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Impact of Unserviced Loans on Microfinance Banks' Performance in Nigeria: A Granger Causality Approach

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Abstract:
Unserviced loan is a major credit risk facing microfinance banks due to their primary role in lending activities. The risk is often associated with more provisions for loan-loss in order to mitigateitsimpact. This study examined the impact of these credit risk variables (unserviced loans and loan-loss provisions) onthe financial performanceof microfinance banks in Nigeria, using the Granger causality approach. Secondary data covering the periods 2012 to 2018, from six purposively selected microfinance banks, was used forthe hypothesized variables in a Vector Autoregressive (VAR) Model.The unit root test was conducted on the data using the Augmented-Dickey Fuller and Phillip-Perron unit roottest, with the aid of the E-VIEW9 statistical software. The resultsrevealed that the variablesare stationary which makes them suitable for the VAR model. Furthermore, the Granger causality analysis was carried out and the results established a causal nexus between the credit risk variables and financial performance to include; a unidirectional causalityflow from non- performing loans to loan-loss provisions and from loan-loss provisions to returns on assets. The study concluded that unserviced loan influences financial performanceamong microfinance banks in Nigeria. Therefore, it was recommended that microfinance banks should regularly and strategically monitor their loan portfolios through the establishment of credit limits at the level of individual borrowers, counterparties or group of counterparties, subject to their own unique credit policies and level of risk tolerance. In addition, policy makers in the banking sector should ensure sound macroeconomic policies, such as inflation and interest rates, which will enhance growth in the microfinance sub-sector.

Keywords: Unserviced loan; Loan-loss provision;Returns on assets; Granger Causality.

I. Introduction

Unserviced loan is among the oldest form of credit risk facing the banking industry. It is often referred to as the risk of default arising from the failure of borrowers to meet their obligations in terms ofloan-repayments. Banks generally function as financial intermediaries between the surplus and deficit units of an economy. According to Kaliu and Kiawa (2015), financial intermediation is very essential in aneconomy and banks are always expected to play crucial role in economic growth, through the provision of loan facilities to Small and Medium-Scale Enterprises (SMEs). However, Broll*et al.* (2002) assert that credit risk is the most significant risk facing banks in their role as financial intermediaries.

The impact of credit risk on the performance of banks has been identified by many researchers (Salas &Saurina, 2002; Aremu, Suberu&Oke, 2010; Boahene, Dasah&Agyei, 2012; Ameur&Mhiri, 2013). These researchers are of the opinion that credit risk influences the profitability of a bank, if not properly managed. In the Nigerian context, Ayodele and Alabi (2014) assert that credit risk is a major risk affecting banking operations in the country. This assertion has been further buttressed by empirical findings on commercial banks in the country, where scholars have shown that credit risk influences financial performance in the Nigerian banking industry (Kargi, 2011; Kolapo, Ayeni&Oke, 2012; Kayode, Obamuyi, Owoputi&Adeyefa, 2015; Taiwo, Ucheaga, Achugamonu, Okoye&Agwu, 2017).

Microfinance Banks (MFBs) give loan facilities in form of micro-credits to people who lack access to such from commercial banks and they are known as major player in economic growth and development (Otieno, Nyagol&Onditi, 2016). This lending activity is often associated with credit risk. For instance, the Central Bank of Nigeria (CBN) has identified credit risk as a major challenge facing the microfinance banking

sub-sector, which has limited lending activities to individuals and enterprises in the country (CBN, 2017).In particular, the apex bank has reported that many of the MFBs have high volume of unserviced loans, which have in turn increased their provisions for loan-loss (CBN, 2018). Situations where MFBs do not have sufficient funds for business usually limit access to loans by customers.

Majority of the MFBs in Nigeria are owned by private individuals and profit making is a core component of their business (CBN, 2019). Several factors may influence the profitability of a bank but studies have shown that unserviced loans and loan-loss provisions (indicators of credit risk) influence profitability among MFBs (Felix & Claudine, 2008; Crabb & Keller, 2011; Boahene*et al*, 2012; Ameur&Mhiri, 2013; Afolabi, Obamuyi&Egbetunde, 2020).In addition,there havebeen limited studies on the causal relationship between these credit risk variables and financial performance among microfinance banks insome countries (Almekhlafi, Almekhlafi, Kargbo&Hu, 2016). However, to the best of our knowledge, thereremains a scarcity of suchempirical relationship among microfinance banks in Nigeria. The closest research on this was carried out by Onaolapo (2015) on commercial banks in Nigeria.In the light of this, our paperis guided by the following research question: What is the causal nexus between credit risk variables (unserviced loan and loan-loss provision) and financial performance (returns on assets) of MFBs in Nigeria?

The study is aimed at establishing the direction of causal relationship between credit risk variables (unserviced loan and loan-loss provision) and financial performanceof MFBsin Nigeria. In order to achieve this objective, the following hypothesis will be tested; there is no causality flow between credit risk and financial performance of MFBs in Nigeria. Findings from this paper will contribute to the ongoing debate on the nexus between credit risk and financial performance and also increase the frontier of knowledge in research on the study variables.

The rest of the paper is arranged thus; section two provides the literature review; section three reveals the methodology, section four consists of the data analysis and results, while the final section presents the conclusion and policy recommendations.

II. Literature Review

Risk, in financial terms can be defined as a situation where expected return on an investment differs from the actual return (Aishatti, 2015). Banks generally operates in a dynamic environment, with constant exposure to risks such as market risk, credit risk, liquidity risk, foreign exchange risk and others. Al-Thamimi and Al Mazrooei (2007) asserts that banking operations require trade-off between risks and returns, particularly in credit portfolio. Credit hasbeen defined as financial resources (loans, overdrafts, facilities, advances, leases and others) made available by a financial institution to its customers, with the intention of repayment at a future date (Kayode*et al.*,2015).These concepts on risk and credit describe credit risk as a financial situation arising from failure to repay these financial resources at the specified future data.

Kayode *et al.*, (2015) assert that credit risk usually comes from banks' financial dealings with individuals, corporate organizations and other banks. It is usually connected with credit lending activities and the ability of borrowers to return a loan. The Basel committee on banking supervision (1999) submit that loan activities are the major and obvious source of credit risk. A high volume of unserviced loans in a bank is therefore an indicator of the presence of credit risk. Onyiriuba (2004) provides some empirical evidence on how poor stock returns emanating from underperforming Nigerian bank credit portfolio fueled negative volatilities in foreign exchange, substantial reduction in the aggregate value of capital market and contagions in other sectors of the Nigerian economy. One sector in the banking industry whose primary function revolves around credit risk is the microfinance banking sub-sector.

Munene and Guyo (2013) define micro-financing as the process of supplying loans and small credits to finance small projects. It is the provision of credit to the poor and low-income earners to enable them engage in productive activities (Udeaja&Ibe, 2006).TheCentral Bank of Nigeria (CBN) refers to financial institutions that engage primarily in micro-financing as microfinance institutions, which can either be banks or non-banks (CBN, 2017). Recent reports from the apex bank suggest that microfinance banks focus solely on providing financial services to rural and poor micro-enterprises and households in the country (CBN, 2019).

Scholars have used different theories to show the nexus between credit risk and the performance of microfinance banks, as it relates to their profitability or loan portfolios. Some of these theories include the firm characteristic theories (Christoper&Ydriss, 2008), the credit market theory (Stiglitz & Weiss, 1981;

Kangogo&Olweny, 2015) and the commercial loan theory (Hosna&Manzura, 2009). Furthermore, studies on microfinance banks have alsorevealed credit risk as a major risk factor influencing financial performance among microfinance banks.

Athanasoglou, Brissimis and Delis(2005) studied the impact of credit risk on the financial performance ofbanks in Greek, using a dynamic panel model. The authors discovered an inverse but significant relationship between credit risk and financial performance. This nexus has been corroborated by other empirical findings in Costa Rica (Epure&Lafuente, 2012), in Yemen (Almekhlafi e*t al.*, 2016), in Tunisia (Ameur&Mhiri, 2013), inGhana (Boahene, Dash &Agyei, 2012) and in Nigeria (Kargi, 2011; Kolapo, Ayeni&Oke, 2012;Kayode*et al.*, 2015; Afolabi *et al.*, 2020). However, these findings disagree with that of Kithiniji (2010) in Kenya, where it was established that credit risk has no impact on the financial performance of banks.

Few researchers have taken a step further to establish the direction of causal relationship between credit risk and financial performance of banks. Almekhlafi et al.,(2016) investigated the determinants of credit risk and its impact on the financial performance of banks in Yemen, for the periods 1998 to 2013 and established the presence of causal relationship between credit risk and bank's performance. Similarly, Tan, Mpeqa, Mensah, Ding and Musah (2019) examined the nexus of credit risk management and banks performance in China, using panel data covering the periods 2006 to 2017. The authors discovered a variety of causal relationships between the indicators of credit risk and bank's performance to include: a unidirectional causality flow from non- performing loan to returns on asset and a bi-directional causality from total loans and advances to returns on asset. In Nigeria, Onaolapo (2015) conducted a study on the analysis of credit risk in the banking sector, covering the periods 2004 to 2009. Using pair-wise Granger causality test, the author established that there is no causality flow between credit risk and financial performance among commercial banks in the country. However, such causal nexus between the study variables is yet to be established among microfinance banks in Nigeria and this paper is aimed at filling the gap.

III. Methodology

The study area of this paperincluded Microfinance Banks (MFBs) in Nigeria and the reports from the Central Bank has listed eight (8) of these banks as the major players in the sub-sector, with branches across the country and a minimum operating capital base of ₦5 billion naira (CBN, 2019).Six of these banks were purposively selected for this study and their audited financial reports, covering the periods 2012 to 2018 were used as secondary data for the hypothesized variables.

Scholars have developed and used different empirical models to specify the relationship between credit risk and bank's financial performance, using return on assets as proxy for financial performance and non-performing loans, loan-loss provisions, total loans and advances as proxies for credit risk (Kolapo*et al.*, 2012; Kayode *et al.*, 2015; Otieno *et al.*, 2016). In our earlier study (Afolabi *et al.*, 2020), we have adapted these models to justify such relationship among MFBs in Nigeria. Therefore, in order to establish the direction of causality between credit risk and financial performance among these banks in Nigeria, the Vector Autoregressive (VAR) model was used and it is specified as:

ROA = f(NPL, LLP, TLA) (1)

Where;ROA = Return on Asset (ratio of banks profit before tax to their total assets)
NPL = Unserviced Loan (ratio of unserviced loans to total loans and advances) LLP =
Loan-Loss Provision (ratio of loan-loss provisions to total loans and advances) TLA =
Total Loans and Advances (ratio of total loans and advances to total assets)

The TLA is not a main variable in the model but was introduced as a control variable since it has been established to also influence bank's financial performance(Kayode *et al.*, 2015).

The secondary data obtained from the financial reports of the six selected microfinance banks were subjected to econometric analysis, using the E-VIEW9 statistical software. Descriptive statistics, such as the mean, median, standard deviation, skewness and kurtosis were computed for thedata representing the explanatory variables. A unit root test was further carried out on the variables using theAugmented Dickey- Fuller and Phillip-Perronunit root test. The Granger causality test was finally used to establish the direction of causality between the credit riskindicators (unserviced loans, loan-loss provision & total loans and advances) and financial performance (proxy by returns on assets).

IV. Results And Discussion

4.1 Descriptive Analysis

Table 1 shows the descriptive statistics of the components of the core variables in the specifiedmodel. These statistics include the mean, minimum & maximum, standard deviation, skewness, kurtosis and the probability values. The summary of the results revealed that the sampled microfinance banks enjoyed a relatively low credit risk, on the average, during the study periods (NPL - 5.39%, & LLP - 5.12%), although the rate of credit approvals was quite high (TLA - 73.06%). In addition, there was a low usage of assets to generate profits among these banks as revealed by the average returns on their assets (ROA- 8.6%).

Table 1: Descriptive Statistics of Variables

Statistics	LLP	NPL	ROA	TLA
Mean	0.051192	0.053966	0.086282	0.730604
Maximum	0.252136	0.124632	0.180180	0.880047
Minimum	0.003602	0.011000	0.001094	0.564724
Std. Dev.	0.051769	0.026491	0.050827	0.092480
Skewness	2.170142	0.475548	0.163570	-0.2531
Kurtosis	7.954758	2.665977	1.902265	1.843895
Probability	0.000000	0.411011	0.317259	0.248151

Source: Authors' Computation from E-VIEW9 (2025)

Furtherresults from Table 1 reveals that the distributions of the variables are non-symmetric, which include positively skewed distributions for NPL, LLP and ROA, with a negatively skewed distribution for TLA. Lastly, the shape of the distribution of NPL, ROA and TLA are platykurtic (kurtosis < 3), while that of LLP is leptokurtic (kurtosis > 3). These suggest that none of the variables has a normal distribution.

The trend lines of the average values of the core variables are further presented in Figure 1. The trend lines portray the variations among these average values within the period of study. For example, the average value of returns on assets declined from 11.2 percent in 2012 to a lowest average value of 7.1 percent in 2015. It however moved up to 8.5 percent in 2017, before closing at 10.7 percent in 2018. This implies fluctuation in average profitability among the selected microfinance bank, during the study periods. The lowest average returns on assets witnessed in year 2015 could be attributed to the response of the country's' economic indicators to the change of government in that year. The movements across the years show a weak usage of assets to generate profits among the selected banks.

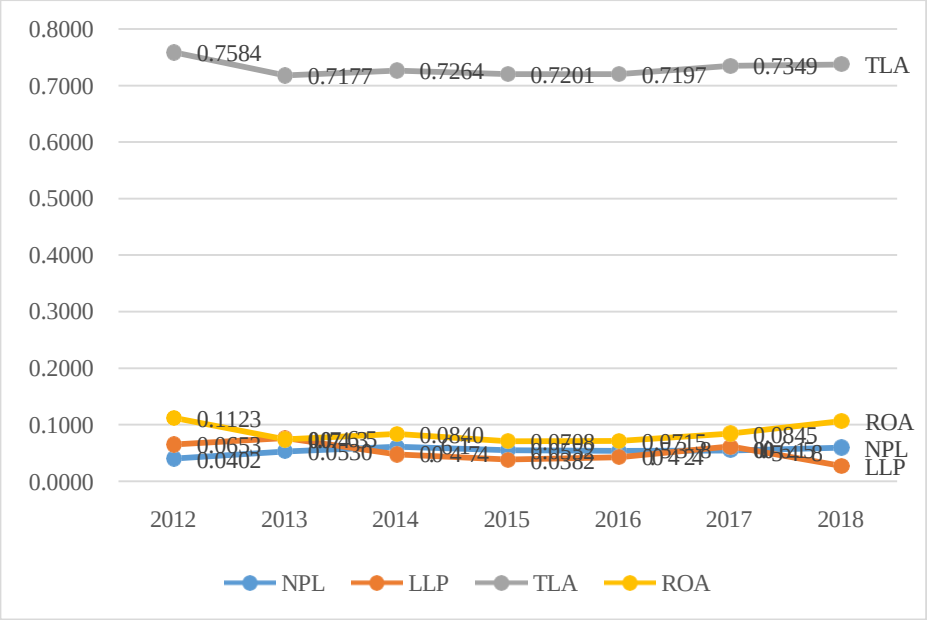

Fig. 1: Trend lines showing the relationship among core variables (NPL, LLP, TLA & ROA) Source: Authors' computation (2025).

Figure 1 also reveals that the average loan-loss provisions ratio increased from 6.5 percent in 2012 to

7.7 percent in 2013 before declining to 3.8 percent in 2015. Although it went up to 6.2 percent in 2017, it however still ended at 2.7 percent in 2018. These movements show that the selected microfinance banks

were only able to make the highest average provisions for loan loss in 2013, with the lowest in 2018. Usually, provisions for loan loss do not increase in situations where there are low rates of loan defaults. Furthermore, the trend lines show that the average unserviced loan ratio increased from 4 percent in 2012 to 6.1 percent in 2014 and thereafter came down to 5.4 percent in 2016, before closing at 6percent in 2018. The movements indicate that variations in average unserviced loans was relatively stable during the study period. This can also be said of the average total loans and advances ratio which ranged between 75.8 percent in 2012 (highest value) and 73.7 percent in 2018, with the lowest value of 71.7 percent coming up in 2013.

4.2 Unit Root Test

The Augmented Dickey-Fuller (ADF) and Phillip-Perron Fisher unit root tests were carried out on the variables.The tests assume individual unit root process and their probabilities are computed using an asymptotic chi-square distribution. The tests also have a null hypothesis which states that that there is unit root and the results are presented in Table 2.

Table 2: Summary of the Unit Root Test

Variables	Methods	Statistics	p-value	Order
ROA	ADF-Fisher	47.3596	0.0000	I(0)
	PP-Fisher	40.0249	0.0001	I(0)
NPL	ADF-Fisher	25.8498	0.0113	I(0)
	PP-Fisher	33.1109	0.0009	I(0)
	PP-Fisher	41.1121	0.0000	I(0)
TLA	ADF-Fisher	28.6929	0.0044	I(0)
	PP-Fisher	23.1885	0.0262	I(0)

Source: Author's Computation from E-VIEW9 (2025)

The ADF-Fisher test results in Table 1 show that the t-statisticsof all the variables (ROA, NPL, LLP & TLA) are statistically significant at the 5% significance level (i.e. $p < 0.05$). The null hypothesis is therefore rejected and we can concludethat the variables are stationary at their level form. Similarly, the PP-Fisher test results also show that the t-statistics of the variablesare statistically significant at the 5% level (i.e. $p < 0.05$). In this instance, the null hypothesis is also rejected and it is concluded that the variables are stationary at their level form. The summary of both the ADF-Fisher and PP-Fisher tests confirms that all the hypothesized variables in the model are stationary at their level form.This implies that the values of the variables have constant variability (do not change over time) and are thus suitable for our analysis.

4.3 Granger Causality

The pairwise Granger causality test was used to establish the direction of causality between credit risk (unserviced loan, loan-loss provisions and total loans and advances) and financial performance (returns on assets). Table 3 gives a summary of thelag selection criteria. The symbol (*) indicates the lag order selected by VAR at the 5%level for all the criteria.

Table 3: Summary of the VAR Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	216.2882	NA	8.39e-12	-14.15255	-13.96572	-14.09278
1	259.6212	72.22163*	1.37e-12*	-15.97475*	-15.04062*	-15.67591*
2	271.8987	17.18856	1.88e-12	-15.72658	-14.04515	-15.18868

Source: Authors' Computation from E-VIEW9 (2020)

Table 4: Summary of the Pairwise Granger Causality Test

Null Hypothesis	Observations	F-Statistic	p-value
NPL does not Granger Cause ROA	30	0.38005	0.6877
ROA does not Granger Cause NPL		1.23936	0.3068
LLP does not Granger Cause ROA	30	3.52153	0.0449

ROA does not Granger Cause LLP		2.29270	0.1218
TLA does not Granger Cause ROA ROA does not Granger Cause TLA	30	1.08522 0.02858	0.3532 0.9719
LLP does not Granger Cause NPL NPL does not Granger Cause LLP	30	0.56358 4.74275	0.5462 0.0179
TLA does not Granger Cause NPL NPL does not Granger Cause TLA	30	0.75943 0.22549	0.4784 0.7997
TLA does not Granger Cause LLP LLP does not Granger Cause TLA	30	1.35473 2.85608	0.2763 0.0764

Source: Authors' Computation from E-VIEW9 (2020)

With a VAR lag order selection of order 1, Table 4 gives a summary of the pairwise causality test. The results indicated that only two F-statistics are statistically significant at the 5% level. The F-statistics (F=3.522) representing the pairwise causality impact between loan-loss provisions (LLP) and returns on asset (ROA) is significant with a p-value of 0.0449. Therefore, the null hypothesis is rejected and we conclude that 'LLP Granger-cause ROA'. Similarly, the F-statistics (F=4.743) representing the pairwise causality impact between unserviced loans (NPL) and loan-loss provisions (LLP) is significantly with a p-value of 0.0179. Therefore, the null hypothesis is also rejected and we conclude that 'NLP Granger-cause LLP'. The other F-statistics of the remaining pairwise causality impacts are not significant at the 5% level, therefore their null hypotheses cannot be rejected.

4.4 Summary of Findings

Empirical results of the pairwise causality test has indicatedthat unserviced loan 'Granger-cause' loan-loss provision, but loan-loss provision does not 'Granger-cause' unserviced loan. This suggest a unidirectional causality flow from unserviced loans to loan-loss provisions, which implies that non- performing loans have a significant impact on changes in loan-loss provision among the sampled microfinance banks, in the long term. Similarly, results have also shown that loan-loss provision'Granger-cause'returns on assets, but the reverse relationship does not hold. This also suggests a unidirectional causality flow from loan-loss provision to returns on assets and further implies that loan-loss provision influences changes in the financial performance (returns on assets) of the banks in the long term. These findings are consistent with those of Almekhlafi, *et al*. (2016) in Yemen and Tan, *et al.* (2019) in China. However, the findings disagree with that of Onaolapo (2015) in Nigeria, who established the absence of a causality relationship between credit risk and commercial bank's performance.

The summary of the results establishes a unidirectional causality flow, running from unserviced loan to loan-loss provision and from loan-loss provision to returns on assets. This implies a unidirectional causality flow from credit risk to financial performance among microfinance banks in Nigeria. The reverse causal flow does not hold, suggesting that other factors, aside these credit risk indicators, predictchanges in financial performance among the microfinance banks.Ogubunka (2011) has identified some of these factors to includethe bank's cost structure, its managerial expertise and technological level.

V. Conclusion And Policy Recommendations

This paper investigated the causal nexus between credit risk variables (unserviced loans & loan- loss provisions)and financialperformanceof microfinance banks in Nigeria, using the Granger causality approach.The unit root test result of the time series data indicated that the hypothesized variables are stationary at their level form. Finding from the Granger causality analysis alsoestablished a unidirectional causality flow running from unserviced loans to loan-loss provisions and from loan-loss provisions to financial performance among the sampled microfinance banks. The paper concludes that unserviced loans and loan- loss provisions influence profitability among microfinance banks in Nigeria.

We recommend regular and strategic monitoring of loan portfolios by credit managers/officers in the microfinance banking sector, in order to reduce their credit risk.Furthermore, microfinance banks should establish a credit limit at the level of individual borrowers, counterparties or group of counterparties, subject to their own unique credit policies and level of risk tolerance. This will serve as a guiding rule in all their loan approvals.Lastly, policy makers in the banking sector should ensure sound macroeconomic policies, such as inflation and interest rates, which will enhance growth in the microfinance sub-sector.

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