STUDIA UNIVERSITATIS ECONOMICS SERIES
"Vasile Goldiș" Western University of Arad
2026 - 36(2)
DOI: 10.2478/sues-2026-0007

MACROECONOMIC VARIABLES, IDIOSYNCRATIC FACTORS AND NON-PERFORMING LOANS OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

Kayode David Kolawole*
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
E-mail: kolawole.kd@unilorin.edu.ng

Abdulazeez Adewuyi Abdurraheem
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria.
E-mail: aabdulaziz70@unilorin.edu.ng

Oluwayomi Omotayo Olota
Department of Business Administration, Faculty of Management Sciences, University of Ilorin, Nigeria
E-mail: olota.oo@unilorin.edu.ng

Biliqees Ayoola Abdulmumin
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
E-mail: abdulmumin.ba@unilorin.edu.ng

Ridwan Bamidele Aliu
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
E-mail: aliubamidele1406@gmail.com

(Received: February 2025; Accepted: June 2025; Published: April 2026)

Abstract: This paper investigated the impact of macroeconomic variables and idiosyncratic factors on non-performing loans (NPLs) of listed deposit money banks (DMBs) in Nigeria. The study employed secondary data from the Central Bank of Nigeria statistical bulletin, World Development Indicator and financial reports of listed deposit money banks (DMBs) in Nigeria. By using data from 1993-2023, this study examined the impact of macroeconomic variables on NPLs. The study also considered panel data spanning from 2013 to 2023 to assess the impact of idiosyncratic factors on NPLs. The study employed Auto Regressive Distributed Lag, static panel data analysis and granger causality test. The findings revealed that domestic debt and crude oil prices exert a negative but significant effect on NPLs.

* Corresponding author: Kayode David Kolawole. *E-mail: kolawole.kd@unilorin.edu.ng*

Meanwhile, the exchange rate influences NPLs negatively in the short run while a significant and positive effect was noticed in the long run. In the short run, the lending rate was found not significant while a positive and significant relationship was established in the long run. The study concluded that macroeconomic variables and idiosyncratic factors are necessary tools that can be used in explaining variation in NPLs and reducing the level of NPLs in an economy. Therefore, this study recommends that the government should ensure stability in the exchange rate and avoid volatility in exchange rate value as deterioration in the exchange rate indicates a devastating effect on the level of NPLs.

Keywords: Non-performing loans; macroeconomic variables; idiosyncratic factors; deposit money banks.

JEL Codes: G3, E4, E5.

1. Introduction

The role of the banking sector cannot be undermined in the economic development and growth of a country. For an economy to grow, a sound financial system, an efficient transmission mechanism, and a cordial relationship between the financial sector and the real sector must be imminent. Banks aid economic growth by providing credit to businesses and households, enabling them to save, invest and increase their spending; banks are regarded as the mechanism that keeps the economy working. The economy will be paralyzed without access to credit and the economy will not function without banks (Naili and Lahrichi, 2020). By collecting deposits from the masses, commercial banks are the custodians of a large proportion of currency in circulation in an economy. Banks create money from deposits collected through the issuance of loans and advances to customers (Chizoba and Bassey, 2021). The role of banks as financial intermediators is depicted by the ability of banks to convert the deposits that are primarily received from household economic units into loans or credits for businesses and other productive economic units to expand operations and make investments in equipment, machinery and other capital goods. The banking sector is exposed to a multitude of risks that pose a dual threat, destabilizing not only its own operation but also endangering the stability of the whole economy (Naili and Lahrichi, 2020). Among the significant risks faced by the banking sector, the risk of default on loans poses a significant threat to the survival of deposit money banks and the economy (Ghosh, 2017). Credit risk which implies the possibility of a borrower's default, depends on asset quality and is manifested in the magnitude of NPLs (Ekanayake, 2018). According to data from the World Bank (2022), of the 76 countries whose data were available on the World Bank database, the average NPLs as a percentage of all gross loans of banks was 5.45%. Of all

continents that the World Bank database covered, Africa had the highest NPLs ratio in 2022 while other continents were less than 5%; in Europe, out of 27 countries, the average non-performing loans was 4.47%. Asia: 3.84%; North America: 2.31%; South America: 3.17%. This explains why non-performing loans in African countries have to be studied and critically examined to be able to identify factors contributing to the increment in non-performing loan ratio and recommend proper policies to tackle the problem.

The banking sector in Nigeria experienced a staggering 220% rise in the NPL ratio from the 2015 full year to the 2016 full year, from 4.88% to 12.80% (Nigeria Deposit Insurance Corporation, 2017). This was a result of an upsurge in macroeconomic factors: the inflation rate rose by 90%, the contraction in the economy's growth rate was 1.62%, and government domestic debt increased by 25%, coupled with a 39.4% drop in crude oil price. NPLs ratio stood at 4.93% in 2021, which was lower than the prudential benchmark of 5%. It weakened further to 4.95% in June 2022. It strengthened to 4.21% at the end of 2022. The improvement was due to stricter management of credit risk practices and the continued implementation of the Global Standing Instruction (GSI) policy which aided loan recovery (Central Bank of Nigeria, 2022). Keeping NPLs at a bar level is necessary to accelerate economic activities. If proper policies are not made to keep the NPLs ratio within and below the prudential benchmark of 5%, resources are locked up in sectors that are not productive which could hamper growth in economic activities and the efficiency of the economy could be impaired. A high rate of NPLs has negative implications on the economy like contraction in economic activities, low investment in capital assets, business failure and increased unemployment. It culminates into a financial crisis if proper policies are not deployed by government and bank managers. Financial crises lead to a decline in asset prices, and they cause borrowers to default which affects the whole financial system. Hence, distress in the banking sector, delineated by NPLs would ebb the bank assets. Deteriorating macroeconomic indicators induce an increase in credit risk and reduce asset quality.

The issue of NPLs is one of the key problems facing the banking sector in Nigeria. The consequences of the global economic downturn which emanated in 2007 and ended in 2009, left the performance of loans in dismay. According to data from CBN, the NPL ratio in 2009 was 33%. This led to the establishment of the Asset Management Corporation of Nigeria (AMCON) in 2010 to buy the outstanding loans from commercial banks while the collection of those purchased loans lies with AMCON. This was able to moderate the asset quality of Nigerian banks which left the NPLs-to-gross-loans ratio at 2.88% in 2014. In 2015, there was a significant upsurge in the growth of NPL value in Nigeria. Since 2015, there has been an

increment in the NPLs to gross loans ratio until 2018, when it reduced to 11.68% from 14.82% in 2017. 2020 witnessed a significant rise in NPLs value which was a result of deteriorating macroeconomic conditions in Nigeria during the pandemic and an increase in loans to revive the economy.

Empirically, the large proportion of NPLs contained in the assets of an insolvent bank is closely tied to the occurrence of a bank crisis. NPLs have a detrimental impact on the banking sector's survival; it's necessary to thoroughly examine the cause of NPLs. Factors inducing NPLs vary across countries. That may be due to changes in the macroeconomic environment and idiosyncratic factors that are internal due to banks' policies. Idiosyncratic factors can be defined as the unique, company-specific characteristics or events relating to banks. They are those factors that specifically relate to the banks which affect non-performing loans. These idiosyncratic factors relate to the quality of loans, management of risk, and general financial health of the bank. However, there were numerous studies on the effect of macroeconomic variables and idiosyncratic factors on NPLs (Radhe, Pradhan and Pandey, 2016; Wood and Skinner, 2018; Waqas, Fatima, Khan and Arif, 2017; Syed and Tripathi, 2020; Chowdhury, 2020) but conclusions and findings differ across countries and regions. This may be attributed to different policies across countries, economic cycles and macroeconomic volatility. In Nigeria, few studies were conducted on the effect of macroeconomic variables and idiosyncratic factors on non-performing loans (Kure, Adigun and Okedigba, 2017; El-Maude, Abdul-Rehman and Ibrahim, 2017; Adamu, John and Badaru, 2021). The results of Nigerian studies were contradictory. One of the limitations of these studies is neglecting important variables that, to our best knowledge, should be included when modeling the effect of macroeconomic variables on NPLs and idiosyncratic variables on NPLs. Variables like domestic debt and oil prices were neglected in Nigerian studies on macroeconomic variables. On idiosyncratic factors, the effects of diversification and efficiency were not properly studied as they impact non-performing loans. Therefore, this study seeks to address the limitation of the literature reviewed by taking cognizance of neglected variables (oil prices, domestic debt, diversification and efficiency). Using secondary data from the Central Bank of Nigeria statistical bulletin and financial reports of listed deposit money banks (DMBs) in Nigeria, this study specifically aimed to investigate the effect of macroeconomic variables on NPLs in Nigeria, evaluate the impact of idiosyncratic factors on NPLs of listed DMBs in Nigeria and investigate the direction of causality between idiosyncratic factors and NPLs of listed DMBs in Nigeria. The research hypotheses are: (i) macroeconomic variables do not have a significant impact on non-performing loans

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48

in Nigeria; (ii) idiosyncratic factors do not affect non-performing loans of listed DMBs in Nigeria (iii) there is bi-directional causality between idiosyncratic factors and non-performing loans of listed DMBs in Nigeria.

2. Theoretical and Literature Review

2.1 Theoretical Review

2.1.1 Skimping hypothesis as proposed by Berger and DeYoung (1997), opines that allocated resources to underwriting and loan monitoring influence cost efficiency and loan quality. They argued that banks are faced with a tradeoff between problem loans in the future and operating costs in the near term. Banks that choose to maximize profits are likely to lower their running costs by reducing the amount of resources deployed to monitor and underwrite loans at the expense of a high level of bad loans and the costs that are associated with them. In the short run, skimping banks seem to be efficient on cost by lowering resources devoted to loan appraisal, credit analysis, loan monitoring and supervision, but in the medium term, the issue of NPLs arises at a significant rate.

2.1.2 Adverse selection theory is one of the results of information asymmetry. Adverse selection arises when lenders have no complete knowledge of borrowers' true creditworthiness and risk tolerance which leads to lending to borrowers who do not have the ability to repay the loan and subsequently increases the level of loan-performing loans. In the credit market of Nigeria, Abugwu et al. (2022) categorized the effect of adverse selection theory into two. The first case arises from the high lending rate set by banks, which makes repayment difficult for borrowers. The bank bears a portion of the loss and banks act in their interest, not in the interest of the borrowers. The second case hinges on the defaulter, fully aware of the risk level of the investment undertaken, going to borrow at a high interest rate from the bank. In the two scenarios, decisions were made due to asymmetric information.

2.1.3 Bad management hypothesis: the ability of managers to adequately control, supervise and monitor their operating costs is determined by low cost efficiency. Berger and DeYoung (1997) see low-cost efficiency as one of the signs of poor practices of bank management. Managers with low-cost efficiency tend to care less about adequate monitoring, supervision and underwriting of loans. Also, these managers most likely exert bad credit rating skills, which lead to approval of loans with high risk. Collateral is appraised poorly by these managers and credit analyses are not thoroughly conducted. All these increase the proportion of approved loans that would be unpaid.

2.2 Empirical Review

The impact of macroeconomic variables and non-performing loans has been investigated by researchers. Some studies focused on a specific country while some focused on groups of countries. The results obtained were mixed and contradictory.

2.2.1 Macroeconomic variables and non-performing loans

Polat (2018) investigated the macroeconomic factors determining non-performing loan levels in two exporting countries: Turkey and Saudi Arabia. Inflation and market capitalization exert a positive influence on NPLs in both Turkey and Saudi Arabia. Additionally, gross domestic product, money supply and public debt were found to impact non-performing loans in Saudi Arabia, while transparency and unemployment negatively affect NPLs. Kure, Adigun and Okedigba (2017), using the Pooled Mean Group and Panel Vector Autoregressive model, found lending rate, credit growth and inflation as major forces driving NPLs in Nigeria. Qwader (2019) examined the effect of macroeconomic variables on NPLs in Jordan from 2001 to 2017. Using ARDL, interest rates, GDP and external grants were found to inversely affect NPLs. Unemployment and workers' remittances abroad had no significant impact on Jordanian banks. Aliyu (2023) found that in the long run, real interest rates, recurrent expenditures and tax revenue will resolve the issue of NPLs in Nigeria. Syed and Tripathi (2020) divided banks into four categories when analyzing the effect of macroeconomic vulnerabilities on NPLs in India. Using GMM, unemployment, inflation, growth rate, exchange rate and interest rate were major determinants of NPLs in public sector banks and SBI associate banks while exchange rate fluctuations were a major determinant for foreign banks and for private banks, interest rate, inflation and growth rate affect the level of NPLs. Sheefani (2015) found a relationship between the inflation rate, interest rate, log of GDP and NPLs. In the short run, unidirectional causality was observed running from inflation, log of GDP and interest rate to NPLs. The study opines that macroeconomic variables have a significant role in understanding the causes of NPLs and means to curb the upward trend of NPLs as evidenced by Impulse Response Functions (IRF).

Asafo, Shuffield and Seyram (2019) examined the relationship between selected macroeconomic variables and NPLs. The study interpolated annual time series data from 2008 to 2017 into quarterly frequencies. Using BVAR, shocks to GDP, credit to the private sector, the monetary policy rate, CPI and imports contribute positively to NPLs while government debt exerts a negative relationship with NPLs in Ghana. Roman and Bilan (2015) assessed the effect of macroeconomic variables on NPLs in EU countries, including public finance-related variables. Using GMM, bank credit and unemployment were found to be major determinants of NPLs and public finance

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48

variables were found to influence non-performing loans in 28 European Union countries. Islamoglu (2015) revealed that public debt, stock-to-GDP ratio and commercial bank interest rates significantly affect NPLs of listed firms in Turkey. Bhattarai (2015) researched the relationship between NPLs of commercial banks and macroeconomic variables in Nepal from 2002 to 2012. The study established an inverse relationship between exchange rates and NPLs and an insignificant relationship was found between GDP and NPLs. The study revealed that banks with higher interest rates have higher NPLs and government bank NPL levels are higher than those of privately owned banks. Foglia (2022) examined the impact of macroeconomic variables on NPLs in Italy during Q3 of 2008 to Q4 of 2020. Employing ARDL, the study found that public debt and GDP negatively impact NPLs while a significant and positive relationship was established between domestic credit, unemployment and NPLs of commercial banks in Italy.

Atoi (2018) considered macroeconomic variables and their impact on nonperforming loans in Nigeria and the study revealed a divergent result. It was revealed that the exchange rate, inflation rate, real gross domestic product and broad money supply have negative and no significant effect on nonperforming loans of the quoted commercial banks. However, it was revealed that a positive interest rate has a significant effect on nonperforming loans, while the effect of tax revenue will, in the long run, resolve the problems of non-performing loans of banks in Nigeria. Karadima and Louri (2021) in their study on economic policy uncertainty and non-performing loans for 507 banks from four European countries. The study revealed that economic policy uncertainty impact positively on NPLs with the impact significantly moderated with higher bank concentration. Similarly, Anastasiou, Louri, and Tsionas (2019) reported that nonperforming loans in European banks were affected by continuous falling macroeconomic environments. Anzagi (2016) and Rezaei and Mansoorian (2019) revealed a significant but negative effect of inflation on nonperforming loans among Kenyan and Iranian banks. However, Ahmad and Bashir (2013) provided a positive significant relationship between inflation and nonperforming loans. Akinlo and Mofoluwaso (2014), in their study, provided evidence of a negative relationship between economic growth and NPLs, while unemployment, credit to the private sector and exchange rates exert a positive influence on NPLs. This is in support of the work of Kjosevski et al. (2019) which revealed a positive and significant influence of unemployment and domestic credit with nonperforming loans in Italy. In the studies of Warue (2013) and Radivojevic and Jovović in 2017, it was revealed that there is a positive effect of GDP and inflation rate on NPLs. Annas et al., 2024, revealed in their study that interest rate is

an important factor affecting nonperforming loans. Ademola (2024) revealed that crude oil prices had a positive and significant impact on the NPLs of banks.

Table 1. Overview of papers on Macroeconomic Variables and Non-performing Loans

Paper	Methods	Main results
Radivojevic and Jovović (2017)	Panel data approach of 25 emerging countries	The study revealed a positive effect of GDP and inflation rate on NPLs
Kjosevski et al. (2019)	Autoregressive Distributed Lag Modelling Approach (ARDL)	A positive and significant influence of unemployment and domestic credit was revealed on nonperforming loans in Italy
Rezaei and Mansoorian (2019)	Panel regression method	A significant but negative effect of inflation on nonperforming loans in Iranian banks was found.
Roman and Bilan (2015)	Generalized Method of Moments (GMM)	Bank credit, unemployment were found to be major determinants of NPLs and public finance variables were found to influence non-performing loans in 28 European Union countries.
Kure, Adigun and Okedigba (2017)	Pooled Mean Group and Panel Vector Autoregressive model	It was found that lending rate, credit growth and inflation as major forces driving NPLs in Nigeria
Qwader (2019)	Autoregressive Distributed Lag Modelling Approach (ARDL)	Interest rate, GDP and external grants were found to inversely affect NPLs
Syed and Tripathi (2020)	Generalized Method of Moments (GMM)	Unemployment, inflation, growth rate, exchange rate and interest rate were major determinants of NPLs in public sector banks and SBI associate banks while exchange rate fluctuations were a major determinant for foreign banks and private banks, interest rate, inflation and growth rate affect the level of NPLs
Foglia (2022)	Autoregressive Distributed Lag Modelling Approach (ARDL)	The study found that public debt and GDP negatively impact NPLs while a significant and positive relationship was established between domestic credit, unemployment and NPLs of commercial banks in Italy.

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48

Aliyu (2023)	Autoregressive Distributed Lag Modelling Approach (ARDL)	The study found that in the long run, real interest rate, recurrent expenditures and tax revenue will resolve the issue of NPLs in Nigeria
Annas et al., 2024	Panel data regression model	It was revealed that interest rate is an important factor affecting nonperforming loans.
Anastasiou, Louri and Tsionas, (2019)	Fully modified ordinary least squares (FMOLS) and Bayesian panel-cointegration vector autoregression techniques	It was revealed **that nonperforming loans in European banks were affected by continuously** falling macroeconomic environments

2.2.2 Idiosyncratic Factors and Non-performing Loans

Radhe, Pradhan and Pandey (2016) used multiple regression models with 21 Nepalese commercial banks as a sample from 2008 to 2014 to empirically assess the impact of endogenous variables on NPLs of commercial banks in Nepal. The study found ROA and LDR exert a positive influence on NPLs' level, while ROE was found to negatively impact NPLs in Nepal. El-Maude, Abdul-Rehman and Ibrahim (2017) showed that an increase in LDR leads to a rise in NPLs and older banks have higher NPLs than new banks. A positive but not insignificant relationship was found between the capital adequacy ratio and NPLs. Waqas, Fatima, Khan and Arif (2017) investigated factors influencing NPLs in Bangladesh, Pakistan and India. The lag of NPLs was found to be positively correlated in the three countries and was statistically significant. Save Pakistan: diversification and management showed a negative effect on NPLs in the three economies. Inefficiency was found to negatively influence NPLs in the three countries and NPLs increase as the unemployment rate increases. Wood and Skinner (2018) revealed a negative relationship between return on assets, return on equity, capital adequacy ratio, loan-to-deposit ratio, and NPLs in Barbados from 1991 to 2015. Koju, Koju and Wang (2018) used both static and dynamic panels to investigate the impact of bank-specific and macroeconomic variables on NPL levels from 2003 to 2015 in Nepal. The study indicated that NPLs increase asset size, inefficiency increases the level of NPLs and high capital adequacy induces low NPLs level. Low growth in economic activities was indicated driver of the high rate of NPLs in Nepal.

Muhammed (2021) examined the effect of idiosyncratic factors on NPLs of quoted DMBs in Nigeria. Using static panel regressions to analyze data from 2010–2019,

liquidity and firm size were found insignificant in explaining the variation in NPLs while capital adequacy significantly impacted NPLs in Nigeria. Chowdhury (2020) revealed that interest income, return on equity, lending capacity and interest income were major determinants of NPL levels in Bangladesh. IRF revealed that shocks of operational efficiency, asset management, lending capacity, ROA and ROE exert a positive relationship with NPLs. Rahbar and Soufiani (2021), using panel smooth transition regression with data that spanned from Q3 of 2004 to Q3 of 2019, divided banks into bad banks and good banks. Interest spread was found as the major driver of NPLs in Iran. The study also revealed that the non-performing loan level decreases as the loan-to-deposit ratio increases for good banks, while a positive relationship was established between the loan-to-deposit ratio of bad banks and NPLs. Mahyoub and Mohd-Said (2021) examined factors affecting the level of NPLs in Malaysia for nine years with fifteen banks as a sample. Using static panel methodology, they found that the rise in NPLs is not influenced by the economic situation. In the banking sector of Pakistan, Ashraf and Butt (2019) indicated that an increased loan loss provision induces the level of NPLs while NPLs reduce as bank size and capital adequacy ratio increase. Bayar and Yilmaz (2019) focused on the effect of macroeconomic variables, bank-specific and institutional factors on NPLs in emerging economies from 2000 to 2013. The study found the emergence of financial crises, a rise in the cost-to-income ratio and lagged NPLs positively affect the level of NPLs, while a rise in the capital adequacy ratio, ROE and return on assets reduces the level of NPLs. Umar and Sun (2016) revealed that bank liquidity does not impact nonperforming loans. However, Anastasiou et al. (2016), in their study on the Euro area banking system, found that ROA and ROE negatively affect NPLs while Ibitomi and Micah (2021), in their study, revealed a significant relationship between liquidity and nonperforming loans. Erdas and Ezanoglu (2022) conducted a study on G20 Countries and it was revealed that the lagged value of NPLs, return on equity, the growth rate of credit and its costs affect non-performing loans. Sareen (2023), in his study, found out that net interest margin has a significant relationship with non-performing assets. Duong et al. (2024) considered firms' funding diversity and performing loans, and it was revealed that long-term credit policies help in controlling NPLs.

Table 2. Overview of papers on Idiosyncratic Factors and Non-performing Loans

Paper	Methods	Main results
Koju, Koju and Wang (2018)	Dynamic panel regression	The study indicated that NPLs increase asset size and inefficiency increases the level of NPLs and high capital adequacy induces low NPLs level

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48

Muhammed (2021)	Static panel regressions	Liquidity and firm size were found insignificant in explaining the variation in NPLs while capital adequacy significantly impacts NPLs in Nigeria
Rahbar and Soufiani (2021)	Panel smooth transition regression	Interest spread was found as the major driver of NPLs in Iran. The study also revealed that non-performing loans level decreases as the loan-to-deposit ratio increases for good banks while a positive relationship was established between the loan-to-deposit ratio of bad banks and NPLs.
Mahyoub and Mohd-Said (2021)	Static panel regressions	The study found that the rise in NPLs is not influenced by the economic situation. In the banking sector of Pakistan
Ibitomi and Micah (2021)	Static panel regressions	The study revealed a significant relationship between liquidity and nonperforming loans.
Erdas and Ezanoglu (2022)	Static panel data models and dynamic panel data models	The study revealed that the lagged value of NPLs, return on equity, the growth rate of credit and its costs affect non-performing loans
Sareen (2023)	Multiple linear regression	It was revealed that Net Interest Margin has a significant relationship with non-performing assets.
Duong et al., (2023)	Fixed Effect Models and the Two-step System Generalized Method of Moments	It was revealed that long-term credit policies help in controlling NPLs.
Koju, Koju and Wang (2018)	Dynamic panel regression	The study indicated that NPLs increase asset size and inefficiency increases the level of NPLs and high capital adequacy induces low NPLs level
Muhammed (2021)	Static panel regressions	Liquidity and firm size were found insignificant in explaining the variation in NPLs while capital adequacy significantly impacts NPLs in Nigeria
Rahbar and Soufiani (2021)	Panel smooth transition regression	Interest spread was found as the major driver of NPLs in Iran. The study also revealed that non-performing loans level decreases as the loan-to-deposit ratio increases for good banks while a positive relationship was established between the loan-to-deposit ratio of bad banks and NPLs.

2.3 Research Gap

In ascertaining the determinants and ways to curb the issue of NPLs in Nigeria, several studies have been carried out (Adamu, John and Badaru, 2021; Osunkoya, Ikpefan and Olokoyo, 2023; Isedu and Erhabor, 2020; Aliyu, 2023; Gambo, Ahmad

and Muhammad, 2017), but a consensus is yet to be reached among researchers regarding the impact of macroeconomic variables and idiosyncratic factors on NPLs as a result of divergence and inconsistent conclusions and results obtained. Findings by the existing body of research were unclear, mixed and cannot be generalized.

3. Methodology

To examine the impact of idiosyncratic factors and macroeconomic variables on NPLs, secondary data were sourced from the CBN statistical bulletin, World Bank Indicator and banks' annual reports of respective banks. The population of this study consists of thirteen (13) banks and nine (9) were selected as a sample. To achieve the first objective, the Autoregressive Distributed Lag (ARDL) Model was employed in the study. ARDL models are helpful for examining complex interactions since they can handle variables with varying orders of integration (I(0) or I(1)). It is also suitable for testing for cointegration, thereby helping to identify long-run relationships between variables. There are tests to be conducted before the choice of the ARDL model. The first step is to conduct a unit root test. The tests help to identify the order of cointegration of the model and if there is a situation having different orders of variables. The next important step is to conduct the bound test of ARDL. This test helps in determining the existence of a long-run relationship between variables. When the F-statistic is higher than the upper bound, it shows the existence of a long-run relationship which gives room for analyzing with ARDL. After this, some post-estimation tests (Breusch Pagan-Godfrey (BPG) heteroscedasticity, Breusch-Godfrey serial correlation test and CUSUM test) are necessary to know if the model is fit for policy recommendations. The model is specified below:
The functional form expression of the model is presented as:

$$NPL = f(COP, LDR, ER, DD) \quad (1)$$

The econometric model is:

$$NPL_t = \beta_0 + \beta_1 COP_t + \beta_2 LDR_t + \beta_3 ER_t + \beta_4 DD_t + \mu_t \quad (2)$$

The short-run ARDL model using an Error Correction Mechanism (ECM) is presented below:

$$NPL_t = \delta_0 + \sum_{i=1}^{P} \delta_1 NPL_{t-i} + \sum_{i=1}^{P} \delta_1 COP_{t-i} + \sum_{i=0}^{p} \delta_3 LDR_{t-i} + \sum_{i=0}^{p} \delta_4 ER_{t-i} + \sum_{i=o}^{p} \delta_5 DD_{t-i}\, \theta ecm_{t-i} + \mu_t \quad (3)$$

After establishing cointegration, the long-run relationship is estimated as below;

$$NPL_t = \delta_0 + \beta_1 COP_{t-1} + \beta_2 LDR_{t-1} + \beta_3 ER_{t-1}\, \beta_4 DD_{t-1} + \mu_t \quad (4)$$

Where:
NPL means Non-Performing Loan
COP means Crude Oil Price
LDR means Lending Rate
ER means Exchange Rate
DD means Ratio of Domestic Debt to Total Debt
μ = Error term
δ_0 = constant. δ_i = Short run coefficients, β_I = Long run coefficient, θ = Speed of Adjustment, p = lag length.

To achieve objective two, static panel regression was employed. This technique is necessary because it allows for control for individual-specific effects, which sometimes correlate with the explanatory variables. The first step is to conduct the correlation test and variance inflation factor (VIF); these tests help to identify multicollinearity. In the absence of multicollinearity then Pooled OLS was conducted. However, the Breusch and Pagan LM test is necessary to know if pooled OLS or the need for a static panel should be conducted and this prompted the need for static. Lastly, a post-estimation test, the Hausman test was conducted to choose between fixed-effect or random-effect regression. The model is specified below:

$$NPL = f(GGL, ETI, AGE, NITI) \quad (5)$$

Econometrically, the modified model is expressed as;

$$NPL_{it} = \beta_0 + \beta_1 GGL_{it} + \beta_2 ETI_{it} + \beta_3 AGE_{it} + \beta_4 NITI_{it} + \varepsilon_{it} \quad (6)$$

Where;
β_0 = Coefficient representing the value of NPL when explanatory variables are held constant.
$\beta_1 - \beta_4$ = Coefficient of the explanatory variables.
NPL means the Non-performing loan ratio of the bank
GGL means Growth in gross loan of bank
ETI means Expenses to income ratio
AGE means the Age of the bank

NITI means Non-interest income to total income ratio

To achieve objective three, Granger panel regression was employed. The Granger test was conducted to determine the level of causation between the variables. The model is specified below:
Using the following Granger causality model, one can examine the relationship between both dependent and independent variables:

$$Y_{it} = \sum_{i=1}^{n} \alpha_{11i} X_{t-i} + \sum_{j=1}^{n} \beta_{11i} Y_{t-j} + \mu_{11t} \quad (7)$$

$$X_{it} = \sum_{i=1}^{n} \alpha_{21i} Y_{t-i} + \sum_{j=1}^{n} \beta_{21i} X_{t-j} + \mu_{21t} \quad (8)$$

For this analysis, the two primary Granger causality models are shown in the above Equations. Y stands for non-performing loans while X stands for idiosyncratic factors.

Table 3. Measurement of Variables and apriori expectation

Variables	Description	Proxy	Notation	Source of Variables	Expected sign
Dependent Variable					
Non-performing loans	Amount of money borrowed not repaid within 90 days after maturity of principal and interest.	$\frac{nonperforming\ loans}{total\ Gross\ Loans}$	NPL	CBN Statistical Bulletin	
Independent Variables					
Macroeconomic Variables					
Lending Rate	This is the average rate that banks lend to borrowers.	Lending rate data from CBN	LDR	CBN Statistical Bulletin	+
Crude Oil Price	This is the amount of crude oil sold per barrel.	Oil price data from OPEC	COP	CBN Statistical Bulletin	–

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48

Public Debt	This denotes amounts borrowed by the Nigerian government during a particular year.	$\frac{domestic\ debt}{total\ debt}$	DD	CBN Statistical Bulletin	–
Exchange rate	This is the rate at which a dollar is worth in Naira. The value of a dollar in Naira.	Exchange rate data from the Central Bank of Nigeria (CBN)	ER	CBN Statistical Bulletin	+
Idiosyncratic Factors					
Bank Age	This is the number of years that a bank has been in existence.	Ln(age)	AGE	Annual Reports	–
Operating expenses to operating income	This measures efficiency in bank management.	$\frac{operating\ expenses}{operating\ income}$	ETI	Annual Reports	–
Non-interest income to total income ratio	This measures the diversification of banks' assets.	$\frac{noninterest\ income}{total\ income}$	NITI	Annual Reports	+
Growth in gross loans	This denotes the increase in borrowings by DMBs	$\frac{gross\ loan_t}{gross\ loan_{s-1}} - 1$	GGL	Annual Reports	+

Source: Authors' compilation

4. Analysis of Data and Results Interpretations

4.1 Pre-estimation Tests

Unit Root Test

The unit root test results revealed the level of stationarity of each variable, which is a fundamental concept in time series analysis. The Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) tests were employed to check whether each variable has a unit root, which would indicate non-stationarity. The result of the unit root conducted is presented below.

The variables NPL, ER, DD, and COP all exhibit non-stationarity, with a stationarity status of I (1). This implies that each of these variables has a unit root and requires first differencing to achieve stationarity. The ADF and PP test statistics for these variables confirm this finding, indicating the presence of a unit root. This means that

these variables have a time-varying mean or variance, and require further transformation to become stationary. This shows that the dependent variable (NPL) has satisfied the condition of ARDL of having an I (1) as the dependent variable.
In contrast, both ADF and PP tests show that the variable LDR is stationary at level, with a stationarity status of I (0). This suggests that LDR does not have a unit root and can be considered stationary, meaning that its mean and variance remain constant over time without the need for differencing.

Table 4. Unit Root Test Result

Variables	ADF test	PP test	Critical Values	Stationarity Status
NPL	-6.218999	-11.77682	-3.679322(1%) -2.967767(5%) -2.622989(10%)	I(1)
LDR	-3.990790	-4.243680	-3.670170(1%) -2.963972(5%) -2.621007(10%)	I(0)
ER	-3.729876	-3.835657	-3.679322(1%) -2.967767(5%) -2.622989(10%)	I(1)
DD	-3.849670	-3.880223	-3.679322(1%) -2.967767(5%) -2.622989(10%)	I(1)
COP	-4.974195	-4.999691	-3.679322(1%) -2.967767(5%) -2.622989(10%)	I(1)

Source: Researcher's Computations

Bound Test for Cointegration

Prior to estimating the ARDL bound testing model, a bound test has to be conducted to find out if there is a long-run relationship between the variables.

Table 5. Bound Test Result

Test Statistic	Value	K
F-statistic	4.577082	4

Critical Value Bounds

Significance	I(0) Bound	I(1) Bound
10%	2.45	3.52
5%	2.86	4.01
2.50%	3.25	4.49

1%	3.74	5.06

Source: Researcher's Computations

The calculated F-stat of 4.577082 exceeds the critical values at (10%, 5%, and 2.5%) levels of significance, indicating a long-run relationship except at 1% where the test is inconclusive. This conclusion is supported by the F-statistic value compared with the critical values.

Specifically, the F-stat of 4.577082 is higher than the I (1) bound value of 3.52 at the 10% significance level, indicating a statistically significant long-run relationship. Similarly, the F-statistic value exceeds the critical values of 4.01, and 4.49 at the 5%, and 2.5% levels of significance respectively.

The F-Bounds test outcomes show a statistically significant long-run relationship between the variables at 5%. The null hypothesis of no levels relationship is rejected, suggesting that there is a significant long-run equilibrium relationship. The results suggest that there is cointegration among the variables.

4.2 Estimation of Model One

Table 6. Short Run Estimates

Short Run Coefficients (ECM)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LDR)	-0.71578	0.494643	-1.44707	0.1672
D(LDR(-1))	1.525139	0.549965	2.773155	0.0136
D(ER)	-0.00008	0.000136	-0.5849	0.5668
D(DD)	-0.34527	0.147466	-2.34137	0.0325
D(DD(-1))	-0.06369	0.182115	-0.3497	0.7311
D(DD(-2))	-0.25011	0.138548	-1.80521	0.0899
D(COP)	-0.00238	0.000648	-3.66457	0.0021
CointEq(-1)	-0.88429	0.161461	-5.47683	0.0001

Source: Researcher's Computations

From the table above, starting with the short-run coefficient of lending rate (LDR) which has a negative coefficient (-0.7157) with NPLs, its significance is refuted by its p-value (0.1672), which is not significant at 5%. The first-year lagged value of the lending rate (LDR(-1)) exerts a positive relationship with NPLs indicating that an increase in last year's value of the lending rate exerts a 1.525139 increment in NPLs in the short run. This coefficient is backed with a p-value of 0.0136 which is significant at the 5% level. The outcome reveals that an increase in the previous year's lending rate results in an increase in NPL. The current year's exchange rate

value exerts a negative but insignificant relationship with NPLs. The ratio of domestic debt to total debt exhibits an inverse relationship with NPL, showing a unit rise in the domestic debt ratio induces a 0.3452 unit reduction in the current year and this result was significant at 5% with a p-value of 0.0325. In the same vein, last year's value of the domestic debt ratio and the last two years' value indicate a 0.06369 and 0.25011 unit reduction in non-performing loans if domestic debt increases by 1 unit but these claims are statistically insignificant with a p-value of 0.7311 and 0.0899, respectively. As government sources for funds domestically, the loanable funds to customers reduce and the level of non-performing loans reduces.

The current crude oil price (COP) has a negative relationship (-0.00238) with non-performing loans with a p-value of 0.0021. This means a unit rise in crude oil price induces a 0.00238 reduction in non-performing loans. This outcome is not surprising, as Nigeria is an oil-exporting nation. An increase in COP leads to an increase in oil revenue for the government, which the government channels to vital components of the economy to foster economic growth and more income for persons and businesses. This makes it easy to pay back bank loans, thereby reducing the level of NPLs of banks.

The error correction term (CointEq(-1)) which is also the speed of adjustment, is highly statistically significant (p-value = 0.0001), indicating a strong mechanism for correcting deviations from the long-run equilibrium. This suggests that any short-term deviations from the long-run relationship between non-performing loans and macroeconomic variables will be quickly corrected. The coefficient of -0.88429 shows that 88.43% of the imbalance between NPL and macroeconomic variables is adjusted periodically.

Table 7. Long Run Estimates

Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LDR	-4.4271	1.16578	-3.79754	0.0016
ER	0.000807	0.000336	2.40345	0.0287
DD	-0.01159	0.085665	-0.13526	0.8941
COP	-0.00269	0.000846	-3.17346	0.0059
C	1.24202	0.253891	4.89195	0.0002

Source: Researcher's Computations

In the long run, lending rates and crude oil prices have a negative and significant relationship with non-performing loans. The inverse relationship means that a rise in the lending rate causes a reduction in NPLs. A rise in the lending rate discourages

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48

borrowers from sourcing funds at unbearable cost and borrowers result to other alternative sources of funds. This reduces the level of NPLs. The exchange rate shows a positive and significant relationship with NPLs in the long run. When the exchange rate depreciates, the value of a loan denominated in foreign currency increases, making it more challenging for borrowers to repay their loans. Exchange rate depreciation increases the amount of local currency needed to service foreign-denominated loans, thereby increasing the debt burden of the borrower which ultimately induces an increase in NPLs. Although the domestic debt ratio has a negative relationship with NPLs in the long run, with a p-value of 0.8941, we strongly reject the claim of it being significant. A high level of domestic debt could be a sign of a stable and strong economy which gives confidence to investors in the government's ability to repay its debt. Strengthening investors' confidence leads to economic growth and more employment opportunities which makes loan repayment convenient. A negative and significant relationship was established between crude oil prices and non-performing loans. Nigeria, being an oil-dependent nation, an increase in crude oil price induces an increase in government revenue. When crude oil prices are high, it leads to an increase in economic activities; it facilitates investment, job creation and high income. These make repayment of loans easier.

Post Estimation Tests

To perform a robustness check on these results, the following diagnostic checks are carried out. Breusch-Godfrey serial correlation LM test was used to test for serial correlation, the Breusch-Pagan-Godfrey test was used to test for heteroskedasticity, the Ramsey RESET test was used to examine the model specification and CUSUM square and CUSUM were conducted to assess model stability.

4.3 Post-estimation Tests

Table 8. Summary of Post-Estimation Tests

Test	F-statistics	Prob	Decision
Serial Correlation test	0.225122	0.8013	Residuals are not serially correlated
Heteroskedasticity Test	0.956797	0.5174	Residuals are homoscedastic
Model Specification Error Test (Ramsey RESET)	0.552360	0.4688	The model is correctly specified

Source: Researcher's Computations

Table 6 which reports the diagnostic tests showed that the model shows no evidence of high-order autocorrelation as validated by the Breusch-Godfrey serial correlation test which was statistically significant at 5%. The probability value of the Breusch

Pagan-Godfrey (BPG) heteroscedasticity test is more than a 5% level of significance. This shows that residuals are homoscedastic.

The model is free from specification errors as shown by the Ramsey RESET test for model specification. The CUSUM and CUSUMSQ revealed that the model is stable and there is no problem of structural change as evidenced by the plot of the test lying within the critical boundaries.

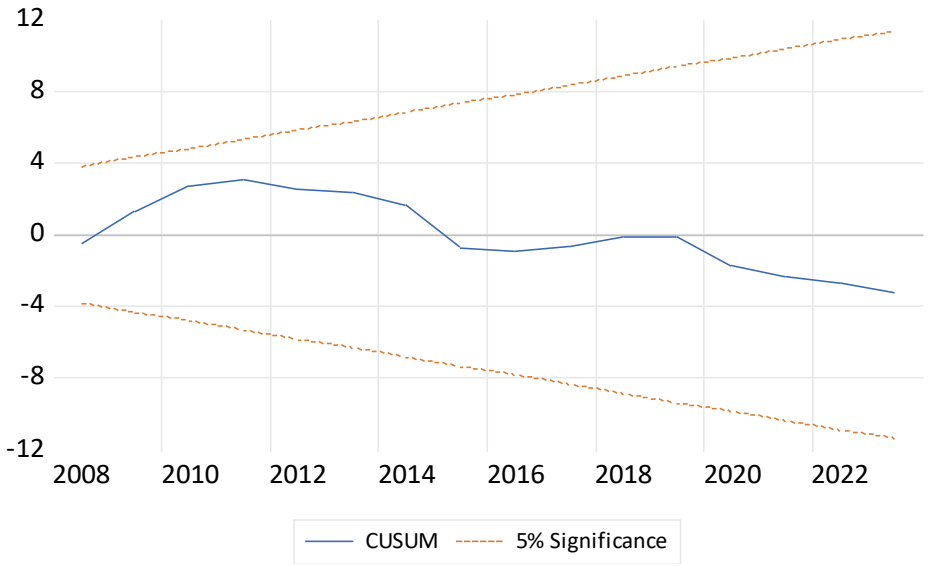

Figure 1. CUSUM Plot
Source: Researcher's Computations

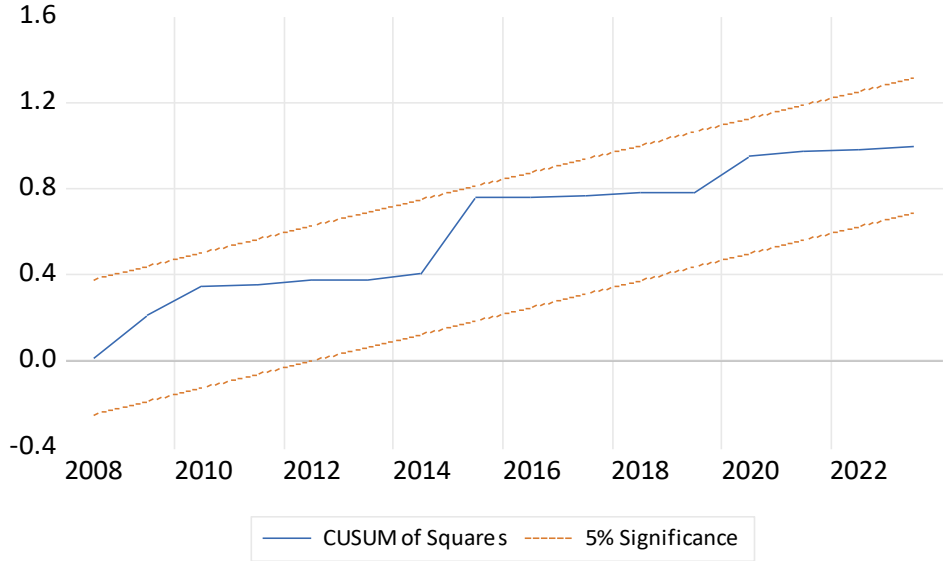

Figure 2. CUSUMSQ Plot
Source: Researcher's Computations

4.4 Estimation of Model Two

To examine the effect of idiosyncratic factors on NPLs of listed deposit money banks in Nigeria, Static panel data analyses are carried out which comprised of Pooled regression, Fixed effects and Random effects. The findings are presented in Table 7.

Table 9. Summary of Static Panel Estimates

Variable	Pooled Panel	Fixed Effects	Random Effects
GGL	-0.047559**	-0.063294***	-0.058649**
	(0.022897)	(0.023213)	(0.022433)
NITI	0.073904	0.039876	0.034112**
	(0.041732)	(0.058005)	(0.01592)
AGE	0.038135***	0.015894	0.039791
	(0.013412)	(0.044301)	(0.02221)
ETI	-0.093753**	-0.203528***	-0.154864***
	(0.040096)	(0.068666)	(0.052223)
C	-0.040709	0.116193	0.003198
	(0.047205)	(0.172349)	(0.082669)
Observation	99	99	99
R-sq	0.126105	0.400483	0.129871

Adj R-sq	0.088918	0.31683	0.092844
F-stat	3.391092	0.400483	3.507491
Prob > F	0.088918	0.31683	0.010278
BP-LM test		23.0782	
prob > LM		0.000	
Hausman test			0.7459

Source: Researcher's Computations

*Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively. Also, standard errors are reported in parentheses*

To choose the appropriate model between Random effect and Pooled OLS, Breusch and Pagan LM test was conducted and the test revealed that random effect is appropriate. Furthermore, the Hausman test was carried out to select the appropriate model between fixed effect and random effect. The outcome showed that the random effect model is suitable. Hence, a random effect model was used in this study.

A negative and significant relationship was established between growth in gross loans and NPLs. This outcome can be explained by the fact that an increase in loans that are distributed marginally tends to spread risk across large numbers of debtors, making individual default on a loan less impactful on the loan portfolio. A positive relationship was established between the diversification of banks' activities and non-performing loans, and it was statistically significant at 5%, and a one-unit rise in the level of diversification induces NPLs to increase by 0.073904 units. Banks not only engage in lending; some banks diversify their operations. Banks engage in agency and brokerage, asset management, financial services, and more. This study reveals that well-diversified banks tend to have high bad loans. Attention and resources are shifted to other activities banks engage in that bring in income for banks. Loan allocation may not go through proper scrutiny and dedication to loan monitoring is relatively lower. All these exacerbate the level of non-performing loans.

Bank age was found to positively impact NPLs and one unit increase in the years that banks have been in existence causes NPLs to increase by 0.0398. The study reveals that long-established banks tend to have a level of non-performing that is higher than newly established banks. Efficiency proxied by the operating expenses-to-operating income ratio was found to be statistically significant at 5% and a negative relationship was established. A unit rise in efficiency level causes a 0.1549unit reduction in non-performing loans. When attentions are drawn to efficient management and supervision of loans, more resources and time are diverted to loan underwriting and allocation, loan disbursement and loan monitoring. All

these prevent lending to customers who do not have the capacity and capability to pay back. It also ensures prompt payment of loans by borrowers. This reduces the level of NPLs.

Table 4.7 also reveals information about the coefficient of determination of the model which shows the explanatory variables jointly induce 12.62% of the fluctuation in the level of NPLs. The P-value of F stat shows that the model is significant at 5% which indicates that the predictor variables are fit to explain the variation in NPLs in the Nigerian banking sector.

4.5 Estimation of Model Three

Granger Causality Test

To examine the direction of causality between macroeconomic variables, idiosyncratic factors and non-performing loans of listed DMBs in Nigeria, the pairwise Granger causality test was used.

Table 10. Pairwise Granger Causality Test

Null Hypothesis:	F-Statistic	Prob.
GGL does not Granger Cause NPL	0.98286	0.4064
NPL does not Granger Cause GGL	2.39798	0.076
NITI does not Granger Cause NPL	3.39633	0.0229
NPL does not Granger Cause NITI	1.86978	0.1434
AGE does not Granger Cause NPL	0.09254	0.9639
NPL does not Granger Cause AGE	1.45491	0.2351
ETI does not Granger Cause NPL	1.27632	0.2899
NPL does not Granger Cause ETI	3..09368	0.01096

Source: Researcher's Computations

Table 10 presented the results of the causality relationship of all variables with NPLs of listed DMBs in Nigeria. The result reveals that there was a unidirectional causality between NITI and NPLs and it shows that the causality runs from NITI to NPLs. Unidirectional causality was also observed between the operating expenses to operating income ratio.

4.6 Discussion of Findings

The main aim of this study was to investigate the impact of macroeconomic variables and idiosyncratic factors on non-performing loans of listed DMBs in Nigeria. To achieve this objective, ARDL was employed to empirically assess the impact of macroeconomic variables on NPL. Static panel methodology was used to analyze the effect of idiosyncratic factors on NPLs and the random effect was most

appropriate for this study, as validated by the Hausman test. Pairwise Granger causality was employed to investigate the direction of causality between idiosyncratic factors and NPLs.

4.6.1 Macroeconomic Variables and Non-performing Loan

The study provides evidence that validates the presence of long-run and short-run relationships between macroeconomic variables and NPLs in Nigeria. Lending rates exert a significant and negative relationship with NPLs both in the short and long run. This outcome does not ratify the apriori expectation. The finding is supported by Adamu, John and Badara (2021); El-Maude, Abdul-Rehman and Ibrahim (2017) also found a negative and significant relationship between lending rate and NPLs in Nigeria. The outcome contradicts the findings of Ekanayake (2018), who established a positive and insignificant relationship between lending rates and NPLs. Exchange rates have a significant and positive relationship with NPLs. The finding is in tandem with apriori expectation. The work of Osunkoya, Ikpefan and Olokoyo (2023); Aliyu (2023); and Syed and Tripathi (2020) corroborates the findings of this study. Atoi (2018) and Kure et al. (2017) found a negative relationship between exchange rates and NPLs. This was in contravention of the findings of this study.

In both the short and long run, domestic debt was revealed to inversely impact NPLs and it was not statistically significant. A negative relationship between domestic debt and NPLs was found in the short run. This outcome contravenes the apriori expectation. Anjom and Karim (2016) found a significant and negative relationship between domestic debt and non-performing loans. Their finding supports the result of this study. Polat (2018); Bayar and Yilmaz (2019) found a significant and positive relationship between domestic debt and NPLs and the outcome does not support the finding of this study. This study reveals a significant and positive relationship between crude oil price and NPLs of DMBs in Nigeria in both the long run and the short run. This outcome is in tandem with the apriori expectation. The study of Polat (2018) corroborates the findings of this study. Therefore, the null hypothesis that macroeconomic variables do not have a significant impact on non-performing loans of listed DMBs in Nigeria should be rejected.

4.6.2 Idiosyncratic Factors and Non-performing Loan

Growth in gross loans was found to have a negative and significant relationship with non-performing loans at 5%. The outcome is not in tandem with the apriori expectation. The outcome concurs with Vighneswara (2012), who opines that growth in gross loans reduces the level of NPLs. The outcome does not agree with the findings of Anjom and Karim (2016), who established that growth in gross loans affects the level of NPLs adversely. Diversification had a positive and significant

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48

effect on NPLs of DMBs in Nigeria. The finding goes in tandem with apriori expectation. The outcome agrees with the study carried out by Ekanayake (2018), who found that the introduction of operations creating non-interest income may increase the level of NPLs due to a lack of focus on lending, monitoring and supervision. The results of Bayar and Yilmaz (2019); Anjom and Karim (2016) contradict the outcome of this study. Bank age had a positive and insignificant relationship with NPLs of listed o love. Efficiency had a negative and significant relationship with NPLs of listed DMBs in Nigeria. This finding is in tandem with apriori expectation. The outcome concurs with the findings of Lipunga (2014), who established that efficient management of loans had a statistically significant effect on the non-performing loans of banks in Malawi. The finding also reinforces the study carried out by Karim et al. (2010), who found that inadequate NPLs management in banking resulted in poor loan quality, which escalated the level of NPL of banks in Singapore.

Therefore, the null hypothesis that idiosyncratic factors do not affect non-performing loans of listed DMBs in Nigeria is not valid and should be rejected.

This outcome confirms the skimping hypothesis and bad management hypothesis. Both hypotheses, as proposed by Berger and DeYoung (1997), stressed the importance of efficient management of loans and supervision by management in non-performing loan reduction. Both hypotheses opine that when loans are well managed and constant supervision and monitoring are carried out on loans given to customers, the level of non-performing loans would reduce.

Finally, the Pairwise Granger Causality Test reveals that only diversification impacted non-performing loans and uni-directional relationships were established between diversification, efficiency and non-performing loans. Hence, the null hypothesis of no bi-directional causality between idiosyncratic factors and NPLs of listed DMBs in Nigeria should not be rejected.

5. Conclusions and Recommendations

The study has comprehensively evaluated the effect of macroeconomic variables and idiosyncratic factors on NPLs of listed DMBs in Nigeria. Secondary data were sourced from the CBN statistical bulletin, the World Bank database, and the banks' annual reports of the respective banks. The study concludes that an increase in oil prices induces economic growth, which reduces the level of NPLs. If the lending rate increases, the level of NPLs increases. Depreciation of the exchange rate leads to an increase in loans denominated in foreign currency, which leads to an increase in the level of NPLs. Spreading of loans across individuals and sectors reduces the level of NPLs as diversification of loans mitigates the non-systematic risk of default.

Diversification and efficiency are important tools that banks can use to lower the level of non-performing loans. When adequate attention is paid to loan monitoring and supervision, the level of NPLs reduces. In line with the findings, the study concludes that macroeconomic variables and idiosyncratic factors are necessary tools to curb plummeting NPL ratios and improve asset quality. The study therefore recommends that the government should make policies, regulations and guidelines aimed at lowering lending rates by banks in the economy. The government can use the Monetary Policy Rate (MPR) to influence the lending rate since banks set their lending rate around the MPR. Also, the interbank rate should be duly monitored and the Central Bank of Nigeria should be actively involved in the interbank lending market to ensure banks that need funds get them at a lower rate. The government should ensure that enough funds are channeled into the productive sector of the economy during an oil boom. The government should also comply with the Organization of Petroleum Exporting Countries (OPEC) on oil-related matters. The government should deploy policies aimed at stabilizing the exchange rate and strengthening the value. Depreciation of the exchange rate should be avoided as much as possible. This helps loans denominated in foreign currencies to be stable in value. Banks should prioritize growing their loan portfolio through sound lending policies, spreading their risk, and upholding tight credit standards. Banks should also ensure that the loans are well diversified across individuals and corporations. Bank management should ensure proper scrutiny of loan requests, adequate due diligence about borrower background and business, thorough credit analysis and loan monitoring and supervision after the funds have been given to the borrower. Also, inconsistent internal policies regarding loan appraisal, lack of clear communication between the loan committee and credit analyst, and shady policies regarding loans to directors should be properly addressed by bank management. Bank regulators should set up new models for risk measurement and management, forcing bank managers to consider those macroeconomic variables while they are managing their credit risk due to their severe financial implications. Those variables should be carefully watched regularly.

Acknowledgements
The authors thank the anonymous reviewers and editors for their valuable contributions.

Funding
This research received no specific grant from any funding agency in the public, commercial, or not–for–profit sectors.

Author Contributions
KKD and RBA conceived the study and were responsible for the design and development of the data analysis. AAA and OOO were responsible for data collection and analysis and also for data interpretation. BAA was responsible for the literature review section. KKD, OOO and BAA were responsible for corrections from reviewers.

Disclosure Statement
The authors do not have any competing financial, professional, or personal interests from other parties.

References
1. Abugwu, C., Kur, K., Urama, H., & Abbah, C. (2022). Loan performance and lending rate: Testing the existence of adverse selection in the Nigerian credit market. African Social Science and Humanities Journal, 3(3), 45–57.
2. Adamu, M., John, Z., & Badara, M. (2021). Effect of bank-specific and macroeconomic factors on nonperforming loans of listed deposit money banks in Nigeria. Gusau Journal of Accounting and Finance, 2(4), 1–15.
3. Adebola, S. S., Yusoff, W., & Dahalan, J. (2011). The impact of macroeconomic variables on Islamic banks financing in Malaysia. Research Journal of Finance and Accounting, 2(4), 22–32.
4. Ademola, A. O. (2024). Effects of loan terms and borrowers' behaviour on non-performing loans in Nigeria's microfinance banks. Indonesian Journal of Business and Economics, 7(2), 1008–1026.
5. Ahmad, F., & Bashir, T. (2013). Explanatory power of macroeconomic variables as determinants of non-performing loans: Evidence from Pakistan. World Applied Sciences Journal, 22(2), 243–255.
6. Akinlo, O., & Emmanuel, M. (2014). Determinants of non-performing loans in Nigeria. Accounting and Taxation, 6(2), 21–28.
7. Aliyu, A. (2023). Macroeconomic variables and non-performing loans of banks in Nigeria. Review of Business and Economics Studies, 11(3), 27–38.
8. Anastasiou, D. (2016). Management and resolution methods of non-performing loans: A review of the literature. Retrieved from https://mpra.ub.uni-muenchen.de/77581/1/MPRA_paper_77581.pdf

9. Anastasiou, D., Louri, H., & Tsionas, M. (2019). Non-performing loans in the Euro-area: Are core-periphery banking markets fragmented? International Journal of Finance & Economics, 24(1), 97–112.
10. Annas, M., Humairoh, H., & Endri, E. (2024). Macroeconomic and bank-specific factors on non-performing loan: Evidence from an emerging economy. General Management, 25(199), 155–161.
11. Anzagi, S. A. (2016). Macroeconomic variables and nonperforming loans of commercial banks in Kenya. Retrieved from https://ir-library.ku.ac.ke/server/api/core/bitstreams/85752519-1199-49cc-aa33-9d1337f936f9/content
12. Asafo, A., Shuffield, B., & Seyram, O. (2019). The macro-economy and non-performing loans in Ghana: A BVAR approach. International Journal of Business and Economic Sciences Applied Research, 11(3), 65–72.
13. Ashraf, N., & Butt, Q. (2019). Macroeconomic and idiosyncratic factors of non-performing loans: Evidence from Pakistan's banking sector. Journal of Finance and Accounting Research, 2(1), 44–71.
14. Atoi, N. V. (2018). Non-performing loan and its effects on banking stability: Evidence from national and international licensed banks in Niger. CBN Journal of Applied Statistics, 9(2), 43–79.
15. Bayar, Y. (2019). Macroeconomic, institutional and bank-specific determinants of non-performing loans in emerging market economies: A dynamic panel regression analysis. Sciendo, 3(1), 95–110.
16. Berger, A., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. Journal of Banking & Finance, 21(1).
17. Bhattarai, S. (2015). Determinants of non-performing loan in Nepalese commercial banks. Economic Journal of Development Issues, 19(1), 22–38.
18. Central Bank of Nigeria. (2022). Annual report. https://www.cbn.gov.ng
19. Chizoba, O., & Bassey, E. (2021). Bank intermediation efficiency and non-performing loans in Nigeria: Data envelopment analysis. Journal on Banking Financial Services & Insurance Research, 11(11), 14–39.
20. Chowdhury, E. (2020). Non-performing loans in Bangladesh: Bank-specific and macroeconomic effects. Journal of Business Administration, 14(2), 55–69.
21. Duong, D. K., Tran, P. M. D., Nguyen, P. Y. N., & Pham, H. (2023). How do funding diversity and non-performing loans affect bank performance in different economic cycles? Cogent Business & Management, 10, 1–21.
22. Ekanayake, N. (2018). The impact of bank-specific and macroeconomic factors on non-performing loans in Sri Lankan commercial banks. Journal of Modern Accounting and Auditing, 11(4), 611–627.
23. El-Maude, J. G., Abdul-Rehman, A., & Ibrahim, M. (2017). Determinants of non-performing loans in Nigeria's deposit money banks. Archives of Business Research, 5(1), 74–88.

24. Erdas, M. L., & Ezanoglu, Z. (2022). How do bank-specific factors impact non-performing loans: Evidence from G20 countries. Journal of Central Banking Theory and Practice, 11(2), 97–122.
25. Foglia, M. (2022). Non-performing loans and macroeconomic factors: The Italian case. Risks, 10(1), 1–13.
26. Ghosh, A. (2017). Sector-specific analysis of non-performing loans in the US banking system and their macroeconomic impact. Journal of Economics and Business, 93(2), 29–45.
27. Ibitomi, T., & Micah, E. E. M. (2021). Empirical analysis of non-performing loans and liquidity of deposit money banks: Nigeria experience. Journal of International Business and Management, 4(9), 1–14.
28. Isedu, M., & Erhabor, O. J. (2020). Non-performing loans (NPL) and loans and advances of commercial banks in Nigeria. Accounting and Taxation Review, 4(1), 104–117.
29. Islamoglu, M. (2015). The effect of macroeconomic variables on non-performing loan ratio of publicly traded banks in Turkey. WSEAS Transactions on Business and Economics, 12(1), 10–20.
30. Karadima, M., & Louri, H. (2021). Economic policy uncertainty and non-performing loans: The moderating role of bank concentration. Finance Research Letters, 38, 1–5. https://doi.org/10.1016/j.frl.2020.101458
31. Kjosevski, J., Petkovski, M., & Naumovska, E. (2019). Bank-specific and macroeconomic determinants of non-performing loans in the Republic of Macedonia. Economic Research-Ekonomska Istraživanja, 32(1), 1185–1203.
32. Koju, L., Koju, R., & Wang, S. (2018). Macroeconomic and bank-specific determinants of non-performing loans: Evidence from the Nepalese banking system. Journal of Central Banking Theory and Practice, 3(1), 111–138.
33. Mahyoub, M., & Mohd Said, R. (2021). Factors influencing non-performing loans: Empirical evidence from commercial banks in Malaysia. Research Journal of Business and Management, 8(3), 160–166.
34. Muhammed, J. (2021). Effect of firms attributes on non-performing loans of listed deposit money banks in Nigeria. Journal of Corporate Finance Management and Banking System. https://doi.org/10.55529/jcfmbs.11.26.41
35. Naili, M., & Lahrichi, Y. (2022). Banks' credit risk, systematic determinants and specific factors: Recent evidence from emerging markets. Heliyon, 8(1).
36. Okedigba, D., Kure, E., & Adigun, M. (2017). Non-performing loans in Nigerian banks: Determinants and macroeconomic consequences. Economic and Financial Review, 55(3), 34–50.
37. Osunkoya, M., Ikpefan, O., & Olokoyo, F. (2023). Macroeconomic and bank-specific determinants of non-performing loans in Nigeria. WSEAS Transactions on Business and Economics, 2(1), 22–38.
38. Polat, A. (2018). Macroeconomic determinants of non-performing loans: Case of Turkey and Saudi Arabia. Journal of Business Research Turk, 10(3), 693–709.

39. Qwader, A. (2019). Relationship between macroeconomic variables and their impact on non-performing loans in Jordanian banks. Asian Economic and Financial Review, 9(2), 166–175.
40. Radivojevic, N., & Jovovic, J. (2017). Examining determinants of non-performing loans. Prague Economic Papers, 3, 300–316.
41. Rahbar, F., & Soufiani, M. (2021). The impact of macroeconomic and banking variables on non-performing loans in oil cycles: Evidence from Iran. Journal of Money and Economy, 16(2), 135–164.
42. Rezaei, I., & Mansoorian, R. (2019). Macroeconomic variables and non-performing loans. Journal of Islamic Economics & Banking, 8(28), 185–202.
43. Roman, A., & Bilan, I. (2015). An empirical analysis of the macroeconomic determinants of non-performing loans in EU28 banking sector. Revista Economica, 67(2), 108–127.
44. Sareen, R. (2023). Analysis of bank-specific factors of non-performing assets. Asian Journal of Management, 14(4), 283–292.
45. Sheefeni, P. (2015). The effects of interest rate spread on non-performing loans in Namibia. European Journal of Business, Economics and Accountancy, 4(5), 31–40.
46. Syed, A., & Tripathi, R. (2020). Macroeconomic vulnerabilities and its effect on non-performing loans in Indian commercial banks. Indian Journal of Finance, 14(2), 34–49.
47. Umar, M., & Sun, G. (2016). Non-performing loans, liquidity creation, and moral hazard: Case of Chinese banks. China Finance and Economic Review, 4(10), 2–23.
48. Waqas, M., Fatima, N., Khan, A., & Arif, M. (2017). Determinants of non-performing loans: A comparative study of Pakistan, India, and Bangladesh. Journal of Finance & Banking Studies, 6(1), 51–68.
49. Warue, B. N. (2013). The effects of bank-specific and macroeconomic factors on nonperforming loans in commercial banks in Kenya. Advances in Management and Applied Economics, 3(2), 1–7.
50. Wood, A., & Skinner, N. (2018). Determinants of non-performing loans: Evidence from commercial banks in Barbados. The Business and Management Review, 9(3), 44–64.

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 36 Issue 2/2026
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 19-48