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Financial Stability and Agriculture Sector Productivity in Nigeria

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Abstract
The study delves into the critical relationship between financial stability and agriculture sector productivity in Nigeria over the period from 1990 to 2022. Drawing on data from the Central Bank of Nigeria (CBN) and the World Bank's World Development Indicators (WDI) 2022, the analysis uses non-performing loans, real interest rates, liquidity ratios, loan-to-deposit ratios, and Treasury bill rates as proxies for financial stability. Agricultural productivity is measured by agricultural gross domestic product (AGDP). Employing the Augmented Dickey-Fuller unit root test and the Auto-Regressive Distributive Lag (ARDL) model, the study assesses the stationarity of the variables and their dynamic interactions. The results from the bounds test reveal that financial stability and agricultural productivity do not exhibit a long-term correlation. However, in the short run, non-performing loans have a negative but significant impact on AGDP in the first and second years, while real interest rates positively influence AGDP. The effects of liquidity ratios, loan-to-deposit ratios, and Treasury bill rates, though positive, were found to be statistically insignificant. The study concludes that financial stability plays a significant role in shaping agricultural productivity in the short run. It suggests that the Central Bank of Nigeria (CBN) should issue stricter guidelines to commercial banks on credit risk management for agricultural loans. This could involve mandating regular audits of agricultural loan portfolios and ensuring adherence to stringent credit assessment procedures, ultimately fostering a more resilient agricultural sector.

Keywords: Financial Stability, Agriculture Sector, Interest Rate, Loan, Nigeria

Introduction

Agriculture stands as the cornerstone of Nigeria's economy, anchoring livelihoods ensuring food security and contributing significantly to the nations GDP. Agriculture encompasses a wide range of activities, including planting, harvesting, animal husbandry, irrigation, pest control and soil management. According to Amadi-Robert and ThankGod (2023), agriculture represents the sector of the economy which includes; agricultural engineering, production of agricultural machinery, fertilizers and other kinds of product to support farming. The agricultural sector is a countries major development tool that ensures a constant food supply and security for the population and also guarantee that the workforce feed with energy to supply labour to industries. Madi et al. (2020) sees agriculture as a process including practice and research of producing food, feeds, fiber and any other desired products by the cultivation of plants and raising of domesticated animals.

Financial stability emerges as a crucial determinant of economic progress, facilitating efficient resources allocation, investment and risk market. In Nigeria context, achieving and maintaining financial stability is paramount to fostering a conducive environment for sustainable agricultural development. Therefore, financial stability refers to a state in which the financial system-compromising financial institutions, markets and infrastructure is resilient to internal and external stocks capable of efficiently allocating resources managing risks and facilitating sustainable economic growth. According to ThankGod and Nwikina (2024) financial stability refers to the ability of a financial system to withstand stocks, mitigate shocks, mitigate risk and operate efficiently to support sustainable economic growth in agreement with this view,

Schinasi (2004) sees financial institution, the stability of financial markets, the absence of turbulence, low volatility within sector. This means that the stability of financial institutions, the availability of credit and the resilience of financial markets profoundly influence the agricultural sectors productivity and resilience to shock.

For, instance, stable financial institutions are more likely to lend to the agricultural sector, providing farmers with the necessary funds to invest in productivity-enhancing technologies, inputs and infrastructure. Also, financial stability can encourage investment in agricultural innovations and research. Stable financial markets provide a conducive environment for venture capital and private equity investment in agricultural technology start-ups, leading to the development and adoption of new technologies that improve productivity. Additionally, financial stability enables farmers to better manage financial risks associated with agricultural production, such as price volatility, weather-related risks, and input cost fluctuations. Conclusively, access to financial instruments like insurance, hedging tools and savings accounts can help farmers mitigate risks and maintain stable incomes, encouraging productivity-enhancing investment.

The dynamic interplay between financial stability and agricultural sector productivity plays a pivotal role in shaping Nigeria's economic landscape influencing growth, development and social well-being. Also, financial stability fosters economic growth by providing a stable and efficient financial system that facilitates the flow of funds from servers to borrowers. Stable financial markets and institutions encourage investment in productive activities such as infrastructure development, manufacturing and entrepreneurship. As business access financing for expansion an investment they create jobs, increase production and contribute to higher output, ultimately, boosting GDP. Financial stability plays a crucial role in ensuring food security by supporting investments in agriculture and food production. Access to credit and financial service enables farmers to invest in modern farming techniques, purchase quality inputs and adopt technologies that enhance productivity and efficiency.

Despite its significance, the relationship between Nigeria's agriculture sector productivity and financial stability is an remains an under-studied aspect of the nation's economic development. Consequently, an in-depth evaluation of the intricate mechanism through which financial stability influences agricultural sector productivity are not thoroughly examined by previous studies and discovered conflicting and contradicting reports. Prior studies investigated financial stability with respect to economic growth, however, none of the previous studies examined the impact of financial stability on agricultural sector productivity, which suggests a gap in literature.

Following this development, the study sought to examine the impact of financial stability and agricultural sector productivity in Nigeria with specific focus on the effect of non-performing loans, liquidity ratio, real interest rate, and loan to deposit ratio on agricultural sector productivity in Nigeria.

Literature Review

Theoretical Framework

The theoretical framework on this study is based on the Virtuous-Unvirtuou Cycle Theory**.** Lauretta et al. (2016) propounded the virtuous-unvirtuous cycle theory. They argue that financial crises, which result from unmitigated financial fragility, have tended to reoccur with increasing frequency since the 1980s. They find that financial crises are endogenously generated Originate-To-Distribute (OTD) model within the new finance paradigm. They contend that good finance ensures the proper allocation of financial resources, the fair distribution of wealth, and positive economic growth (the virtuous cycle). Conversely, bad finance captures part of the

created wealth and aided by a highly technologically advanced financial system with the ability to create money out of nothing, it over time drags the economy into recession or negative growth, destroying wealth and consequently social welfare.

The virtuous cycle is when in the presence of highly technologically developed financial institutions that operate beneficially to the economy, with a high level of savings put into productive use in the economy, thus stimulating a high level of investment and funding for innovation projects. In this case, growth leads financial system development and efficiency. The unvirtuous cycle entails a state in which the financial sector determines and leads the growth path. At a certain point, the highly technologically advanced financial system starts to abuse its monetary creation power, turning the social function for which, the financial institutions were created, into a self-serving one. The theory assumes that total output measured by real GDP is a function of financial power, capital input, labour input and innovation I, as shown below.
$Y = (FP, K, L, I)$ (1)

Where, FP = financial power; K = capital; L = labour; and I = innovation.

According to Lauretta et al. (2016), financial power is held by the financial system and is a function of the leverage ratio, financial innovation and financial institutions' size. It affects total output by exerting a positive or negative effect on real GDP. This effect depends on whether financial power is socially oriented, that is geared towards financing productivity of the economic system or privately oriented, aimed at self-seeking speculative and profit interests. Financial power is expressed as:
$FP = f(LR, SZ, FI)$ (2)

Where: LR is the amount of capital divided by total assets SZ is the size of financial institutions, measured by market shares to GDP FI is the degree of development of the technologically advanced financial system. They established a relationship between financial power and high financial system default risk (FSDR), noting that FSDR arises from the distortion of financial power, through the accumulation of bad debts (BD), which affects the growth path and triggers the unvirtuous cycle.

Empirical Review

Wabo-Nokam and Kem-Mungong (2023) analyzed the impact of financial stability on economic growth in the CEMAC zone. Using annual data over the period 2003-2016, the empirical results from the estimation of a cointegrated panel model using FMOLS and DOLS methods indicate that financial stability has a positive effect on economic growth. Moreover, these results reveal that financial depth does not significantly influence economic growth in the area. Furtherer more,

Dakyong (2023) investigated the nexus between financial development, agricultural output, and institutional quality in Nigeria using annual time series data from 1990 to 2022. The Autoregressive Distributed Lag (ARDL) model and Toda-Yamamoto's (1995) non-causality approach was equally employed. The long-run findings reveal that financial development, institutional quality, and lending interest rates exert a positive and significant impact on agricultural output, while human development has a negative and significant impact. Conversely, the short-run results indicate that financial development and human development positively and significantly influence agricultural output, whereas lending interest rates negatively and significantly impact agricultural output.

Ahulu et al. (2021) examined the effect of financial stability on the economic growth of countries in Sub-Saharan Africa using the World Development Indicators Data. To select the appropriate model best fits for the data, the Hausman test was used to select Random Effect

Estimator Over Fixed Effect Estimator to assess the relationship between the variables. Panel data was collected on Sub-Saharan Africa countries from 2010 to 2019 to predict the effect of financial stability on economic growth. The paper revealed that financial stability accounted for 71.8% of the variation of a country's economic growth for the period other things being equal.

Ijaz et al. (2020) investigates the effect of bank competition and financial stability on economic growth by examining panel-data from 38 European countries over 2001 to 2017. Results show that bank stability significantly contributes to economic growth in Europe. Economic growth falls during crisis periods (both the global financial crisis and the local banking crisis), highlighting the importance of a resilient banking system during crisis periods. Moreover, empirical outcomes show that lower banking competition supports economic growth and increases financial stability. This study provides a framework for banks and regulators to boost economic growth through the channel of banking stability.

Tosunoglu (2018) analyze the relationship between financial stability and economic growth in Turkey as an emerging market considering the 2002 – 2017 period which covers the implementation of inflation targeting monetary policy regime analyses the short and long-run dynamics of financial stability – economic growth relationship by using co-integration and ARDL techniques. Obtained results show that a steadily functioning financial system is a requirement for economic growth. In particular, financial leverage, capital adequacy, asset quality, and liquidity are important components of financial stability affecting the economic growth. Thus, formulating the efficient policies to support economic growth requires understanding the factors that affect financial stability.

Methodology

Data Source

The research design used for this study is the ex-post facto research design. The annual times series data for the study were sourced from the Central Bank of Nigeria (CBN) statistical bulletin (various issues) and World Bank's World Development Indicators. The data covers the periods from 1990 to 2022, indicating thirty-two (32) years sample observations.

Model Specification

The Autoregressive Distributed Lag (ARDL) method was employed in the study to estimate the impact of the independent variables on the dependent variable. The model of this study is based on the modification of Gökhan (2023) when investigating the effect of monetary policy Indicators on Agricultural Prices. Their model was;

$$AP = f(EXR, M2) \quad (1)$$

Where:

AP	=	agricultural commodity price
EXR	=	exchange rate
M2	=	money supply

Therefore, to achieve the objective of this study, the researcher modified the model to accommodate other variables. These include interest rate, (IR), and cash reserve ratio (CRR), treasury bill (TBR). These three variables are incorporated to capture monetary policy. The new expanded model is thus stated as follows;

$$AGDP = f(NPL, BLR, RIR\ LDR) \quad (2)$$

$$AGDP = \beta o + \beta 1NPL + \beta 2BLR + \beta 3RIR + \beta 4LDR + \mu \quad (3)$$

Where:

AGDP	=	agricultural sector contribution to gross domestic product
NPL	=	non-performing loan
BLR	=	bank liquidity ratio
RIR	=	real interest rate
LDR	=	loan to deposit ratio
μ	=	error term
βo	=	constant
β1-β4	=	estimated parameters

Apriori expectation: β1, and β3< 0 β2, and β4>0,

The sign of β1, and β3 are expected by theory to have a negative relationship with agricultural sector contribution to gross domestic product, since increase in NPL and RIR, will make cost of capital very expensive to finance investments in machinery, technology, and other input s that could enhance productivity. Also, this scenario can lead to inability of the farmers to meet up their loan obligation, while β2 and β4 are expected by theory to have a positive relationship with agricultural sector productivity contribution to gross domestic product.

Data Analysis and Results

Table 1: Result of Descriptive Statistics

	AGDP	NPL	RIR	LR	LDR	TBR
Mean	12014.11	44254.45	8.263636	49.53879	64.64818	13.75727
Median	7512.300	28089.00	6.200000	46.80000	62.78000	14.21000
Maximum	47944.06	96297.29	31.50000	104.2000	96.82000	26.90000
Minimum	106.6300	10834.61	0.900000	26.39000	37.56000	4.500000
Std. Dev.	13120.18	31999.61	6.502299	15.45667	13.47187	4.745165
Skewness	1.175432	0.390138	1.470536	1.445626	0.138144	0.209590
Kurtosis	3.518695	1.416186	6.009534	6.242098	2.870496	3.445186
Jarque-Bera	7.968963	4.156398	24.34739	25.94699	0.128021	0.514116
Probability	0.018602	0.125155	0.000005	0.000002	0.937995	0.773323
Sum	396465.8	1416142.	272.7000	1634.780	2133.390	453.9900
Sum Sq. Dev.	5.51E+09	3.17E+10	1352.956	7645.073	5807.719	720.5309
Observations	33	33	33	33	33	33

Source: Authors' Computation, 2024

The result in Table 1 shows that agricultural gross domestic product (AGDP), revealed a mean value of 12014.11 with a minimum of 106.6300 and maximum of 47944.06 while the standard deviation is 13120.18. Furthermore, non-performing loans (NPL), revealed a mean value of 44254.45 while minimum reported a value of 10834.61 and maximum of 96297.29 with standard deviation value of 31999.61. Moreso, real interest rate (RIR) reported a mean value of 8.263636, minimum and maximum value are 0.900000 and 31.50000 with a corresponding standard deviation value of 6.502299. Also, liquidity ratio (LR), reported a mean value of 49.53879 while minimum and maximum reported a value of 26.39000 and 104.2000 with a standard deviation of 15.45667 while loan to deposit ratio (LDR), reported a mean value of 64.64818 while minimum and maximum reported a value of 37.56000 and 96.82000 with a standard deviation of 13.47187 Finally, Treasury bill Rate (TBR), showed a mean value of 13.75727, while both minimum and maximum reported a value of 4.500000 and 26.90000 with

standard deviation of 4.745165. Regarding the other variables in the study (Skewness, Kurtosis & Jarque-Bera). The result of skewness showed that LNPL, LTBR, and LDR are moderately skewed (0.390138, 0.209590 & 0.138144). On the other hand, kurtosis measures the peakness or flatness of the distribution of a series. Therefore, LLDR and LTBR shows a kurtosis value of 2.87 and 3.49, this implies that it is mesokurtic because it has a coefficient of exactly or approximately 3 while LNPL is platykurtic because their coefficient is less than 3. Also, LAGDP, LRIR and LLLR are greater than 3, indicating that they are leptokurtic. The Jarque-Bera measures the difference between the skewness and kurtosis of each of the variables. As regards the Jarque-Bera p-value of the variables; LAGDP, LRIR and LLR are less than 0.05 implies that the null hypotheses is rejected while LNPL, LLDR and LTBR are all more than 0.05. This means that they are normally distributed. Therefore, the variables are subjected to unit root test.

Table 2: Unit Root Test Result

Variables	Levels		First Difference		Order of Integration	P-value
	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value		
LAGDP	-3.477463	-2.957110			1(0)	0.0153
LNPL	-3.502302	-2.963972			1(0)	0.0149
LRIR	-5.240758	-2.957110			1(0)	0.0002
LLR	-2.759132	-2.957110	-6.322406	-2.960411	1(1)	0.0000
LLDR	-4.795049	-2.967767			1(0)	0.0006
LTBR	-2.782900	-2.957110	-5.869186	-2.960411	1(0)	0.0000

Source: Authors' Computation, 2024; Level of significance at 5%

The results of Augmented Dickey-Fuller (ADF) in Table 2 shows that the variables are integrated in different order or a combination of I(0) and I(1) series. The ADF result revealed that LAGDP, LNPL. LRIR and LLDR is stationary at levels 1(0) while, LLR, and LTBR, are stationary after first differencing 1(1). This condition makes the Autoregressive Distributive Lag (ARDL) Bounds test approach to co-integration appropriate for investigating the long-run relationship among these variables.

Table 3: ARDL Bound Test

Test Statistics	Value	K
F-statistics	2.719612	5
Significance	**I (0)**	**1(1)**
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Authors' Computation, 2024

From Table 2, the bound test result indicates that there is no evidence of long run relationships amongst the variables. Because the F-statistic value of 2.719612 exceeds the lower but less than upper bound critical values we therefore affirm that the result is inconclusive.

Table 4: ARDL Short-run Result (LAGDP)

Variable	Coefficient	Std. Error	t-Statistics	Prob
C	0.362141	0.044398	8.156680	0.0012
D(NPL)	0.000819	0.041827	0.019590	0.9853
D(NPL(-1)	-0.211795	0.049710	-4.260627	0.0130
D(NPL(-2)	-1.144095	0.051141	-2.817621	0.0479
D(LRIR)	-0.102190	0.044292	-2.307221	0.0823
D(LRIR(-1)	0.212962	0.049186	4.329757	0.0124
D(LRIR(-2)	0.111688	0.041660	2.680920	0.0552
D(LLR)	-0.323059	0.173597	-1.860976	0.1362
D(LLR(-1)	-0.111053	0.140025	-0.793094	0.4721
D(LLR(-2)	0.124945	0.141227	0.884712	0.4263
D(LLDR)	0.137476	0.169072	0.813118	0.4618
D(LLDR(-1)	0.172350	0.180282	0.956003	0.3932
D(LLDR(-2)	-0.143330	0.155855	-0.919633	0.4098
D(LTBR)	0.334537	0.144758	2.311016	0.0819
D(LTBR(-1)	-0.086432	0.122659	-0.704650	0.5199
D(LTBR(-2)	0.051485	0.133092	0.386480	0.7186
Ecm (-1)*	-0.124837	0.026698	-4.675978	0.0095
Adj R^2 = 0.509447, F-statistics = 2.622683 (0.072666), DW = 2.197291				

Source: Authors' Computation, 2024

The coefficient estimates for the error correction term, ECM (-1) has a negative value and is significant at the 0.05 level. It suggests that the model will reach long-run equilibrium at a rate of 12% every year. This means that a yearly adjustment speed of 12% may fix the mistake from the previous year. The independent variables (LNPL, LRIR, LLR, LLDR & LTBR) explain 51% of the total variance in the dependent variable (CPI), according to the corrected R-Square (R2) value. As a whole, the model is noteworthy since the F-statistic is significant at the 5% level of significance. Without serial correlation, the model would not work, according to the Durbin-Watson statistics of 2.197291, which is close to 2. Table 4 displays the model's short-run outcome. A negative logarithm of non-performing loans (LNPL) of (-0.211795, and -1.144095) was seen in the previous and the second year periods when the log value of agricultural gross domestic product (LAGDP) was used as a surrogate for agricultural sector productivity in Nigeria. This means that the log value of agricultural gross domestic product (LAGDP), which is a proxy for agricultural sector productivity would rise by approximately 0.21% and 1.1 units, for every unit increase in the logarithm of non-performing loan (LNPL) in Nigeria. Non-performing Loans index log value correlate statistically (p=0.0130, and p=0.0479 respectively). Economic theory predicts this outcome. The log value of the agricultural gross domestic product index is likely to fall in response to an increase in non-performing loans. Using the log value of agricultural gross domestic product (LAGDP) as a surrogate for agricultural sector productivity in Nigeria over the previous year, real interest rate log (LRIR) has a positive value of +0.212962. If the log of real interest rate (LRIR) in Nigeria increases by one unit, the log value of agricultural gross domestic product (LAGDP), which is a proxy for agricultural sector productivity, would rise by about 0.21%. Based on the p-value of 0.0124, it can be concluded that real interest rate is significantly related to the log value of agricultural gross domestic product. Economic theory supports this outcome. The predicted outcome is that the log value of agricultural gross domestic product index will fall in response to an increase in real interest rate.

As a surrogate for agricultural sector productivity in Nigeria over the second year, the log value of agricultural gross domestic product (LAGDP) is positive (+0.124945) when applied to the log of liquidity ratio (LLR). This means that the log value of agricultural gross domestic product

(LAGDP), which is a proxy for agricultural sector productivity, would increase by about 0.12% for every unit rise in the log value of liquidity ratio (LLR) in Nigeria. The correlation between the logarithm of liquidity and the logarithm of the agricultural gross domestic product is statistically insignificant (p=0.4721). Economic theory predicts this outcome. As a surrogate for agricultural sector productivity in Nigeria over the second year, the log value of agricultural gross domestic product (LAGDP) is positive (+0.137476 and 0.172350) when applied to the log of loan to deposit ratio (LLDR). This means that the log value of agricultural gross domestic product (LAGDP), which is a proxy for agricultural sector productivity, would increase by about 0.14% and 0.17% for every unit rise in the log value of loan to deposit ratio (LLDR) in Nigeria. The correlation between the logarithm of loan to deposit ratio and the logarithm of the agricultural gross domestic product is statistically insignificant (p=0.4263 and 0.4618). Economic theory predicts this outcome. Last but not least, as a surrogate for agricultural sector productivity in Nigeria during the present and second year period, the value of treasury bill rate (LTBR) is positive (+0.334537 and +0.051485) using the log value of the livestock contribution to gross domestic product (LGDP). This means that the log value of the log value of agricultural gross domestic product (LAGDP), which is a proxy for agricultural sector productivity, would rise by about 0.33% and 0.0.05% for every unit increase in the log value of treasury bill rate (LTBR) in Nigeria. A statistically insignificant association between the Treasury bill rate and the log value of agricultural gross domestic product is shown by the p-value of 0.0819 and 0.7186. Economic theory predicts this outcome. The predicted outcome of a rise in access to electricity on livestock production is that the log value of livestock production will rise.

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Table 5: Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity Test Results

	F-Statistic	Prob-Value
Ramsey Reset Test	1.708672	0.3692
Breusch-Godfrey Serial Correlation LM Test	0.430263	0.5587
Breusch-Pagan-Godfrey Heteroskedasticity Test	0.184087	0.9963

Source: Authors' Computation, 2024

The results of the diagnostic test in Table 5 shows that the linearity test using Ramsey Reset test indicates that the f-statistic (1.708672) with computed p-value of 0.3692 which is greater than 5 percent (0.05) critical value, hence the study reject the null hypothesis and conclude that the model is correctly specified. The result of the Serial or Autocorrelation Test using Breusch-Godfrey Serial Correlation LM Test shows that the f-statistic is 0.430263, with a Chi-Square probability value is 0.5587. This indicates that the probability value of about 56 percent (0.5587) is greater than 5 percent (0.05) critical value; hence the study confirms no serial correlation in the model. The result of the heteroscedasticity test using Breusch-Pegan-Godfrey test shows that the f-statistic is 0.184087 with a Chi-Square probability value of 0.9963. The result suggests that there is no evidence of heteroskedasticity in the model since the probability Chi-square value is more than 5 percent (P >0.05). So, residuals do have constant variance which is desirable in regression meaning that residuals are Homoscedastic.

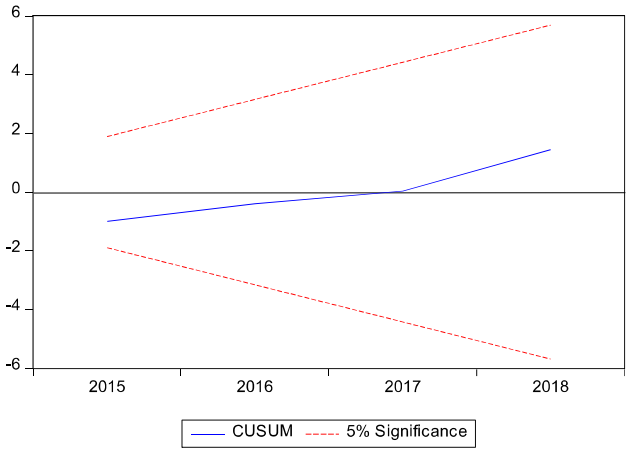

Figure 1: The Cumulative Sum Recursive Plot
Source: Authors' Estimation, 2024

Figure 1, shows the summary of the stability of the model. The graph shows that the model is stable, this is evident by the fact that the blue line inside the graph is in between the two red lines. This also indicates that it is less than 0.05 level of significance.

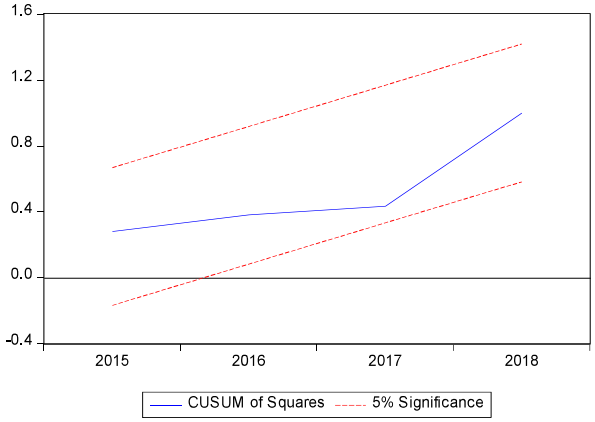

Figure 2: The Cumulative Sum of Square Recursive Plot
Source: Authors' Estimation, 2024

The Figure 2 also shows that the sum of squares of the recursive residuals of the AGDP is relatively stable especially looking at financial stability. Most especially for the period under investigation AGDP has remained within the critical bounds. The results imply that the null hypothesis of no stability of the short-run AGDP can be rejected at 5% significance level.

Discussion of Findings

For non-performing loan and agricultural gross domestic product in Nigeria, the inference drawn from regression analysis using the Auto-Regressive Distributive Lag (ARDL) result revealed that, non-performing loans (NPL) have a negative relationship with agricultural gross domestic product (AGDP) in the short-run. The positive relationship between non-performing loans (NPL) and agricultural gross domestic product (AGDP) conform to economic theory. It is expected that increase in non-performing loans (NPL) will lead to a decline in agricultural gross domestic product in the country. However, the p-value of the result indicate that non-performing loans (NPL) is statistically significant to influence agricultural gross domestic product (AGDP).

The real interest rate and agricultural gross domestic product in Nigeria. inference drawn from regression analysis using the Auto-Regressive Distributive Lag (ARDL) result revealed that, real interest rate (RIR) have a positive relationship with agricultural gross domestic product (AGDP) in the short-run. The positive relationship between real interest rate (RIR) and agricultural gross domestic product (AGDP) do not conform to economic theory. It is expected that increase in real interest rate (RIR) will lead to a fall in agricultural gross domestic product (AGDP). However, the p-value of the result indicate that real interest rate (RIR) is statistically significant to influence agricultural gross domestic product (AGDP).

In the case of liquidity ratio and agricultural gross domestic product in Nigeria the inference drawn from regression analysis using the Auto-Regressive Distributive Lag (ARDL) result revealed that, liquidity ratio (LR) has a positive relationship with agricultural gross domestic product (AGDP) in the short-run. The positive relationship between liquidity ratio (LR) and agricultural gross domestic product (AGDP) supports economic theory. It is expected that increase in liquidity ratio (LR) will result to an upsurge in agricultural gross domestic product (AGDP). However, the p-value of the result indicate that liquidity ratio (LR) is statistically insignificant to influence agricultural gross domestic product (AGDP).

In the loan to deposit ratio and agricultural gross domestic product in Nigeria, the Auto-Regressive Distributive Lag (ARDL) result revealed that, loan to deposit ratio (LDR) have a positive relationship with agricultural gross domestic product (AGDP) in the present and second year period of the short-run. The positive relationship between loan to deposit ratio (LDR) and agricultural gross domestic product (AGDP) conform to economic theory. It is expected that increase in loan to deposit ratio (LDR) will improve agricultural gross domestic product (AGDP). However, the p-value of the result indicate that loan to deposit ratio (LDR) is statistically insignificant to influence agricultural gross domestic product (AGDP).

Treasury bill rate and agricultural gross domestic product in Nigeria**,** inference drawn from regression analysis using the Auto-Regressive Distributive Lag (ARDL) result revealed that, treasury bill rate (TBR) have a positive relationship with agricultural gross domestic product (AGDP) in the current and second year period of the short-run. The positive relationship between Treasury bill rate (TBR) and agricultural gross domestic product (AGDP) conform to economic theory. It is expected that increase in Treasury bill rate (TBR) will improve agricultural gross domestic product (AGDP). However, the p-value of the result indicate that Treasury bill rate (TBR) is statistically insignificant to influence agricultural gross domestic product (AGDP).

Conclusion

Following the findings, the study draws the conclusion that financial stability variables such as non-performing loans and real interest rate have significant influence on agricultural gross domestic product. Precisely, the regression result on the relationship between non-performing loan and agricultural gross domestic product reported that non-performing loan is negative and significant with agricultural gross domestic product in the previous and second year period of the short-run. This means that as the stock of non-performing loans increases, deposit money bank liquidity will decline leading to limitation of loans that would be advanced to the agricultural sector. Also, ARDL result posted that the real interest rate, had a positive and significant relationship with agricultural gross domestic product in the short-run. By implication, as Central bank increase the interest rate, investors in the agricultural sector continue to demand for more loans. This might be due to high demand to essential goods and services that enables them to meet customer and consumers demand and also make profit.

Recommendations

Given the findings of the study, the following recommendations are provided.

1. The Central Bank of Nigeria (CBN) should issue stricter guidelines to commercial banks on credit risk management for agricultural loans. This could involve mandating regular audits of agricultural loan portfolios and ensuring adherence to stringent credit assessment procedures, ultimately fostering a more resilient agricultural sector.
2. The Central Bank of Nigeria (CBN) should maintain real interest rates at a level that promotes agricultural investments. This could involve setting a target range for real interest rates that balances the need for agricultural growth with the broader macroeconomic objectives of inflation control and financial stability.
3. The Central Bank of Nigeria (CBN) should assess the current liquidity ratio requirements for banks to determine if they are set at an optimal level that encourages lending to the agricultural sector. If the liquidity ratio is too high, it might be constraining banks' ability to lend effectively, particularly to sectors like agriculture that require targeted support.
4. The Central Bank of Nigeria should assess the effectiveness of its current LDR targets, particularly in relation to the agricultural sector. If the LDR is not significantly impacting AGDP, the CBN may need to re-evaluate whether these targets are appropriate for stimulating agricultural lending.

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