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Effect Of Microfinance Bank Financial Intermediation On Agricultural Output In Nigeria: 1992 - 2018

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Abstract

This study examined the effect of financial intermediation by microfinance banks on the output of agricultural sector in Nigeria between 1992 and 2018. Data were collected in this study from the secondary sources and analyzed by means of inferential statistics. Specifically, the study employed Vector Error Correction model technique in data analysis after establishing the stationarity of the data series by means of Augmented Dickney-Fuller test and determined long run equilibrium relationship via Johansen cointegration technique.Findings from this study revealed that in the long-run, there was a positive and significant relationship between microfinance banks' credits to agriculture and the output of agricultural sector in Nigeria as MCA was found to be positively promoting agricultural output by about 2.7%. Also, micro-finance banks' gross saving deposit (MGSD) was found to have negative and significant relationship with agricultural output both in the short-run and in the long-run. Moreover, the deposit interest rate was found in this study to exhibit positive behavior in the short run but negative and significant relationship with agricultural output in the long-run. The lending interest rate by finding of this study negatively facilitated agricultural output in the short run but maintained positive relationship with agricultural output in the long run.Based on these findings, it was concluded that financial intermediation by microfinance banks was an insignificant determinant of agricultural output in Nigeria. Consequently, it was recommended that microfinance banks should be brought under close monitoring and supervision by the monetary authorities to ensure that significant portion of their deposits is not left fallowed and unproductive but optimally converted to credits for lending, especially to the grassroots farmers who lack investable capital for agricultural investment.

Keywords: Financial intermediation, microfinance banks, agricultural output.

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1. Introduction

Financial intermediation is a role played by the financial intermediaries which is divided into banks and non-banks. While bank financial intermediaries include deposit money banks, microfinance banks, merchant banks, and other form of licensed banks that engage in the acceptance of deposits from the surplus sectors and provision of credits to deficit sectors of the economy. Financial intermediation helps to solve most of the problems such as high cost, inconvenience, confidence and others associated with direct financing because they stand in-between the lender and the borrower. Through financial intermediation, the surplus sector lends its surpluses to the intermediaries who in turn, deploy the various amount collected to provide credit to other people. If the link (financial intermediaries) between the deficit and the surplus sectors of an economy does not exist, the surplus sector will have excess funds which would be held idle instead of profitably saving such funds and earning interest on them. Financial intermediaries, therefore, match the deposits needs of the savers with the investment needs of the borrowers. [1] While giving his own account, Alexandru [2] explained that financial intermediaries perform functions such as reduction of transaction costs, the reduction of liquidity risk, provision of information and debt renegotiation among others.

Furthermore, given that agriculture is a key productive sector within Nigeria that requires adequate finance; hence the financial intermediaries are expected to play important role in agricultural development by facilitating ways and means by which a farmer obtains the necessary fund required in order to carry out agricultural production, and at the same time supply funds to meet up with demand for produces in agricultural sector of the economy. Needless to emphasize that finance enables the acquisition of machinery and farm equipment to substitute labour use and the purchase of other farm inputs. Also, given that agricultural sector is one of the key sectors that propel economic growth, especially in Nigeria being an agrarian country; and because of its pivotal role in promoting economic development, there is need for constant flows of finance to this sector for the expansion of its productivity. Nigeria as a nation has the potentials to become the largest economy in Africa, and a major player in the global economy because of its rich human and natural resources, with which she can build a prosperous economy, reduce poverty significantly, and provide sound health care for her citizens. [3]

Despite the theoretical and the empirical evidences pointing to positive relationship between financial intermediation and output agricultural sector in Nigeria,

accessing capital through financial intermediaries is typically hard and expensive. In spite of the large financing needs of agricultural sectors, the public and private sector have not devoted sufficient financial resources for positive impact on the agricultural sector. Afangideh [4] opines that commercial banks for instance, lend only 5 to 10 percent of their loan portfolios to the sector, and focus more on sectors they perceive to be less risky, like the oil and gas, telecoms industries, and recently, religious organizations. Furthermore, although there are many financial intermediaries operating in both formal and informal sectors of the economy, this study focused on the intermediation by banks in the formal sector of the economy because their financial intermediation process is well monitored, supervised and regulated by the monetary authority. Hence, attention is focused on intermediation by Micro-finance banks was chosen because of their proximity to the grassroots farmers. Also, almost each community in Nigeria is always proud of at least one microfinance bank in its domain; and finally, the collateral and lending requirements of microfinance banks are not as stringent as other conventional banks.

Admittedly, a great deal of empirical studies have been carried out in the area of this study, however, most of the existing works focused on the lending aspect of financial intermediation by microfinance banks while the aspect of borrowing by financial intermediaries from the surplus sector has not been given due consideration. Therefore, since financial intermediation is a cycle that is initiated by borrowing from the surplus sector and completed by lending to the deficit sector, there is need to empirically investigate the effect of financial intermediation by microfinance banks on the output of agricultural sector in Nigeria. From the foregoing, this study strived to answer the following questions:

i. What is the effect of microfinance banks' gross saving deposit on the output of agricultural sector in Nigeria?

ii. What is the effect of microfinance banks' credits to agriculture on the output of agricultural sector in Nigeria?

iii.What is the effect of prime deposit interest rate on the output of agriculture sector in Nigeria?

iv. What is the effect of prime lending interest rate on the output of agriculture sector in Nigeria?

In line with the above research questions, the following objectives were identified for achievement in this study:

i. examine the effect of microfinance banks' gross saving deposit on the output of agricultural sector in Nigeria;

ii. investigate the effect of microfinance banks' credits to agriculture on the output of agricultural sector in Nigeria;

iii.evaluate the effect of deposit interest rate on the output of agricultural sector in Nigeria;

iv. examine the effect of lending interest rate on the output of agricultural sector in Nigeria

Consequently, the following statements of hypothesis were conjectured for this study:

i. H01: Microfinance banks gross saving deposits have no significant effect on the output of agricultural sector in Nigeria;

ii. H02: Microfinance banks' credits to agriculture has no significant effect on the output of agricultural sector in Nigeria;

iii.H03: Deposit interest rate does not have significant effect on the output of agricultural sector in Nigeria;

iv. H04: Lending interest rate does not have significant effect on the output of agricultural sector in Nigeria;

2. LITERATURE REVIEW

2.1 Conceptual Review

A financial intermediary can be referred to as an institution or individual that serves as a conduit for parties in a financial transaction. Jerome [5] asserts that, the financial system collects savings from the surplus spending units and moves these funds to deficit spending units (Borrowers). According to Bamisile [6], volume of credit available to economic units for investment determines the rate of economic growth as measured by the Gross Domestic product. Nzotta [7] observes that, interest rates, credit ceiling and sectoral allocation have been found useful to ensure efficiency in resource allocation as well as innovative ideas and development in individual institution.

Onoh [8] posits that, the adoption of a market based mechanism, which is now in vogue in both developed and developing countries has enhanced the efficiency and responsiveness of the monetary authorities in responding to macro economic problems. Despite the progress made in ensuring a sound, stable and efficient financial system that can respond positively to the needs of the Nigerian development, there is still considerable room for improvement. More importantly, Ezirim [9] posits that, the challenges posed by the globalization, liberalization and technological innovations are enormous, especially in terms of competition and thereby increasing sophistication of consumer financial services which will put a lot of pressure on existing resources. Orsota [10] asserts that, despite the large number of banks, which should have provided considerable competition, there is wide spread between the deposit and lending rate.

Gorton and Winton [11] assert that financial intermediaries are firms that borrow from consumers/ savers and lend same to companies that need resources for investment. Financial intermediaries can be classified into institutional investors, pure intermediaries like investment banks and Deposit Money Banks. Among all the financial intermediaries, banks are the major financial intermediaries that accept deposits and make loans directly to the borrowers. [12] Karna [13] explains that the term financial intermediary may refer to an institution, firm or individual who performs intermediation between two or more parties in a financial context. Typically, the first party is a provider of a product or service and the second party is a consumer or customer. Financial intermediaries are banking and non-banking institutions which transfer funds from economic agents with surplus funds (surplus units) to economic agents (deficit units) that would like to utilize those funds. Financial Institutions are basically two types: Bank Financial Intermediaries, (BFIs) and Non-Bank Financial Intermediaries, (NBFIs)

Bank financial intermediaries include deposit money banks, microfinance banks, merchant banks, primary mortgage banks etc. While non-bank financial intermediaries are pension fund, insurance companies, stock exchanges, cooperative societies, mutual trust funds, investment companies, pensions funds etc. Akinmulegun and Dare [14] opine that in borrowing money from the surplus sector, the intermediaries are not borrowing strictly

for their own investment use, but they bear in mind that by the nature of their business, borrowers will come to them. Hence in finance terms, the essential function of financial intermediaries is to satisfy simultaneously the portfolio preferences of the two types of individuals or firms i.e the borrower (deficit) spending unit on one hand, and the lender (surplus) spending unit on the other hand.

Roles of Agriculture in Economic Development

Ajibola (2018) defines agriculture as the cultivation of land, raising or rearing of animals for the purpose of production of food for man, feed for animals and raw materials for industries. The agricultural sector in the Nigerian perspective consists of all sub-sectors which essentially involves cropping, livestock, forestry, fisheries and aquaculture. It includes sub activities under these sectors such as pasturing, food and cash crop cultivation under cropping, poultry, piggery, cattle rearing under livestock; lumbering under forestry, as well as processing and marketing of theses agricultural products. Ogieva [15] has similar idea when he defines agriculture as the art and science of cultivating the soil, producing livestock, preparing livestock feeds, processing crops and livestock products for man, and the process of selling excess crops and livestock.

Review of Agricultural Performances in Nigeria

In his own account of agricultural performance in Nigeria, Ogen [16] notes that the Nigerian economy has been majorly sustained by oil, and recently, the government has seen agriculture as another mainstay and bedrock of the nation's economic growth. For the most part of 2016, and in 2017, oil production plunged to new lows due in large part to the effect of militant activities in the Niger Delta region which have seen numerous oil pipelines blown up by militants, resulting in Nigeria going into its first recession in over 20 years resulting in high inflation, a dollar liquidity crunch, budget deficit in government spending and a declining stock market. And the agricultural sector had been the biggest positive contributor to the growth. [17]

In all quarters of 2016, it was recorded as the top performing sector with the growth of 4.54 per cent, again repeating its performance of a 4.53 per cent growth in second quarter. Agriculture output picked up again in second quarter of 2016 and remained so since its plunge recorded the lowest quarterly growth in eleven quarters in first quarter of 2016. In 2017, from 3.4 per cent in first quarter of 2017 to 3.0 per cent in second quarter of 2017, the Nigerian agriculture sector grew to 12.5 per cent in nominal terms, compared to 9.8 per cent in first quarter of 2017. [18] However, according to Bada [19], there was a record of a slight slowdown in the sector, particularly in crop production despite the efforts to support the sector by expanding famers' access to credit through the Central Bank of Nigeria's Anchor Borrower's Programme as well as the Growth Enhancement Scheme by the Federal Government. In terms of agricultural output, Johnston and Kilby [20] opine that the appraisal of agriculture's contributions to national economy can be made using four primary criteria, namely:

i. The proportion of the population engaged in agriculture;

ii. The share of agriculture in the Gross Domestic Product

iii. The proportion of the nation's resources, other than labour devoted to or employed in agricultural productuon, and

iv. The contribution of the agricultural sector to foreign trade.

Agriculture and Gross Domestic Product

Ajibola (2018) explains that agriculture; specifically in Nigeria is a major contributor to the country's Gross domestic Product. In the early 1960s, agriculture contributed over 60% to the GDP, and this dropped to about 20% in the 1970s mainly due to over-reliance on oil. In recent time however, the percentage of contribution to GDP by agriculture has been hovering around 20% from year 2000 and as at 2016, is stood at 24.4%. Meanwhile, with the depletion of oil in years to come, the economy will without doubt, critically depend on the agricultural sector.

Financial Constraints to Agricultural Performance in Nigeria

Historically, financial institutions have been reluctant to serve agricultural sector for many reasons:

i. The agricultural sub-sector has some peculiar (systemic) risks that can hardly be diversified, calculated or quantified, making it almost not possible for commercial, merchant banks and other financial institutions to make correct forecast and prediction in granting loans/credits to the sector. [21] When natural hazards or adverse weather conditions take place, they typically affect a large number of farmers and firms simultaneously, making it more challenging for financial providers to diversify their portfolio of clients, since when one client fails to pay, many others will be in the same situation.

ii. **Absence of marketable securities**: in Nigeria for example, farmers are peasants that can not afford any meaningful collateral to obtain loans from banks and other financial institutions, the communal land system in Nigeria compounds the case more.

iii. **Illiteracy and ignorance**: Most Nigeria are illiterate and ignorant of the services being offered by banks and other financial institutions. Most farmers live in rural areas and far from happenings outside thier vicinity.They are in a world of their own.

iv. I**nterest rate problem:** Most farmers cannot compete favorably with other sectors of the economy in finance market as interest on agricultural loans are always high as a result of the risk inherent in agro-business.

v. **Incidence of Loan Diversion**: The causes of loan diversion are different and numerous.. For example, the burden of extended family system can compel a farmer to use a part or all the loans has just received from a bank to pay for the hospital bill of a mother-in-law. Also, unfavorable investment climate in agricultural sector and delays in the disbursement of approved agricultural credit can also lead to loan diversion.

vi. **Lack of Managerial Skills**: Many farmers lack the desired management or managerial skills. Many of them know nothing about the preparation of feasibility reports that could be acceptable to banks and also in the art of farm management and this simply makes many of them fail.

vii. **Inconsistent government policies:** Inconsistency

in government policies affects both the availability and quality of agricultural credit to the farmers.

Financial Intermediation by Microfinance banks and output of Agricultural Sector

Afangideh [22] explained that there was a relationship between agricultural output and financial intermediation. This is because agricultural sector needs financial resources in form of capital to grow its output and productivity. These financial resources are always not available, or where they are available, they are usually too minute to facilitate expansive agricultural output. The foregoing then necessitates the agricultural investors to resort to borrowings from the financial intermediaries such as microfinance banks that specialize in the mobilization of financial resources from the surplus sector for onward lending to the agricultural sector. Microfinance banks are important in the provision of the necessary funds for the agricultural sector to acquire land, mechanized farming implements, input materials and so on which will lead in return to an accretion in agricultural output. The amount of credit granted to the agricultural sector by microfinance banks is necessary as this has the propensity to has a multiple positive effect on a nation's socio-economic and industrial growth, as a vibrant and virile agricultural sector would strengthen the ability of a country to cater for the feeding of its ever growing population as well as generate gainful employment, boost foreign exchange earnings and serve as source of raw materials for industries. [23]

3.Theoretical Review

Theory of Balanced Growth

The theory of balanced growth which was first propounded by Rosenstein-Rodan in 1943 and later supported by Nurske in 1948. Rosenstein-Rodan in 1943 opined that for development to take place in the whole of eastern and south-eastern Europe, the whole of the industry must be created. The theory explained that there should be a proper balance between investment in agriculture and industry as both are complementary. An increase in agricultural production would cause an increase in the industrial expansion because the products of the farms are raw materials to the industry. If there is expansion in industry, employment is created and the income earned would partly be spent on food stuffs. Supply of food must therefore be increased. Similarly, supply of raw materials would also increase with industrial sectors' expansion. He concluded by saying it is important that the agricultural sector must develop along with the industries or else there would be inflation. In connection with the focus of this study, this theory has justified the need to promote growth in agriculture at the same speed with industrial counterparts. To this end, the outcome of this study would further consolidate on the need to promote agriculture through proper mobilization of deposit and prudent credit allocations by the financial intermediaries.

The Quantity Theory of Credit

This theory was postulated by Werner in 1993, in his work towards a quantity theory of disaggregated credit and international capital flows with a central focus on different equations of exchange distinguishing between money used for GDP-transactions and money used for non GDP-transaction. He further stressed that money should not be defined as bank deposits or other aggregates of private sector savings. More so, that bank should not be seen as financial intermediaries that lend existing money, rather creators of new money through the process of lending. The bank credit can be disaggregated into credit for GDP-transactions and credit for non-GDP transactions. The former drives nominal GDP and the latter assets transaction values. Consequently, the effect of bank credit depends on its quantity and quality which is defined as whether it is used for unproductive transactions (credit for consumption or asset transactions, producing unsustainable consumer or asset inflation, respectively) or productive transactions (delivering non-inflationary growth). Credit used for productive transactions aims at income growth and is sustainable; credit for asset transactions aims at capital gains and is unsustainable. In addition, growth of GDP requires increased transaction in economic activities, which in turn require larger amount of money to be used for such transactions; therefore, the money used for transactions can only rise if banks create more credits. In this case, banks are the financial intermediaries and economic activities include, among others, investment in the agricultural sector. By implication, this theory has justified the need to promote lending to agricultural sector by the financial intermediaries as this has the tendency of boosting nominal GDP, and hence, support the need to carry out this study to see what effect does bank financial intermediation has on the output of agricultural sector.

4.Empirical Review

The study of Ali and Jatau [24] examined the impact of deposit money bank's credit on agricultural output in Nigeria from 1981 to 2014 using OLS. They found that within the period under review, there was substantial increase in Deposit Money banks' credit to the agricultural sector. Thus, Deposit Money banks' credit was found to be a great and viable means of finance for growth in the agricultural sector in Nigeria even though the growth rate in agricultural output was far from being proportionate. Even so, the ordinary least square method showed that Deposit Money banks' credit to the agricultural sector significantly and positively affected agricultural output in Nigeria. Also the lending rate of Deposit Money Banks had an inverse relationship with Agricultural output

Sanjay, Krishna, Prashant and Sushanta [25] in their study of Financial intermediation and economic development in the state of Bihar, India found out that given the low level of financial development in Bihar (below 20% credit-GDP ratio), the positive link between finance and development is coming out only in the context of agricultural sector. The stagnation in CD ratio is a clear indication of low level of financial intermediation which appears to be due to historical NPAs driving down the appetite of the financial intermediaries to make loans. The government intervention in the priority sector continues to encourage banks to make loans into this sector, which receives the highest sectoral credit. Measures such as Kisan Credit Card and bank branch expansion at district level tend to have positive effect on per capita income in Bihar. Easing government restrictions in the banking system (such as credit rationing due to priority sector lending or loan waiver incentives, and entry barriers) can aid the process of financial development in Bihar.

Ali [26] investigated the long run and short run linkages between economic growth and financial development in Sudan from 1970 to 2011. He employed Autoregressive distributive lag (ARDL) techniques. He used three indicators to measure the financial developments which are the ratio of liquid liabilities of commercial banks to nominal GDP, the credit provided to private sector by commercial Banks as a percentage of GDP and the broad money supply as a share of GDP. He also used control variables in the analysis such as trade openness, inflation, government expenditure and gross investment. His analysis indicated that liquid liabilities and credit to the private sector have a positive effect on economic growth. The study also found that inflation, government expenditure, trade openness and money supply have adverse impacts while gross investment has a positive impact on the economic growth in Sudan.

Udoka, Mbat and Stephen [27] empirically examined the effect of commercial banks' credit on agricultural output in Nigeria. Four research hypotheses were formulated to guide and direct the study. The ex-post facto research design was adopted for the study. Data for the study were collected from published articles and the Central Bank of Nigeria Statistical bulletin. To estimate the specified equation, the ordinary least squares regression technique was employed. Based on the results obtained, the following result arose; the estimated results showed that there was a positive and significant relationship between agricultural credit guarantee scheme fund and agricultural production in Nigeria. This means that an increase in agricultural credit guarantee scheme fund could lead to an increase in agricultural production in Nigeria; there was a positive and significant relationship between commercial banks credit to the agricultural sector and agricultural production in Nigeria. This result signified that an increase in commercial banks credit to agricultural sector led to an increase in agricultural production in Nigeria. The study recommended that the positive effect of agricultural credit guarantee scheme fund on agricultural production called for the proper funding of the scheme by the government. To this end, there was the need for the government to continue to guarantee loans lent to farmers as this would encourage the banks to lend more to farmers.

Olowofeso, Adeboye, Adejo, Bassey and Abraham [28] investigated the relationship between credit to agriculture and agricultural output in Nigeria by means of nonlinear autoregressive distributed lag (NARDL) model using a time series data from 1992Q1 to 2015Q4. Results show no evidence of asymmetry in the impact of credit to output growth in the agricultural sector (positive and negative changes) in the short-run, but different equilibrium relationships exist in the long-run. The dynamic adjustments show that the cumulative agricultural output growth is mostly attracted by the impact of the positive changes in credit to agriculture with a lag of four quarters of the prediction horizon. This calls for the need for a policy on moratorium on credit administration to agricultural sector.

Agunuwa, Inaya and Proso [29] undertook an empirical investigation of the impact of Commercial Banks' Credit on Agricultural Productivity in Nigeria (Time Series Analysis. The estimation techniques of impulse response and variance decomposition were employed in the estimation of the equation. Results showed that credit to private sector positively impacts the agricultural and manufacturing sector of the economy and capacity utilization. This implied domestic investment would be facilitated with increased credit to private sector. Furthermore, results findings revealed that currency outside banks had a negative impact on actual output of agriculture and manufacturing sectors. Also, currency outside banks boosted agricultural and manufacturing sectors and capacity utilization in the long run. However, gross domestic savings impacted negatively on capacity utilization and a positive influence on manufacturing and agricultural outputs. Nevertheless, political instability declined agricultural and manufacturing outputs in the short period and both sectors experienced increase in outputs in the medium and long periods. The results further showed that political instability caused expansions in capital utilization in the short period, while contractions were experienced in the subsequent terms.

Murtala, Ahmad, Siba and Mohammed [30] investigated the role of financial intermediaries in sustainable economic growth of Nigeria. Augmented Dickey-Fuller and Phillips-Perron unit root tests, as well as Andrew-Zivot, were used to check the stationary of each variable in the model. All the variables were found to be integrated of oreder one 1(1). The study employed ARDL bounds testing to examine the relationship between financial sector indicators (with particular attention to insurance, bank, and stock market development) and economic growth in both shortrun and long-run. Toda Yamamoto Granger Causality was also applied to observe the nature of causality. Their findings suggested that there was a significant positive long-run and short-run relationship between stock market, insurance development, and economic growth. The results are consistent with theoretical and empirical predictions. However, a negative short-run and long-run relationship existed between bank development and economic growth. The feedback coefficient was negative and significant, suggesting about 0.37 percent disequilibrium in the previous period was corrected in the current year. They found a stable long-run relationship between economic growth and financial depth, as indicated by the CUSUM and CUSUMSQ stability tests. Bank credit, insurance, value of the stock transaction, and interest rate jointly caused economic growth while bank credit, insurance, value of the stock transaction, and GDP did not jointly cause lending. Their findings are consistent with the view that economic growth is an outcome of the financial development.

Obilor [31] examined the impact of commercial banks' credit to agriculture on agricultural development in Nigeria. From the statistical computation, analyses and findings of the test carried out, it showed that the joint action of commercial banks credit to the agricultural sector, agricultural credit guarantee loan by purpose, government financial allocation to agricultural sector and agricultural products prices are significant factors that can influence agricultural production in Nigeria. Commercial banks' credit to agricultural sector for the period 1984 to 2007 has no significant positive impact on agricultural productivity in Nigeria. Agricultural scheme loan by purpose has led to a significant positive growth in agricultural productivity in Nigeria. Using OLS, government fund allocation to the agricultural sector has led to a significant positive growth in agricultural productivity. Prices of agricultural products have not made any significant positive impact on agricultural productivity.

Tonye and Andabai [32] examined the relationship between financial intermediation and economic growth in Nigeria. The methodology used was vector error correction model. The study found that there is long run relationship between financial intermediation and economic growth. The study concluded that about 89% of the variations in economic growth in Nigeria are explained by changes in financial intermediation variables. The study does not consider effects of financial intermediation on economic development using credit to private sector, lending rate and interest rate margin as independent variables in the country.

Basher [33] examined the linkage between open markets, financial sector development and economic growth to know if markets along with financial sector development affect economic growth in Nigeria. The study made use of Granger causality test, Johansen cointegration test and vector error correction model. It was found that the causation between open markets, financial sector development and growth in Nigeria is weak and insignificant, and such cannot be used to forecast economic growth in Nigeria. This study also does not consider effects of financial intermediation on economic development using credit to private sector, lending rate and interest rate margin as independent variables in the country.

4.METHODOLOGY AND THEORETICAL FRAMEWORK

Research Design

Ex post facto research design was adopted in this study. This was because the event being investigated had already occurred before this study was conceived.

Theoretical Framework

This study was anchored on the theory of balanced growth which was propounded by Rosenstein-Rodan in 1943. Rosenstein-Rodan in 1943 theorized that there should be a proper balance between investment in agriculture and industry as both are complementary and hence, promote both agricultural and industrial growth. To this end, the outcome of this study would further justify the need or otherwise to promote agriculture through proper mobilization of deposit and prudent credit allocations by the financial intermediaries like microfinance banks.

Model Specification

The model in this study was derived from the theory of balance growth which affirms that investment in agricultural sector has the tendency of promoting the industrial sector and by extension, overall economic growth. This was the model used by Nnamocha and Charles [34] when they investigated the effect of bank credit on agricultural output in Nigeria. In their study, they specified the following linear model:

AGO = f(PSC, BLR, IDO)…… eq(3.1)

This study adapted the model in eq(3.1) by introducing microfinance bank intermediation proxies as follows:

AGO = f(MGSD, MCA, SIR, LIR)…… eq(3.2)

The econometric form of eq(ii) can be stated as:

AGO = α0 + α1MGSD + α2MCA + α3DIR + α4LIR + Ut.....Eq(3.3)

By taking the natural logarithm of the Eq (3.3) to the exclusion of DIR and LIR (because they are already expressed in percentages), eq(3.4) was derived as follows:

lnAGO = α0 + α1lnMGSD + α2lnMCA + α3DIR + α4LIR + Ut.....Eq(3.4)

Where:

lnAGO = Natural logarithm of agricultural output, proxied by Real Gross Domestic Product of agricultural sector as a measure of agricultural output.

lnMGSD = Natural logarithm of Microfinance banks' Gross Saving Deposits.

LnMBCA = Natural logarithm of Microfinance Banks Credits to Agricultural sector.

DIR = Average deposit interest rate i.e this is the minimum saving deposit interest rate in the economy.

LIR = Average lending interest rate. This is the minimum lending interest rate in the economy.

α0 = Intercept of the model

α 1- α4 = Parameters or coefficients of the exogenous variables.

Apriori Expectation

In line with the model specified in this study, it was expected that financial intermediation by microfinance banks would have a positive effect on the output of agricultural sector in Nigeria within the period covered by this study. Thus, it was expected that α1>0; α2>0; α3>0; α4 <0

Sources of Data

Data for this study were collected from the secondary sources. These data were obtained from various editions of Statistical Bulletin of the Central Bank of Nigeria and the annual reports and accounts of microfinance banks between 1992 and 2018.

Method of Data Analysis

The descriptive nature of the data was examined. Jarque-Bera test of normality was used to see whether the data were normally distributed. The null hypothesis in the normality test assumes that the series are normally distributed. Likewise, the mean based coefficients of skewness and kurtosis were applied to check the symmetric nature of the variables. Augmented Dickney-Fuller unit root test method was used to establish the stationarity of the variables employed in this study. After the unit roots analysis of the data series were carried out, the data series were found to be robustly integrated at order one I(1). Consequently, this study employed error correction mechanism (ECM) as data analysis technique. This technique was first used by Sargan (1984) and later developed and popularized by Engle and Granger, is a means of reconciling the short-run behavior of an economic variable with its long-run behavior. It is a restricted VAR designed for use with non-stationary series that are known to be cointegrated. Vector Error Correction Model (VECM) was applied once the co-integration test shows the existence of the long-run relationship among the variables of interest. Johansen method was adopted in this study because it circumvents the use of two-step estimators; and can estimate and test for the presence of multiple co-integrating vectors. The objective of VECM is to investigate the short term dynamic

behavior of the model and describe how it is adjusting to each period towards its long-run equilibrium state while its benefit includes its ability to conveniently measure the correction from disequilibrium of the previous period which has a very good economic implication. Thus, the VECM for this study is specified as follows:

$\Delta logAGOt\text{-}1 = \alpha 0 + \theta i\Sigma\Delta log\ MGSDt\text{-}1 + \gamma i\Sigma\Delta logMCAt\text{-}1 + \lambda i\Sigma\Delta DIRt\text{-}1 + \varphi i\Sigma\Delta LIRt\text{-}1 + \Psi ECMt\text{-}1 + Ut$ .....Eq(3.5)

Where:

a0 = Constant term or intercept of the model

θi, γi, λi, φi, = Short run dynamic coefficients of the parameters to equilibrium;

MGSD, MCA, DIR and LIR = Parameters to be estimated;

ΨECMt-1 = The coefficient that measure the speed of adjustment or convergence of ΔlogAGOUT to the equilibrium in case there is deviation, which was expected to be negative and statistically significant. [35]

5.RESULTS, DICUSSIONS AND FINDINGS

Data Interpretations

Descriptive Statistics

From the summary of descriptive statistics on Table 4.1, LIR has the highest mean value of 18.56, followed by MGSD (9.93), AGO (9.03), MCA (7.40), while DIR has the lowest mean value of 5.62. Looking at the standard deviation which measures the degree of deviations of the data sets from their mean values, AGO has the lowest standard deviation of 0.57 which implies that all its observations cluster around its mean value the error of the estimates are minimized. This is followed by MGSD with standard deviation value of 1.70 which is also low. Next is MCA with a standard deviation value of 1.75. DIR and LIR however have the highest standard deviation values of 4.34 and 3.15 respectively, and this connotes that their series observations are not clustered around the sample mean value. With respect to skewness, normal skewness should have 0 values. Thus, all the variables mirror the normal distribution except DIR and LIR with 1.53 and 1.86 skewness values respectively. DIR and LIR skewness values thus indicates they have long right tail and exhibits positive skewness.

Kurtosis measures the thickness or flatness of the distribution of the data series. For a distribution to be normal, and hence, mesokurtic, its kurtosis value must be 3. From Table 4.1 therefore, all the variables (with the exception of DIR and LIR) were all clearly platykurtic (negative kurtosis) because they have kurtosis values that are less than 3. Being platykurtic indicated that all the series will have lower value below the sample means, suggesting flat tommy distribution. DIR and LIR with kurtosis values of 3.98 and 7.48 on the other hand are higher than 3, suggesting leptokurtic i.e positive kurtosis.

The Jarque-Bera statistics measures the difference between the skewness and the kurtosis of each of the variables series with those from the normal distribution. The null hypothesis for Jarque-Bera test was that the distribution was normal. Thus from Table 4.1, and with respect to AGO, MCA and MGSD with Jargue-Bera probability values that are above 0.05 significance level, null hypothesis could not be rejected. Hence, AGO, MCA and MGSD were all normally distributed. The case was however, different for DIR and LIR with probability values of 0.003 and 0.000 which were less than 0.05 significance level. Hence, there was no enough reason to accept null hypothesis which meant that DIR and LIR series were clearly not normally distributed series.

Unit Root Test

The results of the ADF unit root test conducted on the research variables were presented on Table 4.2. All the variables were integrated of order one when they were defined at logarithm levels except lending interest rate. Further subjecting the variables to first differencing removed all the non-stationarity in the variables and the null hypothesis of the presence of a unit root was robustly rejected at both 1% and 5% significance levels, implying therefore, that the variables were integrated of order one I(1) which is the major condition for co-integration analysis. Thus, the I(1) variables were entered into the error correction model in their first differenced form while LIR was included in its level form.

Optimal Lag Length Selection Procedure

The second important step in co-integration analysis is the determination of optimal lag length because there is need to have Gaussian error terms i.e standard error terms that do not suffer from non-normality, autocorrelation, heteroskedasticity etc. Thus, in this study, optimal lag length was chosen by estimating VAR model which included all the variables in levels and the model that minimized AIC was selected as the one with the optimal lag length. Thus, in the Table 4.3, the optimal lag length for the model of this study is 1.

Co-integration Test

The co-integration test establishes whether a long run equilibrium relationship exists among the variables. To establish co-integration, the likelihood ratio (trace statistic) must be greater than the critical value of Johansen co-integration trace test at 5% level of significance. The null hypotheses of no co-integration H0: $\beta 1, = \beta 2, = \beta 3, = \beta 4 = \beta 5 = 0$ and alternative hypotheses H1: $\beta 1, \neq \beta 2, \neq \beta 3 \neq \beta 4 \neq \beta 5 \neq 0$ implies co-integration among the variables. The co-integrating equation was chosen from the normalized co-integrating coefficient with the lowest log likelihood. The report of the cointegrated test is displayed on Table 4.4.

Error Correction Model (ECM) Result

Since co-integration has been established, it is important to proceed to the error correction model. The estimated ECM is displayed on the Table 4.5:

From the Table 4.5, the co-integrating equation and the long-run model can be stated as follows:

LAGOt-1 = -7.6780 + 0.0273LMCAt-1 – 0.3361MGSDt-1 – 0.0362DIRt-1 + 0.1081LIRt-1

Looking at the long run co-integrating equation and long run model derived from the Error Correction terms as stated above, it is obvious that two of the exogenous variables (MCA, and LIR) have long-run positive relationship with endogenous variables while the remaining two exogenous variables (MGSD and DIR) maintain significant long-run negative relationship. In this case, micro-finance banks' credits to agriculture (MBCA) as well as the lending interest

rate (LIR) all have positive co-integrating relationships with the output of agriculture (AGO) in the long-run. On the other hand, both gross saving deposit of the micro-finance banks (MGSD) and deposit interest rate (DIR) have negative long-run relationship with agricultural output.

Therefore, in the long-run, 1% increase or decrease in the first lag of MCA was associated with about 2.7% increase or decrease in the average mean value of agricultural output. In other words, the average value of agricultural output will increase or decrease by about 2.7% if MCA rises or falls by 1%. Therefore, in the long-run, microfinance banks credit was a positive and significant determinant of agricultural performance by 21% in line with theoretical expectation. This is because increase in microfinance banks' credit to agricultural sector is expected to reflect in terms of increase in the output of the sector. This finding suggests that microfinance banks' credits are beneficial to Agricultural output and plays an important role in the growth process of the sector. This is evidence that the microfinance banks' credit policy has given priority to lending significant portion of their deposits to agricultural sector. With respect to MGSD, average value of agricultural output tends to fall by about 34% in the event of 1% increase in MGSD and vice versa. MGSD thus defied a priori expectation of increasing agricultural output should the saving deposits with microfinance banks increases; the reason for this might be suggestive of poor disposition of microfinance banks nationwide to lending significant portion of their credits to vital sector like agriculture. This can also be a product of poor or relaxed regulation of microfinance banks by the regulatory bodies that should have ensured adequate lending to agriculture via special directive. As revealed by CBN statistical bulletin (2018), percentage of credits to agriculture in relation to microfinance aggregate deposits base in the last 10 years is hovering around 10%, which is insignificant to provoke any meaningful growth in the sector.

In case of deposit interest rate, 1% rise or fall in the level of DIR would cause the average value of agricultural output to decrease or increase by about 3.6%. This also relationship contradicts theoretical expectation that increase in deposit interest rate should have encouraged aggressive deposit from the surplus sector because every rational investor aspires to earn high return on their investment. Theoretically, increase in deposit base of the microfinance banks is expected to increase their ability to lend more to agricultural sector, and increase in lending to agricultural sector is expected to have multiplier effect of improving the output of the sector. Apropos lending interest rate (LIR), 1% rise in the rate at which credit was provided to agricultural sector was associated with 11% increase in the agricultural output against a priori expectation.

The foregoing connotes that interest rate on agricultural loan was not too high but moderate during the period covered by this study, and hence encouraged both actual and potential investors in the agricultural sector to access credits to facilitates agricultural investment for the overall output growth of the sector. Moreover, a closer look at the t-statistics on Table 4.5 reveals that all the exogenous variables were statistically significant to the estimated co-integrating and long-run model except MCA whose t-statistic is less than 2. Standard errors are the standard deviations of the sampling distribution of the estimator which measures the precision of the estimates in the long-run co-integrating model. In this case, the standard errors of the estimated coefficients of the exogenous variables are relatively low as expected, which is a further corroboration of the reliability of the estimated coefficients.

Table 4.6 contains the short-run coefficients of the Error Correction estimates. The Error Correction Term (ECT), which represents the speed of adjustment or convergence to long-run equilibrium is -0.095. The coefficient is rightly signed which connotes that the previous year deviation from long-run equilibrium is corrected in the current period at an adjustment speed of 9.5%. This implies that when the agricultural output was at disequilibrium level in the short run due to experience of any shock by the explanatory variables, the speed of its adjustment to converge to equilibrium on the long run was 9.5%. The R2 signifies that all the explanatory variables in the model account for 51% total variation in agricultural output (AGO) while the remaining 49% is attributed to the white noise residual as proxy for other factors not captured in the model. The Durbin-Watson statistics value is approximately 2 which implies that the estimated coefficients are not auto-correlated. However, there is need to simplify the error correction model by estimating a parsimonious model (ECM 2) developed from the over-parameterized model as displayed on Table 4.6.

The VECM predicting the relationship between agricultural output and financial intermediation by microfinance banks can be stated thus:

$\Delta logAGOt\text{-}1 = 0.0696 - 0.1499\Delta loMGSDt\text{-}1 + 0.0098\Delta logMCAt\text{-}1 + 0.0053\Delta logDIRt\text{-}1 - 0.0050\Delta LIRt\text{-}1 - 0.0254ECTt\text{-}1$

Table 4.7 contains the short run coefficients. In the short-run, the first lag of microfinance banks' credits to agriculture (MCA) has positive but insignificant relationship with agricultural output (AGO), which is consistent with long-run relationship as earlier pointed out when explaining Table 4.6. MCA therefore, conforms to a priori expectation both in the short-run and in the long-run. Thus, in the short-run, 1% increase in MCA was associated with about 0.9% increase in the average value of AGO and vice versa. The reason for the insignificance of MCA coefficient may not be far from the sharp decline in agricultural lending by microfinance banks from as high as 38% in 1998 to all time low of 3% in 2006. As at 2017, agricultural lending by microfinance banks was 7% in relation to the gross deposit base. Moreover, just like in the long run, the first lag of micro-finance banks' gross saving deposit (MGSD) has significant negative relationship with AGO in the short run. Hence, 1% increase or decrease in MGSD was accompanied by about 14% decrease or increase in the average value of AGO.

For deposit interest rate (DIR), the negative relationship exhibited in the long run was altered in the short run as it first lag was positively but insignificantly related to AGO in conformity to the a priori expectation. To this end, 1% rise in DIR was associated with 0.5% increase in the average value of AGOUT and vice versa. This signifies that deposit interest rate is instrumental to improving agricultural performance, although at a low rate; this is because high deposit interest rate will attract more savings

deposits from the surplus sector into the microfinance banks as financial intermediaries. This will increase their loanable deposits and consequently their ability to lend more to agricultural sector.

In addition, the coefficient of determination (R2) of 0.40 indicates that about 40% of the variation in the agricultural output (AGO) was explained by the explanatory variables, while the remaining 60% was accounted for by other factors not included in the model but represented by stochastic term. Furthermore, the standard error of the estimated model which represent the standard deviation of the sampling distribution of the estimator that measures the precision of the estimates of the model was very low at 0.0740. moreover, the standard error of the individual parameter coefficients were all relatively low as expected and this further lends credence to the reliability of the estimated coefficients.

Test of Research Hypotheses

Hypothesis One

H01: Microfinance banks gross saving deposits have no significant effect on the output of agricultural sector in Nigeria;

H11: H01: Microfinance banks gross saving deposits have significant effect on the output of agricultural sector in Nigeria;

From Table 4.7, findings reveal that the p-value calculated for microfinance banks gross saving deposits is 0.0196, which is lower at five per cent significance level than the 0.05 critical value. Hence, the null hypothesis was rejected while the alternative hypothesis was accepted. The implication of this is that Microfinance banks gross saving deposits have significant effect on the output of agricultural sector in Nigeria.

Hypothesis two

H02: Microfinance banks' credits to agriculture have no significant effect on the output of agricultural sector in Nigeria;

H12: Microfinance banks' credits to agriculture have significant effect on the output of agricultural sector in Nigeria;

From Table 4.7, findings also reveal that the p-value calculated for microfinance banks' credits to agriculture of 0.6822 is greater at five per cent significance level than the 0.05 critical value. Hence, there was no enough reason to reject null hypothesis; the alternative hypothesis was rejected which means that there is positive but not significant relationship between microfinance banks' credits to agriculture and the output of agricultural sector in Nigeria;

Hypothesis Three

H03: Deposit interest rate does not have significant effect on the output of agricultural sector in Nigeria;

H13: Deposit interest rate has significant effect on the output of agricultural sector in Nigeria;

From Table 4.7, the p-value calculated for deposit interest rate of 0.6769 is greater at five per cent significance level than the 0.05 critical value. Hence, the alternative hypothesis was rejected while the null hypothesis was accepted. The implication is that deposit interest rate, although has positive relationship, does not have significant effect on the output of agricultural sector in Nigeria;

Hypothesis Four

H04: Lending interest rate does not have significant effect on the output of agricultural sector in Nigeria;

H04: Lending interest rate does not have significant effect on the output of agricultural sector in Nigeria;

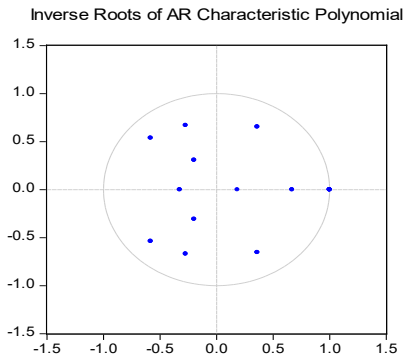
Also, findings reveal from Table 4.7 that the p-value calculated for lending interest rate is 0.2776 which is higher at five per cent significance level than the 0.05 critical value. Hence, the null hypothesis was accepted while the alternative hypothesis was rejected. The implication of this decision is that lending interest rate has no significant negative effect on the output of agricultural sector in Nigeria.

Table 4.8: VEC Granger Causality/Block Exogeneity Wald Tests

Source: Author's Computation (2020)

Looking at Table 4.8, with agricultural output as endogenous variable, MGSD has a significant long run causality effect on AGO

Diagnostics Tests



From Table 4.8, the null hypothesis is that the residuals are serially uncorrelated, therefore, the F-statistic p-value of 0.5548 indicates that we failed to reject the null hypothesis at both 1% and 5% significance levels. It was therefore concluded that the residuals were serially uncorrelated.

Table 4.1: Summary of Descriptive Statistics

	LAGO	LMGSD	LMCA	DIR	LIR
Mean	9.030333	9.938602	7.408564	5.624815	18.56857
Median	9.160834	10.43464	8.117998	4.110000	17.95000
Maximum	9.772476	12.21465	9.716552	16.66000	29.80000
Minimum	8.209252	6.460843	3.384390	1.410541	13.54250
Std. Dev.	0.570338	1.703664	1.753906	4.344827	3.151466
Skewness	-0.220378	-0.291957	-0.539181	1.532981	1.863384
Kurtosis	1.443506	1.743251	2.295686	3.986231	7.485179
Jarque-Bera	2.944057	2.160421	1.866289	11.66937	38.25633
Probability	0.229460	0.339524	0.393315	0.002924	0.000000
Sum	243.8190	268.3423	200.0312	151.8700	501.3515
Sum Sq. Dev.	8.457411	75.46421	79.98083	490.8157	258.2251
Observations	27	27	27	27	27

Source: Author's Computation (2020)

Table 4.1: Augmented Dickey-Fuller Unit Root Test Results
Unit root test at logarithmic levels
H0: b = 0; Ha: b > 0

Variables	Critical value @1%	Critical value @5%	ADF test statistics	Remarks	Order of Integration
LAGO	-3.711457	-2.981038	0.633191	Non-stationary	-
LMGSD	-3.724070	-2.986225	-0.930049	Non-stationary	-
LMCA	-3.711457	-2.981038	-2.185444	Non-stationary	-
DIR	-3.711457	-2.981038	-2.830392	Non-stationary	-
LIR	-3.711457	-2.981038	-6.012838*	Stationary	I(0)
		Unit root test at first differences			
Variables	Critical value @1%	Critical value @5%	ADF test statistics		Order of Integration
LAGO	-3.724070	-2.986225	-4.735129*	Stationary	I(1)
LMGSD	-3.724070	-2.986225	-7.490003*	Stationary	I(1)
LMCA	-3.769597	-3.004861	-4.567332*	Stationary	I(1)
DIR	-3.724070	-2.986225	-4.990933*	Stationary	I(1)
LIR	-	-	-	Stationary	I(0)

Source: Author's Computation (2020)
Notes:*Denotes significance at the 5% level and the rejection of the null hypothesis of non-stationarity.

Table 4.3: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria						
Endogenous variables: LAGO LMBCA LMGSD DIR LIR						
Exogenous variables: C						
Date: 01/20/20 Time: 17:36						
Sample: 1992 2018						
Included observations: 25						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-146.0050	NA	0.121387	12.08040	12.32417	12.14801
1	-48.87659	147.6351*	0.000397*	6.310127*	7.772778*	6.715805*
2	-26.70837	24.82841	0.000655	6.536669	9.218196	7.280411
* indicates lag order selected by the criterion						

Source: Author's Computation (2020)

Table 4.4: Co-integrattion Test result

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		**Max-Eigen**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.841475	46.04605	33.87687	0.0011
At most 1	0.663322	27.21572	27.58434	0.0557
At most 2	0.513965	18.03686	21.13162	0.1285
At most 3	0.287545	8.475960	14.26460	0.3324
At most 4 *	0.144836	3.911559	3.841466	0.0479
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's Computation (2020)

Considering the maximum Eugen statistics on Table 4.4, it indicates one co-integrating vector or equation at 5% significance level which provides evidence for the rejection of null hypotheses of no co-integration and this implies that long run relationship exists among the variables.

Table 4.5: Vector Error Correction Estimates (Long-run Coefficients)

	LAGO(-1)	LMCA(-1)	LMGSD(-1)	DIR(-1)	LIR(-1)	C
Coint. Coefs.	1.000000	0.0273	-0.3361	-0.0362	0.1081	-7.6780
Standard errors		0.0247	0.0213	0.0078	0.0159	
t-statistics		1.11	-15.79	-4.65	-6.81	

Source: Author's Computation (2020)

Table 4.6: Result of the Over-Parameterized Vector Error Correction Estimates

Dependent Variable: D(LAGO)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 01/22/20 Time: 12:12				
Sample (adjusted): 1995 2018				
Included observations: 24 after adjustments				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
ECM(-1)	-0.094874	0.202508	-0.468496	0.6478
D(LAGO(-1))	0.892642	0.646307	1.381142	0.1924
D(LAGO(-2))	0.374184	0.505234	0.740616	0.4732
D(LMGSD(-1))	-0.203180	0.077967	-2.605979	0.0230
D(LMGSD(-2))	-0.014820	0.088411	-0.167632	0.8697
D(LMCA(-1))	0.016606	0.028682	0.578980	0.5733
D(LMCA(-2)	0.015003	0.032344	0.463863	0.6510
D(DIR(-1))	0.021200	0.018801	1.127589	0.2815
D(DIR(-2))	0.005748	0.013558	0.423972	0.6791
D(LIR(-1))	-0.007097	0.013316	-0.532987	0.6038
D(LIR(-2))	-0.011043	0.007206	-1.532466	0.1513
C	0.024677	0.046655	0.528917	0.6065
R-squared	0.512586	Mean dependent var	0.063306	
Adjusted R-squared	0.065790	S.D. dependent var	0.082081	
S.E. of regression	0.079335	Akaike info criterion	-1.923423	
Sum squared resid	0.075528	Schwarz criterion	-1.334396	
Log likelihood	35.08107	Hannan-Quinn criter.	-1.767154	
F-statistic	1.147249	Durbin-Watson stat	1.849744	
Prob(F-statistic)	0.406527			

Source: Author's Computation (2020)

Table 4.7: Result of the Parsimonious Model (ECM 2)

Dependent Variable: D(LAGO)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 01/22/20 Time: 12:55				
Sample (adjusted): 1995 2018				
Included observations: 24 after adjustments				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
ECM(-1)	-0.025362	0.111743	0.226970	0.8232
D(LAGO(-1))	0.309453	0.387380	0.798837	0.4354
D(LMGSD(-1))	-0.149870	0.058169	-2.576467	0.0196
D(LMCA(-1))	0.009803	0.023535	0.416521	0.6822
D(DIR(-1))	0.005291	0.012479	0.423980	0.6769
D(LIR(-2))	-0.004978	0.004439	-1.121560	0.2776
C	0.069484	0.024286	2.861064	0.0108
R-squared	0.398724	Mean dependent var	0.063306	
Adjusted R-squared	0.186509	S.D. dependent var	0.082081	
S.E. of regression	0.074032	Akaike info criterion	-2.130148	
Sum squared resid	0.093172	Schwarz criterion	-1.786549	
Log likelihood	32.56178	Hannan-Quinn criter.	-2.038991	
F-statistic	1.878866	Durbin-Watson stat	1.797106	
Prob(F-statistic)	0.143177			

Source: Author's Computation (2020)

Table 4.8: VEC Residual Serial correlation LM Test

Null Hypothesis: no serial correlation at lag order h		
Date: 01/22/20 Time: 14:37		
Sample: 1992 2018		
Included observations: 24		
Lags	**LM-Stat**	**Prob**
1	23.38988	0.5548
Probs from chi-square with 25 df.		

Source: Author's Computation (2020)

Table 4.9: VEC Residual Heteroskedasticity Tests

Date: 01/22/20 Time: 14:52		
Sample: 1992 2018		
Included observations: 24		
Joint test:		
Chi-sq	**Df**	**Prob.**
337.6412	330	0.3741

Source: Author's Computation (2020)

Since the null hypothesis is that the residuals are homoskedastic, the p-value of 0.3741indicates that we failed to reject this null hypothesis at both 1% and 5% significance levels. It was therefore, concluded that the residuals were homoskedastic.

6. CONCLUSION AND RECOMMENDATIONS

Conclusion

This study has examined the effect of financial intermediation by microfinance banks on the output of agricultural sector in Nigeria. Obviously, banks makes use of a high degree of financial leverage with borrowed funds and the treasury functions of a bank underscores all the techniques that are involved in the sourcing of deposit from the surplus units that would be channeled to the deficit sector of the economy. Findings of this study revealed that in the long-run, there was a positive and significant relationship between microfinance banks' credits to agriculture and the output of agricultural sector in Nigeria as MCA was found to be positively promoting agricultural output by about 2.7%. This finding thus, conforms to the finding of Kolawole (2013) who found out that a long run relationship existed among the variables and that there was a direct relationship between banks' credits and agricultural productivity. Micro-finance banks' gross saving deposit (MGSD) was found to have negative and significant relationship with agricultural output both in the short-run and in the long-run. Moreover, the deposit interest rate was found in this study to exhibit positive behavior in the short run but negative and significant relationship with agricultural output in the long-run. The lending interest rate by finding of this study was negatively facilitating agricultural output in the short run but maintained positive relationship with agricultural output in the long run. This positive long run relationship is not in conformity to theoretical expectation by classical theory of interest rate which states that there is an inverse relationship between the rate of interest and the demand for capital. Thus, based on the foregoing premises, it was concluded in this study that financial intermediation by microfinance banks was an insignificant determinant of agricultural output in Nigeria.

Recommendations

Based on the findings obtained in this study, the followings were recommended:

i.Microfinance banks should be brought under close monitoring and supervision by the monetary authorities to ensure that significant portion of their deposits is not left fallowed and unproductive but optimally converted to credits for lending, especially to the grassroots farmers who lack investable capital for agricultural investment.

ii.Having found microfinance credits to be insignificantly promoting agricultural output in this study, microfinance banks should be directed by the monetary authority to promote economic growth by lending larger part of their deposits to agricultural sector so as to increase the agricultural output.

iii.Since deposit interest rate has negative effect on agricultural output in the long run, there is urgent need for policy to review and constantly monitor the deposit interest rate payable by commercial banks to depositors which is presently not encouraging to boost inflows of deposit which must have accounted for the reason for negative relationship; this will encourage depositors or surplus sector to deposit more of their surplus funds with the banks, and as a result of this, there will be increase in the lending capacity of the banks as more deposits are available for lending to stimulate agricultural performance.

iv.Lending interest rate should be kept under close watch of the menetary authority to ensure it does not rise to the level that will discourage borrowings by the farmers and agricultural investors from the banks.

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Nill

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