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An Empirical Investigation on Impact of Interest Rates on Agricultural Investment in Nigeria

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Abstract
The main thrust of this study is to examine the impact of interest rate on agricultural investment in Nigeria for the period 1980–2015. In a bid to finding the nexus between interest rate and agricultural investment in Nigeria, the study relied on agricultural investment, lending interest rate, deposit interest rate and agricultural output as variables. The study employed the ARMA Least Square technique to determine the impact of interest rate on agricultural investment in Nigeria. The empirical findings showed that deposit interest rate and agricultural output have a positive impact on agricultural investment, growth, and development while lending interest rate impacts negatively on agricultural investment in Nigeria. Based on the findings, the study recommends that government and various stakeholders in the agricultural sector should improve on the macroeconomic policies such as interest rates, inflation, the income level that could impact on the level of investment that would contribute positively to agricultural development in Nigeria.

Keywords: Interest Rate, Agricultural Investment, Nigeria

1.1   Background to the study

Over the years, investing in agricultural production has been a critical factor in the growth and development of the agricultural sector and by extension economic growth. Its importance cannot be overemphasized. Investment is the engine of economic activity and the primary cause of economic growth accounting for the change in capital stock during a period. It is the accumulation of newly produced physical entities, such as factories, machinery, houses and goods inventories. Consequently, unlike capital, investment is a flow term and not a stock term. This means that investment is measured over a period of time. Investment plays a very important role in economic growth in a country. Countries rely on investment to solve economic problems such as poverty, unemployment, etc. (Muhammad 2004). As such determinants of the level of investment become paramount in an economy.

One of the most topical issues in Nigeria today is that of agricultural development, investment, and its sustainability. Agriculture is important because it provides food and employment for the populace, raw materials for industries, and market for industrial goods. Eboh, Ujah, and Nzeh (2009), observed that the contemporary economic significance of agricultural sector is even more remarkable. They opined that in the past

half a decade, the impressive growth rate of the nation's economy had been driven by the non-oil sector, particularly the agricultural sector. This, in other words, according to them means that the growth rate of the overall economy is to a large extent dependent on the growth rate in agriculture GDP.

The relationship between financial reform, development, agricultural development and investment and economic growth has been the subject of a growing literature in both developed and developing countries (World Bank, 2008). To enhance the development of the financial system in the economy, interest rate reform, a policy under the financial sector liberalisation was formulated. The expectation of this reform was that it would encourage domestic savings and make loanable funds available in the banking institutions. Obute, Adyorough, and Itodo (2012) defined interest rate deregulation as an economic term used to refer to a situation whereby forces of demand and supply are allowed to determine the value of interest rates rather than its value being administered directly by monetary authorities. Interest rate policy in Nigeria is a major instrument of monetary policy with regards to the role it plays in the mobilization of financial resources aimed at promoting investment, economic growth, and development. The interest rate is the price paid for the use of money. It is the opportunity cost of borrowing money from a lender. It can also be seen as the return being paid to the provider of financial resources and thus an important economic price.

The Agricultural sector, one of the sources of economic growth, has been looked unto to pave the way for economic development because of its potentials. The realization of this fact led the Nigerian government to embark on several agricultural development programmes, many of which, unfortunately, failed (Manyong et al. 2005; and Ogungbile, 2008). Among these agricultural programmes is the establishment of the Nigerian Agricultural Credit Guarantee Scheme Fund (ACGSF) in 1977 aimed at mobilizing funds from the banking sector for rural development by guaranteeing loans through the commercial banks for investment in agriculture, thereby minimizing the risks involved in financing the sector. The fluctuations in the financial sector appeared inseparable from the performance of the ACGSF in meeting up with its goals of mobilizing adequate credit for the agricultural sector (Onoja, Onu, and Ajodo-Ohiemi, 2012).

According to Anna (2012) and Singhania (2011), the interest rate is determining factor in return on investment. Thus investor will channel their investments from low-interest rates to higher interest rate because it provides an incentive to investors looking for higher returns. Therefore high-interest rate can lead to increased agricultural investment. The transmission mechanism between interest rate and investment is a bidirectional relationship. High-interest lending could deter agriculture investors from sourcing fund from the financial sector, but low-interest rate will spur the agricultural investment prospects. On the other hand, high deposit interest rate will encourage savings thereby making loanable funds available for investment. Conversely, low deposit interest rate will dissuade the public from savings thereby reducing the availability of investible fund.

1.2   Statement of the Problem

Agriculture development is very vital to the development of every economy. The development of agriculture relies on the availability of investible fund (agricultural investment) by both private and public sector. The availability of investible fund invariable depends on the volatility of interest rate.

Prior to SAP in 1986, the interest rate in Nigeria was generally fixed by the CBN with periodic adjustments depending on the government sectoral priorities. The monetary authority in promoting investment in key sectors in the economy (Agricultural, Manufacturing, etc.) charged special interest rates on loans taken by these sectors so as to encourage the growth in the output of the sectors for a possible improvement in economic growth (Udoka, 2000). The prevailing rates of interest were regulated by the government through the Central Bank of Nigeria (CBN) so as to guide the economy towards economic growth through these key sectors. The period is considered as a financial repression period (government regulations, laws, and other non-market restrictions preventing financial intermediaries from functioning at full capacity) as explained by Mckinnon & Shaw (1973), such regime was characterized by a highly regulated monetary policy environment in which policies of directed credits, interest rate ceiling and restrictive monetary expansion were the rules rather than exception (Soyibo and Olayiwola, 2000). However, the strict regulatory regime could not be sustained. The deposit rate increased from 4% in 1975 to 9.5% in 1986, while the lending rate rose from 6 to 10.5% within the same period.

The low and sometimes negative real interest rates discouraged savings, increased the demand for loan able funds. The demand for credit soon exceeded the supply of funds while essential sectors of the economy were starved of funds (Obute, Asor and Idoko 2012).

As a result of the link between the financial sector and the real sector of the economy, and since lending rate translates into a cost of capital, the relationship has a direct implication for agricultural investment. Thus the objective of this paper is to examine the impact of interest rate on Agricultural investment in Nigeria.

1.3   The objective of the study

The general objective of this study is to determine the impact of interest rate on Agricultural investment in Nigeria.
The specific objectives include:
  i.   Examine the interest rate policy in Nigeria;
  ii.   Examine the relationship between interest rate and Agricultural investment in Nigeria;
  iii. Examine the relationship between interest rate and Agricultural production in Nigeria;
  iv.   Make appropriate policy recommendations.

1.4   Research Question
  i.   What is the interest policy of Nigeria?
  ii.   Is there any relationship between interest rate and agricultural investment in Nigeria?
  iii. Is there any relationship between interest rate and Agricultural production in Nigeria?

1.5   Hypothesis
  i.   There is no relationship between interest rate and agricultural investment in Nigeria;
  ii.   There is no relationship between interest rate and agricultural production in Nigeria.

Literature Review

2.0   Introduction

The Nigerian Agricultural Sector is among the most heavily regulated sector of the Nigerian Economy. The special interest of Government in the Agricultural sector is due to its relevance in the provision of raw materials for industries and most importantly the provision of food for the teaming Nigeria population and also serving as a source of foreign exchange for the economy. The Nigerian Agricultural section is not alone in government intervention in terms of regulation, according to Akiri and Adofu (2007), opined that the banking industry owing to the nature of activities role, and function it performs in the economy, is also one of the widely and heavily regulated sectors in both developing and developed countries of the world. As a financial intermediary, banks help in channeling funds from surplus economic regions to the deficit ones in order to facilitate the business transaction and economic development in general. The Agricultural sector is not left out in benefits of the surplus fund from the surplus spenders in the economy.

Oni (1993) opined that the structure of Nigeria agriculture identified three distinct phases namely, the period of agricultural discrimination (1960-1970), the period of government intervention(1970-1985), and the period of the structural adjustment programme (1986-till date). The period of agricultural discrimination was characterized by active discrimination against agriculture. This 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 enhancement of food supplies. During the period of the Structural Adjustment Programme (SAP) the policy sought to eliminate price distortion and promote market liberalization among other things, in a bid to promote healthy growth and development.

Anyanwu (1997) opined that, Commercial banks encourage savings. Since investments are made out of savings, the establishment of commercial banks, especially in the rural areas, makes savings possible hence economic development is accelerated.

2.1   Conceptual Framework

The interest rate is the return on investment, the investor will channel their investments from low-interest rates to higher interest rate because it provides an incentive to foreign investors looking for higher returns therefore high-interest rate can lead to increased agricultural investment.

Ibimodo (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 the limited supply of credit among the many competing demands. Okopi (2008) sees the agricultural sector in the Nigeria contexts to embrace all the sub-sectors of the primary industries. They include farming (which include livestock rearing and growing crops) fishing and forestry. Agricultural production, therefore, refers to the final output of the agricultural sector of the economy.

2.2   Trends in Interest Rate Policy and reforms and its attendant Impact on Agro-investment in Nigeria

Over the years, the role of agriculture as the mainstay and driver of growth of the Nigerian economy has been recognized through government initiated policies to increase investment in food and agricultural production (Uniamikogbo, 2006). Such policies include the National Accelerated Food Production Programme (NAFPP) of 1972; the Operation Feed the Nation (OFN) of 1976 and the Green Revolution (GR) of 1980, among other agriculture-related programmes aimed at boosting agricultural production. These were the River Basin Development Authorities (RBDAS) and the Agricultural Development Project (ADP) (Ekpo, Ndebbio, Akpakpan & Nyong, 2004). The government has also attempted to increase investment in Nigerian agriculture through budgetary allocations and the provision of cheap and readily available credit facilities. The indications are that government budgetary allocation has become an important determinant of agricultural production in Nigeria (Nwosu, 1995). Yet, government budgetary allocation to agriculture is not without limitations.

The first is the relatively low allocation to the agricultural sector. The second is the actual expenditure which often falls short of budgeted expenditure and the high rate of under spending which is usually higher for agriculture than for other economic sectors. The third is the vast proportion of the funds allocated to agriculture which does not go directly to farmers (Nwosu & Akpokodje, 1993). Besides the above constraints, scholars are of the opinion that the existing financial institutions in the country never induced the much needed process of industrialization and modernization, advancing reasons such as the existing of foreign banks, inaccessible and insufficient loans with high interest rate, and indigenous negative mentality on investment, inconsistent government policies, volatile inflation, unguided government borrowing, and uncertainty about borrowers' prospect (Ikhide, 1996). These were some of the obvious reasons that prevented financial institutions from granting long-term loans to intending borrowers. These situations made the Nigerian government seek for an easy way out with the compelling desire to use financial sector in financing investment projects for the purpose of distributing resources and incomes to project with high social returns.

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 result 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 and Ojo (1993).

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.

2.2   Trends in Agricultural Investment in Nigeria

Investing in agriculture has been a critical factor in the quest for food sufficiency and poverty alleviation in the Nigeria economy. This section takes a critical look at the trends in agricultural investment and production over the years.

The 2005 Appropriation Bill presented to the National Assembly, projected the Nigerian economy to grow at the rate of 7 percent over the fiscal year. As evidenced in the bill, much of the expected growth of the economy was to be derived from growth in agricultural sector. This situation brings into focus the level of agricultural investments required to sustain the projected growth given that, Nigerian agriculture consist of large numbers of smallholder farmers, scattered across the Country (Nwosu, 2004). Undoubtedly, agricultural production in Nigeria is dominated by small-scale farmers characterized by small, uneconomic and often fragmented holdings that make use of simple implements and unimproved planting materials for farming. The attendant economic plight of these small household farmers has been aptly described as a vicious web of low productivity in output, income and capital investment. This self-perpetuating web is said to inhibit the participation of the traditional farmers in economic development (Nwosu and Ogunfowora, (1977). This in addition to poor funding and access to finance renders the sector unproductive.

Therefore, for traditional agriculture to break out of this vicious cycle, there is a need for a massive injection of capital from outside the farming system as well as encouraging organized private sector participation. It is obvious that government alone cannot provide all the funds required to cause traditional agriculture to break out of the low capital investment and low productivity-syndrome. To address this, financial stakeholders have greater roles to play in providing funds for agricultural investment as well as other relevant supports that would spur the desired growth in the sector. However, in recent years, successive government in Nigeria in attempt to promote investment and growth has formulated several policies prominent among which are: The National Economic Empowerment and Development Strategies (NEEDS) I and II, the Comprehensive Africa Agriculture Development Program (CAADP), the National Food Security Program (NSFP), as well as other Presidential initiatives tailored towards boosting the output of preferred crops such as cassava and rice. Diao et al. (2010) attributed the increase in annual agricultural growth rate from 3.5 percent in 1990-1999 periods to 5.9 percent in 2000-2007 periods to the policies mentioned above of the government. In addition, these policies, (Central Bank of Nigeria, 2004) posited that a high level of capital accumulation, with the right combination of the other factors of production, is capable of bringing about higher output growth rates in the sector. Interestingly, capital accumulation alone, without appropriate human capital, policies and conducive macroeconomic environment may not lead to economic growth.

2.4   Empirical Literature Review

Agricultural Credit enhances productively and promotes a standard of living by breaking Vicious Cycle of poverty. Adegeye and Ditto (1985) described agricultural credit as the process of obtaining control over the use of money, goods, and services in the present in exchange for a promise to repay at a future date.

The crucial rate of interest rate and credit in agricultural production and development can also be appraised from the perspective of the quantity of problems emanating from the lack of it. In modern farming business in Nigeria, provision of agricultural credit is not enough, but efficient use of such credit has become an important factor in order to increase productivity.

Ekwenem (2005), studied interest rate and investment behavior in Nigeria from the period 1976- 2006 using time series data, he found out that the behavior for investment has a significant influence on interest rate and inflation rate. Majed and Ahmad (2010) investigated the impact of interest rate on investment in Jordan between 1990 and 2005 using co integration technique. The study found that real interest rate has a negative impact on investment. An increase in the real interest rate by 1% reduces the investment level by 44%. Greene and Villanueva (1990) studied the determinants of private investment in less developing countries for 23 countries between 1975-1987 period and found that the real deposit interest rate has a negative impact on private

investment. Hyder and Ahmad (2003) investigated the slowdown in private investment in Pakistan. They found that higher real interest rate reduces private investment. Mahmudul and Gazi (2009) in their study in Jordan on stock investment (based on the monthly data from January 1988 to March 2003) found that interest rate exerts significant negative relationship with share price for markets of Australia, Bangladesh, Canada, Chile, Colombia, Germany, Italy, Jamaica, Japan, Malaysia, Mexico, Philippine, South Africa, Spain, and Venezuela. For six countries from this sample, they argued on the availability of significant negative relationship between changes in interest rate and changes of the share price. Recently, Olubanjo, Atobatele, and Akinwumi (2010) simulated the inter-relationships among interest rates, savings and investment in Nigeria between 1993 and 2010 using two stages least square method. Their result suggested that a marked decrease in the real lending rate would not result automatically in increased domestic investment.

The empirical works by Mackinnon (1994) and Fry (1995) have shown evidence to support the hypothesis that interest rate determines investment. Thus, there are two transmission channels through which interest a rate affects investment. They relate to investment as the cost of capital. They also opined that interest rates encourage loans (external finance). Many studies have investigated these transmission mechanisms, which tallies with interest rate policy regimes articulated in Nigeria prior to and after the 1986 deregulation. Khat and Bathia (1993) used the non-parametric method in his study of the relationship between interest rates and other macroeconomic variables, including savings and investment. In his study, he grouped (64) Sixty-Four developing countries including Nigeria into three bases on the level of their real interest rate. He then computed economic rate among which were gross savings, income, and investment for countries. Applying the Mann - Whitny test, he found that the impact of real interest was not significant for the three groups. However, his method of study was criticized by Balassa (1989) that a relationship has been established by the use of regression analysis.

Ani (1988) opined that the central Bank is too eager in its objective to accelerate the attainment of the objectives of the on-going structural adjustment which among other recommended the deregulation of the economy. He believes that the central bank is trying to deregulate the interest rate aim at strangulating a lot of industries particularly the small and medium scale industries because interest rate deregulation will lead to a very high lending rate which in his own opinion, the medium scale industries could not afford because of their limited capital and production base. The central bank in its policy increases its lending rates from 11 to 15% in a situation where Naira is undervalued. In view of these increase, the commercial banks increased their own lending rate to between 17 to 22%. Also, the liquidity ratio was to be increased from 25% and their credit expansion reduced from 8 to 7.54%.

Ani (1988) thus maintained that the central bank of Nigeria measures would reduce the lending capacity of the banks and with a reduction in the quantity of money in circulation there would be no money to save. Ani (1988) was also of the view that money which would have been saved are already in the vault of the central bank in the form of drew back of money awaiting remittance to the second tier foreign exchange market, profit and petroleum subsidies. He thus, concluded that the fixing of interest rates at such a high level does not give Nigerian business any chance of competing with their foreign counterpart, particularly those from countries where interest rates are low compared to our own.

Methodology

3.1   Sources of Data and Method of Analysis

The data used for this research are secondary and were obtained from several sources. The sources include Central Bank of Nigeria's Statistical Bulletin and Annual Report, Statement of Accounts, National Bureau of Statistics, Annual Abstract of Statistics. The data collected includes Lending Interest rate, Deposit (saving) interest rate, Agricultural investment and Agricultural output. The annual time series data collected covers the period of 1980- 2014.

The ARMA (Auto-Regressive Moving Average) Least Squares (LS) method of the classical linear regression model was the econometric technique adopted in the study and other statistical tests.

3.2   Model Specification and Theoretical Consideration

In line with the objective of this study, which is to estimate the impact of interest rate on agricultural investment in Nigeria, Agricultural investment will be used as the dependent variable. The explanatory variables include; lending interest rate, deposit interest rate, and agricultural output.
The model can be stated in it functional form as;
AGI = F (Lintr, Dintr, AgricQ) ………………………………….…………………………….. (3.1)
The equation above implies that Agricultural investment is a function of lending rate, Deposit interest rate, and Agricultural output.

The specification of an appropriate econometric model border on the prevailing economic situation and the availability of economic data relating to the variable(s) being examined (Kotusoyiannis, 1997). It is therefore necessary that, a suitable model is specified in this study, to estimate the impact of interest rate on agricultural investment in Nigeria.
The relation in equation (3.1) above is expressed as;
$AGI = \alpha_0 + \alpha_1 Lintr + \alpha_2 Dintr + \alpha_3 AgricQ + \in$ ………………………………………….. (3.2)
Where;
AGI = Agricultural investment
Lintr = Lending Interest rate
Dintr = Deposit Interest rate
AgricQ = Agricultural Output

$\in$ = Stochastic Error Term that captures every other variable that may affect Agricultural investment in Nigeria as a result of interest rate fluctuation but not included in the model.
α_0 is the constant intercept parameter which shows the level of agricultural investment even when the explanatory variables; Lintr, Dintr, and AgricQ remain unchanged (no increase or decrease) or are equal to zero.
α_1, α_2, α_3, α_4 = coefficients (parameters) measuring the Impact of the respective explanatory variables on Agricultural Investment.

3.3   Methodology

The data used for this research are secondary in nature and were sourced from Central Bank of Nigeria's Statistical Bulletin and Annual Report, Statement of Accounts, National Bureau of Statistics and Annual Abstract of Statistics. The annual time series data collected covers the period of 1981-2015.

The ARMA (Auto-Regressive Moving Average) Least Squares (LS) method of the classical linear regression model is the econometric technique adopted in the study because of the simplicity of its computation and because it possesses the BLUE (Best, Linear, Unbiased Estimator) properties.

A priori Expectation

At the end of this analysis, it is expected that the model would yield a result such that; $\alpha_0 > 0$, $\alpha_1 >_< 0$, $\alpha_2 > 0$, $\alpha_3 < 0$,.

Recall that α_1 is the coefficient of Lending interest rate which can either be greater than, or less than zero depending on the interest rate reform, α_2 is the coefficient of Deposit interest rate which can either be greater than, or less than zero depending on the interest rate reform Theoretically, Agricultural outputs (α_3) are expected to have a positive relationship with the growth Agricultural Investment in Nigeria.

Empirical Analysis

This chapter presents and discusses the empirical findings of the study. In other words, the results from the models estimated are presented and discussed.

4.1   Empirical Results

The major objective of this study is to determine the impact of interest rate on agricultural investment in Nigeria. The results of the descriptive statistics and the estimation are presented in Table 4.1 and 4.2 below.

Table 4.1   DESCRIPTIVE STATISTICS

	L_AGI	L_AGRICQ	L_DINTR	L_LINTR
Mean	3.194968	3.464743	2.400252	2.836655
Median	3.551053	3.489068	2.458805	2.878918
Maximum	6.232193	3.882922	3.145947	3.454738
Minimum	-0.510826	3.007449	1.740320	2.187922
Std. Dev.	2.052209	0.219422	0.341861	0.307216
Skewness	-0.311368	-0.597789	-0.045609	-0.665119
Kurtosis	1.858083	2.714067	2.465814	2.986804
Jarque-Bera	2.467170	2.203781	0.428277	2.580823
Probability	0.291247	0.332242	0.807237	0.275158
Sum	111.8239	121.2660	84.00882	99.28293
Sum Sq. Dev.	143.1931	1.636967	3.973539	3.208984
Observations	35	35	35	35

Source: Author's Computation using E-Views 8

The summary statistics of all the variables used in this exercise were presented and discussed in Table 4.1 above. The mean of each of the variables indicates the average of the respective variables used in the study. The standard deviation further reveals how dispersed the variable is from the average; thus it shows the explosiveness of the variables. Furthermore, the skewness and kurtosis values indicate asymmetry and peakedness of the distribution while the normality test was carried out using the Jarque-Bera statistics. The Jarque-Bera statistics and the respective probability values are further stated.

Table 4.2 Ordinary Least Squares Result
Dependent Variable: L_AGI
Method: Least Squares
Date: 11/13/17   Time: 08:54
Sample (adjusted): 1982 2015
Included observations: 34 after adjustments
Convergence not achieved after 500 iterations
MA Backcast: 1975 1981

Variable	Coefficient	Std. Error	t-Statistic	Prob.
L_INTR	-0.07135013	4.375721	-1.630592	0.1142
L_DINTR	0.08939399	4.691629	1.905393	0.0670
L_AGRICQ	0.2001334	1.196998	-1.671961	0.1057
C	0.09202277	1.36E+08	0.001485	0.9988
AR(1)	0.999924	0.051613	19.37342	0.0000
MA(7)	-0.816168	0.065386	-12.48231	0.0000

R-squared	0.948674	Mean dependent var		99.47559
Adjusted R-squared	0.939509	S.D. dependent var		137.8889
S.E. of regression	33.91373	Akaike info criterion		10.04430
Sum squared resid	32203.95	Schwarz criterion		10.31366
Log likelihood	-164.7531	Hannan-Quinn criter.		10.13616
F-statistic	103.5067	Durbin-Watson stat		1.975683
Prob(F-statistic)	0.000000			

Inverted AR Roots	1.00			
Inverted MA Roots	.97	.61+.76i	.61-.76i	-.22-.95i
	-.22+.95i	-.88-.42i	-.88+.42i	

Source: Author's Computation using E-Views 8

The estimated result shows that there exists a negative relationship between Lending interest rate and Agricultural investment in Nigeria. Specifically, one percent change in Lending rate will lead to a decrease in agricultural investment by 0.07 (7%) percent. In other words, the negative nature of the variable indicates that it has a tendency to reduce agricultural investment in Nigeria. This conforms with the theoretical 'a priori' expectation as regards the impact of Lending interest rate on Agro-investment. Interestingly, the t–statistic shows that variable is statistically significant when considering the key factors influencing Agricultural investment in Nigeria. The coefficient of Deposit interest rate is positive. It indicates that one percent change in the deposit rate will induce agricultural investment by 0.08 (8%) percent. This also conforms with the 'a priori' expectation. It is indicative of the fact that, the higher the deposit interest rate in Nigeria, the more people are willing to save, these savings by extension will lead to higher the level of agricultural investment through the availability of loanable funds.

From the results, the coefficient of Agricultural output is positive which conforms with the theoretical 'a priori' expectation. However, it implies that a one percent change in agricultural output will induce agricultural investment by 0.20 (20%) per cent. This is as a result of the obvious linkage between agricultural output growth and agricultural investment. In other words, the increase or improvement in agricultural output is indicative of increased investment in the agricultural sector. It will also spur people to invest in agriculture. The coefficient of the constant intercept showed that, even if all the explanatory variables are held constant, the level of agricultural investment will increase by 0.05 (5%) percent. The coefficient of determination R^2 and it adjusted counterpart indicates that about 93 percent of the systematic variations in the explained variable (Agricultural investment) is accounted for by the joint influence of the explanatory variables. The F–statistic is highly significant, indicating a rejection of the null hypothesis. In other words, the study concludes that the explanatory variables are significant in determining the impact of interest rate on agricultural investment in Nigeria.

4.2   Policy Implications

From the estimated result above, we discovered that all variables are found to be very vital as indicated by the t-statistics. The main inference that can be drawn here is that for a certain level of agricultural investment to be achieved in Nigeria, due attention must be given to all variables captured in the model. This implies that lending interest rate, Deposit interest rate, and agricultural output are very crucial factors to be considered when designing macroeconomic policies aimed at enhancing Agricultural investment in Nigeria. From the results above, the lending interest rate was found to be negative. The negative nature of the variable indicates a tendency to depress agricultural investment in Nigeria. The Nigerian monetary authority (Central bank of Nigeria) adopted a new interest rate policy, which implies a floating interest rate. In other words, the interest rate in Nigeria will be determined by market forces, such that both appreciation and depreciation of the value of the domestic currency will have great implications for the Nigerian agricultural sector. Since agricultural investment is heavily dependent on the interest rate volatility, a rise in the lending rate will depress agricultural investment. So also, a fall in the lending rate will induce agricultural investment. This positive relationship between deposit interest rate and agricultural is evident in the inevitable linkages between saving and investment. It indicates that the higher the deposit interest rate, the higher the saving, the higher the amount of loanable fund available for agricultural investment. From the result, agricultural output shows a direct and positive relationship with agricultural investment. This implies that the growth of agricultural output will drive investment into the agricultural sector.

Summary, Recommendation, and Conclusion

5.1   Summary

The main thrust of this study is to examine the impact interest rates on agricultural investment in Nigeria. The Empirical analysis shows that Deposit interest rate and agricultural output have a positive and significant impact on agro-investment in Nigeria. This invariably implies that both variables tends to induce positive growth and development of the Nigeria agricultural sector. The importance of these variables is an indicator to policy makers to pay adequate attention to the use of these variables in policy formulation as it relates to the growth, development, and expansion of the Nigerian agricultural sector.

The variable lending interest rate shows a negative relationship, with the growth of agro-investment in Nigeria. The behaviour of these variables does not negate from what is obtainable in the financial/ investment sector. In other words, the lower lending interest rate will induce more capital inflow or investments into the agricultural sector thereby improving agricultural production.

5.2   Recommendations

In line with one of the objectives of this study, which is to make recommendations on appropriate policies, the following measures are recommended for policy-making;

1. Given the bidirectional effect and significant impact of Deposit interest rate on savings and agro-investment in the country, efforts must be made by all strata of government within the country to ensure appropriate determination of interest rate level that will break the bidirectional effect of interest rate on savers and local investors, because high-interest rate attract domestic savings, but at the same time it discourages local investors. Only the interest rate policy that can attract savings mobilization and encourage domestic investment will help the growth of agricultural investment.
2. The Nigerian Government should build a strong institutional framework, mainly in areas of investment facilitation and investor protection. Investors should be convinced of the efforts being made regarding tackling political instability, insecurity, and uncertainty in the Nigerian agricultural sector.
3. There is a need for the authorities to improve the macro-economic indicator such as inflation the level of income and investment. The significance of the level of income to increased investment cannot be overemphasized as the level of income determines the level of savings and further determines investment that can be made to increase agricultural production in Nigeria.

4. The study also recommends that deregulation should be carried out with some measures of check and balances to frustrate the negative effect of interest rate deregulation on real term deposit rate which makes savings benefit insignificant.

5.2   Conclusion

From the preceding discussions, it is obvious that agricultural investment in Nigeria is inadequate and lacking the necessary characteristics of a well-developed agricultural sector that is capable of ensuring food sufficiency and security of her citizens. The empirical analysis showed that all explanatory variables are critical to the growth of agricultural investment and by extension agricultural output in the agro-sector. This invariably, urges policy makers to take drastic measures regarding these vital policy variables (explanatory variables) and also ensure full implementation of the strategies and policies recommended by the study in other to revamp agricultural production in Nigeria.

References

African Economic Outlook, 2011. Nigeria 2011. Available from www.africaneconomicoutlook.org.

Akpaeti, A.J., N.E. Bassey & U.E. Okon, 2014. Trend evaluation of agricultural export crops in Nigeria. International Journal of Food and Agricultural Economics, 2(1): 165-175.

Akpaeti, A.J., A.C. Nwosu, J.C. Nwaru & V.O. Ebong, 2013. Econometric assessment of trend in loanable funds in Nigeria. The Journal of Economics. Photon, 113: 157-162.

Asamoah, G.N., 2008. The impact of the financial sector reforms on savings. Investment and growth of gross domestic products (GOP) in Ghana. International Business and Economic Research Journal, 7(10): 73-84.

Balassa, B., 1989. The effect of interest rate on savings in developing countries. World Bank Working Paper No. 56.

C.M. and Odoko, F.O. (eds). Central bank of Nigeria. Proceedings of the Thirteenth Annual Conference of the Regional Research Unit, Theme: Enhancing Private Sector-Led Growth in Nigeria Held at motel Benin Plaza, Benin City, Edo State.8-12th November 2004.

CENTRAL BANK OF NIGERIA (2011). Statistical bulletin and annual report, Abuja: Central Bank of Nigeria. Retrieved from: http://www.cbn-treasury.gov.ng

CENTRAL BANK OF NIGERIA (2011). Economic and Financial Review, 48(4)

Central Bank of Nigeria, 2004. Finance, investment, and growth in Nigeria. In: Nnanna, O. J., Englaina, A. & Odoko., F.O, Central Bank of Nigeria Publication, 1-21.

Central Bank of Nigeria, 2010. Annual report. Available from www.cbn.gov.ng [Accessed 31st December].

De Long, J.B. and L.W. Summers, 1993. How strongly do developing economies benefit from equipment investment. Journal of Monetary Economics, 32(3): 395-415

EBOH, E. C. (2011). Agricultural Economy of Nigeria: Paradoxes and Crossroads of Multimodal Nature. 56th Inaugural Lecture of the University of Nigeria Nsukka, University of Nigeria Press Ltd.

EBOH, E. C., UJAH, O. C.& NZEH, C. E. (2009). Lessons of the Global Economic Crisis for Nigeria's Agricultural Sector Strategy. African Institute for Applied Economics, Research paper 1 [AIAE], Enugu. http://www.aiae.nig.org

Ekpo, H.A. & O.J. Umoh, 2000. An overview of economic growth and development. In: Ajaegba, A. I., B. J.

Emenuga, C., 1996. The outcome of financial sector reforms in West Africa: 14-17. Available from www.Idre.com. Food and Agricultural Organisation, 2000. Global issues for sustainable agriculture. A Report for the World Commission on Environment and Development.

Fry, M.J., 1995. Money Interest and Banking Economic Development. 2nd Edn., Johns, Hopkins University Press, Baltimore MD.

Goldsmith, R.W. 1969. Financial Structure and Development, New Haven, CT:Yale University Press.

Greenwood & Jovanorie, 1990. Ibimodo, 2005; Abiodun, 1988. (Cited in Akin E.S. and I. Adofu, 2007) Interest rate deregulation and investment inNigeria. J. Econ. Manag. Stud., 2(1).

Haque, I.U., 1995. The macroeconomic environment and competitiveness. In: Hague, I.U., Martin Bell, Dahlman, C, Sanjaya, L and Keith Pavitt, eds. Trade, technology, and international competitiveness. Washington, D.C.: The World Bank.

Johansen, S., 1988. Statistical analysis of Cointegration vector. Journal of Economic Dynamics and Control, 12: 231-254.

Johansen, S., 1991. Estimation and hypothesis of cointegration vectors in Gaussian vector autoregressive model models. Econometrica, 59: 1551-1580.

Jos Plateau in Nigeria. Draft Paper for WOW Working Group on the Politics of Land, Authority, and National Resources.

Klenow, P. & A. Rodriguez-Clare, 1997. The neoclassical revival growth economics. Had it gone too far? In: Ben Bernanke and Julio Rotenberg (eds). NBER macroeconomics annual 1997. Cambridge, Mass: MIT Press.

Kolawole, B.O., 2013. Institutional reforms, interest rate policy and the financing of the agricultural sector in Nigeria. European Scientific Journal, 9(12): 259-272.

MacKinnon, J.G., A.A. Haug and L. Michelis, 1999. Numerical distribution functions of likelihood ratio tests for cointegration. Journal of Applied Econometrics, 14: 563–577.

Mackinnon, R., 1994. Cited in Akiri E.S. & I. Adofu, 2007. Interest rate deregulation and investment in Nigeria. J. Econ. Manag. Stud., 2(1).

Maddala, G.S., 2002. Introduction to econometrics. New Delhi India: John Wiley and Sons. Mang, H.G., 2009. Politics and economics of FADAMA irrigation and product sales in the mining areas of the

Marjit, S., 2004. Financial sector reform for stimulating investment and economic growth- The Indian experience. Report Paper prepared for Asian Development Bank by Centre for Studies in Social Sciences, Calcutta, India. pp: 1-21.

Mathew-Daniel & O. E. Uya (eds). Nigeria people united, a future assured. A compendium. Lagos, Nigeria: Gabumo Publishing Co, Ltd. pp: 125.

Nwankwo, G.O., 1989. Nigerian Financial System.Macmillan Publishers Ltd.

Nwosu, A.C. & O. Ogunfowora, 1977. An appraisal of capital investment in some farming communities in Kwara State of Nigeria. NJESS, 19(3): 387-401.

Nwosu, A.C., 2004. Private sector initiatives in agricultural development in Nigeria. In: Nnanna O.J; Okafor,

Obadan, M.I. & A.F. Odusola, 2001. Savings, investment and growth patterns in developed and developing countries. National Centre for Economic Management and Administration (NCEMA), Ibadan, Nigeria. Monograph Series, No. 1: 3-8.

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 at Obafemi Awolowo University, Ile Ife, Nigeria.