

The Nexus of Interest Rate Deregulation, Lending Rate and Agricultural Productivity in Nigeria

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Abstract: The study examined the nexus of interest rate deregulation, lending rate and agricultural productivity in Nigeria by employing co-integration and error correction techniques on annual data spanning 1986 to 2009. Nigeria has embarked on several agricultural policy measures aimed at repositioning and enhancing variables that affects the sector's productivity. The findings from the study showed that interest deregulation had a positive and significance effect on agricultural productivity. Based on the findings, this study recommends a market determined interest as a stimulant in enhancing agricultural production. Also the government should ensure that the financial sector implements policies that will make credit available to the preferred sector, particularly to all categories of farmers and not only to bigger borrowers like the government alone because this will go a long way in boosting agricultural productivity in Nigeria.

Key word: Agriculture, bank, co-integration, deregulation, error correction model, interest rate

INTRODUCTION

The role of interest rate deregulation cannot be overemphasized in agricultural production in Nigeria. Many economists have argued that the deregulation of interest rate has led to trudge in the real interest rate which has induced savings and investment in general.

In developing economies, the agricultural sector is one of the most heavily regulated among others sectors like; oil, electricity and communication sector to mention a few. The focus on the agricultural sector is centered on the ability of the sector in raw materials production for industries and food for consumption. Apart from the above, serves as a source of foreign exchange for the economy. Akiri and Adofu (2007) established that the agricultural sector is not the only sector that is been widely deregulated rather, other sectors like the banking, culture industries, oil industry etc. has also been regulated both in developed and underdeveloped countries of the world.

Over and above all, the role of banks as financial intermediaries cannot be overemphasized because banks assist in channeling funds from surplus economic regions to the deficit ones in order to facilitate business transaction and economic development at large. No wonder the government of Nigeria implored the local marketers to apply for licenses to build private refineries, but it was discovered that this move failed because the

independent marketers were solely driven by the desire to maximize profit. In the same vein, the Agricultural sector also benefited from surplus fund gotten form the surplus spending in the economy.

Banks are perhaps the most heavily regulated of all businesses due to the fact that they are providers of finance which is often viewed as the lubricant of the economy as observed by Cameroun *et al.* (1967). As financial intermediates, banks channel funds from surplus economic unit to deficit units to facilitate trade, production (Agricultural), capital formation etc. This view is also buttressed by Anyanwu (1997) that Commercial Banks tends to encourage savings which in turn induces investment because investment are made out of savings, the establishment of commercial banks mostly in rural areas makes savings possible hence economic development is accelerated.

Deregulation which is supposed to bring about healthy competition; as Fergusson and Stephen (1995) noted is a misnomer; sustainable competition which instead of arousing competition, it has now become a tool of exploitation and dragging the market forces to the background.

Moreover, in countries where the financial marketers are repressed (that is, interest rate control, compulsory public debt placement; and control on external capital flows) given a fixed nominal interest rate fiscal deficits

raise inflation, resulting in a repressed (even negative) real interest rates as observed in World Bank (1993).

However, the governments do intervene in order to give stringent laws in the operation of the banking system. Although they sometimes, intervene may be with the intention of correcting the drawback of the price fixing mechanisms to ensure that what is commercially rational for an individual bank is approximately rational for all.

Prior to the introduction of Structural Adjustment Programmes (SAP) in Nigeria in 1986, the Nigerian financial sector was characterized by rigid exchange rate and interest rate controls, mandatory sectoral allocation of bank credit to the private sector, all of which engendered distortion and inefficiencies that results to low direct investment. Funds were inadequate, the Nigeria currency was overvalued and the monetary and credit aggregate moved rather sluggishly such that the economy was sort of engulfed with a general lull. The introduction of SAP led to some financial regulations like; interest rate, exchange rate and other deregulations according to (Ogwuma, 1993; Ojo, 1993). However as a reversal policy, the government in January 1994 expressly introduced some measure of regulation into interest rate management owing to wide variations and unnecessarily high rate under the complete deregulation of interest rates.

In light of the above, the deposit rates were once again set at 12.45% per annum while a ceiling of 21% per annum was fixed for lending rate. The cap on interest rates introduced in 1994 was retained in 1995 with a little modification for flexibility but was lifted in October 1996 to pursue a flexible, interest rate regime as observed by Omole and Falokun (1999). In line with the adoption of the market-based technique of monetary management, interest rates policy remained flexible and responsive to changes in market conditions. However, as an instrument of monetary policy the central Bank of Nigeria CBN (2000) indirectly influenced the level and direction of change in interest rate movement through its invention rate on various money market assets especially the Minimum Rediscount Rate (MRR) as well as the stop rate of weekly tender for treasury bills. The MRR as the nominal anchor of CBN's interest rate policy continued to be used proactively in line with prevailing economic conditions while the rate of treasury bills is made market related and competitive with comparable money market instruments CBN (2006). Further, the MRR has undergone some fluctuations since 1987 to date as a result of the changes in the CBN policies which in turn have changed the overall economic conditions. In August 1987, was 15.0% and was reduced to 12.75% in December of 1987 with the objective of stimulating investment and growth in the economy. In 1989, the MRR was raised to

13.25% in order to contain inflation. To further liberalize interest rate management, the cap on interest rate was lifted in 1992 and re-imposed in 1994 when inflationary spiral could not contained. However, in October 1996, interest rates were fully deregulated with the banks given freedom to determine the structure of interest rates in consultation with their customers. The CBN however, retained its discretionary power to intervene in the money market to ensure orderly developments in interest rates. The policy of interest rate deregulation has been retained since 1997. Interestingly, the MRR was replaced with the Monetary Policy Rate (MPR). Again, the MPR was brought down to 10% from 14% MRR, with a lending rate of 13% and a deposit rate of 7% which stood as a standing facility intended to stem volatility in interest rates especially that of the interbank rates.

It is pertinent to know that under a deregulated interest rate system the market plays a vital role in determining the interest; this implies that both banks and their customers are free to be on the round tables to negotiate and arrive at a suitable interest rate on deposits and loans respectively. This study attempts to investigate the possible impacts of interest rate deregulation on Agricultural output and including rate Nigeria. However the paper is structured into five sections which section one contains the introductory part. Section two is the conceptual framework and the review of related literatures Section three comprises the methods, material and specification of model and estimation. While section four entails results and discussions and section five concludes and recommends policy options for way forward.

CONCEPTUAL FRAMEWORK/ EMPIRICAL EVIDENCE

Conceptual framework: According to investor's glossary (2010) deregulation is an act by which the government regulation of a particular industry (Agricultural sector) is reduced or eliminated in order to created and foster a more efficient market place. However, the main purpose of deregulation most at times is to weaken the government influence and forge greater competition. Technically speaking, deregulation aims at exploring the market forces in order to determine the lending and deposit rate respectively in an economy.

Oxford Dictionary of Economics (2003) defines rate of interest as the extra payment per unit of the loan normally calculated as an annual rate.

Jhingan (2005) defined interest rates as the rental payment for the use of credit by borrowers and return for parting with liquidity by lenders. Like other prices interest rates perform a rationing function by allocating limited

supply of credit among the many competing demands. Interest rate may also be seen as the price of credit which might be subject to distortions due to inflation. According to Wikipedia (2005) an interest rate is the rate at which interest is paid by a borrower for the use of money that they borrow from a lender. It can also be said as a rate which is charged or paid for the use of money is usually expressed as an annual undertaking.

Agricultural sector can be looked at from diverse perspective depending on the economy in question. However Agricultural sector in Nigeria contexts embraces all the sub-sectors of the primary industries as opined by Amassoma (1997). They encompass farming which includes; livestock rearing and growing crops, fishing and forestry. Agricultural production therefore refers to the final output of the agricultural sector of the economy. This definition was adopted by Adofu *et al.* (2010) which this study is also going to adopt.

LITERATURE REVIEW AND EMPIRICAL EVIDENCE

As opined by Oni (1993), the structure of Nigerian agriculture can be classified into distinct phases. However, the phases encompasses the period of the Structural Adjustment Programme (SAP) in 1986 till date which is the emphasis of this study. In this period, there was agricultural bigotry which was characterized by active discrimination against agriculture. The period was also marked by export restrictions and duties on food crops, all of which served as disincentives to domestic agricultural production. During the period of government intervention, agricultural policies attempted to promote rural development and enforcement of food supplies. It should be noted that during the period of the Structural Adjustment Programme (SAP) the policy sought to eliminate price distortion and promote market liberalization among other things as observed by Adofu *et al.* (2010) and reemphasized in this study as a bid to promote healthy growth and development.

Adegeye and Ditto (1985) described agricultural credit as the process of obtaining control over the use of money and services in the present in exchange for a promise to repay at a future date. Ideally, we know that agricultural credit can be used to enhance productivity and also to promote standard of living thereby breaking the vicious cycle of poverty in a developing economy like that of Nigeria.

When there is a serious problem in the rate of interest and credit associated to agricultural production and development which in the long run affect this sector or quantity of problems emanating from it. However in

modern farming business in Nigeria and other developing countries, obtaining credit is not what matters most but rather how efficient such credit are utilized for the purpose for which they were obtained for in order to ensure a fostered productivity. This is further buttressed in 1987, when the president pegged interest rate which kicked against the aim of stimulating new investment or did it increase capacity utilization of industry and hence the need for deregulation.

The need for deregulation is motivated by the Keynesian investment theory emphasized by McKinnon and Shaw (1973). The classical economist however stipulates the rate of interest as the major determinant of savings (Olusoji, 2003; Chete, 1999; McKinnon and Shaw, 1973). They are all of the view that the rate of interest is the factor that brings about the demand for investment and willingness to save into equilibrium with one another as pinpointed by Umoh (2003).

According to Afolabi *et al.* (2005) government intervention in the form of interest rate ceilings and sectoral allocation of credits created highly concentrated market structure leading to monopolistic and/or oligopolistic tendencies as well as promoting other inefficiencies which caused distortions in the economy.

Gupta (1970) in his study of personal savings in developing countries argued that high real interest rate increases savings. While a contrary view opined by Ajayi (1978), in his study concludes that savings deposits rates in a deregulated regime is not significant in explaining the demand for savings.

In line with the above, the empirical works by McKinnon (1973) and Fry (1989) have shown evidence to support the hypothesis that interest rate determine investment. This pinpoints that there are two transmission channels through which interest rate tends to affect investment (i) that they relates to investment as cost of capital and (ii) that they relate to cost of capital investment as cost of capital. In their study, they also buttress that, interest rates encourages loans which is in form of external finance. Many researchers as undergone several studies that has investigated on these transmission mechanisms which corresponds with interest rate policy regime articulated in Nigeria prior to and after the 1986 deregulation as observed by Sanusi (2002)

The determinant and structure of real interest rates was reviewed by Agu (1988) in Nigeria between 1970 – 1985. His study asserted that there is negative effect of low real interest rate on savings and investment through the financial repression regime and as a result concluded that the relationship between interest rates, savings and investment is inconclusive.

In contrast to with the above opinion, Williams (2009), in its findings stipulates that real interest rates were generally negative as a result of the repressed regime prior to 1986, when the rates were fixed and as such brought about financial disintermediation which led to low savings, low investment and low growth in the economy.

In the same vein, Agu (1988) pinpointed that the central bank is faster than its shadow in its aim to induce the achievement of its objectives through the ongoing Structural Adjustment Programme (SAP) which gave both to the recommendation of deregulation of the economy. He is of the view that the central bank embarked on deregulation in other to kill a lot of industries most especially the standard and medium scale industries because interest rate deregulation will lead to a very high leading rate which the small and medium scale industries would not be able to afford due to their limited capital and production base. The CBN on its part increased its lending rate from 11 to 15% in situations where they feel that naira is undervalued. Sequel to the above the commercial banks increased its lending rate to between 17 to 22% as opined by Adofu *et al.* (2010). Although this rates was later increased following the new policy of the CBN in March 2009 to between 22 to 24% at the maximum including other charges as opined by Williams (2009).

In line with the above, Williams (2009) further buttressed that, the mandatory interest rate policy will result to a near shut down in lending rate volume to any bank with major credit concerns because the new policy ensures that only the highest quality borrower have access to new bank credits within the year.

Both Ani (1988) and Ojo (1988) respectively are of the view that money awaiting remittance to the second tier foreign exchange profit and petroleum subsidies is significant to the working of economic activities' and as a result concluded in their studies that the fixing of interest rates at such a high level does not give Nigerian businesses any chance of competition with their foreign counterparts especially those from countries where interest rates are low compared to that of Nigeria. And that if interest rate is not controlled it might lead to increase in cost of capital which in turns discourages investment.

On the contrary, Anyanwu *et al.* (1997) is of the assertion that, interest rate deregulations will definitely lead to more efficient allocation of financial market resources due to the fact that, interest rate will now reflect scarcity and relative efficiency in different use. This implies that only efficient investors will have access to scarce financial resources. However, with subsistence

nature of agricultural production in Nigeria, it has therefore becomes difficult for the sector to access the resources.

Abiodun (1998) has a two-way opinion that, deregulation of interest rate will mar or stimulate/ the economy. He adduced that deregulation of interest rate will lead to an increase in interest rate which tends towards a positive effect, as saving will be increased. He further buttressed that high interest rate will not result to cost push inflation due to the fact that borrowers will transfer high cost of borrowing to customers by the means of including it in the cost of production. Abiodun (1998) further emphasized that; high cost of borrowing/lending will slow down investment, because borrowing will be greatly reduced. Therefore, investment in new businesses will reduce while existing ones may not be able to compete adequately for scarce fiancé due to high cost of borrowing. He further opined that, free market should serve as checks and balance and that some measure of control on interest rate will be beneficial if only investment can be deliberately channeled into the preferred sectors such as; Agriculture, Manufacturing etc.

THE MODEL SPECIFICATION AND ESTIMATION

Development of the model: A model is identified if it is in a unique statistical form that enables unique estimates of the parameters to be subsequently estimated from a sample data. Hence, in this study we shall reformulate the model used by Adofu *et al.* (2010) in their assessment of Interest rate Deregulation and its effect on enhancing Agricultural productivity in Nigeria. In the current study, we shall use eight macroeconomic variables. In our model, Agricultural output (AGRIC) depends on Bank Lending (BKLD), Credit to Agricultural Sector (CRAG), Credit to Private Sector (CRPR), Direct Investment (DINVT), Exchange Rate (EXH), Interest Rate (INT) and Stochastic error (U_1).

This model is given as:

$$\text{AGRIC} = f(\text{BKLD}, \text{CRAG}, \text{CRPR}, \text{DINVT}, \text{EXH}, \text{INT}, U_1) \quad (1)$$

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- **AGRIC:** This refers to the total agricultural output realizable within the period under consideration
- **BKLD:** This is the rate at which banks are ready to give loans out to the preferred sectors and this data are extracted from the CBN statistical bulletin 2008
- **CRAG:** This refers to credit available to Agricultural sector. The data is obtained as in the above

- **CRPR:** This refers to credit available to core private sector. The data is obtained as above
- **DINVT:** This is an investment which is sufficiently large to affect countries subsequent decisions or it can be said as the purchase of a controlling interest that would still permit active control of the economy according to Investopedia Financial Dictionary (2010)
- **EXH:** This is the exchange ratio of Naira and Dollar. The data is obtained from the CBN bulletin 2006 and 2008, respectively
- **INT:** This is the interest rate which is defined as interest differential between maximum lending rate and savings deposit rate it has negative impact on credit. Interest rate determination is a critical factor in the loadable funds market given its role in the mobilization and allocation of credit in an economy as pinpointed by Uremedu (2006)
- U_1 : Refers to the stochastic disturbance term or error term

The above Implicit function in the model in Eq. (1) can be reduced to a linear explicit functions form as thus:

$$\text{AGRIC} = \beta_0 + \beta_1 \text{BKLD} + \beta_2 \text{CRAG} + \beta_3 \text{CRPR} + \beta_4 \text{DINVT} + \beta_5 \text{EXH} + \beta_6 \text{INT} + U_1 \quad (2)$$

Sources of data and methods of analysis: This research work employed basically the secondary data sources from central bank of Nigerian publication i.e., the CBN statistical bulletin 2006 and 2008, respectively. The study made use of ordinary least square, econometrics model to ascertain the nexus of Interest rate Deregulation, lending rate and Agricultural production in Nigeria. The empirical implementation of the model made use of macroeconomic data covering 23 years (1986-2008) because 1986 was the period prior to when interest rate was deregulated. Our model encompasses the classical the Keynesian as well as more recent and less conventional models. The equation specified for the study assisted us to determine the T-value, F-statistics and Domain Watson test respectively which were used to test for the significance of the equation specified. This could be done by ascertaining if the OLS econometric regression coefficient is positive then the calculated t-value should be greater than the tabulated valued thereby indicating that there is positive relationship between the dependent and the independent variable. However the co-efficient of determination (R^2) was used to measure the rate at which the dependent variable is explained by independent variables. In the same vein, if the Durbin Watson test is approximately two (2) then it shows that there is absence of auto correlation in the variables used.

Before the regression analysis, we perform a stationary test for variables used. In economic analysis it is paramount that variables used are stationary before the application of standard econometric techniques. This is to avoid misleading results. In performing the stationarity test we used a maximum lag of 7 and excluded both intercept and trend.

EMPIRICAL ANALYSIS OF RESULTS AND DISCUSSION OF FINDINGS

Data analysis: To empirically examine the nexus between interest rate deregulation, lending rate and agricultural output in Nigeria, this section commences its empirical analyzes by testing the time series properties of the variables. This was carried out in order to ascertain whether the variables have unit root or not. Owing to the fact that variables which are non-stationary at level might have the tendency of moving together in the long-run (that is having a long-run relationship); the co-integration between the variables were examined while the regression analysis was analyzed to examine the relative contribution of the explanatory variables on economic growth.

Time series properties of data: The unit root test has become an increasingly popular path to ascertaining the properties of macroeconomic time series. This development is an outcome of the fact that most macroeconomic time series exhibit non-stationarity behaviour in their level form, which often poses a serious potential problem to econometric analysis and may therefore lead to spurious result if appropriate measures are not taken. To guard against spurious regression result this study takes the step in checking the properties of the variables with the use of the Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller (1981). The result is presented in Table 1.

With respect to the ADF test reported on Table 1, all the variables for the regression estimate were found to be integrated of order one, implying that the variables are $I(1)$ series.

Co-integration test: Evidence from the unit root test above indicated that all the variables are integrated of the same order, that is, the variables have unit roots. In this wise, the Johansen (1988) co-integration test is applied to test whether the linear combinations of the variables could result in a long-run relationship among the variables. The co-integration result is presented in Table 3.

Table 2 shows that the null hypothesis of no co-integrating vector is rejected at none and at most one co-integrating vector at 1% significance level, but the null hypothesis for at most 2 co-integrating vector is accepted

Table 1: Unit root test on variables

Augmented Dickey-Fuller (ADF) test			
Variables	Level	1 st /2 nd Diff	Remarks
LAGRIC	-0.7675	-4.7991*	I(1)
LBKLD	-2.7312	-4.1273*	I(1)
LCRAG	-0.6899	-5.2221*	I(1)
LCRPR	-2.5566	-4.9061*	I(1)
LDINVT	-1.4268	-4.0291*	I(1)
LEXH	-1.2253	-3.3808**	I(1)
LINT	-2.0783	-4.5106*	I(1)

Authors computation; *: 1%; **: 5% significance level
 LAGRIC = Log of Agricultural Output; LDINVT = Log of Direct Investment; LBKLD = Log of Bank Lending; LEXH = Log of Exchange Rate; LCRAG = Log of Credit to Agric. sector; LINT = Log of Interest Rate; LCRPR = Log of Credit to the Private Sector

Table 2: Co-integration test result

Eigenvalue	Likelihood ratio	5% Critical value	1% Critical value	Hypothesized No. of CE(s)
0.833629	134.9000	124.24	133.57	None **
0.755791	95.44221	94.15	103.18	At most 1*
0.685899	64.42811	68.52	76.07	At most 2
0.528824	38.95120	47.21	54.46	At most 3
0.501163	22.39568	29.68	35.65	At most 4
0.265342	7.095196	15.41	20.04	At most 5
0.014059	0.311501	3.76	6.65	At most 6

Authors computation; L.R. test indicates two co-integrating equation(s) at 5% significance level

Table 3: Result for long-run estimate

Variable	Coefficient	S.E	t-statistic
C	9.548841	1.741634	5.482691
LBKLD	0.253430	0.358180	0.707550
LCRAG	0.066142	0.114448	0.577928
LCRPR	0.007128	0.015742	0.452832
LDINVT	0.179159	0.072623	2.466962
LEXH	-0.054446	0.171868	-0.316788
LINT	-0.458959	0.309240	-1.484154

Authors computation; R² = 0.78 F = 10.48(0.000) (0.000) DW = 2.39

Table 4: Residual stationarity test

Variables	ADF	Order of integration
ECM	-1.4544 (-4.0296)	1(0)

Authors computation; The values in parentheses are t-statistics for the stationarity test for the residual term

Table 5: Over parameterized regression estimate

Variable	Coefficient	S.E.	t-statistic	Prob.
ECM (-1)	-1.768386	0.572297	-3.089980	0.0214
C	0.013032	0.147429	0.088393	0.9324
DLBKLD	-0.126513	0.487614	-0.259452	0.8040
DLCRAG	0.014774	0.158743	0.093066	0.9289
DLCRPR	0.011461	0.018570	0.617204	0.5598
DLINVT	0.298913	0.189035	1.581256	0.1649
DLEXH	-0.052387	0.320645	-0.163380	0.8756
DLINT	-0.439374	0.516420	-0.850807	0.4275
DLAGRIC (-1)	0.162189	0.360936	0.449357	0.6689
DLBKLD (-1)	0.004584	0.531412	0.008625	0.9934
DLCRAG (-1)	-0.154753	0.142761	-1.083997	0.3200
DLCRPR (-1)	0.007826	0.021496	0.364054	0.7283
DLINVT (-1)	0.039877	0.166156	0.239995	0.8183
DLEXH (-1)	-0.322797	0.282082	-1.144334	0.2961
DLINT (-1)	0.543797	0.431674	1.259741	0.2545

Authors computation; R² = 0.76, Adjusted R² = 0.21, F = 1.375(0.36), DW = 2.07

both at 1 and 5%, respectively, this means that there are two co-integrating vectors in the model specified in this study. More so, the idea of co-integration is that if two or more series are *I*(1) series then, it is possible that their residuals are stationary, that is, *I*(0). This study employed the DF test on the residuals of the long run, thus the result of the long run estimate is presented in Table 3 while the result on the DF tests on the residuals is presented on Table 4.

As shown in Table 4, the null hypothesis stipulates that there is “a random walk” which was rejected at one percent level of significance, indicating that Agricultural Output, Direct Investment, Bank Lending rate, Exchange Rate, Credit to Agric. Sector, Interest Rate and Credit to the Private Sector were co-integrated.

As a follow up to co-integration tests, we over parameterized the variables in the model and used Schwarz Information Criteria to guide parsimonious reduction of the model. This helps to identify the main dynamic pattern in the model and to ensure that the dynamics of the model have not been constrained by inappropriate lag length specification (Table 5).

It was observed from Table 6 that there are significant improvement in parsimonious model over the over parameterized model. The Adjust R², F-stat, and the D.W improved significantly. Overall, the model could be considered to be reasonably specified based on its statistical significance and fitness.

An examination of the results for the parsimonious error correction model (Table 6) showed that the explanatory power (R²) of the model is high (73%). This implies that the model explained at least 73% of variations in agricultural output in Nigeria. Furthermore, the F-statistics 5.02 (0.01) indicated that the model fit the data relatively well while the Durbin Watson statistics (2.01) indicated absence of autocorrelation.

Table 6: The parsimonious error correction regression estimate

Variable	Coefficient	S.E	t-Statistic	Prob.
ECM (-1)	- 1.490176	0.262313	- 5.680906	0.0001
C	0.030239	0.061266	0.493570	0.6298
Δ LCRPR	0.010180	0.009862	1.032292	0.3208
Δ LDINVT	0.271339	0.110615	2.453010	0.0290
Δ LINT	- 0.403467	0.237354	- 1.699848	0.1129
Δ LCRAG (-1)	- 0.139542	0.089993	- 1.550583	0.1450
Δ LEXH (-1)	- 0.255979	0.170045	- 1.505359	0.1561
Δ LINT (-1)	0.487454	0.261150	1.866565	0.0847

Authors computation; $R^2 = 0.73$, Adjust $R^2 = 0.58$, $F = 5.02$ (0.01), $DW = 2.01$

In addition to the above the coefficient of individual variables is examined to determine the relative contribution of each variable to agricultural output in Nigeria. The co-efficient of credit to private sector was positive (0.02) but insignificant. The positive effect of credit to private sector on agricultural output is consistent with a priori expectation given the positive effect of credit on economic growth but the insignificant effect is true in the case of Nigeria, because over the years the credit to private sector have been centered on the oil and gas sector of the economy. In contrast to the above the co-efficient of direct investment was positive (0.27) and significant. The positive effect of direct investment on agricultural output is consistent with a priori expectation, implying that a one per cent increase in direct investment would stimulate output by 27%. Furthermore, the co-efficient of interest rate was negative (-0.40) and insignificant. The negative effect of interest rate on agricultural output is consistent with a priori expectation, implying that a one per cent decrease in interest rate would stimulate output by 40%.

The co-efficient of the first lagged value of credit to the agricultural sector was negative (-0.13) and insignificant. The negative effect of the value of previous year's credit to agricultural sector on agricultural output is inconsistent with a priori expectation, implying that a one per cent increase in the first lagged value of credit to agricultural sector is capable of reducing current agricultural output by 13%. Also, the co-efficient of the first lagged value of exchange rate was negative (-0.28) and insignificant. The negative effect of the first lagged value of exchange rate on agricultural output is consistent with a priori expectation, implying that a one per cent increase in the first lagged value of exchange rate is capable of enhancing current agricultural output by 28%. The implication of the above result is that a decline in exchange rate implies reduction in the cost of imported agricultural inputs and consequently stimulating current agricultural output. Finally, the parsimonious estimate revealed that the co-efficient of the first lagged value of interest rate was positive (0.49) and insignificant at five per cent significant level. The positive effect of the value of previous year's interest rate on agricultural output is

inconsistent with a priori expectation, implying that a one per cent increase in the first lagged value of interest rate is capable of increasing current agricultural output by 49%.

CONCLUSION AND RECOMMENDATION

This study investigated the nexus of interest rate deregulation, lending rate and agricultural productivity in Nigeria. The authors used O.L.S econometric model to estimate the effect of interest rate deregulation, lending rate and agricultural productivity. The results revealed that all variables were found to be co-integrated of order one. The study also revealed that the dynamics of the model have not been constrained by an inappropriate lag-length specification which was illustrated by Schwarz information criteria. Further, the E.C.M showed that the explanatory variables account for approximately 73% variation in the agricultural output. The Durbin Watson statistics (2.01) indicates the existence of auto-correlation.

From the results, it can be deduced that (CRPR) was positive but insignificant. This confirms studies carried out by Williams (2009) and Ani (1988) that high interest rate due to mandatory interest rate policy will lead to a shutdown lending rate volume to banks with major credit concern because the policy is meant to favour only high quality borrowers that have access to banks credits. Following from the above, it is ideal for the government to encourage total deregulation of interest rate in other to avoid financial disintermediation which may lead to low credit, investment and growth.

Over and above all, the government through the CBN should implement policies that would enhance credit at least to the preferred sectors which will in turn boost agricultural output in Nigeria. The studies also recommend that the monetary authorities bridge the widened gap existing between lending rate and deposit rate to enhance credit and growth in Nigeria.

Reduction of risks and uncertainties in agriculture, to be achieved through the introduction of a more comprehensive agricultural insurance scheme to reduce the natural hazard factor militating against agricultural production and security of investment.

A nationwide, unified and all-inclusive extension delivery system under the Agricultural Development Programs (ADPs).

Active promotion of agro-allied industry to strengthen the linkage effect of agriculture on the economy. Provision of such facilities and incentives as rural infrastructure, rural banking, primary health care, cottage industries etc. to encourage agricultural and rural development and attract youths (including school leavers) to go back to the land.

To increase agricultural productivity, there is the need for a proper loan appraisal and follow-up, including very careful loan screening procedure and timely disbursement of approved loans to farmers to ensure prompt and appropriate use of such loan.

To also ensure prudent use of loan resulting from the deregulated interest rate, there is need for the financial institution to organize an agricultural project appraisal and monitoring team. This would result in greater use agricultural loans. To further enhance agricultural production, there is the need to:

- Creating a conducive macro-environment to stimulate greater private sector investment in agriculture so that the private sector can assume its appropriate role as the lead and main actor in agriculture
- Rationalizing the roles of the tiers of government in their promotional and supportive activities to stimulate growth
- Reorganizing the institutional framework for government intervention in the sector to facilitate smooth and integrated development of agricultural potentials
- Articulating and implementing integrated rural development as a priority national program to raise the quality of life of the rural people
- Increasing agricultural production through increased budgetary allocation and promotion of the necessary developmental, supportive and service-oriented activities to enhance production and productivity and marketing opportunities
- Increasing fiscal incentives to agriculture, among other sectors, and reviewing import waiver anomalies with appropriate tariffication of agricultural imports
- Promoting increased use of agricultural machinery and inputs through favorable tariff policy.

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REFERENCES

- Abiodun, 1988. Cited in Adofu and E.S. Akiri, 2007. Interest rate deregulation and investment in Nigeria in Nigeria. *J. Econ. Manage. Stud.*, 2(1).
- Adegeye, A.I. and J.S. Ditto, 1985. *Essential of Agricultural Economies*. New Edn., Impact Publishers, Ibadan, Nigeria.
- Adofu, I., M. Abula and S.I. Audu, 2010. An Assessment of the effects of interest rate deregulation in enhancing agricultural productivity in Nigeria. *Curr. Res. J. Econ. Theory*, 2(2): 82-86.
- Afolabi, E., 2005. Nigeria's Debt is Looming; Which Way Forward Punch Nigerian Newspaper. Retrieved from: <http://www.punchnewspaper.com>, (Accessed on: 6, October).
- Agu, C.C., 1988. *Nigerian Banking Structure and Performance: The Banking System Contribution to Economic Development studies*. Onitsha African FEP Publishers
- Ajayi, E.A., 1989. Nigeria debt management experience. *Central Bank Nigeria J.*, 13(2).
- Amassoma, D., 1997. The impact of interest deregulation on agricultural production in Nigeria. Unpublished B.Sc. Project, Department of Economics, University of Port Harcourt, Port Harcourt Rivers State.
- Agu, C.C., 1988. Interest rate policy in Nigeria an attendant distortion. *Sav. Dev. J.*, 12(1).
- Anyanwu, J.C., A. Oyefusi, H. Oaikhanan and F.A. Dimowo, 1997. *The Structure of Nigerian Economy (1960-1997)*. Joanne Education Publishers, Joanne Onitsha, ISBN: 10-9782784176.
- Cameroun, *et al.*, 1967. *Financial Marketing, Money and Banking*. *Annual Rev. Sociol.*, 29: 443-464..
- CBN, 2000. Central Bank of Nigeria Annual Report and Statement of Account for the Year Ended 31st December. Retrieved from: <http://www.centralbank.org>, (Accessed on: 23 November, 2010).
- CBN, 2006. Monetary Credit, Foreign Trade and Exchange Policy Guidelines for 2000 Fiscal Year, Monetary Policy Circular Publication. No. 34. Retrieved from: <http://www.cbn-treasury.gov.ng>, (Accessed on: March 3).
- Chete, L.N., 1999. Macro-Economic Determinant of Private Savings in Nigeria. NISER monograph, series NO 7, pp: 1-4.
- Dickey, D.A. and W.A. Fuller, 1981. Likelihood ratio statistics for autoregressive time economic growth: The case of Turkey. *J. Soc. Sci.*, 5(1): 33-42.

- Fergusson, M. and R.P. Stephen, 1995. What constitutes evidence of discrimination in lending? *J. Finance*, 5: 739-748, Reprinted in the *Economic of Housing*, London Edward Publishing 1997.
- Fry, M., 1989. Foreign Debt Instability: An Analysis of National Savings and Domestic Investment Response to Foreign Debt Accumulation in 28 Developing Countries. *J. Int. Money Finance*,
- Gupta, K.L., 1970. On some determinant of rural and urban household saving behaviour; The economic record. *The Society of Australia*, 46(116): 378-383.
- Investopedia Financial Dictionary, 2010. Retrieved from: <http://www.investopedia.edu.co.uk>, (Accepted on: October 17).
- Jhingan, M.L., 2005. *Macro Economic Theory*. 3rd Edn., Konark Publishers, Delhi.
- Johansen, S., 1988. Statistical analysis of cointegrating vectors. *J. Econ. Dyn. Control*, 12: 231-254.
- Mckinnon, R. and Shaw, 1973. *Money and Capital in International Development*. The Brokenness Institution, Washington D.C.
- Mckinnon, R.I., 1973. *Money and Capital in Economic Development*. 1st Edn., Brookings Institution, Washington D.C., USA.
- Ogwuma, P.A., 1993. Recent Development in Nigerian Financial Service Industry; Problems and Challenges: An Address at an Annual Dinner of the Chartered Institute of Bankers, Lagos, November.
- Ojo, M.O., 1993. Monetary Policy Instruments in Nigeria, Their Changing Nature and Implications. *The Nigeria Banker*.
- Ojo, M.O., 1988. Agricultural performances and policy under structural adjustment programme in Nigeria. A paper presented at the 1988 Annual Conference of the Nigeria Economic Society, Obafemi Awolowo University, Ile Ife, Nigeria..
- Olusoji, M.O., 2003. Determinants of Private Savings in Nigeria: An Error Correction Approach NDIC Quarterly Publication, 13 September.
- Omole, D.A. and G.O. Falokun, 1999. The Impact of Interest rate Liberalization on Corporate Financing Strategies of Quoted Companies in Nigeria. The Proceeding of the Conferences on African Economic Research Consortium (AERC 99), Kenya PG 52.
- Oni, S.A., 1993. *Nigeria Agricultural Policies during the Third Republic. Managing the Nigerian Economy in the Third Republic*.
- Sanusi, J.O., 2002. The evolution of monetary management in nigeria and its impact on economic development. *CBN Bull.*, 26(1): 1-19.
- Umoh, O.J., 2003. An Empirical Investigation of the Determinants of Aggregate National Savings in Nigeria. *J. Monetary Econ. Integr.*, 3(2): 113-132.
- Uremedu, S.O., 2006. The impact of real interest on savings mobilization in Nigeria. Unpublished PHD Thesis.
- Wikipedia on Answers.com, 2005. Definition of Term. Retrieved from: <http://www.wikipedia.com>, (Accessed on: November 24, 2010).
- Williams, E., 2009. *The Return of Interest Rate Caps*. Business World Publication, May 17.
- World Bank, 1993. *World Bank Policy. Res. Bull.*, 4(3), May-July.