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Financial Inclusion and Agricultural Output in Nigeria (1981-2022)

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Abstract
This paper assessed financial inclusion vis-à-vis agricultural output in Nigeria. The discovery and dependence on crude oil led to neglect of agricultural sector. Some agriculturists are financially excluded due to their rural location. The sectorial distribution of commercial banks loans seems poor as agriculture get less than 10 percent of Nigeria annual budget. This study seeks to specifically ascertain the effect of commercial bank loans on agricultural sector (CBLAGR); deposit of rural branches of commercial banks (DRBCB); loans by rural branches of commercial banks (LRBCB) and number of commercial banks branches in rural areas (NCBBRA) on agricultural output (AGOP) in Nigeria. Using data obtained from CBN statistical bulletin, 2023 under ex-post facto research design the study adopted ordinary least square (OLS) regression technique in analyzing the data. The hypotheses were tested at 5% level of significance. The Findings of the study reveal that commercial bank loans on agricultural sector had a positive effect on agricultural output, deposit of rural branches of commercial banks had a positive effect on agricultural output; loans by rural branches of commercial banks had negative effect and number of commercial banks branches in rural areas had a negative effect on agricultural output in Nigeria. Is recommended among others that: Banks should be increasing loans and advances to agricultural sector even as they establish more branches in rural areas to enhance financial inclusion.
Key words: financial inclusion, agriculture, commercial banks, deposit, loans.

Introduction

Agriculture has been the main stay of the Nigerian economy before the discovery of crude oil. People engage in agriculture for both commercial and subsistence purposes. Nigeria which is commonly described as the giant of Africa have a vast land area of 923,768 km^2 with estimated population of over 200million. Nigeria is an agrarian country with large arable land for agricultural purposes. Umaru and Inusa (2022) stated that agricultural output is important in every developing country, especially in Nigeria as food insecurity, high food import, and increasing food prices are pestering issues that have not been addressed, thus, the growing need to increase agricultural sector output.

Agriculture has a crucial role as the economic backbone for many households and is a substantial sector of the country's economy (Ayeomoni & Aladejana, 2016). Agriculture has been defined to encompass various forms of farming as cultivation of land, fishing, livestock, poultry and forestry (Ojo et al., 2022). The agricultural sector of Nigeria's economy has the critical role of broadening the productive and export base of the economy by creating employment, ensuring industrial input, food security and economic growth. However, despite its importance, the sector faces several challenges including limited access to financial services and lack of inclusion in the formal financial system which invariably affects yield and performances (Emaziye, 2015 as cited in Ashoro et al., 2024)

Financial inclusion is a way or process for enhanced moving of the unbanked populace into the formal financial activities. The MAYA declaration 2011 for sustainable financial inclusion have made developing economies to ensure that they reduce the volume of the population that do not have access to formal financial services. El-said et al. (2020) defined financial inclusion as access to and use of financial products and services by people. Also, Oladimeji and Adegbite (2019) defined financial inclusion as the process that ensures ease of access, availability, and usage of the formal financial system for the members of an economy or that process whereby financial services are delivered by a range of providers to reach all those who could use them. The Central Bank of Nigeria's push for cashless policy in 2012, reduction in know your customer (KYC) requirements for account opening, establishment of people's bank in 1989 and Community Banking in 1990 helped to set the strategy for financial inclusion, hence breaking the barriers for those financially excluded (Ozili, 2022). These provisions helped push more people to the banking sector and advanced the course of financial inclusion in Nigeria.

Onaolapo's study (2015, as cited in Okuma, 2019) defined financial inclusion as a process that ensures the ease of access, availability and usage of a formal financial system by all members of the economy. Ashoro et al. (2024) emphasized that financial inclusion is recognized as a key driver of economic development and poverty reduction. The bringing of rural dwellers close to financial services enables them to get financing to fund their various needs both agricultural and otherwise. Consequently, its role in boosting agricultural output by bringing farmers into the banking space cannot be over-emphasized. Abraham (2018) collaborating the forgoing, also stated that there are vital areas in which banks continued to seek better results included providing access to financial services and thereby bridging the gap that constrains the growth of the agricultural sector.

It was noted in the study by Fowowe (2020) that agriculture contributed 63.8% of gross domestic product (GDP) as at 1960, but has dropped drastically to 23.8%, 20.3% and 21.4% in 2010, 2014 and 2018 respectively. The forgoing was attributed to the discovery and eventual dependence on oil as the country's source of revenue leading to Nigeria's loss of her self-sufficiency status in food production. It is obvious that some of the present day farmers are financially excluded. They use crude tools leading to low productivity which eventually keeps farmers poor. It is appalling to note that the sectorial distribution of commercial banks loans and advances showed that agriculture got 8%, 1.96%, 1.67%, 3.26%, 5.15%, 5.98% and 6.16% in years 2000, 2006, 2010, 2016, 2020, 2021 and 2022 respectively (CBN bulletin, 2022).

It is estimated in FAO's study (2017, as cited in Ekine & Onu, 2018) that Nigeria has lost $10billion in annual export opportunity from groundnut, palm oil, cocoa and cotton alone due to reduction in their production. Furthermore, Ekine and Onu (2018) observed that agricultural sector is growing at a slow pace given its initial abandonment for oil, government inadequate support and non-cultivation of large chunk of our arable land.

Oyelade (2019) highlighted a major reason behind the decline of the agricultural sector's contribution to the GDP as lack of access to credit from commercial banks. This lack of access hinders farmers from seizing economic opportunities, increasing output, and escaping poverty. This has hampered the growth of the agricultural sector and have adversely affected the poor farmers who would have relied on accessing funds from banks in their rural areas in order to increase their output. It is against this backdrop that this study examined the effect of various financial inclusion variables (commercial banks loans and advances; deposits of rural branches of commercial banks; loans by rural branches of commercial banks and number of commercial banks branches in rural areas) on agricultural sector output in Nigeria.

The broad objective of this study was to examine the effect of financial inclusion on agricultural output in Nigeria for the period 1981 to 2022. This broad objective was further split into four specific objectives as follows:

Research objectives:

1) To examine the effect of commercial banks loans and advances to agricultural sector on agricultural output in Nigeria.
2) To examine the effect of deposits of rural branches of commercial banks on agricultural output in Nigeria.
3) To examine the effect of loans by rural branches of commercial banks on agricultural output in Nigeria.
4) To examine the effect of number of commercial banks branches in rural areas on agricultural output in Nigeria.

Research hypotheses:

The research hypotheses expressed in null forms are as follows:

1) Commercial banks loans and advances to agricultural sector had no positive effect on agricultural output in Nigeria.
2) Deposits of rural branches of commercial banks had no positive effect on agricultural output in Nigeria.
3) Loans by rural branches of commercial banks had no positive effect on agricultural output in Nigeria.
4) Number of commercial banks branches in rural areas had no positive effect on agricultural output in Nigeria.

Review of Related Literature

Conceptual review

World Bank's 2014 Global Financial Development Report defined financial inclusion as the percentage of a population that utilizes financial services. Nwanne's study (2015, as cited in Okuma et al., 2019) defined financial inclusion as a state in which all the people of a particular nation have complete access to the appropriate desired financial products and services in order to manage their money effectively. This implies that it is a situation whereby financial services are made available by providers to all that have need and could use them.

Hence, to achieve broad-based economic growth that can lift low-income households' incomes, financial inclusion is needed along the agricultural value-chain (Menkeh, 2021).

Accordingly, Evans and Lawanson (2017) hinted that financial inclusion is critical in the fight against hunger and poverty. Etea and Obodoechina (2019) referred to the agricultural sector as those activities that give rise to the production of crops and rearing of animals for man's use. Yilson, et al. (2021) gave a comprehensive definition of agriculture as the deliberate act by an individual, group of individuals, organizations or government to modify a portion of the earth's surface through the cultivation of crops, livestock, forestry or fishery for personal sustenance or economic gain. The agricultural sector of Nigeria's economy stands out as being vital in broadening the productive, consumption and export base of the economy.

Theoretical Review

Financial Inclusion Theory: According to financial inclusion theory, financial inclusion activities and initiatives should be directed on the most vulnerable parts of society, such as the poor, young people, mothers, and the elderly, who are disproportionately affected by economic inequality and crises. It makes sense to get poor people into the mainstream banking market because they are especially impacted by financial bubbles and economic recessions (Menkeh, 2021).

Financial Literacy Theory: According to the financial literacy theory, financial inclusion should be accomplished through education that raises people's financial literacy. According to this theory, financial inclusion programs and activities aimed at increasing the people's financial literacy will enhance their willingness to engage in the formal financial sector. The philosophy of financial literacy has several virtues. Financial literacy may educate individuals on the financial goods and services available to them. They will be willing to engage in formal financial transactions via the acquisition of a bank account, once they become aware of available financial products and services that may help them enhance their standard of living. Secondly, improving financial literacy allows people to access more advantages offered by the formal financial sector. (Okello, et al., 2020; Ozili, 2022).

Empirical Review

Sethy and Goyari (2023) examined the impact of financial inclusion on agricultural productivity in South Asian countries from 2004 to 2018. The researchers followed the Human Development Index method to construct a multidimensional time varying financial inclusion index to measure the level of financial inclusion. The long-run elasticity of financial inclusion on agricultural productivity is examined by using the FMOLS and DOLS approaches. The empirical results confirm that financial inclusion has a positive impact on agricultural productivity. Furthermore, the interaction term between financial inclusion and human capital is positively associated with

agricultural productivity. These results suggest that South Asian countries can increase agricultural productivity by improving the coverage of financial inclusion in the long-run.

Umaru and Inusa (2022) examined the asymmetric effect of financial inclusion on agricultural output in Nigeria. The variables used were volume of automated teller machines, point of sale, mobile banking pay and cheques. Data was sourced from the Nigerian Inter-Bank Settlement System Plc (NIBSS) and CBN statistical bulletin 2021. The non-linear Autoregressive Distributed Lagged (NARDL) model and Stepwise Least Squares (STEPLS) were employed in the estimation. The study revealed that financial inclusion positively and significantly affect agricultural output in Nigeria for the period reviewed.

Atalki and Agbenyo (2020) examined the nexus between gender, financial inclusion and agriculture productivity in Ghana. The study adopted a cross-sectional research design with secondary data sources from the Ghana Living Statistical Survey 7. The data was analyzed using the ordinary least square method with STATA version 15 software. Their findings revealed that financial inclusion has a significant positive relationship with agricultural productivity. Also, factors such as age, farm size, household size, ownership of land have a positive impact on agricultural productivity coupled with the low level of education. Furthermore, the results indicated that farm size, equipment ownership, expenditure on inputs, age, marital status, land ownership, household size, and education level are determinants of agricultural productivity. Finally, the paper revealed that male farmers are more financially inclusive than their female counterparts.

Fowowe (2020) conducted an empirical investigation of the effects of financial inclusion on agricultural productivity in Nigeria. The Living Standards Measurement Study– Integrated Surveys on Agriculture (LSMS-ISA) methodology was used. The study exploited the time series and cross-section dimension of the data by using panel data estimation. They found out that financial inclusion exerted positive and statistically significant effects on agricultural productivity in Nigeria.

Okuma et al. (2019) examined the causality between financial inclusion and Nigeria's agricultural sector output. The ex-post facto research design was employed while annual time series data was obtained from the Central Bank of Nigeria statistical bulletin. They used Unit Root Test, Engle–Granger Co-integration Test, Error correction Model (ECM) Test and Granger Causality Tests to analyse the data. Financial inclusion proxies used in the study were: prime lending rate, deposit rate, the agricultural credit guarantee scheme fund, the demand for deposits from rural areas and the deposits of bank loans to small scale enterprises (% of total loan). The findings showed that

financial inclusion explained 41% of the changes in the Nigerian agricultural sector output. Prob(F-statistics) co-efficient of 0.070531 proved that the explanatory variables have an insignificant effect on the dependent variable and Granger Causality Test showed more support for the non-existence of a causal relationship between the variables of explanatory variables and the dependent variables.

Abraham (2018) examined the effect of financial access on poor farmers in rural northern Nigeria, by checking if the poorest income quintile would benefit most from programs aimed at increasing their access to financial services in rural northern Nigeria. He used 320 questionnaires which were administered in two rural communities (Rijau and Fakai) and analyzed using an ordered logit regression model. He found out that access to financial services by using formal financial institutions and farmer savings clubs benefits vulnerable farmers (mostly women). The robustness check using the Brant test also confirmed that the parallel regression assumption of the model was not violated. A policy scenario that seeks to increase the delivery of financial services to rural farm households using community savings clubs and microfinance institution reforms for reaching the financially underserved was also found to benefit the poorest income quintile, hence, bringing them out of poverty.

Kalu et al. (2018) investigated the effect of financial inclusion on the agricultural sector in Nigeria. The study utilized survey data generated from 600 recovered questionnaires which were administered to farmers in both rural and urban locations in Nigeria. The study developed adequacy gap index and timeliness gap index to measure the penetration gap index theory of financial inclusion through the application of the pecking order theory. The adequacy and timeliness gap indices revealed that the different formal lending agencies were unable to meet the credit needs of these small scale farmers hence, credit was inadequately and untimely provided to small scale farmers because they depend on rain-fed agriculture. The penetration gap index revealed that the penetration of financial inclusion in agricultural sector is still shallow in Nigeria.

Olaniyi (2017) examined if rural financial inclusion enhance agricultural growth. The study used annual data covering the period 1981 to 2014. The ARDL bounds testing approach was used to analyze the long-run and short-run dynamics of the relationship between financial inclusion and agriculture in Nigeria. The variables used were agricultural share of GDP, lending interest rate, broad money, outstanding loans from financial sector to agricultural sector. The findings showed that usage of financial services had significant impact on agriculture both in the short-run and long-run. This means that for sustainable agricultural development in rural areas, improving financial inclusion is critical in Nigeria. On the contrary, access to finance had insignificant impacts on agricultural growth.

Methodology

The *"ex-post facto"* research design was adopted in this study. Secondary data for the period 1981 to 2022 (42 years) was sourced from CBN statistical bulletin and analysed using Ordinary Least Square technique. The hypotheses were tested at 5% level of significance. The decision rule was to accept the null hypothesis if the coefficient value is negative. The null hypothesis was rejected if the coefficient value is positive.

Model Specification

The multiple regression analysis model was used. The relationship is expressed as:

$Yt = bo + b1x1 + b2x2 + b3x3 + \ldots\ldots\ldots Btxt + et$

Where:

Y = dependent variable

b_o = intercept

$x1$, $x2$, $x3$ are the independent variables

et = random error term

$bo, b1, b2, b3$ are the parameters of the model.

This study used the model:

AGOP = f(CBLAGR, DRBCB, LORCB, NCBBRA)

The model is functionally expressed as follows:

$AGOP = b_o + b_1CBLAGR + b_2DRBCB + b_3LRBCB + b_4NCBBRA + et$

Where:

AGOP = Agricultural output

CBLAGR = Commercial bank loans to agricultural sector

DRBCB = Deposit of rural branches of commercial banks

LRBCB = Loans of rural branches of commercial banks

NCBBRA = Number of commercial bank branches in rural areas

This study used commercial bank loans to agricultural sector (CBLAGR), deposit of rural branches of commercial banks (DRBCB), loans of rural branches of commercial banks (LRBCB) and number of commercial bank branches in rural areas (NCBBRA) as independent variables, while agricultural output (AGOP) was used as the dependent variable. These independent variables as it concerned the rural areas were chosen because those in the rural areas are most likely to face financial exclusion challenges unlike those in urban areas. Also, those in rural areas are those mainly engaged in agriculture due to the availability of large expanse of arable land in such area. So their activity have a direct bearing on the overall agricultural production in Nigeria which are affected by the level of their financial inclusiveness.

Presentation of Data:

Table i: Data on commercial bank loans to agricultural sector, deposits of rural branches of commercial banks, loans by rural branches of commercial banks, number of commercial bank branches in rural areas and agricultural output.

YEAR	CBLAGR ₦' Billion	DRBCB ₦' Billion	LRBCB ₦' Billion	NCBBRA	AGOP ₦' Billion
1981	0.59	0	0	240	17.05
1982	0.79	0.11	0.04	308	20.13
1983	0.94	0.13	0.04	407	23.80
1984	1.05	0.28	0.06	432	30.37
1985	1.31	0.31	0.11	451	34.24
1986	1.83	0.87	0.37	481	35.70
1987	2.43	1.23	0.49	529	50.29
1988	3.07	1.38	0.66	602	73.76
1989	3.47	5.72	3.72	756	88.26
1990	4.22	8.36	4.73	765	106.63
1991	5.01	10.58	5.96	765	123.24
1992	6.98	4.61	1.90	774	184.12
1993	10.75	19.54	10.91	775	295.32
1994	17.76	4.86	1.60	763	445.27
1995	25.28	8.81	8.66	701	790.14
1996	33.26	12.44	4.41	675	1,070.51
1997	27.94	19.05	11.16	675	1,211.46
1998	27.18	18.51	11.85	714	1,341.04
1999	31.05	15.86	7.50	714	1,426.97
2000	41.03	20.64	11.15	722	1,508.41
2001	55.85	16.88	12.34	722	2,015.42
2002	59.85	14.86	8.94	722	4,251.52

2003	62.10	20.55	11.25	722	4,585.93
2004	67.74	64.49	34.12	722	4,935.26
2005	48.56	18.46	16.11		6,032.33
2006	49.39	3.12	24.27		7,513.30
2007	149.58	3.08	27.26		8,551.98
2008	106.35	13.41	46.52		10,100.33
2009	135.70	3.30	15.59		11,625.44
2010	128.41	0.02	16.56		13,048.89
2011	255.21	0.02	19.98		14,037.83
2012	316.36	0.02	22.58		15,816.00
2013	343.70	0.02	739.92		16,816.55
2014	478.91	0.48	988.59		18,018.61
2015	449.31	90.37	29.17		19,636.97
2016	525.95	87.93	43.78		21,523.51
2017	528.24	185.34	530.99		23,952.55
2018	610.15	308.85	200.07		27,371.30
2019	772.38	354.86	202.59		31,904.14
2020	1,049.68	351.50	107.52		37,241.61
2021	1,457.82	427.45	119.85		41,126.06
2022	1,812.47	521.21	111.17		47,944.06

Source: CBN statistical bulletin (2022)

Findings:

Table ii: Descriptive Statistics

	AGOP	C	CBLAGR	DRBCB	LRBCB	NCBBRA
Mean	9450.626	1.000000	231.1818	64.37859	83.28059	630.7083
Median	3133.471	1.000000	48.97745	10.58070	11.85270	714.0000
Maximum	47944.06	1.000000	1812.470	521.2149	988.5879	775.0000
Minimum	17.05218	1.000000	0.590600	0.019723	0.035900	240.0000
Std. Dev.	12611.17	0.000000	401.2636	131.0975	203.2207	159.7867
Skewness	1.465765	NA	2.442378	2.265518	3.334073	-1.110142
Kurtosis	4.328597	NA	8.814442	6.853315	13.50916	2.950843

Jarque-Bera	18.12831	NA	100.9200	60.43799	264.6321	4.932075
Probability	0.000116	NA	0.000000	0.000000	0.000000	0.084921
Sum	396926.3	42.00000	9709.637	2639.522	3414.504	15137.00
Sum Sq. Dev.	6.52E+09	0.000000	6601511.	687462.0	1651946.	587231.0
Observations	42	42	42	41	41	24

The above table displayed the descriptive statistical behaviour of all the parameters that were subjected to estimation in this study.

Table iii: Unit root test extracts

Null hypothesis: There is unit root

Variables	ADF STAT	5% critical	Inference	p-value	Decision
CBLAGR	-9.709988	-2.938987	1(2)	0.0000	Reject H0
DRBCB	-3.617413	-2.938987	1(1)	0.0098	Reject H0
LRBCB	-3.210743	-2.954021	1(0)	0.0283	Reject H0
NCBBRA	-5.773200	-3.012363	1(2)	0.0001	Reject H0
AGOP	-7.865308	-2.938987	1(2)	0.0000	Reject H0

Source: Researcher's extraction from the unit root tests results using ADF methods.

The above table 3 showed that there is no unit root for LRBCB at difference order 0; there is no unit root for DRBCB at difference order 1; there is no unit root for CBLAGR, NCBBRA and AGOP at difference order 2. Since the probability values are less than 5% significant level, the series are stationary and suitable for estimation using regression technique of analysis.

Test of Hypotheses

Decision rule: Accept the null hypothesis if the coefficient value is negative, otherwise reject.

Table iv: Summary statistics for hypotheses testing:

Hypothesis	**Variable**	**Coefficient**	**Std. error**	**t-statistic**	**Probability**	**Decision**
One	CBLAGR	60.51885	7.937653	0.774478	0.0000	Reject H0
Two	DRBCB	57.19939	46.29034	1.235666	0.2325	Reject H0
Three	LRBCB	-76.69681	87.82992	-0.873242	0.3940	Accept H0
Four	NCBBRA	-1.258481	0.920972	-1.366472	0.1886	Accept H0

Source: extract from regression output

Hypothesis One: H0: Commercial banks loans and advances to agricultural sector had no positive effect on agricultural output in Nigeria. Given that CBLAGR had a coefficient of 60.51885, we

reject the null hypothesis and accept the alternate one. Thus, commercial bank loans and advances to agricultural sector had a positive effect on agricultural output in Nigeria for the period reviewed.

Hypothesis Two: H0: Deposits of rural branches of commercial banks had no positive effect on agricultural output in Nigeria. Given that DRBCB had a coefficient of 57.19939, we reject the null hypothesis and accept the alternate one. Thus, deposits of rural branches of commercial banks had positive effect on agricultural output in Nigeria for the period reviewed.

Hypothesis three: H0: Loans by rural branches of commercial banks had no positive effect on agricultural output in Nigeria. Given that LRBCB had a coefficient of -76.69681, we accept the null hypothesis. Thus, loans by rural branches of commercial banks had no positive effect on agricultural output in Nigeria for the period reviewed.

Hypothesis four: H0: Number of commercial banks branches in rural areas had no positive effect on agricultural output in Nigeria. Given that NCBBRA had a coefficient of -1.258481, we accept the null hypothesis. Thus, number of commercial banks branches in rural areas had no positive effect on agricultural output in Nigeria for the period reviewed. The R^2 value of 0.904431 and Adjusted R^2 value of 0.883193 indicated that the independent variables (CBLAGR, DRBCB, LRBCB and NCBBRA) explained 90% (88% in real terms) the changes in the dependent variable (AGOP) in Nigeria for the period reviewed. The probability (F-statistic) of 0.000000 showed that the model is statistically fit to explain significance of the relationships. The coefficients of CBLAGR and DRBCB were positive, but those for LRBCB and NCBBRA were negative.

Summary of Findings

1. There is a positive and significant effect of commercial banks loans and advances to agricultural sector on agricultural output in Nigeria for the period reviewed.
2. There is a positive but non-significant effect of deposits of rural branches of commercial banks on agricultural output in Nigeria for the period reviewed.
3. There is a negative and non-significant effect of loans by rural branches of commercial banks on agricultural output in Nigeria for the period reviewed.
4. There is negative and non-significant effect of number of commercial banks branches in rural areas on agricultural output in Nigeria for the period reviewed.
5. The result of joint test showed that the financial inclusion variables (CBLAGR, DRBCB, LRBCB and NCBBRA) are jointly significant in explaining changes in agricultural output in Nigeria for the period reviewed.

Conclusion

Agricultural sector remains key to achieving food sufficiency and food security in Nigeria. Hence, it should be given its priority place in the scheme of things through enhanced government funding, commercial banks presence and funding. Some financial inclusion variables have been shown by this research work to contribute to agricultural output in Nigeria. This is evidenced in the result of the analysis done, as the coefficient of CBLAGR and DRBCB had positive signs. Also, the joint test (Probability of F-statistic) had value of 0.0000, which showed that jointly the independent variables had effect on agricultural output. This joint test result is also in agreement with the various research works presented in the empirical literature. The genuine drive for the growth of the agricultural output should not be compromised in Nigeria.

Recommendations

1) Banks should keep up with their increasing loans and advances to the agricultural sector. This will help maintain its positive and significant effect on agricultural output in Nigeria.
2) Banks should improve on their deposit drive in rural areas using the various tiers of account with simplified account opening requirements. This will help them drive more deposit, hence helping their deposit that have positive effect to also achieve significant effect on agricultural output.
3) Bank loans and advances to the agricultural sector need to be beefed up. Also, they should ensure that such credits are used for the agricultural purposes that they are aimed at. This will help reverse the negative and insignificant effect of loans by rural branches of commercial banks on agricultural output in Nigeria.
4) Banks should not shy away from establishing branches in rural areas. It is imperative that more banks are needed to assist more farmers' access financial services. This will help reverse the negative and insignificant effect of number of commercial bank branches in rural areas on agricultural output in Nigeria.

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