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Analysing the Nexus between Financial Inclusion and Credit Risk of Deposit Money Banks in Nigeria

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Abstract
This paper provided an empirical analysis of the relationship between financial inclusion and credit risk of all the commercial banks in Nigeria between 2007- 2022. We represented financial inclusion with bank availability, bank accessibility and bank usage, and credit risk with non-performing loans. Our study also adopted three control variables: real GDP, inflation and unemployment rate while using autoregressive distributed lag model (ARDL) to conduct the investigation. To guard against spurious results and ensure credible and robust outcomes the authors engaged pre and post analytical checks such as stationarity, autocorrelation, heteroscedasticity, normality, Wald and CUSUM tests. We discovered that it was only formal account ownership (ACC) and unemployment rate that exerted positive and significant effect on the non-performing loans. Therefore we conclude that finical inclusion has not benefited the Nigeria banking industry in aspect of reduction of non-performing loans. The study recommends that much as more efforts should be directed towards enhanced digital financial literacy, upgrade of digital infrastructure, deployment of more automated teller machines, etc., the regulatory body and bank management should adopt strict and proactive supervisory measures to contain the undesirable fallouts of the initiative.

Keywords
Financial Inclusion, Commercial Banks, Credit Risk, Nigeria

INTRODUCTION

Credit risk management is a crucial aspect that determines the stability of commercial banks. The soundness and sustainability of banking institutions in turn are critical in promoting economic growth and eradicating poverty in developing nations such as Nigeria. Financial inclusion can result in favourable or unfavourable influences on financial stability. It engenders financial access and however also stimulates behavioral changes of customers in areas of savings and borrowing. Hence the attention of policy makers and scholars are increasingly attracted to its evolvement.

Financial inclusion means getting adults who are without bank accounts into opening and operating such facilities (Allen et al, 2016; Ozili, 2020). It occurs when the citizenry finds it easy and less cumbersome to becoming a bank customer for the purposes of saving, borrowing and participating in the financial system. It provides numerous positive benefits like sound financial standing, low unemployment and increased economic performance (see, Han and Melecky, 2013; García and José, 2016; Ozili, 2018b; Ozili, 2020a). In the microcosm, financial inclusion provides a platform for emancipation of the poor from poverty. This is achieved through providing the poor an access to savings instruments (Ouma et al, 2017), less stringent access to loan facility (Hendricks and Chidiac, 2011), facilitating small business startups (Ozili, 2018b) and cheap financial services (Ozili, 2018b). Further with financial inclusion banks can have the chances of spreading their credit to different categories of customers thereby reducing the risk of over concentration on few borrowers. Enhanced financial inclusion can lead to better credit assessment and risk management practices, reducing the likelihood of loan defaults. Hence, it has become the aspiration of several nations to expand their size of financial inclusion (Demirguc-Kunt et al, 2017, Ozili, 2020a; Markose et al, 2020).

On the other hand, financial inclusion may contribute to deterioration of banks' credit portfolio such as doubtful debts arising from customers' procurement of credit facilities from banking institutions. According to Allen et al (2016), one of the fallouts of financial inclusion is massive participation in financial intermediation which can easily result in customer's abuse of loan facilities. And this can lead to unwanted incidences of bad debts. Put differently, it means that financial inclusion can give rise to loan losses. In view of the above, Hannig and Jansen (2010) have rightly contended that substantial increase in financial inclusion will give rise to institutional risk though with marginal chances of going systemic. This position is also supported by García and José (2016) who however noted that such institutional risks are largely from various new products created by new financial institutions.

Commercial banks have severally faced challenges related to credit risk, which can have undesirable consequences on banks' stability and broader economic system. Of recent, the enormity of credit facility and the consequences of loan losses have created great worry to regulators and bankers. Research by Erhabor et al., (2020) highlight that non-performing loans (NPLs) remain a persistent challenge affecting the profitability and stability of banks. Also Naili and Lahrichi (2022) state that non-performing loans represent the main challenge that jeopardizes the steadiness of the banking industry. Therefore, it is vital that the regulatory authority and bank's management improve their capacity to understand the intricacy and the factors that affect lending activities for the safety of the financial sector. Financial inclusion becomes a subject of scrutiny here.

The foregoing is supported by theoretical literature which has suggested that there is a connection between financial inclusion and credit risk. Literature review reveals a complex association between inclusiveness and financial risk in Nigerian deposit money banks. While financial inclusion initiatives have expanded access to banking services, they also present challenges related to credit risk management. Achieving a balance between these two objectives is essential for promoting financial inclusion while safeguarding the stability of the banking sector. Empirically some investigations have been undertaken to determine the impact of financial inclusion on credit risk. For example, some authors found that financial inclusion can enhance credit risk through massive deposit mobilisation, large multitude of financial institutions and variety of market instruments (see Hannig and Jansen, 2010; Han and Melecky, 2013; García and José, 2016). However these relationships have not been sufficiently investigated, more especially in Nigeria. Further interrogation is therefore required to determine if financial inclusion can enhance or worsen non-performing loans. There is the need to robustly scrutinize the impact of financial inclusion on this critical indicator of bank stability (default risk).

Few and closely related works in this topic have been done by Ozili (2021), Ozili and Adamu (2021) Olusegun, Evbuomwan and Belonwu (2021) and and Moeti and Sin-Yu (2024). The first two is intercountry inquiry which investigated whether increased financial inclusion can precipitate a worsening credit condition. However they employed only three years for their investigation and this seems to be very narrow and insufficient for robust analysis. Similarly, the third authors did not only have very few number of years (5 years) as their sample period, their regressand is not non-performing loan but the Z-score which was computed with three financial indicators: equity/assets ratio, assets return and the standard deviation of assets return. For the last authors, though their sample period is fairly long, their dependent variable is broad and differ from our non-performing loans; they include bank Z-scores, etc. Therefore there is paucity of research in this topic under Nigeria context, particularly the one that has an extended period as research period. This is the literature gap we intend to cover. It is anticipated to add to banking literature especially in Nigeria as it covers a fairly long period of time (2007-2022) for the investigation. Also the varying results on the implications of financial inclusion on financial stability call for more research. Our work tests the significance of each constituent of the financial inclusion in enhancing or alleviating financial vulnerabilities in Nigeria.

We organized the remaining parts of our study as follows: literature review, research design, results and analysis, and conclusion.

REVIEW OF RELATED LITERATURE

Contextual Review

Financial exclusion is a significant issue in Nigeria, with most of the country's money circulating outside the formal banking system. Before recent initiatives to promote financial inclusion, Nigeria's economy primarily relied on cash transactions, with a large portion of the narrow money supply existing as currency outside the banking system. Nigeria has a population of 228.6 million people (United Nations, 2024) with age distribution made of about 50 percent adults (i.e. 114.3 million young and old adults) who are old enough to own bank accounts. However, only about 61.6 million Bank Verification Numbers (BVN) holders were recorded as at march, 2024 (NIBSS, 2024) representing just about 54 percent of the adults. BVN is more credible for determining account ownership as it shows unique identity for each individual account across the Nigerian banking industry. The low number has posed a serious challenge to the Nigerian apex bank, Central Bank of Nigeria, in conducting its core monetary mandates such as financial stability, price stability among others.

There were reoccurrence of bank crises arising from factors such as insufficient capital base and non-performing loans which have contributed to financial instability. For example, in 1997, the collapse of about 26 out of 64 banks in Nigeria significantly eroded public confidence in the banking sector. These incidences have continued to precipitate capital consolidation (especially 2004 consolidation programme) and frequent review of prudential guidelines so as to reduce such systemic crises. The need for effective and increased deposit mobilization was stressed. The government

adopted financial inclusion strategy to help strengthen the banking system for stability and profitability through massive mobilization of funds, access to credits, among others.

Conventional banks are encouraged to open a minimum number of branches in rural areas, while microfinance banks (formerly known as community banks) are required to offer basic transactions to rural low-income communities and impose ceilings on applicable charges. The banks were instructed to primarily serve local residents with simple and straightforward services; and to create a platform for mobilizing savings in rural areas through an extensive network of branches across all parts of society. The government also established the People's Bank to cater to low-income and rural dwellers, providing credit to small borrowers who could not meet the stringent requirements of conventional banks. Fintech banks are also encouraged and licensed in the country to lure the youths to participate in financial intermediation. In fact, the government launched Nigerian Financial Inclusion Strategy as an official programme aimed at promoting and simplifying access to financial products, particularly among rural and underserved populations.

Significant strides have been made with these initiatives; financial inclusion in Nigeria has undeniably achieved significant milestones, steadily bringing more people into the banking sector. Since the 1990s, the average ratio of currency outside the banking sector (COBs) to narrow money supply (M1) has consistently decreased. Mobile banking and agent banking have expanded the reach of commercial banks and improved their deposit base. For instance, OPAY, a Nigerian fintech enterprise, offers a mobile payments and financial services platform, boasting a user base of more than 21 million individuals. Although there has been progress, it's important to recognize that overall exclusion rates still remain high, largely due to the obstacles posed by low financial literacy and poverty.

Empirical Literature

Moeti and Sin-Yu (2024) analyzed the impact of including more people in the financial system on banks' stability across the 37 Sub-Saharan African countries with data spanning from 2005 to 2019. Using dynamic panel equation, they discovered that financial inclusion enhances financial stability, specifically in countries with low income. They employed three distinct proxies to represent financial stability: these are the percentages of bank deposits to bank credit, the bank Z-scores, and the ratio of liquid assets to short-term funding. Yunus et al (2023) scrutinized the influence of financial inclusion on the performance metrics of Nigerian banks and investigated how banking performance correlates with variables such as ATMs, branch networks, the quantity of bank accounts, and the deployment of sales terminals. Utilizing data encompassing all commercial banks in Nigeria from 2013 to 2018, the study employed the Least Squares approach for analysis. The findings revealed a statistically significant positive impact of ATMs, banking branch distribution, and sales terminals on banks' return on assets (ROA). The study concluded that financial inclusion initiatives significantly enhance both customer satisfaction and bank profitability.

Abdulrazaq, Adeola and John (2022) empirically examined the impact of financial inclusion tools on the performance of Nigerian banks. A fixed-effect regression model was carried out. The results showed that Automated Teller Machines (ATMs), bank branches, and point-of-sale (POS) terminals had a positive and statistically significant impact on bank performance at both the 1% and 5% significance levels. However, the results regarding the number of bank accounts were found to be non-significant. The study suggested that enhancing the quality of financial services will attract more customers to banks, thus enhancing their performance. Consequently, it is recommended that additional ATMs, POS terminals, and bank branches be established to facilitate better inclusive finance. Jungo, Madaleno and Botelho (2022), in their analysis of the impact of financial inclusion and competitiveness on banks' financial stability, adopted Feasible Generalized Least Squares model and revealed that financial inclusion reduced credit risk and increased bank stability.

Ozili and Adamu (2021) conducted an investigation to determine whether countries with elevated levels of financial inclusion exhibit reduced instances of nonperforming loans and lower allocations for loan loss provisions in their banking sectors. Their analysis employed a fixed effect panel regression technique to explore the impact of financial inclusion on nonperforming loans and loan loss provisions in a sample of 48 countries. The sample period included only three years: 2011, 2014, and 2017. Their results indicated that an increase in formal account ownership is associated with higher levels of nonperforming loans. However, they also discovered that there was a reduction in bank loan losses provisions in nations where robust accounts, ample banks' branch availability, with a widespread network financial inclusion is achieved. Ozili (2021) also investigated whether heightened degrees of financial inclusion correlate with improved economic risk. Data drawn from 79 countries which equally covered for only three years were analyzed with Ordinary least square (OLS) regression method. The results indicated that bloated account ownership is linked to high financial risk, exhibited through higher rates regarding nonperforming loans and significant cost inefficiency within the financial sectors of advanced and transitioning economies

Olusegun, Evbuomwan and Belonwu (2021) empirically examined the linkage between financial inclusion and financial stability in Nigeria, using panel data from the first quarter of 2014 to the fourth quarter of 2018. A financial inclusion index was developed to capture aspects of penetration, availability, and usage. The study's findings revealed a positive relationship between financial inclusion and financial stability, suggesting that higher levels of financial inclusion could enhance financial stability. Regarding specific dimensions, both penetration and availability showed a positive correlation with financial stability, while usage demonstrated a negative correlation. Ozili (2019) investigated the impact of financial development on non-performing loans using panel data from 134 countries covering the period 2003 to 2014. The study revealed that two proxies for financial development, foreign bank presence and financial intermediation, are

positively associated with non-performing loans. Also Ahamed and Mallick (2019) examined the relationship between financial inclusion and bank stability. The authors undertook a cross-country study of 2,635 banks in 86 countries from 2004 to 2012 and discovered that great levels of financial inclusion led to greater bank stability. According to them this is particularly evident with banks that have higher share of customer deposits and the ones that bear lower marginal costs of providing banking services as well as those that operate in countries with high quality governance.

Musau, Muathe and Mwangi (2018a) conducted an empirical examination of the interplay between financial inclusion and credit risk and the mediation effect of bank competitiveness of commercial banks in Kenya. Financial inclusion was proxied by bank availability, bank accessibility and bank usage whereas credit risk was represented by the non-performing loans ratio for the period 2007 to 2015. The findings indicated that bank availability and bank usage showed a negative significant effect on credit risk. While bank accessibility indicated a positive significant effect on credit risk. Bank competitiveness was found to partially mediate the relationship between financial inclusion and credit risk. Again Musau, Muathe and Mwangi (2018b) similarly employed panel multiple regression to ascertain the effect of financial inclusion on credit risk as well as the moderation effect of GDP on commercial banks in Kenya from 2007 to 2015. Financial inclusion was measured by availability, accessibility and usage while bank credit risk (the dependent variable) was represented by non-performing loans ratio. Bank availability and bank usage showed a negative significant effect on credit risk. Whereas bank accessibility indicated a positive significant effect on credit risk. GDP growth rate was found to significantly moderate the relationship between financial inclusion and credit risk.

Chen et al (2018) examined whether the promotion of financial inclusion affects the non-performing loans of commercial banks in China. They analyzed data from 31 provinces from 2005 to 2016 with fixed effect model. The results revealed a negative impact of financial inclusion on non- performing loans. Park and Mercado (2015) found that financial inclusion reduces poverty and decreases income inequality. Additionally, a strong rule of law and robust financial regulatory oversight enhance the level of financial inclusion.

RESEARCH DESIGN

Data

The data used in this study was extracted from the global financial development indicators and the world development indicators available in the World Bank database. The sample period covers seventeen years: 2007 -2022. The study variables for financial inclusion and financial stability were informed by the review of relevant literature and data availability and the need to extend the works of Ozili and Adamu (2021), Ozili (2021), and Olusegun, Evbuomwan and Belonwu (2021 who rather used constricted frame of time to conduct their investigations. The indicators of financial inclusion are bank availability, bank accessibility and bank usage which serve as independent variables whereas non-performing loans which is a proxy of credit risk is the dependent variable. This study contributes to the banking literature. It determines whether financial inclusion is a determinant of bank stability.

The Model

This work used Augmented Dicky Fuller (ADF) and Phillips Perron (PP) processes to find out the stationarity of the data sets. ADF is a modified version of Dicky Fuller (1979) model for investigating for unit root characteristics. PP test is related to ADF, but with an inbuilt processes to rectify the DF procedure.

ADF specification: $\Delta y_t = \psi y_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta y_{t-i} + \xi_t$ (1)

The econometric model used to estimate the effect of financial inclusion on non-performing loans is specified below. The model is estimated using autoregressive distributed lag technique.

$$NPL = \alpha_0 + \alpha_1 ACC + \alpha_2 ATM + \alpha_3 BR + \alpha_4 RGDP + \alpha_5 INF + \alpha_6 UMR \quad \xi_t \qquad (2)$$

where α is the constant term, ACC is the number of adults that own an account at a formal financial institution (% age 15+). ATM is the number of automated teller machines per 100,000 adults. BR is the number of bank branches per 100,000 adults. NPL is the bank non-performing loans to gross loans ratio (%). GDP is real GDP growth rate, INF represents inflation rate, and UMR denotes unemployment rate while ξ_t = a white noise phenomenon for capturing the effects of other exogenous factors on bank non-performing loans.

The autoregressive distributed lag model (ARDL) framework formulated by Peseran, Shin and Smith (2001) for the estimation is specified as:

$$\mathcal{Y}_t = \alpha + \sum_{i=1}^{p} \Upsilon_j \mathcal{Y}_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q} X_{j,\ t-i}\ '\beta_{j,\ i} + \xi_t \qquad (3)$$

where $\mathcal{Y}_t$ is a vector; $\mathbf{X}_t$ is regressor which can be I(1) or I(0); **β** and Υ are parameters; α is the intercept; k, p, q are optimal lag orders, ξ_t is a vector of the residual.

Substituting our variables in ARDL we derive a model for both short term and speed of adjustments estimates.

$$\Delta NPL_t = \alpha_{01} + \sum_{i=1}^{p} \alpha_{1i} \Delta NPL_{t-i} + \sum_{i=1}^{q} \alpha_{2i} \Delta ACC_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta ATM_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \Delta BR_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \Delta INF_{t-I+} \sum_{i=1}^{q} \alpha_{6i} \Delta UMR_{t-I} + \lambda ECT_{t-}\, i + \xi_t \qquad (4)$$

The parameter λ measures the speed of restoration to equilibrium

Justification of Variables

The literature show that non-performing loan is a major non- discretionary determinant of loan loss provisions in the banking sector (see Ozili and Outa, 2017; Caporale et al, 2018; Danisman et al, 2021). The NPL ratio is commonly used to measure risk in the banking sector (see Louzis et al, 2012; Ozili, 2019). A high NPL ratio will reduce the profitability of the banking sector, make the banking sector become unstable and transmit instability to the financial system (Louzis et al, 2012; Ozili, 2019). The GDP variable used in the study is real GDP growth rate. In times of economic prosperity, non-performing loan is fewer in the banking sector because debtors can easily repay their debt as their incomes increase and business profit increase. This leads to fewer non-performing loans. In recessionary times, non-performing loan is higher in the banking sector due to tight financial conditions that make it difficult for debtors to repay their debt owed to banks. This leads to higher non-performing loans (see, Peterson and Arun, 2018; Ozili and Outa, 2017). Therefore, a negative relationship between GDP and NPL is expected.

The ACC, BR and ATM variables are the financial inclusion indicators used in this study. Formal account ownership (ACC), bank branches per 100,000 adults (BR) and ATMs per 100,000 adults (ATM) are widely used as indicators of financial inclusion in the financial inclusion literature (see, Naumenkova et al, 2019; Raza et al, 2019; Ozili, 2020; Neaime and Gaysset, 2018; Ozili, 2018; Emara and El Said, 2021, Kumar et al, 2021; and Ozili, 2021b). The control variables include, the unemployment rate, GDP growth rate and inflation rate.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 Descriptive Statistics

	ACC	ATM	BR	NPL	RGDPG	INF	UMR
Mean	36.01	13.87	5.28	9.69	3.72	12.76	4.29
Median	33.95	16.14	5.09	6.00	3.90	11.95	3.85
Std. dev	5.75	3.72	0.85	8.78	2.88	4.05	0.68
Skewness	0.36	-1.10	0.24	2.13	-0.56	0.43	0.73
kurtosis	1.84	3.44	1.50	7.17	2.40	2.47	1.87
JB Stat	1.24	3.37	1.65	23.74	1.089	0.68	2.27
JB Prob	0.53	0.18	0.43	0.00	0.58	0.70	0.32

Source: Author's Eviews computation

In the descriptive statistics in Table 1, the values of mean and median of all the variables are nearly the same and thus display marginal dispersion. On kurtosis, (ATM and NPL) are leptokurtic showing peaked distribution. Further, greater number of the variables have skewed distribution; all the variables except NPL values are larger than 0.05 and show normality. Nonetheless, this may not affect the validity of the results (Brooks, 2008)

Table 2 ADF and PP Test

Variables	ADF (Trend and Intercept)			PP (Trend and Intercept)		
	ADF Stat	Critical Value (0.05)	Order of integration	PP Stat	Critical Value (0.05)	Order of integration
LNACC	-4.5422	-3.0988	I(1)	7.1059	-3.0988	I(1)
LNATM	-5.8502	-3.0810	I(0)	-6.0721	-3.0810	I(0)
LNBR	-4.2926	-3.0988	I(1)	-6.3014	-3.0988	I(1)
INF	-4.5422	-3.0988	I(1)	-5.0277	-3.0988	I(1)
NPL	-4.1430	-3.0988	I(1)	-6.2487	-3.0988	I(1)
RGDP	-6.9060	-3.5262	I(1)	-4.4429	-3.0988	I(1)
UMR	-3.9357	-3.1448	I(0)	-4.4998	-3.5236	I(1)

Source: Extracted from Eviews

The results from the Augmented Dickey Fuller (ADF) disclose that all the variables excluding LNATM and UMR are stationary at order 1. Then with Philip Perron results, LNATM is stationary at levels while the other variables become stationary at order 1. Therefore with this mixture of I(1) and I(0) variables, ARDL model becomes suitable for the regression analysis.

Table 3 ARDL Estimates, Error Correction and Diagnostic Results

Short run results		
Variable	**Coefficient**	**Prob.**
NPL(-1)	0.1762	0.4
LNACC(-1)	1.2323	0.02
LNATM(-1)	-6.1181	0.31
LNBR(-1)	0.9169	0.49
RGDP(-1)	-17.9318	0.20
INF	1.9273	0.17
UMR	0.05	0.04
Error Correction Model		
ECM(-1)	-0.6027	0.02

Goodness of Fit		
R2	0.91	
F-statistic	4.94	0.00
Validity tests		
D-W stat	2.0856	
B-G LM F-stat	0.7832	0.38
Het- BPG	0.9624	0.58
JB- Normality	0.3217	0.85
Ramsey F-stat	0.1714	0.67
Ramsey T-stat	0.4254	0.67
Wald F-stat	4.2872	0.00

Source: Eviews

Only Account ownership (ACC) has positive and significant effect on the non-performing loans. Formal account ownership contributed to an increase in NPL by 1,2%. It means that an increase in ownership of account worsens the situation of credit risks. Also bank branches showed positive but insignificant influence on non-performing loans by 0.9%. Conversely, ATM has a negative and insignificant probability of 0.61 with positive coefficient of 0.6% on the credit risk. Further, the control variables of RGDP and inflation indicate non-significant impact on the non-performing loans. Whereas unemployment rate contributes to deterioration of bank stability with its significant (0.04) and positive parameter of 0.1%.

Further, the R^2 of 91 percent is high indicating that the model is good. Similarly, the F-stat with probability of 0.000 shows that, altogether, the regression is significant and can be used for valid analysis. For autocorrelation, we did not totally base our decision on the result from the Durbin Watson Test (DW) whose statistic value of 2.1 is suggestive of autocorrelation (as a general rule when DW is greater than 2, it is a signal of the presence of autocorrelation). Therefore, we went farther to employ Breusch-Godfrey (BG) serial correlation (a higher order test) to cross check the finding and discovered that the suspected autocorrelation is not credible. In other words, the BG p-values of 0.3829 **(**F- stat**)** and 0.2996 (Chi-squared stat) showed a convincing evidence of no autocorrelation. Breusch Pagan and Godfrey (BPG) check for non-constant variances shows an absence of heteroscedasticity. This is indicated with its p-value of 0.58 which is greater than 5% significance level. The Wald test disclosed that there is no redudant variables among the regressors. With p-value of 0.000, it means the predictor variables in the regression are individually and separately adding values to the model.

Furthermore, there is no error of specification. The p-values of T and F statistics of 0.67 (see table 3) as well as the both Cumulative Sum of Recursive Residuals (CUSUM) and Squared Cumulative Sum of Recursive Residuals bear a confirmation. The blue lines lie between the upper and lower bounds of each of the two graphs showing stability of the model (see figures 1 and 2). In addition, the result discloses that the residual series of the time series is normally distributed. This is shown in the Jerque Bera p-value of 0.85 (see Fig. 3).

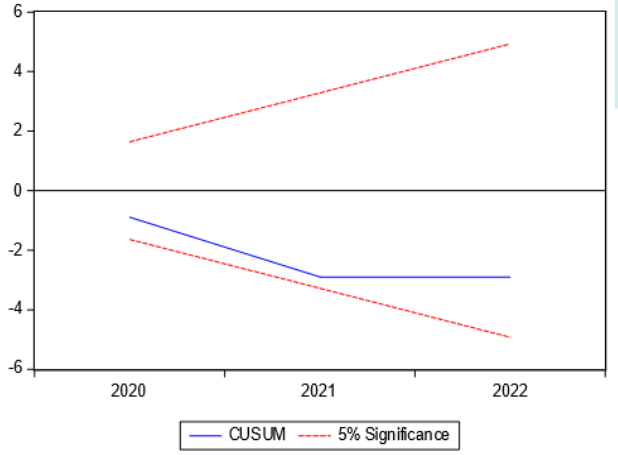

Fig. 1

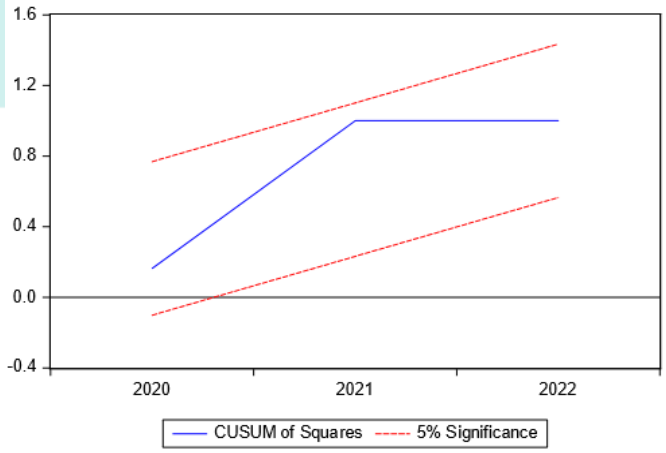

Fig. 2

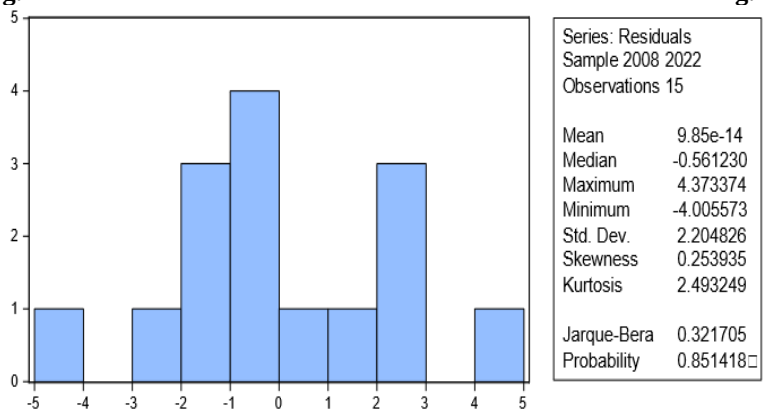

Fig. 3 Histogram

CONCLUSION

This paper examined the impact of financial inclusion on bank credit risk using non-performing loans. We employed autoregressive distribute lag model on annual time series ranging from 2007 to 2022. Our findings indicate that increased ownership of formal account is connected with rising non- performing loans in Nigeria. This may be the consequence of fragile supervision and weak credit risk management of banks which are participating in the financial intermediation process. We suggest that this great opportunities of easy access to credit facilities opened through financial inclusion should be properly monitored. The regulatory body should strengthen supervisory mandates to forestall lax lending practices. Bank availability, BR, also exhibit positive association with doubtful loans though it appears to be non-significant. Contrary ATM has negative and insignificant relationship. This implies that bank usage has the capacity to reduce credit risk but however lacks the significant capacity. We recommend that there should be more deployment of ATM machines more especially in the rural areas to be able to contribute to reduction of bad loans. The control variable, the unemployment rate, also aggravates non-performing loan problem in the country.

To move forward, more and intensified efforts should be activated to enhance digital financial literacy, upgrade digital infrastructure, putting up more automated teller machines, working on micro finance banks to operate largely in the rural areas where the bulk of our population resides. This will help the make the bank availability and usage to exert contributory effects on NPLs.

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