

An Inquiring into the Impact of Deposit Money Banks' Loans/Advances on Agricultural Sector in Nigeria; 1980 – 2011

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Abstract

The study investigated the impact and the determinants of Deposit Money Banks' loans and advances granted to agricultural sector in Nigerian sector from 1980 to 2011. In doing this the study employed rigorous econometric methods such as the multiple OLS regression, Philips-Perron, Unit Root Stationarity Test, Johnansen Co-integration, Parsimonious Error Correction Mechanism and Granger Causality Test with the help of E-views statistical package version 3.0. The results of the study revealed that the overall model is statistically significant. Based on this, the study concluded that deposit money banks' loans and advances did make positive impact on the agricultural sector of Nigerian within the period of review. The study therefore recommended that the Federal Government and Monetary Authorities should respectively use expansionary fiscal and monetary policies to expand the volume of loans and advances that are given to agricultural sector of Nigeria. As a matter of policy action, if this done it will stimulate increase in output of agricultural sector and also contribute significantly to economic growth.

Keywords: Deposit Money Banks, Loans, Advances, and Agricultural Sector, Interest Rate, Liquidity Ratio, Assets.

1.0 Introduction

1.1 General Overview

The importance of lending to various sectors of the economy stresses the sensitive and vital roles that deposit money banks play in financial intermediation and facilitation of capital formation to promote economic growth by operating in a sound manner within regulative framework of the Central Bank of Nigeria (C B N). In line with this, Ahmed (1989) points that bank activities centred on intermediate funds between savers (surplus units) and investors (deficit units). They act as catalysts in the process of capital formation. As noted by Teriba (1978) the establishment of sectoral preferences for deposit money banks' lending is to bring about re- allocation of loans and advances away from sectors where they were employed primarily to finance imports and send such loans advances to where it can enhance productivity. Making reference to the directives of Central Bank of Nigeria, deposit money banks are required to channel to the preferred sector (production sector) a minimum percentage of their total loans and advances and with a reasonable low rate of interests. Olokoyo (2011) in the same direction, making reference to the Bank and Other Financial Act Amendment (BOFIA) (1998), argues that bank's loans and advances should be directed to preferred sectors of the economy in order to enhance economic growth and development. As a confirmation to this, studies (Osayameh (1991), Teriba (2008), Titilolan (1992), Ojo (1999), Mordi (1986) Nwankwo (2000) and Chodechai (2004) in regulated and deregulated periods carried out studies on related subject matter and interestingly the results revealed that deposit money banks have failed with the required minimum loans and advances allocated to the non-oil sector while exceeding the required maximum to the less preferred sectors. However, it is also important to note that the deposit money banks have been granting loans and advances to the non-oil sector, but the worry of this study is to ascertain why the non-oil sector has not been performing significantly well in the Nigerian economy.

Arising from the foregoing, it therefore behooves on this study to find out how the loans and advances granted by the deposit money banks have been contributed to the performance of the agricultural sector in the Nigerian economy from 1980 to 2011. The significance of the study cannot be over emphasized, as the findings will contribute, first and foremost, to the existing knowledge in the discipline of economics, finance and banking, also serves as working tools at the disposal of policy makers in the areas of formulation of monetary and fiscal policies in addressing macroeconomic problems in Nigerian economy. The study is divided into five sections. The introductory aspect of the work is in section one, while section two considers literature review: theoretical frameworks and review of empirical studies. Section three is tailored down to the method of study, as section four looks at data presentation, analyses and results interpretation, and section five of the study is devoted to concluding remarks and recommendations.

2.1 Theoretical Framework

In every study, the theoretical analyses that are framed within the context of the study always aid in addressing conceptual and methodological issues that are raised in the study, which however are always the points of departure between the previous studies and the present study. Therefore, the theoretical framework of this study is anchored on the following theory:

Multiple - Lending Theory: This theory reveals that banks should be less inclined to share lending (loans syndication) in the presence of well developed equity markets and after a

precise consolidation. Both outside equity, mergers and acquisitions increase banks' lending capacities, thus reducing their need for greater diversification and monitoring through share lending (Ewert, Szczesmy and Schenk, 2000; Ongene and Smith 2000; Jhingan, 1990; Ajie, Ezi, Akekere and Ewubare, 2006). This theory has a greater implication for banks in Nigeria in the light of the recent 2005 consolidation exercise in the industry. In this line of argument, the classical system views the interest rate, exchange rate, deposit rate, and financial ratio of banks as strong and uncompromising factors that determines granting of loans and advances to private individuals and corporate organisations. This is called the real theory of interest rate. This is because these factors do not in any way depend on monetary conditions. Meanwhile, in the classical system, the supply of capital is the same as saving.

2.2 Review of Empirical Review

In line with this study, some empirical works have been done by some scholars in consideration of the variables factors that affect the demand and supply of loans and advances. Melits and Pardine in Ojo (1978) investigated the factors that affect the demand and supply of deposit money banks' loans and advances, using a simple simultaneous equation method, and estimation strong results were obtained. The results revealed that the constraints on the capability to grant loans and advances were identified as capacity of deposit money banks' assets, interest on lending, alternative earning assets cost per dollar on bank deposit liabilities. In a similar study, Ojo (1978) also identified that liquidity ratio was seen as an important variable in determining the supply of loans and advances in Nigeria. Ojo (1999) in a study of roles and failures of financial intermediation by banks in Nigeria, revealed that money deposit bank can lend on medium and short term basis without necessarily jeopardizing their liquidity, if they must contribute meaningfully to the economic development, the majority pattern of their loan should be on a long term nature rather than on a short term period. However, Oloyede (1999) claims that it is generally acknowledged that money deposit banking by its nature is highly prone to volatility and fragility – whether arising from exogenous shorts or endogenous policy measures – and therefore, amenable to regulations and supervision. Mordi (1986) in his own empirical study identified that the desired level of loan supply is a function of excess liquid assets yield on money deposit bank loans (average deposit money banks lending rate) and cost per naira of deposit. Ladman and Adams (1978) were able to identify that deposit money banks in the Dominican Republic did not follow the policy of giving out more loans to agricultural sector (preferred sector) due to a higher costs of transactions. However, Donald (2008) also observed that the revenue obtained in the agricultural sector was not able to cover all the cost of lending in form of administration, default ratio and supervisory costs in most of the less developed countries.

3. Method of Study

Data Required and Source

In this study, the data required for the study are the dependent variable: Share of agricultural sector in the total GDP. Independent variables: Loans and advances to agricultural sector, interest rate, the assets of deposit money banks, and the liquidity ratio of deposit money banks in Nigeria from 1980 to 2011. The data required for this study are secondarily sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and National Bureau of Statistics (NBS) and other statistical publications. The data are based on time series. In the data analysis technique Cooney (1998) opines that analysis of data is the process of organizing and summarizing data in order to provide answers to the research questions or test hypotheses stated in the study. He further argues that it includes strategies and proceeding for summarizing and exploring relationships among the variables on which data have been collected. Onuchuku and Adoghor (1999) assert that regression analysis provides an estimating equation which expresses the functional relationship between variables. Further,

they hold that multiple regression analysis deals with relationship between three or more variable, one dependent and the others explanatory variables or regressions. They also maintain that econometric is a special type of economic analysis and research in which the general economic theory formulated in mathematical terms, is combined with empirical measure of economic phenomena. In view of the foregoing, this study therefore employs econometric techniques of Ordinary Least Square Method (OLS) of multiple regression analysis in the estimation of a long run function.

Model Specification

The functional relationship

Model 1 (Agricultural Sector (AGS) Equation)

$$AGS = f(TLAAGS, INR, DBA, DLR) \quad (1)$$

Where: AGS = Agricultural Sector; TLAAGS = Total loans and advances to Agricultural Sector; INR = Interest Rate; DBA = Deposit Money Bank's Assets; DLR = Deposit Money Banks Liquidity Ratio. From the above functional relationship, the econometric model was specified thus. The econometric form represents the actual population representation of the true relationship or the structural or explicit function of the relationship. It is specified thus:

$$AGS_{1t} = a_0 + a_1 TLAAGS + a_2 INR + a_3 DBA + a_4 DLR + U_{1t} \quad (2)$$

a_0 , is the intercept terms, while a_1 , a_2 , a_3 , and a_4 are the slope coefficients representing parameters estimated. U_{1t} is the disturbance term assumed to be purely random, and the subscripts t are for the dating of variables in time periods. Using equation 2 above, the mathematical form of the model is further specified below. The mathematical form represents the sampled size of the study, which is the actual portion of the population that is estimated in this study.

$$AGS_{1t} = a_0 + a_1 TLAAGS + a_2 INR + a_3 DBA + a_4 DLR + e \quad (3)$$

Apriori Expectation of the Behaviour of the Variables in the Model

Economic postulations suggest that the level of deposit money banks' lending determines the level of performance of any real sector of the economy which agricultural sector is an integral part. But it is expected that increase in interest rate discourages lending to the real sector of the economy, increase in assets and liquidity of deposit money banks will increase lending to the agricultural sector of the Nigerian economy. $a_1 > 0$; $a_2 < 0$; $a_3 > 0$; $a_4 > 0$.

Statistical Criteria: These are determined by statistical theory and aimed at evaluating parameters of the model. They are; Coefficient of determination (R^2) and F-statistic.

The Econometric Criteria used in the study include: the Durbin-Watson, which determines the presence or absence of positive or negative autocorrelation which is associated with time series data. Again, the Unit Root Test of Stationary: A stochastic process is said to be stationary if its mean and variance are constant overtime and the value are auto-covariance between the two time period depends only on the distance or lie between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2003). In doing this in this study, Phillips-perron (pp) unit roof test was used. Test of Cointegration was employed to ascertain whether there is a long term, or equilibrium, relationship between (or among) them (Gujarati, 2003). The study adopted Error Correction Model which is an extension of short

run disequilibrium models, which also incorporates past period's disequilibrium. The ECM for model I is specified as: $AGS_t = a_0 + a_1 TLAAGS + a_2 INR + a_3 DBA + a_4 DLR + ECM_{t-1} + \sum_{i=1}^p \epsilon_i$. Granger Causality Test: This is another econometric test that is used to determine the direction of Granger causality in the variables.

4.0 Results Presentation and Analysis

Table 4.1: Short Run Result of Ordinary Least Square Regression of AGS Model

Variable	Coefficient	t-Statistic	Prob.
C	-127319.4	-0.123537	0.9026
TLAAGS	42.21120	7.311706	0.0000
INR	-18887.22	-0.613018	0.5452
DBA	0.183510	5.233273	0.0000
DLR	7163.965	0.417536	0.6797

$R^2 = 0.936647$, Adjusted $R^2 = 0.926900$, F-Statistic = 96.09953, DW = 1.941078.

Source: An Extract from the regression result output

Table 4.1 documents the static regression result of agricultural sector equation. From the table the calculated R^2 is 0.936647, meaning that the explanatory power of the independent variables is about 94 percent strong by implication, it means that about 94 percent changes in agricultural sector is being attributed to total loan to the sector (TLAAGS), interest rate (INR), the asset profit of the deposit money bank (DBA) and the liquidity ratio of deposit money bank (DLR). The remaining 6 percent of changes is attributed to other factors that are not captured in the model but covered by the stochastic term. Specifically, all the variables are rightly signed. Therefore, increase in TLAAGS, DBA and DLR will spur growth in the agricultural sector, while increase in INR will reduce agricultural output in Nigeria. But INR and DLR have high values while TLAAGS and DBA have low values of standard error and higher values of t-stat. The F-stat calculated of 96.09953 is greater than the F-tab of 2.67 (4,32) which calls for the rejection of the null hypothesis and acceptance of the alternative. It implies that the overall model is statistically significant because the variable are well fitted therefore they are the major determinants of loans that deposit money banks can grant to agricultural sector, as part of non-oil sector. However one disturbing thing in the results is the value of Durbin-Watson stat of 1.941078. This depicts the presence of positive auto-correlation, hence the need for further test in order to correct the spurious regression that is observed in the result. Spurious regression is occasioned by variations in the mean distribution of time services which makes it non-stationary. This necessitates the unit root stationary test with the use of Philips-Perron. This is preferable because it has some non-parametric features that could help in the circumstance.

Table 4.2: Philips-Perron (PP) Unit Root Stationary Test For All the Variables

Variables	Order of Stationary	PP Calculated	PP Critical Value	Order of Integration	Decision
AGS	At Level	8.338231	-2.9591	1(0)	Non stationary
	1 st Difference	1.708932	-2.9627	1(0)	Non stationary
	2 nd Difference	-10.43730	-2.9615	1(1)	Stationary
TLAAGS	At Level	1.086162	-2.9591	1(0)	Non stationary
	1 st Difference	-8.738408	-2.9627	1(1)	Stationary
	2 nd Difference	-17.31620	-2.9665	1(1)	Stationary
INR	At Level	-2.248617	-2.9591	1(0)	Non stationary

	1 st Difference	-6.943287	-2.9627	1(1)	Stationary
	2 nd Difference	-14.20172	-2.9665	1(1)	Stationary
DBA	At Level	0.656730	-2.9591	1(0)	Non stationary
	1 st Difference	-6.189103	-2.9627	1(1)	Stationary
	2 nd Difference	-12.88262	-2.9665	1(1)	Stationary
DLR	At Level	-2.421488	-2.9591	1(1)	Stationary
	1 st Difference	-5.743838	-2.9627	1(1)	Stationary
	2 nd Difference	-10.85363	-2.9665	1(0)	Non stationary

Decision Rule: A variable is non-stationary if $PP_{cal} > PP_{tab}$.

A variable is stationary if $PP_{cal} < PP_{tab}$.

The result in the table shows that agricultural sector (AGS) being a dependent variable in equation 1 is stationary at 2nd difference, therefore it is said to be integrated to order one 1(1). Implying that there is significant change in the time series loans granted to the sector by DMB. On the other hand, total loans and advances to agricultural sector (TLAAGS) as an independent variable is stationary at 1st difference and maintains that at 2nd difference thus TLAAGS is integrated to order one; 1(1) at 1st difference. This means that total loans and advances granted to agricultural sector has the tendency to make significant impact in long run. More so, the total loans and advances granted to that sector actually increased over time. Interest rate (INR) as an explanatory variable is stationary at 1st difference and 2nd difference. This implies that as interest rate keeps decreasing in the long run, the non-oil sector is likely to receive more loans and advances from deposit money bank. Deposit money banks' asset (DBA) and liquidity ratio (DLR) as independent variables assume the status of stationarity at 1st and 2nd difference, as well as total loans and advances to manufacturing sector (TLAMFS) and total loans and advances to mining sector (TLAMNS). This result suggests that they are capable of improving the performance of agricultural sector in Nigeria at long run. But within the period of study, these explanatory variables have made impact on the dependent variable which is AGS. In order to determine the long run equilibrium or equation among the variables, Johansen co-integration test is conducted and reported below.

Table 4.3: Johansen Co-integration Test of Agriculture Sector Model

	Likelihood	5 Percent	1 Percent	Hypothesized
Eigenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
0.972818	151.2237	68.52	76.07	None **
0.568724	46.67318	47.21	54.46	At most 1
0.352826	22.28400	29.68	35.65	At most 2
0.180952	9.664917	15.41	20.04	At most 3
0.125113	3.876142	3.76	6.65	At most 4

*

*(**) denotes rejection of the hypothesis at 5%(1%) significance level

The co-integration test result of agricultural sector (AGS) equation presented in table 4.3 shows that the likelihood ratio value of AGS and DLR are greater than the critical values at both 5% and 1% (i.e. $151.2237 > 68.52$ and 76.07 ; and $3.876142 > 3.76$ and 6.65 respectively). This calls for the rejection of the null hypothesis at 5% (1%) significance level. Therefore a long run relationship exists between AGS and DLR. However, the likelihood ratio values of TLAAGS, INR and DBA are less than the critical values at 5% and 1% (i.e. $46.67318 < 47.21$ and 54.46 ; $22.28400 < 29.68$ and 35.65 ; and $9.664917 < 15.41$ and 20.04 at

5% and 1% respectively. This result suggests that a long run relationship does not exist among the variables; and between AGS and them. Having established that mixed results are observed in the foregoing, we proceed to conduct the error correction model in the equation. The low value of Durbin Watson result which depicts the presence of positive autocorrelation is subjected to further test for the benefit of correcting the error inherent in time series data. The result is reported below.

Table 4.4: Parsimonious Error Correction Model of Agricultural Sector Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGS(-1)	23.98542	12.57541	1.907328	0.0929
AGS(-2)	0.333505	0.630223	0.529186	0.6110
AGS(-3)	0.310317	0.423032	0.733555	0.4842
TLAAGS	2.292956	7.326388	0.312972	0.7623
TLAAGS(-1)	-992.5465	548.7011	-1.808902	0.1081
TLAAGS(-2)	51.08425	43.71899	1.168468	0.2763
TLAAGS(-3)	-43.62928	34.57323	-1.261938	0.2425
INR	30239.27	28999.65	1.042746	0.3275
INR(-1)	406823.2	232879.3	1.746927	0.1188
INR(-2)	35125.97	38451.60	0.913511	0.3877
INR(-3)	21885.13	29753.87	0.735539	0.4830
DBA	-0.116439	0.220707	-0.527573	0.6121
DBA(-1)	-4.042445	2.299907	-1.757656	0.1169
DBA(-2)	0.223175	0.471528	0.473301	0.6486
DBA(-3)	-0.516025	0.572116	-0.901959	0.3934
DLR	17009.18	14699.84	1.157099	0.2806
DLR(-1)	-153670.3	84771.65	-1.812756	0.1074
DLR(-2)	-5181.650	13372.02	-0.387500	0.7085
DLR(-3)	22535.02	14072.52	1.601349	0.1480
ECM(-1)	-23.38715	12.71343	-1.839562	0.1031
R-squared	0.996553			2299824.
Adjusted R-squared	0.988365	S.D. dependent var		3092839.
S.E. of regression	333611.6	Akaike info criterion		28.44915
Sum squared resid	8.90E+11	Schwarz criterion		29.40073
Log likelihood	-378.2881	Durbin-Watson stat		2.775644

Source: An Extract from the Regression Output.

As documented in table 4.4, the parsimonious error correction model was estimated in order to correct to a reasonable extent the error observed in the static OLS regression result in table 4.1. The result shows that at current and past (2) periods TLAAGS maintains the right sign. Interest rate (INR) on the other hand has a positive sign this result suggests that economically speaking deposit money banks in Nigeria are willing to increase the loans and advances profit at higher interest rate. This is because, interest rate as a cost of borrowing is a source of earning to the deposit money banks. This result in practice holds, but it negates economic theory which holds that lower interest rates stimulate borrowing. Further, deposit money banks assets (DBA) has the right sign at past (2) period. This is because the asset profile of deposit money banks appreciates as more loans and advances are granted to non-oil sector of the Nigerian economy. The liquidity ratio of deposit money banks has the right sign at current and past (3) periods. This also is related to the dimension of DBA. The negative sign of the error correction model (ECM) is a strong supporter of the relevance of the mechanism, because it is expected that any error observed to be either positive or negative can be corrected by the mechanism. This justification of the use of ECM is observed in the value of Durbin Watson-stat of 2.775644, depicting the presence of negative auto-correlation as against the positive as observed in the static of regression of the same equation.

Table 4.5: Granger Causality Test of Agricultural Sector Equation

Null Hypothesis:	Obs	F-Statistic	Probability
TLAAGS does not Granger Cause AGS	30	2.38211	0.11300
AGS does not Granger Cause TLAAGS		8.05306	0.00200
INR does not Granger Cause AGS	30	0.32821	0.72327
AGS does not Granger Cause INR		1.36837	0.27293
DBA does not Granger Cause AGS	30	0.60471	0.55403
AGS does not Granger Cause DBA		7.93695	0.00214
DLR does not Granger Cause AGS	29	2.04756	0.15100
AGS does not Granger Cause DLR		1.00275	0.38173

Source: An Extract from the Regression Output.

Table 4.5 of the study shows that there is a uni-directional causality between TLAAGS and AGS, because $2.38211 < 2.67$ (F-tab); but $8.05306 > 2.67$. Thus TLAAGS does not Granger Cause AGS; but AGS Granger Causes TLAAGS. Both interest ratio (INR) and AGS do not Granger Cause each other because the pairwise values of 0.32821 and 1.36837 are $< F$ -tab of 2.67 (4,32); hence there is no directional causality relationship between them. The pairwise values of 0.60471 and 7.93695 for DBA and AGS show that a uni-directional causality relationship exists between deposit money banks asset (DBA) and Agricultural Sector (AGS). This is because $0.60471 < 2.67$ (F-tab; 4, 32) but $7.93695 > 2.67$ (F-tab: 4, 32). Hence, DBA does not Granger Cause AGS, but AGS Granger Cause DBA. On the other hand, the pairwise values of DLR and AGS; 2.04756 and 1.00275 are < 2.67 (F-tab; 4, 32). This means that they do not Granger Cause each other; therefore there is no directional causality relationship that exists between the two variables, DLR and AGS.

5.0 Concluding Remarks and Recommendations for Policy Actions

Given the unpleasant performance of the agricultural sector in Nigeria, this study deemed it necessary to consider as a source of assistance, the loans and advances granted to the sector by deposit money banks and other factors that could encourage or discourage the DMB to grant loans and advances to the sector. In doing so, the study covers the period of 1980 to 2011 and employed rigorous econometric methods such as the static OLS regression, Philips Error Unit Root Stationarity Test, Johnansen Co-integration, Parsimonious Error Correction Model and the Granger Causality Test with the help of E-views statistical package version 3.0. The results of the study revealed that the overall model or equation is statistically significant. With the aid of Philips –Perron, AGS became stationary at 2nd difference, while TLAAGS, INR, DBA and DLR became stationary at 1st difference. A long run relationship exists between AGS and DLR; while a short run relationship exists between AGS and TLAAGS, INR, and DBA. The error correction model was able to correct the pitfalls that could cause spurious regression in the time series data. This is confirmed by the value of DW which is greater than 2, depicting the presence of negative autocorrelation. A bi-directional causality exists between AGS and INR and DLR, while uni-directional causality exists between AGS and TLAAGS and DBA.

Based on this, the study concludes that deposit money banks' loans and advances did make positive impact on the agricultural sector of Nigerian within the period of review. Based on the foregoing the study therefore recommends that: The Federal Government and Monetary Authority should respectively use expansionary fiscal and monetary policies to expand the volume of loans and advances that are given to the non-out sector, especially the agricultural, manufacturing and mining sectors in Nigeria. This, if done, will stimulate increase in output

in these sectors and also contribute significantly to economic growth. There should be review of monetary policy with the target of increasing money supply so as to be able to reduce the costs of borrowing (interest rate). The achievement of this will crowd in investors and encourage them to borrow more. Deposit money banks should diversify in their investment endeavours in order to have a formidable asset base. This is because a reliable asset base will encourage both savings and borrowing (investment). And finally, the Central Bank of Nigeria should tighten the control of deposit money banks so as to discourage them from granting loans and advances that could be dividend from the real sector of Nigerian economy.

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