

**RESEARCH ARTICLE****Non-Performing Loans and Key Macroeconomic Variables' Nexus in Nigeria**

Egiyi, Modesta Amaka PhD

Department of Accountancy, Godfrey Okoye University, Enugu State

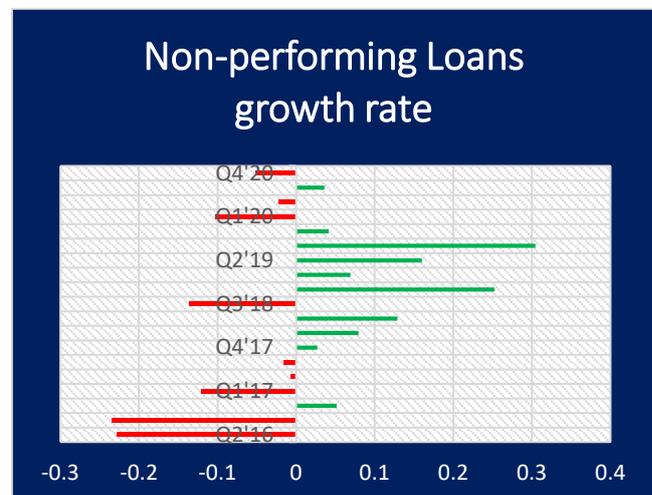
**\*Corresponding Author: Egiyi, Modesta Amaka | Department of Accountancy, Godfrey Okoye University, Enugu State****ABSTRACT**

From a practical standpoint, non-performing loans are one of the big challenges for the banking sector even in Nigeria. This paper investigated this serious challenge by developing the nexus between non-performing loans and key macroeconomic indicators. Upon this backdrop, the data of Economic indicators (Interest Rates, Inflation and Gross Domestic Product) and Non-performing Loans are employed for the time span of 2016-2020 on a quarterly basis. By applying the Gaussian regression, the result revealed that a positive relationship exists between the interest rate, inflation rate and non-performing loans. However, there is a negative relationship between gross domestic product and non-performing Loans hence, non-performing loans negatively affect economic growth.

**Keywords:** *Non-Performing Loans; Macroeconomic Variables; Nigeria*

**1. Introduction**

The Banking sector is considered a vital sector for any economy. As much as banks are the primary source of providing blood to the economy in the form of funds, banks generate funds by transferring pool of funds from the surplus units to the deficit units of the economy. By this key role, banks take part in the development of any economy. From the past two decades, significant changes were witnessed in the world of banking and in recent years the banking system all over the world is well established.



Source: Authors' construct using NBS Data

In Nigeria specifically, NPL witnessed drastic fall from Q4'18 up until Q1'20 where it started rising all through 2020. As greater percentage of the Nigerian banking sector is being run by the private sector, so banks are not willing to pay loans to the investors. A loan is categorized as non-performing when the principal and interest is due and unpaid for six months or more from the first day of default (CFI Team, 2022). Both institutional or structural and macroeconomic factors influence NPL. The institutional or structural indicators are related to financial supervision and regulation, as well as the incentive system in place. It makes intuitive sense that differences in financial regulation and supervision have an impact on banks' actions and risk management procedures and are significant in explaining cross-national variations in NPL. The macroeconomic environment affects the balance sheets and ability of borrowers to service their loan. Indeed, the level of NPLs affects the banking efficiency, which in turn affects the financial stability, and the real economy (Khan, Siddique, & Sarwar, 2020).

Ahmed, Shehzadi, Sufyan, & Hassan (2022) stated that financial inclusion contributes positively to economic

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growth by reducing NPLs, however, NPLs negatively impact financial inclusion as well as economic growth.

Rising trend in low non-performing loans adversely effected availability of economic agents in Nigeria economy thereby constructing financial intermediation and economic activities hence growth (Umoren, Eyo, & Akpan, 2018).

High non-performing loan levels also hurt banks' bottom lines. Low profitability results from high NPLs necessitating more provisions, which reduces interest revenue and increases costs related to monitoring them. This results in a decrease in the credit available to families and businesses, or the real economy. In West African countries NPLs present a significant risk to the banking sector (Adeola & Ikpesu, 2017). Uncontrolled or high levels of NPLs can catalyze the deterioration of not only one bank, but also the entire banking system and the economy, provided that banks rely to the maximum extent on non-performing loans for their revenues. It is, therefore, imperative to conceptualize the factors influencing NPLs in order to identify proper and sensitive frameworks for coping with them. Rising levels of NPLs can have some severe consequences. For example, rising levels of NPLs inhibit the commercial bank from refinancing the defaulting customer, which once again places the defaulters in a nasty low-productivity loop (Azhari & Kadir, 2018). Due to the variations, lenders need to be vigilant to follow predetermined strict criteria and ensure that certain risks are resolved and, if not, at least lower the risk of default on loans.

So many works has been done on NPL, but none has been done on its relationship with macroeconomic variables, this research work seeks to fill this gap.

## 2. Literature Review

A lot of research has been done on the Nigerian banking sector but there is very insignificant focus on the Non-performing Loans. Ibitomi & Micah (2021) investigated empirical analysis of non-performing loans and liquidity of Deposit Money Banks (DMBs): Nigeria experience. A panel regression analysis was performed on a data of 15 quoted DMBs from 2009 to 2019. Based on the empirical findings, the study found only four variables – Non-performing Loans, Capital Adequacy Ratio, Bank Size and Inflation significantly related at a 5% significant level with banks' liquidity while the other three; Gross Domestic Product, Loan Growth and Monetary Policy Rate were identified as insignificant.

Umar & Sun (2016) observed an insignificant relationship between these two prominent concepts – banks' liquidity and NPLs. They argued that liquidity creation by Chinese banks stands to be independent and unrelated with NPL changes. They identified liquidity creation as a better measure of risk compared with loan growth employed by prior studies it helps to provide an absolute amount of risk transformation.

Existing literature showed that other factors such as capital, size and loan growth also influence banks' liquidity (Nzioka & Kariuki, 2021). The relationship between the banks' liquidity and capital has been observed by quite a number of studies which have positive correlation between two concepts. The authors argued that as their capital rises, they tend to expand businesses, settle more financial obligations, meet customers' demands, invest in profitable assets and ultimately strive for continuity. They added that the banks' minimum capital requirements are made them strong and resilient; reduced the risk of insolvency and restored the public confidence in their service delivery (Choon et al., 2013; Faroq & Nasir, 2017; Jane, 2014; Vodova, 2011; Gakpo, Anafure & Mensah, 2021).

## 3. Methodology and Results

This study investigates the relationship and impact of non-performing loans to inflation, interest rate, and gross domestic product (economic growth) for the quarterly time span of Q12016 to Q42020. This further capture how key macroeconomic variables respond to non-performing loans. Given that there exist few literatures on this study, however, this research is novel from country-specific standpoint.

The three distinct models can be specified as:

$$\begin{aligned}
 \text{INFR} &= \delta_1 + \vartheta_1 \text{NPL} + \mu_1 && \text{-----} && (1) \\
 \text{INTR} &= \delta_2 + \vartheta_2 \text{NPL} + \mu_2 && \text{-----} && (2) \\
 \text{LGDP} &= \delta_3 + \vartheta_3 \text{NPL} + \mu_3 && \text{-----} && (3)
 \end{aligned}$$

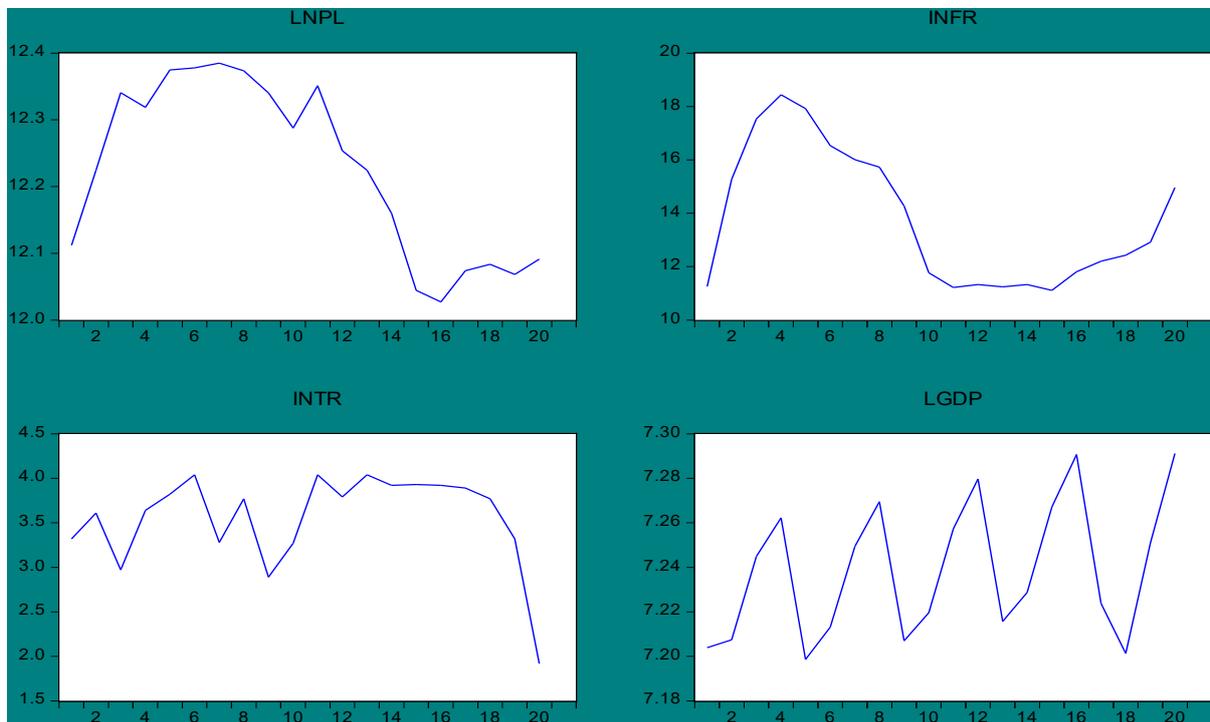
By applying the Gaussian Single Regression analysis, we obtained the following results.

**Table 1 Descriptive Statistics of Research Variables**

	LNPL	INFR	INTR	LGDP
Mean	12.22564	13.76400	3.557500	7.239109
Median	12.23903	12.67500	3.770000	7.236786
Maximum	12.38503	18.44000	4.040000	7.291150
Minimum	12.02697	11.11000	1.920000	7.198601
Std. Dev.	0.130527	2.560552	0.522039	0.030901
Skewness	-0.194345	0.497966	-1.666878	0.265036
Kurtosis	1.439255	1.759708	5.793894	1.718522
Jarque-Bera	2.155838	2.108505	15.76648	1.602634
Probability	0.340303	0.348453	0.000377	0.448738
Sum	244.5127	275.2800	71.15000	144.7822
Sum Sq. Dev.	0.323706	124.5721	5.177975	0.018142
Observations	20	20	20	20

Source: Authors' computation (2022)

**Panel A: Graphical Trends of Study Indicators**



Source: Authors' construct from research dataset using E-views 9.0

**Table 2 Summary of Unit Root Results**

	Level Form at 5%		First Difference at 5%		
	PP Statistics	Critical Level	PP Statistics	Critical Level	
LNPL	-3.658500	-3.673616	-	-	I(0)
INFR	-2.495023	-3.673616	-5.149507	-3.690814	I(1)
INTR	-1.731281	-3.029970	-4.381955	-3.040391	I(1)
LGDP	-3.314858	-3.029970	-	-	I(0)

*Source: Authors' computation (2022)*

**Table 3 Ordinary Least Squares Gaussian Regression Result**

<b>Model 1: <math>INFR = C + LNPL</math></b>				
LNPL	11.79931	3.693890	3.194278	0.0050***
C	-130.4901	45.16260	-2.889340	0.0098
<b>Model 2: <math>INTR = C + LNPL</math></b>				
LNPL	0.162463	0.941910	0.172483	0.8650
C	1.571282	11.51608	0.136442	0.8930
<b>Model 3: <math>LGDP = C - LNPL</math></b>				
LNPL	-0.044038	0.054826	-0.803235	0.0323**
C	7.777506	0.670323	11.60263	0.0000
<b>R-square = 0.419686</b>		<b>F-stat(p-value) = 3.857101(0.0298)</b>		

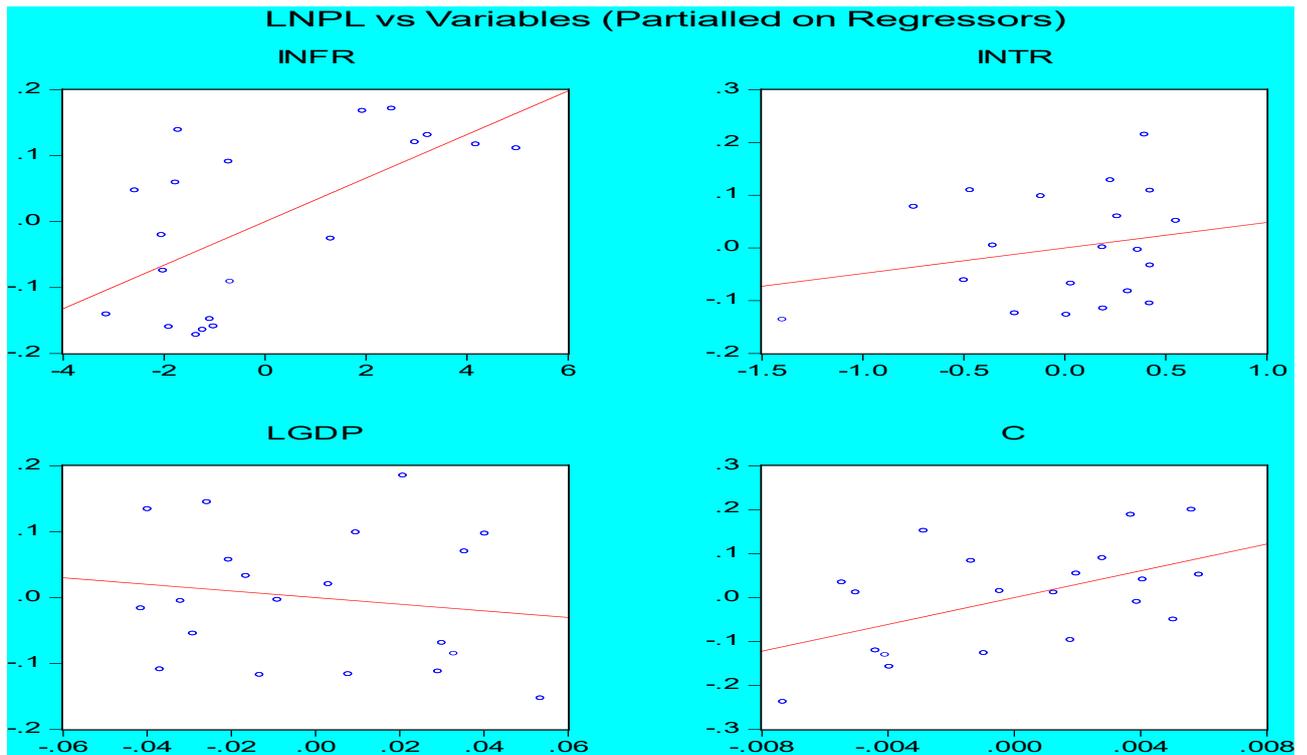
*Source: Authors' computation (2022); Notes: \*\*\*, \*\* shows significance of 0.01 and 0.05 significance level.*

**Discussion of Results**

Panel A shows the graphical trends of the research variables and further reveals the volatility inherent in key macroeconomic indicators such as gross domestic product, inflation rate, interest rate and non-performing loans. Table 1 gives face-value information about the measures of cluster, dispersion and variability of the variables under consideration. The mean values of 7.2391 and 12.22564 show the respective expected observations of the logged Real Gross Domestic Product and logged Non-Performing Loans in Nigeria over the quarterly time-span of study. This interpretation is akin to that of other variables in line with their respective mean values. The difference between the maximum values and minimum across the data set will yield the range. The standard deviations as well indicate that the variables exhibit some variations and also, about two variables from the data set are negatively skewed. The skewness and kurtosis show that the data in relation to each of the research variables are normally distributed as most of the values fall within the cutoff point of -3.0 to 3.0.

The result of the stationary test employing the Phillips-Perron technique shows that non-performing loans and gross domestic product were stationary at levels (see Table 2). this means that they are integrated of order zero [I(0)]. On another hand, inflation rate and interest rate were stationary at first difference which indicate that they are integrated of order one, that is I(1). These eventually suggests cointegration and a dynamic relationship amongst the variables.

**Panel B: Leverage Plots**



Source: Authors' computation (2022)

In the first model as shown in Table 3, we found  $\vartheta_1$  to be positive which shows a positive relationship between non-performing loans and inflation rate, and further exhibit a significant impact (0.0050) on inflation. Similarly, model 2 shows  $\vartheta_2$  to be positive which indicates a positive relationship between non-performing loans and interest rates. By implication, a percentage increase in non-performing loans lead to about 0.16 unit rise in interest rate which conforms to a priori expectation, and ultimately affect the economic growth. The outcome of the third model showed  $\vartheta_3$  to be negative which explains the negative relationship that exists between non-performing loans and economic growth (GDP) in Nigeria. More so, the model is statistically significantly different from zero at the 5% level of significance.

It is imperative to note that the overall model is statistically significant at the 5% level of significance which makes the results fit for policy recommendations. Panel B flashes the leverage plots of the target variable partialled on the regressors where the 5% bound line exhibit stability. However, INFR and LGDP shows some volatility in terms of its structural breaks and outlier of some plots.

**4. Conclusion**

This research piece establishes relationship between non-performing loans and increasing inflation rates and interest rates, and a negative correlation with economic growth. Based on the findings in this study non-performing loan hampers economic progress of a country and should be curtailed.

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