25.50	18.80	4.63041263	6.7	10.6
1991	8.186141	20.01	14.29	5.09352748	6.9	12.7
1992	8.209252	29.80	16.10	4.77452646	6.4	12.2
1993	8.227821	18.32	16.66	4.83657601	10.1	13.1
1994	8.253143	21.00	13.50	4.31854133	8.1	13.1
1995	8.288379	20.18	12.61	3.223534	6.2	10.0
1996	8.326891	19.74	11.69	3.05234819	6.3	9.2
1997	8.36769	13.54	4.80	3.74681822	7.7	10.1
1998	8.406316	18.29	5.49	3.5287047	7.7	10.6
1999	8.456093	21.32	5.33	4.55225632	8.1	11.9
2000	8.484871	17.98	5.29	4.97535298	7.7	12.7

2001	8.52209	18.29	5.49	5.55637104	9.4	15.6
2002	8.964067	24.85	4.15	4.90645337	8.2	13.3
2003	9.031792	20.71	4.11	4.92979587	8.2	14.7
2004	9.092522	19.18	4.19	4.60425845	8.2	12.3
2005	9.160834	17.95	3.83	5.91359996	8.3	11.8
2006	9.232344	17.26	3.14	6.0693896	8.0	13.3
2007	9.301868	16.94	3.55	8.16342756	11.2	15.5
2008	9.362664	15.14	2.84	10.5168419	17.7	20.5
2009	9.419817	18.99	2.68	13.0144254	20.7	21.3
2010	9.476459	17.59	2.21	10.90279	18.6	20.2
2011	9.5052	16.02	1.41	10.371343	16.9	19.3
2012	9.57009	16.79	1.70	11.2420338	20.4	19.4
2013	9.599034	16.72	2.17	10.745831	19.7	18.9
2014	9.640849	16.55	3.38	13.4056776	19.2	19.9
2015	9.677353	16.93	3.50	12.1124043	19.8	20.1
2016	9.7176	17.08	4.18	11.9686424	20.8	21.3
2017	9.724	17.13	4.21	11.953242	21.0	21.6

Source: CBN Statistical Bulletin of various years

Legend; PLR = Prime Lending Rate, DR = Deposit Rate, RFS = Ratio of Financial Savings to GDP, RPSC = Ratio of Private Sector Credit to GDP, and RMS = Ratio of Money Supply to GDP, LnAOG = Natural log. of the Agricultural Sector Output in Nigeria. The raw data from where this table is derived are at the appendix.

Table 2: Unit Root Test In order to establish the degree of integration, a Stationality Test is conducted using the standard Augmented Dickey Fuller (ADF) to avoid spurious result and conclusion. Unit Root Result of the Financial Deepening Variables and Agricultural Sector Output in Nigeria

S/No	Variables	At level	At fist different	Orders of ()	At level	At fist different
1	DR	-	-6.049942	1(1)at5%	Not significant	Significant
2	LnAOG	-	-5.201722	1(1)at5%	Not significant	Significant
3	PLR	-	-5.785241	1(1) at5%	Not Significant	Significant
4	RFS	-	-5.338022	1(1) at5%	Not significant	Significant
5	RMS	-	-4.838714	1(1) at5%	Not significant	Significant
6	RPSC	-	-4804401	1(1) at5%	Not significant	Significant
At 5% c.v		-	-3.574242			

Source: Authors computation using E-view 10 computer package

Form the above table of ADF results; we conclude that all the Financial Deepening variables and the independent variable are stationary at their first differencing at 5% critical level. It then became imperative to also examine if the variables could be co-integrated at long run (have long run relationship).this study therefore resorts to use Engle-Granger approach to Co-integration.

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

Null Hypothesis: RESID01 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.003375	0.0210
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

*MacKinnon (1996) one-sided p-values.
Source: Authors computation using E-view 10 computer package

Co-integrated test of financial deepening variables using Engle and Granger (1987) method of testing Co-integration indicated that p-value of ADF test is 0.0210. since the P-value is less than 0.05, we reject the null hypothesis that states no existence of long run equilibrium relationship between the independent and dependent variables, the Augmented Dickey Fuller (ADF) value -4.003375 is greater than -3.587527critical value at 0.05 level of significant in absolute terms. It is therefore concluded that the six (6) Co-integration financial deepening variables have long run equilibrium relationship at 5% significant level.

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

Dependent Variable: D(LNAOG)
Method: Least Squares
Date: 05/12/18 Time: 03:03
Sample (adjusted): 1986 2017
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.078581	0.088188	-0.891057	0.3821
D(DR)	-0.015754	0.007886	-1.997656	0.0577
PLR	0.006849	0.004450	1.539138	0.1374
D(RFS)	0.013518	0.017349	0.779198	0.4438
D(RMS)	-0.016900	0.012431	-1.359489	0.1872
D(RPSC)	0.008422	0.011036	0.763151	0.4531
ECM(-1)	-0.126866	0.085490	-1.483990	0.1514
R-squared	0.243586	Mean dependent var		0.057188
Adjusted R-squared	0.246261	S.D. dependent var		0.076076
S.E. of regression	0.074295	Akaike info criterion		-2.160577
Sum squared resid	0.126955	Schwarz criterion		-1.833631
Log likelihood	39.40865	Hannan-Quinn criter.		-2.055984
F-statistic	1.234438	Durbin-Watson stat		1.527874
Prob(F-statistic)	0.325377			

Source: Authors computation using E-view 10 computer package

Re-structuring the econometric equation to accommodate the Error Correction Model coefficient of the independent variables, we have LnAOG = -0.078581-0.015754DR +0.006849PLR +0.013518RFS -0.016900RMS +0.008422RPSC.The above equation indicates that PRL, RFS, RPSC have positive contributions to the dependent

variable while DR and RMS have negative contributions to AOG. These variables do not have short run relationship but co-integrated at the long-run, which means in the short-run, there was an error. Therefore, we need to know the speed at which the error could be adjusted. The significant of ECM (-1) holds that a negative and statistical significant Error Correction Model co-efficient is a necessary condition for the variables to Co-integrated. The ECM co-efficient of -0.126866 means that the speed at which the variables will attain a long-run relationship is 13%. The p-value of DR, PLR, RFS, RMS, RPSC shows 0.0577, 0.1374, 0.4438, 0.1872, 0.4531 respectively indicates that all the independent variables have no statistical significant effect on agricultural sector output in Nigeria. The value of adjusted R-squared 0.246261 of the model shows the co-efficient of multiple determinants. It indicates that 25% of the changes that occur in the dependent variable (AOG) are influenced by the changes in the independent variables; hence DR, PLR, RFS and RPSC do not have significant impact on AOG. Though the Prob. (F-statistic) value of 0.325377 indicates that all the independent variables combined together still have no significant effect on the dependent variable (AOG) and finally the Durbin-Watson statistic value of 1.527874 indicates the absence of auto correlation which shows the absent of positive first order serial correction.

Model Estimation

The result of the Granger Causality Test was used to address the objectives of the study. The models results were used to answer research questions and to test hypotheses.

Table 5:- Pairwise Granger Causality Test for hypothesis one: Financial Deepening has no Causal Relationship with Agricultural Sector Output in Nigeria.

Pairwise Granger Causality Tests
Date: 05/12/18 Time: 05:57
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
RFS does not Granger Cause LNAOG	30	0.28884	0.5954
LNAOG does not Granger Cause RFS		7.49949	0.0108
RMS does not Granger Cause LNAOG	30	0.43268	0.5162
LNAOG does not Granger Cause RMS		6.53499	0.0165
RPSC does not Granger Cause LNAOG	30	0.23527	0.6316
LNAOG does not Granger Cause RPSC		6.07853	0.0203

Source: Authors computation using E-view 10 computer package

The Causality Test on table 6 is used to address objective one of the study. The aim is to examine the relationship between the financial deepening and agricultural sector output in Nigeria. The proxies for financial deepening are Prime Lending Rate (PLR), Deposit Rate (DR), Financial Saving as a Percentage to Real Gross Domestic Products (RFS), Private Sector Credit as a Percentage to Real Gross Domestic Product (RPSC), and Money Supply as a Percentage to Real Gross Domestic Product (RMS). Hence, the objective one is presented in table 6 based on the following hypothesis

Demand-Following Hypothesis

HO: P = O, i.e. AOG does not granger cause PLR, DR, RFS, RPSC, EMS.

H1: P = 1, i.e. AOG granger causes PLR, DR, RFS, RPSC, RMS

Supply-Leading Hypothesis

HO: P = O, i.e. PLR, DR, RFS, RPSC, RMS do not granger cause AOG

H1: P = 1, i.e. PLR, DR, RFS, RPSC, RMS granger cause AOG

To accept the alternative hypothesis, the P- value needed to be within the critical value of 0.05 significant levels. Thus, there are four possible scenarios related to the direction of the causality between LnAOG and the financial deepening variables.

1. Unidirectional causality from financial development variables to LnAOG
2. Unidirectional causality from LnAOG to financial development variables.
3. Bi-directional causality or feedback from each other
4. Independence from each other otherwise known as no causality.

The results of the above analysis imply that F-statistics and the probability value of the first equation proved the existence of unidirectional causality from AOG to PLR. Therefore, there is existence of demand following hypothesis. Thus, Agricultural Sector Output (AOG) in Nigeria Granger Causes Prime Lending Rate (PIR)

The second equation implies that the F-statistics and P-value of the second equation indicate independence causality (i.e no causality). Therefore there is no existence of relationship between Deposit Rate (DR) and Agricultural Sector Output (AOG) in Nigeria during the period of 1986 to 2017. Equation three F statistics and probability results proved the existence of unidirectional causality from AOG to RFS. There is therefore existence of demand following hypothesis. Thus, Agricultural Sector Output (AOG) in Nigeria within the period of study granger causes Financial Saving as a Percentage of Real Gross Domestic Product (RFS). The F statistics and probability value of the equation four indicate that there is existence of unidirectional causality running from AOG to RMS. Hence, there is existence of demand following hypothesis. Thus Agricultural Sector Output (AOG) in Nigeria within the period of study granger causes money supply as a Percentage of Gross Domestic Products (RMS) The result of equation five implies that F statistic and probability value proved the existence of unidirectional causality running from AOG to RPSC. Hence, there is existence of demand following hypothesis. This indicates that Agricultural Output Growth (AOG) in Nigeria within the period of 1986 to 2017. Granger causes Private Sector Credit as a Percentage to Gross Domestic Product (RPSC). The results of the Causality Test are in accordance with the results of ECM of Ordinary Least Square which revealed that DR, PLR, RFS, RMS and RPSC with P-values of 0.0577, 0.1374, 0.4438, 0.1872 and 0.4531 respectively do not have any significant effect on agricultural output in Nigeria. Thus, the Prob. (F-statistic) value of 0.325377 shows that all the variables of financial deepening put together have no significant relationship with the dependent variable and this gives a strong support to estimation of the Pairwise Granger Causality Test of the objective one.

4.4 Discussion of Results

The results of this study were discussed in line with the results of ECM and Pairwise Granger Causality Analysis for each of the financial development indicators. This discussion was done to establish the nature of relationship existing between Financial Deepening and Agricultural Sector Output in Nigeria based on the stated objectives of the study. The Augmented Dickey Filler (ADF) results of Financial Deepening indicators and Agricultural Sector Output indicated that all the variables are stationary at their first differencing at 0.05 critical levels. This necessitated the use of co-integration. The co-integration test also revealed that the six (6) Co-integration financial deepening variables have long run equilibrium relationship at 5% significant level. The Error Correction Model (ECM) result showed that PRL, RFS, RPSC have positive contributions to the AOG while DR and RMS have negative contributions to AOG. The ECM co-efficient of -0.126866, means that the speed at which the variables will attain a long run relationship is 13%. The value of adjusted R-Squared at 0.246261 of the model showed that 25% of the changes that occur in the dependent variable (AOG) are influenced by the changes in the independent variables. All the financial deepening variables do not have significant impact on AOG and the Prob. (F-statistic) value of 0.325377 also indicated that all the independent variables combined together still have no significant effect on the dependent variables (AOG). Though, among the five variables of Financial Deepening indicators, it is only the Deposit Rate (DR) that showed no existence of causality with Agricultural Sector Output (AOG) in Nigeria during the period of study. The result of Pairwise Granger Causality Test also showed the existence of unidirectional causality from AOG to PLR, RFS, RMS, RPSC which is in accordance with the results of ECM of ordinary least square which revealed that DR, PLR, RFS, RMS and PRSC with P-values of 0.0577, 0.1374, 0.4438, 0.1872 and 0.4531 respectively do not have any significant effect on the agricultural output in Nigeria. This implies existence of demand following hypothesis in Nigeria during the period of study. Thus, Agricultural Sector Output spurs Prime Lending Rate (PLR), Financial Savings as a Ratio to GDP (RFS), Credit to Private Sector (RPSC), Money Supply (RMS). Therefore, the AOG predicts how sound and productive these financial deepening indicators will be. The enhancement and improvement on AOG by the Nigeria policy makers will lead to more productive financial development in Nigeria. Though, this result does not agree with the apriori expectation, but at the same time gives a strong support to the findings of Robinson (1952) [29], Lucas (1988) [19], Odhiambo (2008) [27], Muhammad and Muhammad (2010) [23], Iwedi and Igbanibo (2015) [14], who posit that financial development primarily follows economic growth. They assert by and large, it seems to be the case that where enterprise lead financial follows. The demand following hypothesis is more common in developing nations and this is attributed to the undeveloped nature of their financial sector and this result solidify the notion that agricultural sector is very significant and if enhanced will lead to more efficient and effective financial system that will eventually spurs the entire Nigerian economic system.

Hence, the causality between financial deepening and agricultural sector output in Nigeria 1986 to 2016 provided more support for the growth-leads-to-finance hypothesis. Nigeria as a nation has been concentrating more on development of the financial system that yields no positive result which may be attributed to thyme fact that agriculture sector of the nation has been almost abounded without considering its causality effect on finance and entire its economy

5. Summary of Findings, Conclusion, and Recommendations

5.1 Summary of Findings

The study had investigated the Causal Relationship between Financial Deepening 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 Co-integration Test result indicated that ADF value is greater than 0.05 critical value at absolute terms. Hence, Null Hypothesis (H_O) is rejected.
- The adjusted R-squared co-efficient of determination indicated that Financial Deepening explains 25% of changes in Agricultural Sector Output in Nigeria and hence is a veritable tool in increasing Agricultural Sector Output in Nigeria.
- The P-value of ECM indicated that DR, PLR, RFS, RMS and RPSC are not having statistical significant effect on the AOG.
- Prob. (F-statistics) co-efficient of 0.325377 indicated that explanatory variables put together have insignificant effect on the dependent variable. Therefore, Alternative Hypothesis (H_1) is rejected.
- The Granger Causality Test indicated that there is no evidence to support the existence of causal relationship between AOG and DR in the study.
- The result of Granger Causality showed more support for the existence of unidirectional causal relationship running from AOG to Financial Development, hence, AOG, granger causes PLR, RFS, RPSC, RMS indicating evidence of demand following hypothesis (AOG leads Financial Development).

5.2 Conclusion

Specifically, based on the result of the ECM analysis and interpretation, it was found that Financial Deepening has not contributed much and not statistically significant in explaining the total changes in the agricultural sector output in Nigeria. The Granger Causality Test also revealed that Agricultural Sector Output (AOG) predicts the Financial Deepening. The study therefore concludes that the Nigerian government and their policy makers should concentrate more on the development of agricultural sector, this in turn will lead to more efficient and effective prime lending rate, savings attitude, increase the quantity and quality of money supply, enhanced private sector credit, improvement on exchange rate, effective mobile payment transaction and improved financial development that will in turn lead to economic growth.

5.3 Recommendations

The findings of this study informed the following recommendations:

(1) The policy makers should initiate policies that will promote the development of Agricultural Sector Output and eliminate obstacles that hinder growth and deepen the robustness and competiveness of the agricultural sector business in Nigeria, the establishment of functional practical

agricultural institutions in Nigeria. Establishment of functional agro-firms and encouragement of private owned cottage and micro firms that will employ the skilled labour and also make use of the agricultural sector output 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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