Impact of Financial Sector Development on Agricultural Productivity in Nigeria

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Abstract

Agriculture plays key roles in Nigerian economy as it serves as a source of food to people and raw materials to industries. This study examined the impact of financial sector development on agricultural output in Nigeria, using ARDL estimation technique. It employed money supply, credit to private sector and loans to agricultural sector as indicators of financial development, while using proportion of GDP to agricultural sector as a proxy for agricultural output in Nigeria. The annual data used cover the period of 1981 – 2020. It is found in the study that agricultural sector loans have negative impact on agricultural output in both short and long-run. Then, the study also found that adjusted money supply (adjusted M_2) has positive impact on agricultural sector output in the long run in Nigeria. It was concluded that financial sector development has impact on agricultural productivity in Nigeria.

Keywords: Agriculture, Financial development, ARDL

JEL Classification: F02, E13, C22

1. Introduction

Agriculture is the source of food to man and raw materials for agro-allied industries. It comprises of all forms of farming including cultivation of land, fishing, livestock and rearing of animals, poultry and forestry. Egwu (2016) and Anyanwu (1997) asserted that agriculture provide gainful employment from which the teeming population of the country can make ends meet, and provide the nation's industries with local raw materials and reliable source for government revenue. Agriculture contribute largely to GDP in Nigeria and small- scale farmers play important role in this contribution (Rahji & Fakayode 2009). Though their productivity and growth are adversely affected by limited access to credit facilities (Odoemenem & Boinne, 2010). It is expected that agricultural credit will play a critical role in the development of agricultural sector. (Douong & Izumida, 2002).Agricultural output in Nigeria comes largely from peasant farmers, who reside in the rural areas. It serves as a means of livelihood for over 70% of the population and a source of raw-materials for the agro-allied industry and a source of foreign exchange for the country (Von, 1994 & Hill, 1983). Food is largely supplied by small scale farmers in Nigeria and they produce close to 85% of all the agricultural produce (Okuneye, 1995).

There are several theories that have been brought forward to bear the determinants of productivity, which include productivity in agricultural sector. Those determinants include labour, capital, environment, agro-chemicals, trade openness, gross domestic product, industrialization, term of trade etc. An important determinant is financial development, which enables farmer to increase their investment and adopt new inventions in their farming operations which help to increase the productivity level.

Financial development helps farmers to buy inputs such as seedlings, fertilizers and agro-chemicals to boost agricultural output. Thus, stable, affordable and accessible financial services are sine qua non for improvement in productivity of agricultural sector. Swinnen (1999) opined that access to agricultural credit is greatly hampered in developing countries by imperfect and costly information in the market. The problems particularly affect the agricultural sector (Stiglitz, 1993). The household of farmers are constrained by credit while the provision of credit could lead to a rise in production and income. The access of farmers to former credits is estimated to be limited to 5% of the farmers in Nigeria and 15% of them in both Asia and Latin America. Generally in developing countries, 5% of the borrowers receive 80% of their total credit. In a bid to address this problem, Nigerian government established Agricultural Credit Gaurantee Scheme (ACGS) in 1977. The establishment of the scheme is aimed at encouraging the commercial banks in providing loans to farmers by guaranteeing the banks against inherent risk in agricultural lending.

Considering the importance of agriculture in an economy, the authority in caherge need to make policies that will improve the performance of the sector in the economy. But before government can make such policies, they need to be guided by studies that shed light on various factors that influence agricultural output. Due to the foregoing, many studies have been carried out to provide insight on the factors that determine agricultural output, which will be reviewed later. Since financial development have been identified as one of the factors that determine output, this study intends to find out whether financial development has impact on agricultural output in Nigeria. As it is known that financial development has various measures, which include credit to private sector, money supply, savings, to mention but a few. The study would have employed many indicators of financial development, but for brevity, it will employ only three as mentioned earlier. So, this study is to examine the impact of credit to private sector, adjusted money supply and loans to agricultural sector on agricultural output in Nigeria. Arising from the forgoing, the study has the following research questions which include: what is the impact of credits to private sector on agricultural output? What impact do loans have on agricultural sector base on agricultural output? Does adjusted money supply have impact on agricultural output? The main objective of this study is to examine the impact of financial development on agricultural output in Nigeria while the specific objectives are: to examine the impact of credit to private sector on agricultural output; to examine the impact of loans on agricultural sector in relation to agricultural output; to examine the impact of adjusted money supply on agricultural output.

The justification of the study for theory is in terms of how the study support the existing theory. If the study found that financial sector development has impact on output, it implies that the study uphold the supply-leading hypothesis. If it does not have impact on financial sector development, it means that the study does not uphold the hypothesis. In the case of justification for policy purpose, if the study found that financial sector development has positive impact on agricultural output, government is expected to put in place policies that will enhance financial development in order to facilitate the growth of output in agricultural sector. But, if the study found that financial sector development does not have impact on output of agricultural sector, the government should not be bothered in manipulating financial development with intention of influencing output of agricultural sector. Considering justification for future research, the present study lean on the extant studies and it is expected that the future research will lean on this study in terms of serving as a reference material.

With reference to limitation to the study, the study covers only Nigeria and not West Africa, Sub-Saharan Africa, African countries, developed countries, developing countries or any other geographical locations. The variables that are employed as indicators of financial sector development are just three, which include credit to private sector, loans to agricultural sector and adjusted money supply, leaving out so many indicators of financial sector development for brevity and want of space. The foregoing relates to variable scope. Lastly, in relation to period scope, the study examined the impact of financial sector development on agricultural output in Nigeria and is restricted to secondary data from 1981 to 2020. This is because some data were not available before 1981. This study is organised into five sections to facilitate understanding and interpretation. Section one is the introductory aspect of the study. Section Two covers the conceptual issues and review of relevant empirical studies. Section Three entails the methodology employed in the study, Section Four covers the presentation and discussion of results while Section Five discusses summary, conclusion and recommendations.

2. Literature Review

Conceptual Review
According to the World Bank (2012) financial development is related to the process of reducing the cost of getting information, enforcement of contracts and ensuring transaction result in the emergence of financial contracts, markets and intermediaries. Oluwole (2014) describe financial development as an extension overtime of the financial structure. To Rajan and Zingales (2003) and Levine (1999), financial development deals with the ability of financial sector in acquiring information, registration of contracts, enforcement of contracts, facilitation of transaction and creation of incentives for the emergence of a particular type of financial contracts, markets and intermediaries, and all at low costs.According to Smith (1998), agricultural output comprises of output sold, (including trade between agricultural holdings), stocks changes; output for final consumption; output manufactured for further processing by agricultural product manufacturers; and intra-unit consumption of livestock feed products. According to the Manual on Economic Accounts for Agriculture and Forestry (2000), agricultural output includes certain crop products that are used again by the same holding in the form of intermediate consumption; this concerns mainly products for animal feeds.

Theoretical Review
The Keynesian theory makes proposition that, increase in government expenditure and demand leads to increase in economic growth. Keynesians are of the believe that, consumer demand determine growth in the economy. Therefore, the theory favours expansionary fiscal policy to increase the level of output. Keynesians propose that increase in government expenditure on unemployment, benefits infrastructural facilities and education. The pitfall of the theory lies in the dearth of discretion in application of government expenditure in the economy, which may lead to inflation.

The Neoclassical growth model is an advancement of Classical growth model, which states that output growth is determined by the level of capital and labour. Neoclassical growth theory has proposition that economic growth is determine by the level of capital, labour and technological progress. It believes that labour and capital in varying degrees in production leads to short-term equilibrium. The theory emphasise technical progress as a key determinant of economic growth. The model by implication, picture technology of an efficiently run society, that does not experience macroeconomic problems such as

unemployment or inflation due to dearth of effective demand. The Neoclassical output growth model can be classified into three separate sources viz: growth in technical progress, labour growth and capital growth, which if combined leads to general growth in an economy.

The supply-leading hypothesis, according to Patrick (1966) posits that, as the economy develops, the links between financial development and growth alternates. The theory believes that financial development and availability of financial services determine output growth in the economy. The increase in output in the economy that is due to increase in financial services will come into play at the early stage of development. The influence of financial development on growth fades away as the economy grows. In the case of the demand-following hypothesis, it is postulated that as the economy grows demand for financial services rises, which calls for creation of more financial services in the economy.

Empirical Review

Yuyu, Duan, Lin, Jingjing & Wenyan (2021) analyse the effect of rural financial development on agricultural technology innovation using rural financial scale and rural finance efficiency. It examines how the effects of rural financial development differ in locations with different levels of marketization and economic development. The empirical results revealed that the development of rural finance has a positive impact on agricultural technology innovation. Rural finance efficiency has a positive effect on innovation in places with a small level of marketization, while the rural financial scale has a positive effect on technological innovation in places with a high level of marketization. Muhammad, Wen & Marium (2019) analysed the effects of financial development on agricultural output in South Asia using data for the period 1973–2015. The other variables in the study are human capital, physical capital, trade openness and income level. The estimated results show that financial development has a non-linear effect on agricultural productivity, which suggests that agricultural output initially increases with increase in financial development and then it declines when financial sector development continue to increase. Agricultural output increases as both physical and human capitals rise. Agricultural productivity also rises as trade openness and income level rises. In addition, industrialisation has positive effect on agricultural output, while the effect of both carbon emission and rural labour force is negative on agricultural output in the region.

Muhammad, Muhammad & Muhammad (2011) carried out a study on the effect of financial sector development on agricultural output growth in Pakistan the study employed ARDL bounds test approach to co-integration to determine the long run relationship between the series employed. The Granger Causality test was carried out to ascertain the direction of causality among the series, and the robustness of causality results was tested via innovative accounting approach (IAA). The results indicate that financial sector development has a positive effect on agricultural output growth. This implies that financial sector development plays it's a key role in ensuring the rise in agricultural output growth. In a related study by Martha (2021) on the relationship among financial sector development, international trade and economic growth in Ghana, the study determined the long run relationship and the possible direction of causality that may exist among financial sector development, international trade and economic growth, using data for the period 1965-2017. The Autoregressive Distributed Lag Bounds test approach of co-integration was employed to test the cointegration of the series and Granger Causality was employed to measure the direction of causality among

the series. The bound test results shows that long-run relationship abounds among the series, while the result of causality indicated that a unidirectional causality running from trade to growth and from financial sector development to growth abounds. It suggests that both trade and financial sector development cause growth in Ghana.

Also, the study by Christina (2013) examined the causal relationship between economic growth and financial sector development in Tanzania. The study employed Granger causality to analyse the direction of causality between the two variables. The results indicated that a long-run relationship exists between all the indicators of financial sector development and economic growth. Also, bi-directional causality relationship exist between financial sector development and economic growth in Tanzania in both the short-run and the long-run. The study thus, recommends that the current state of financial sector in Tanzania should be developed further to make the economy more monetized by ensuring greater availability of monetary credits and deposits in private banks.In another study, Oluwole (2014) examined the nexus between economic growth and financial sector development in Nigeria. The study centered on the effect of money and capital market, as indicators of financial sector development on economic growth in Nigeria. The method used in analyzing the time series data, which cover the period of 1981 – 2010, is Ordinary Least Square (OLS). The findings show that banking system domestic credit to private sector and money supply (M_2) have effect on the output (GDP) while value of deals, market capitalization, MCAP (Capital Market variables) do not have effect on output. In another study, Benhabib & Spegel (2000) analysed the relationship between financial intermediary development indicators and economic growth. The estimation technique employ is panel estimator that allows for the endogeneity of the regressor. It is found in the study that financial sector development indicators are correlated with both total factor productivity and physical human capital accumulation.However, different studies have been carried out by different researchers on agricultural output but none has focused on the impact of financial sector development on agricultural output in Nigeria. Especially, none of the extant studies reviewed employed adjusted money supply (adjusted-M_2) as an indicator of financial sector development, which determines financial development. This serves as research gap the study intends to fill.

3. Methodology

The study is premised on supply-leading and demand-following hypothesis of Patrick (1966). According to supply-leading hypothesis it is the availability of financial services that lead to growth in the level of output. Patrick stressed that output growth is determined by financial sector development, which are expressed as indicators of it, including money supply (M_2), credit to private sector and total deposit in financial institutions etc. Secondary data sources have been employed to gather data on the variables used from 1981-2020. The data source include National Bureau of Statistics (NBS), 2020 and Central Bank of Nigeria (CBN), 2020).

The study is to analyse the characteristics of the series, using the mean, median, maximum, minimum, standard deviation and coefficient of variation, including the trend analysis to show how the series fall and rise over time. The unit root tests is to be conducted using Augmented Dickey Fuller (1988) to determine whether the series are stationary in order to avoid estimation of spurious regression as a result of carrying out regression analysis on non-stationary series. The null hypothesis of unit root test is that a series has unit root, using p-values of t-statistics at 5% significance level. A series is said to have unit root when the p-value of t-statistics is greater than 0.05, otherwise, it

does not have. Also, the series are to equally be subjected to co-integration test to determine the long-run relationship among the series using Johnson Juselius if the series are I (1) and if they are of mixture I(1) and others, we shall employ ARDL Bound test . The results from the co-integration test determines the econometric technique used in the study, which will be long-run Auto Regressive Distributed Lag (ARDL) if the series are co-integrated, and if not, we shall use short-run ARDL.

The diagnostic tests that will be employed for the models include serial correlation test using Breusch-Godfrey Serial correlation test. The null hypothesis is no serial correlation and it is not rejected if the p-value of F-statistic is greater than 0.05 significance level. Also, heteroscedasticity test is to be employed to test whether the model suffers the problems of unequal variance using Breusch-Pagan-Godfrey test with the null hypothesis of no heteroscedasticity. The null hypothesis is rejected if the p-value of F-statistic is less than 0.05 significance level. CUSUM and CUSUM Squared tests will be employed to determine the stability of the model while Jarque-Bera test will be employed to determine whether the error terms are normally distributed. Based on the theoretical framework, the model of the study is specified as below.

$$ASOUTPUT = f(FD)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ 1$$

Modifying equation 3.1 which represents supply-leading hypothesis of Patrick (1966) to include other variables aside from financial sector development indicator, we have the following

$$ASOUTPUT = f(ASLOAN, ARF, ADJM_2, CPS, LR)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ 2$$

Where ASOUTPUT= Agricultural Output, ASLOAN = Agricultural Sector Loans, $ADJM_2$ = Adjusted Money Supply, CPS_i = Credit to Private Sector, ARF = Average Rain Fall, LR = Lending Rate, and U_i = Other Factors Affecting Agricultural Output. The model is thus specified in econometric form as below

$$ASOUTPUT_t = \beta_0 + \beta_1 ADJM_{2t} + \beta_2 CPS_t + \beta_3 ASLOAN_t + \beta_4 AFR_t + \beta_5 LR_t + U_t \dots\dots \ 3$$

Where: β_0 is intercept and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are parameters estimates and U_i = error term

A-priori expectations: $\beta_1, \beta_2, \beta_3, \beta_4 > 0, \beta_5 > 0$. The measurement of variables are presented as below with the unit of measurement.LASOUTPUT = as log of agricultural output in ₦ billion, LASLOAN = as log of agricultural sector loans in ₦billion, $LADJM_2$ = as log of adjusted money supply expressed as M_2 – currency in circulation in ₦billion

LCPS = as log of credit to private expressed in ₦billion, LARF = as log of average rain fall, LR = as percentage of loans

4. Results

This chapter focuses on presentation and discussion of results which include trend analysis, descriptive statistics, unit root test, co-integration test, estimation results and diagnostic tests.

From Figure 1, the graph of ASOUTPUT shows an upward trend from 1981 to 2020, with a sharp increase in 2007. The shape of ASLOAN is zig-zag with increasing trend, couple with linear trend between 1917 and 2020. The graph of ARF fluctuates throughout its entire run, which means that it shows a cyclical trend. In the case of the shape of ADJM2, it maintains upward movement trend, with low values before 1999. It was after the return to democratic rule in 1999 that the adjusted money supply continued to increase. Likewise, the shape of CPS shows an increasing trend, with low

values before 1999 and a bit of fluctuations. It is revealed from the figure that the graph of LR fluctuates while it rose to its peak (29.80%) in 1992.From Table 1, it is revealed that the mean of ASOUTPUT is 8216.517 with median, maximum, minimum and standard deviation of 4932.755, 18348.180, 2303.510 and 5530.399 respectively. The maximum value can be found in 2020 while the minimum value can be found in 1984. The mean of ASLOAN is 160.984 while its median is 44.795.
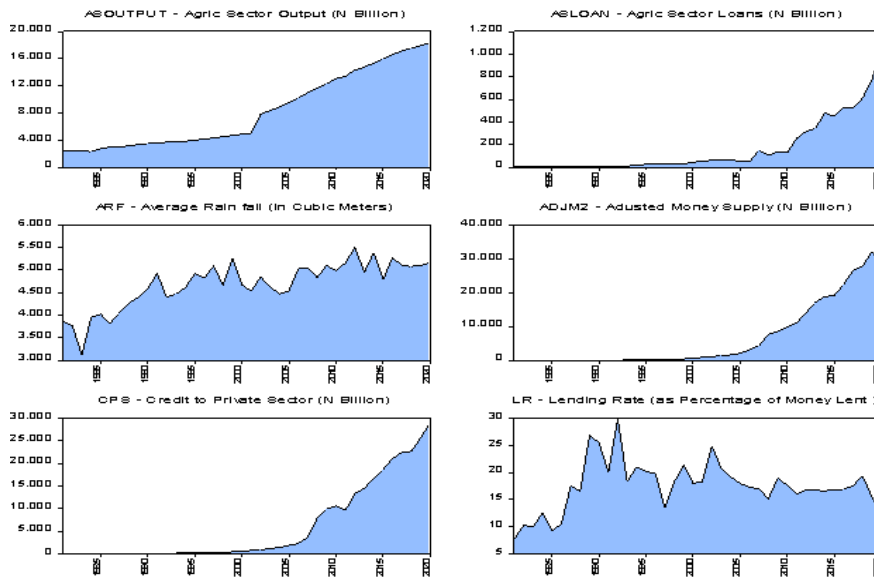

Figure 1: Trend Graph of ASOUTPUT, ASLOANS, ARF, ADJM$_2$, CPS and LR
Source: Author 2022

Table 1: Descriptive Statistics of ASOUTPUT, ASLOANS, ARF, ADJM$_2$, CPS and LR

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Obs.
ASOUTPUT	8216.517	4932.755	18348.18	2303.51	5530.399	40
ASLOAN	160.984	44.795	1049.68	0.59	248.0328	40
ARF	4681.12	4805.975	5501.125	3121.692	514.4045	40
ADJM2	6545.735	779.465	32103.49	11.45	9789.239	40
CPS	5914.408	647.665	29051.61	8.57	8726.284	40
LR	17.454	17.53	29.8	7.75	4.603	40

Source: Author'sComputation

The maximum and minimum values are 1049.68 and 0.59 respectively, which are found in 2020 and 1981. The mean and median of AFR are 4681.735 and 779.465, while its maximum value stands at 5501.125, which is found in 2012 and its minimum stands at 3121.692, which is found in 1983, with standard deviation of 514.405. The mean, median, maximum and minimum and standard deviation are 6545.735, 779.465, 32103.49, 11.45 and 9789.239 respectively for ADJM2. The minimum and maximum values are found in 1982 and 2019 respectively. The mean of CPS is 5914.408 while its median is 647.665 with maximum, minimum and standard deviation values of

29051.61, 8.57 and 8726.284 respectively. The minimum value is found in 1981 while the maximum value is found in 2020. In the case of lending rate, the mean and median of LR are 17.454 and 17.53 respectively while its maximum, minimum and standard deviation are 29.8, 7.75 and 4.603 respectively. The maximum value is found in 1992 while the minimum value is found 1981.

Table 2: Augmented Dickey-Fuller Test

Variables	Level	1st Diff.	Conclusion
LADJM2	0.8266	0.0016	I(1)
LASLOAN	0.7414	0.0000	I(1)
LASOUTPUT	0.9323	0.0000	I(1)
LCPS	0.8047	0.0010	I(1)
LR	0.1517	0.0000	I(1)
LARF	0.3436	0.0000	I(1)

Source: Author'sComputation

From Table 2 above, it is revealed that all the series have unit root at levels as the p-values are greater than 0.05 significance level while they are all stationary at first-difference as they have p-values that are less than 0.05 significance level. Consequently, due to the results of unit root tests that show that all the series are I(1), we employed Johansen-Juselius co-integartion test being the appropriate method of co-integration. The results revealed that the series had long-run relationship or they are co-integrated as shown in Table 4in Appendix. In addition, Table 5 in Appendix shows that the appropriate lag to be selected for the model is one as shown in various lag selection criteria. Because the series are co-integrated, the study employs ARDL and presented the long-run and short-run estimations.

Table 3: ARDL Short-run and Long-run Estimation Results

MODEL a		MODEL b	
D(LCPS)	-0.121	LCPS	-0.669
	(-1.268)		(-2.389)
	{0.215}		{0.023}
D(LR)	0.001	LR	0.004
	(1.225)		(1.195)
	{0.230}		{0.242}
D(LASLOAN)	-0.083	LASLOAN	-0.197
	(-2.325)		(-2.547)
	{0.027}		{0.016}
D(LARF)	0.197	LARF	0.467
	(1.012)		(0.990)
	{0.320}		{0.330}
D(LADJM2)	0.092	LADJM2	1.065
	(0.869)		(3.739)
	{0.392}		{0.001}
CointEq(-1)	-0.422	C	1.248
	(-3.967)		(0.737)
	{0.000}		{0.467}

Source: Author'sComputation

Explanatory Note: LCPS is log of credit to private sector, LR is lending rate, LASLOAN is log of agricultural sector loan, LARF is log of average rain fall, LADJM2 is log of adjusted M_2 and CointEq(-1) is the error correction term. Model a and b are

ARDL short-run and long-run models respectively while () and {} represent the parenthesis for t-statistic and p-values respectively. An estimate is adjudged to be statistically significant if its p-value is less than 0.05 significance level. Source: Author (2022)

It is revealed in the table above that the coefficient value of CPS in the short and long run are -0.121 and -0.669 respectively with p-values of 0.215 and 0.023, which implies that the coefficient value of CPS is negative and statistically significant at 5% significance level in the long-run while it is negative but statistically insignificant in the short-run. It can be concluded that credit to private sector (CPS) has negative impact on agricultural sector output in the log-run. This does not conform to the a priori expectation. The reason being that, credits to farmers by banks may be diverted to other non-agricultural investments. This contradicts the findings by Muhammad et al. (2019), Muhammad et al. (2011) and Martha (2021).The table also reveals that the coefficient values of LR in the short-run and long-run are 0.001 and 0.004 respectively with p-values of 0.230 and 0.242. This implies that the coefficient value of LR is positive but statistically insignificant. Thus, it does not have impact on agricultural sector output (ASOUTPUT).

In the case of agricultural sector loans (ASLOAN), the coefficients of LASLOAN in the short and long run are -0.083 and -0.197 respectively with p-values of 0.027 and 0.016, which implies that the coefficient values are negative and statistically significant at 5% significance in the long-run and short-run. Thus, loan to agricultural sector has negative impact on agricultural output in the short and long-run. The finding contradicts the apriori expectation and is not in consonance with the findings by Muhammad et al. (2019), Muhammad et al. (2011) and Martha (2021). The reason may not be unconnected to failure of farmers to use the loans they get from banks judiciously or for the purpose for which they collected the loans or it may be due to possible diversion of funds or loans meant for investment in agricultural sector to other things that may not be that productive.

Also, the coefficient of average rain fall (ARF) in the short and long-run are 0.197 and 0.468 respectively with p-value of 0.320 and 0.330. This implies that the coefficients are positive but are not statistically significant in the short-run and long-run. So, average rain fall has no influence on output of agricultural sector in the short-run and long-run.In the case of $ADJM_2$, its coefficients in both short-run and log-run are 0.092 and 1.065 respectively with p-values of 0.392 and 0.001. This implies that the coefficient of $ADJM_2$ in the short-run is positive but not statistically significant, but it is positive and statistically significant at 5% significance level in the long run. So, adjusted money supply has positive impact on agricultural output in the long-run. This is incomparable with any extant study as the researcher is unaware of any existing studies that employed adjusted money supply the way it is being measured in this study as a determinant of agricultural output.In the case of error correction term (CointEq(-1)), its coefficient is -0.422 with p-value of 0.000, which is statistically significant at 5% significance level. This implies that there is 42% speed of adjustment for any equilibrium shock in the short –run.

The diagnostic tests employed by the study include serial correlation, heteroscedasticity, normality of residuals and stability tests. It is revealed that the F-statistic in Breusch-Godfrey Serial Correlation test is 0.850 with p-value of 0.438, which is greater than 0.05 significant level. Thus, we cannot reject the null hypothesis of no serial correlation. So, the model does not have serial correlation problem (see Table 3 in Appendix). In

addition, the results of Jaque-Bera normality test reveal that the Jarque-Bera value is 2.398 with p-value of 0.302, which is greater than 5% significance level (see Figure 1 in Appendix). Hence, the null hypothesis of normality of residual cannot be rejected. Therefore, the model is free from the problem of non-normality of residual series. Also, it is revealed that the F-statistic in Breusch-Pagan-Godfrey heteroscedasticity test is 1.478 with p-value of 0.206, which is greater than 0.05 significant level. Thus, we cannot reject the null hypothesis of no heteroscedasticity. So, the model does not the problem of heteroscedasticity or unequal variance (see Table 4 in Appendix). Lastly, the CUSUM and CUSUM-Squared tests reveal that the model is stable as the blue dotted line falls in-between the two dotted lines in the two tests respectively (see Figure 3 & 4 in Appendix)

5. Conclusion and Recommendations

This study made an attempt to examine the impact of financial sector development on agricultural output in Nigeria for the period 1981 – 2020. The study shows lack of consistent relationship between financial sector development and agricultural output. It indicates that financial sector development in Nigeria has positive impact on agricultural output in the long-run. This is as shown by the adjusted M_2 in the regression results. Also, it is concluded that loans to agricultural sector has negative impact on agricultural output in the short and long run. On a while, then, financial sector development has influence on agricultural sector productivity.

The insignificant impact of credit to private sector in agricultural sector does not mean that government should not embark on policies measure that would improve lending rate. Government should focus on policies that would encourage commercial banks to reduce their cost of lending (interest rate on agricultural loan to be reduced to 5%) so as to stimulate investment in agriculture and hence promote economic growth.Based on the finding in which adjusted money supply, government should formulate policies that will enhance the positive impact of it on agricultural output.

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Appendix

Table 4: Cointegration Test Result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.852444	152.5414	95.75366	0.0000
At most 1 *	0.680354	79.82663	69.81889	0.0064
At most 2	0.371801	36.48611	47.85613	0.3722
At most 3	0.241910	18.81997	29.79707	0.5059
At most 4	0.155678	8.295756	15.49471	0.4343
At most 5	0.047903	1.865342	3.841466	0.1720

Table 5: Optimum Lag Selection Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	57.73621	NA	0.003390	-2.850606	-2.632914	-2.773860
1	79.73462	36.86220*	0.001091*	-3.985655*	-3.724425*	-3.893559*
2	79.74540	0.017482	0.001153	-3.932184	-3.627416	-3.824739
3	79.74750	0.003291	0.001220	-3.878243	-3.529937	-3.755449

Table 6: Breusch-GodfreySerial CorrelationTest Result

F-statistic	0.850281	Prob. F(2,28)	0.4380
Obs*R-squared	2.233020	Prob. Chi-Square(2)	0.3274

Table 7: Heteroscedasticity Test Result

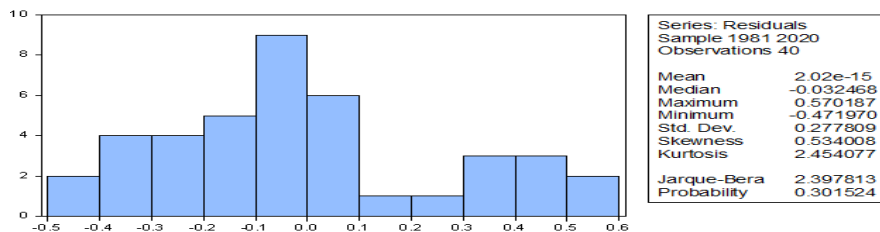| F-statistic	2.477542	Prob. F(8,30)	0.2059
Obs*R-squared	7.76491	Prob. Chi-Square(8)	0.2162
Scaled explained SS	8.68272	Prob. Chi-Square(8)	0.1200

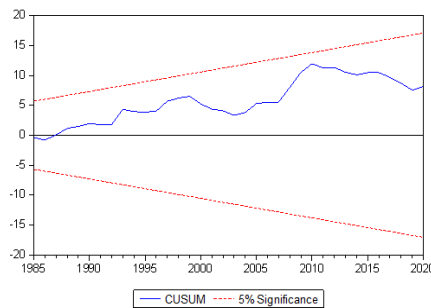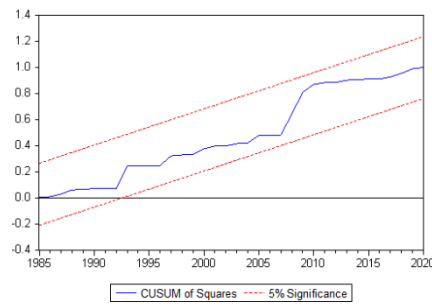*Figure 2: Normality of Residual Test*

Figure 3: CUSUM Test of Stability   *Figure 4: CUSUM Squared Test of Stability*