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Non-performing Loans and Profitability of Selected Deposit Money Banks in Nigeria (2010 - 2021)

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Abstract

Rising non-performing loans threaten the financial performance of banks, as it reduces both the bank's profit and its intermediation capacity. The immediate consequence of large amount of non- performing loans in the banking system is the possibility of bank failure. This study examined the effect of non-performing loans on the profitability of selected deposit money banks in Nigeria. Considering that the banking industry is a pillar of the economy, any shock to the industry would certainly affect the financial system and the economy as a whole. In the same way, accumulation of non-performing loans can negatively affect private consumption which may lead to economic contraction. Specifically, this study examined the effect of sub-standard debt, doubtful debt, lost, and loan to assets ratio on return on assets of selected deposit money banks. The study applied the Panel Ordinary Least Square (POLS) technique to estimate the model. The study covered a period of twelve years that is from 2010 to 2021 using data that were carefully obtained from the annual reports and financial statement of the banks. The findings revealed that there is a significant negative relationship between return on assets, sub-standard debt and loan to assets ratio, while a positive significant relationship exists between return on assets and lost loan. On the contrary, doubtful debt was found to have insignificantly related to return on assets. In terms of effect assessment, the study found that sub-standard debt, doubtful debt, lost, and loan to assets ratio have no significant effect on return on assets of selected deposit money banks. The study recommends that banks' management should follow the provisions of prudential guidelines in granting loan facilities to customers. Deposit money banks should diversify their lending to different sectors of the economy. Concentration of lending to a particular sector of the economy, for instance, oil and gas should be done with caution so as to avoid an accumulation of doubtful debt when there is fluctuation in the price of oil in the international market.

1. Introduction

Economic stability is enhanced by the banking sector's stability. Due to bad credit management, the stability of Nigerian banks is currently doubtful. No deposit money bank can survive without lending since they earn income from it (Eniafe, 2020) [13]. Conversely, many banks find themselves lending to investors and companies without doing a thorough background check. Increasing non-performing loans (NPLs) in the modern banking industry, which is categorized into sub-standard, bad debt and doubtful are very critical but frequent issues in bank management. The consequences of non-performing loans is not only a challenge to banks worldwide but also to Nigerian banks.

A poor financial system struggling with NPLs could stifle economic growth, just as a strong financial system encourages economic growth. NPLs have two economic repercussions, according to Zeng. First, if NPLs increase, economic growth may drop, leading to inefficient resource allocation. Second, as NPLs develop, more capital will be needed to support them since the banks will be unable to finance new, commercially viable projects due to capital erosion. A generic term is used to cover a variety of formulations in the International Monetary Fund's 2014 report on global financial stability. A loan is deemed to be non-performing if payments (principal and/or interest) due have not been paid for at least 90 days. The Bank of International Settlements (BIS) five-tier classification system divides loans into five grades: pass, special mention, substandard, dubious, and essentially lost, with the last three being labelled as NPLs. A sound loan relates to category one, a special mention loan may not have any payments owing at the moment but may have a collections issue in the future (Bishnu, 2020) [9]. However,

worldwide accounting and banking standards use the term impairment rather than non-performing. The issue of NPLs is important for Nigeria's banking industry. This reduces this sector's ability to spur economic growth (Boudriga, Taktak & Jellouli, 2010) [11].

NPLs were identified as the primary cause of Nigeria's financial sector troubles, which the country had previously experienced. Nigeria's insolvent banks accounted for 20% and 22%, respectively, of the system's assets and deposits in 1993. In April 2015, in response to worries about the recent rise in NPLs, the Central Bank ordered banks to publish a list of persistent debtors in three national daily newspapers after giving them three months to turn their loans around. The banks had complied with the directive by August 1st, 2015. In any economy, NPLs causes banking crises. Banks can create money through credit expansion and realize a significant portion of their earnings through offering new loans (Vodová, 2013) [38]. Banks take different risks in order to remain in business, but the main one is credit risk, which is positively related to banking crises (Fofack, 2015) [17]. The risk is that borrowers may not pay back the loan, thereby rendering such loans Non-performing. In empirical studies of emerging economies, NPLs have received relatively little attention.

Rising NPLs threaten the financial performance of banks, as it reduces both the bank's profit and its intermediation capacity. The central role the banking sector plays in the economy, any shock to the sector will have a snowballing effect not only on the financial system but also on the economy as a whole. Since lending accounts for a larger portion of banks' revenues and profits, it stands to reason that when lending capital is lost to non-performing loans, a larger portion of revenue would likely also be lost. Once revenue is lost in one financial year, the capability of the bank to provide access to credit facilitates to other business and individuals would practically fall in the following financial year. This implies that the bank will either refrain from lending altogether or cut the amount set aside for lending in the upcoming fiscal year. Observed that non-performing loans have negative effect on return on assets in Nigeria.

The studies carried out by different authors in Nigeria on the subject matter have inconsistent results. Some indicated that NPLs have negative impact on bank profitability. Such studies include that of Eniafe (2020) [13], Etale, Ayunku & Etale (2016) [15] and Okoh, Inim, and Idachaba (2019) [31]. Other studies such as Oke and Wade-Awe (2019) and Adebisi and Oke (2015) [1] contend that NPLs does not exert a negative impact of bank profitability. These inconsistent results have greatly affected policy formulation and implementation because some banks recorded high NPLs and profits simultaneously contrary to theoretical postulations. Some of the studies adopted analytical techniques and different time periods. These must have also affected their results and conclusions. All these constitute a gap which this study intend to fill. Hence, this study is an attempt to examine the effect of non-performing loans on the profitability of selected deposit money banks in Nigeria.

2. Literature review
Non-Performing Loan (NPL) is a credit facility for which the interest and/or principal amount has been past due for a predetermined amount of time is considered non-performing. A loan is an asset for a bank since it generates a stream of cash flows through interest and principal repayment. A bank's profits are derived from interest payments. If an asset is not maintained for an extended period of time, banks typically classify it as non-performing. A loan is categorized as past due if payments are only slightly overdue, and as soon as payments are seriously overdue (often for 90 days), it is classified as a NPLs. A high percentage of NPLs in comparison to other lenders could be a red flag. Profitability refers to the act of performing financial activity. In broader sense, profitability refers to the degree to which financial objectives being or has been accomplished. It is the process of calculating the monetary value of the outcomes of a firm's policies and operations. It is used to assess a company's overall financial health over a certain period of time and may also be compared to other enterprises in the same industry or aggregated across industries or sectors. The topic of the banking sector's profitability has gained a lot of attention recently, and there is now a lot of literature that looks at how resource management affects bank profitability. There are several metrics used to gauge profitability, such as return on equity, net interest margin, and return on assets. However, there are differing opinions among academics regarding which indicator is better than the others as a reliable indicator of profitability. For instance, ROA, ROE, and NIM were all deemed to be positive metrics by Goudreau and Whitehead (2019) [18] and Uchendu (2015) [28]. Hancock (2019) [19] used only ROE to measure profitability in her study. Odufulu (2014) [29] measured profitability only based on gross profit margin.

This study is anchored on the moral hazard theory. This theory was introduced in economic literature by K. J. Arrow in 1963 and M. V. Pauly in 1968. The theory states that the problem of moral hazard may result from information asymmetric between banks customer and the bank which makes it almost impossible to distinguish bad from good prospective borrowers. Researchers have noted that moral hazard problem has led to overtime pilling up of NPLs. This hypothesis serves as the foundation for this study because banks' clients and financial organizations frequently conceal crucial information about lending and borrowing arrangements. Moral hazard maintains that where one party takes higher risk because the consequences will be borne by another. According to the moral hazard hypothesis, a circumstance that increases risk occurs when a bank customer offers false information about their financial statements or their creditworthiness or has a hidden motivation to take extraordinary risks in an effort to make money before the contract expires. The bank customer who is the borrower may not enter into the contract with the bank in good faith, hence gives misleading information about his or financial status or credit capacity. Accurate information about borrowers and the enterprise the credit is used for is necessary for effective financial systems and financial intermediation. This study is anchored on this theory since bank customers and financial institutions tend to hide key information concerning the lending and borrowing contracts. Efficient financial systems and financial intermediation requires accurate information about borrowers and the venture the credit is used for this will minimize the prevalence of non-performing assets in Nigeria's deposit money banks.

For readers' accessibility and preciseness, the empirical studies were reviewed subsequently. The effect of NPLs on

Kosovo banks' profitability from 2010 to 2019 was investigated by Besmir & Muhamet (2021) [8]. Profit was calculated using the classic profit theory, with Return on Assets as a function of the ratio of NPLs, Liquidity Risk, and Bank Size as the controlling factors. We used multivariable linear regression to estimate how the profit function is determined. The results showed that at constant, NPLs influence on profitability is statistically significant, the ROA drops by 0.19% for every 1% increase in NPL. It is advised that Kosovo's commercial banks adopt a balanced strategy for portfolio expansion and exposure to credit risk.

Eniafe (2020) [13] examined the effect of NPLs on deposit money institutions in Nigeria. Deposit money banks' (DMBS) primary function is to act as a go-between for the excess unit (supply side) and the deficit unit (demand side) of funds. Profitability, asset growth, and clientele expansion are the three main goals of DMBS. DMBS provides loans and advances to private citizens, public entities, and corporate organizations. Loan default may be widespread as a result of poor asset quality and significant non-performing assets (credit risk), which could lead to enormous loan losses and lower bank profitability. This study looked into how Nigerian money deposit banks performed in relation to NPLs. Data was gathered from secondary sources, and hypotheses were formed. The study made use of the validated ECM model (through assessments of residuals and least squares). The findings showed that NPLs had an impact on Deposit Money Banks' performance across the study period, although net interest margin and the ratio of deposits to loans each had a different effect. The report suggests, among other things, that deposit money institutions establish an efficient credit strategy that reflects flexible tenure, reorganization of credit terms, and conversion. This approach might assist in slowing the rate of NPLs, which would reduce the likelihood of default significantly as return on equity rose.

Arif (2020) [6] notes that commercial banks' lending operations are subject to the risk of NPLs. Some people are unable to repay their debts in full, while others can only pay back a tiny percentage, which eventually leads to the build-up of NPLs. In order to decrease NPL, this study offered an empathetic credit risk method as a derivation of the agency theory and spiritual leadership theory. This study looks at the empathy credit risk model. 150 BPR leaders were chosen as respondents from a population of 260 leaders at the BPR in the Central Java Province using a purposive sample strategy. Data analysis utilizing SEM AMOS reveals that there is a significant positive association between credit collectability and NPLs. Profitability is significantly impacted negatively by NPLs.

Bishnu (2020) [9] over a five-year period from 2013–2014 to 2017–2018 with a total of sixty observations to assess the effects of NPLs on commercial banks' profitability in Nepal. The data analysis employed the multiple regression model. The variables in the study are return on equity, NPLs, capital adequacy ratios, liquidity, bank size, and inflation. Three distinct models' revealed that NPL, CAR, and LIQ have substantial negative relationships with ROE. Similar to how the SIZE has a strong and favorable association with ROE. In relation to ROE, the INF has good but unimportant results. From the study's findings, the variables NPL, CAR, LIQ, and SIZE play a significant effect in determining profitability. Profitability is not considerably impacted by the INF. The bankers have taken the overdue payments with

sincerity.

Shahid, Gul, and Naheed discovered the connection between credit risk and financial performance of Pakistani commercial banks in 2019. In order to reduce credit losses and increase profit, managing and dealing with credit risk is a critical function of banks. NPLs, Return on Equity (ROE), Return on Assets (ROA), and capital adequacy ratios have all been employed for this. The information was gathered between 2010 and 2017 from 24 Pakistani banks that were in operation. Leverage, NPLs, and provision for facilities ratios were used in this study to demonstrate a significant correlation between credit risk and bank financial performance.

Osakwe, Ananwude, and Nduka (2019) [33] looked into credit risk management and efficiency in the banking industry in Nigeria, an emerging market in Africa. Result of the study which used information from 1999 to 2018, demonstrated that credit risk management had a significant impact on the effectiveness of the banking system in Nigeria. They advised banks to strictly adhere to the rules governing the issuing of loans and advances to clients. Additionally, banks are required to follow the credit risk management regulations set forth in the prudential guidelines.

Okoh, Inim, and Idachaba (2019) [31] investigated the effect of NPLs on the financial performance of commercial banks in Nigeria between the years 1985 and 2016. The study used multiple regression approaches to examine data gathered from publications by the NDIC and CBN statistical bulletin for various years. The study's results show that the cash reserve ratio (CRR) and the ratio of NPLs to total loans (NPL/TLR) had a statistically significant adverse effect on ROA. These results suggest that a high proportion of NPLs would have a detrimental effect on the financial health of Nigerian commercial banks. As a result, the study suggests that Nigeria's regulatory bodies establish and promote a setting where commercial banks can adopt effective risk management procedures.

Oke and Wale-Awe (2018) [30] demonstrated in plain language that Total assets (TAS) are used as the control variable, and the loan loss provision (LLP) and loss adjustment data (LAD) made by DMBs can be used to indicate risks and performance, respectively. Descriptive statistics was used to establish, using data taken from the financial statements for the 16-year period from 2002 to 2017, which the loan loss provision has little to no effect on profitability.

Kalu, Shieler, and Amu (2018) [22] investigated whether credit risk management techniques and the financial success of microfinance companies in Kampala, Uganda. By using a sample of 60 employees from the finance and credit departments of three licensed microfinance institutions in Kampala, Uganda—namely, Finca Uganda Ltd., Pride Microfinance Ltd., and UGAFODE Microfinance Ltd. Primary data, which included closed-ended questions, was gathered utilizing questionnaires. The annual reports of the microfinance institutions (MDI) served as a source of secondary data (2011 - 2015). In order to analyze the population, frequencies and descriptive statistics were used. The Pearson linear correlation coefficient was utilized to explore the connection between credit risk management tactics and financial success.

Oloruntoba, Zaid, and Oluwafolakemi (2018) [32] investigated the effect of credit risk management on

Nigerian banks' performance. Five Nigerian banks were chosen through the use of a purposeful sampling technique. For this investigation, secondary data were used. It was taken from the banks' audited financial statements for the years 2006 to 2017. This study also made use of Nigerian Stock Exchange Fact Book 2017 for the Nigerian banks and CBN bulletin 2017. Linear Regressions and descriptive statistics were employed in the analysis process. NLPR (= 0.809), CARR (= 11.246), and LTDR (= 6.300) have a considerable impact on financial performance as assessed by ROA, according to the results. Additionally, the outcome demonstrates that while NLPR (= -1.57) has a detrimental impact on ROE, CARR (= 17.982) and LTDR (= 3.227) have a considerable influence on financial performance as evaluated by ROE. The study comes to the conclusion that the credit risk management tools used by the chosen banks during the study's time period had a significant impact on their financial performance.

Asllanaj (2018) [7] studied how credit risk management affected the Kosovo commercial banks' financial results. Using a multiple regression model, panel data of 85 observations from 2008 to 2012 of ten commercial banks was examined. The study also explains if there is a high or weak correlation between commercial banks' financial performance and their capital sufficiency, asset quality, managerial effectiveness, earnings, and liquidity. The study comes to the conclusion that commercial banks in Kosovo can use the CAMEL model to evaluate and grade its credit risk management.

Jonathan and Michael (2018) [21] investigated the connection using Fidelity Bank Nigeria PLC between credit risk management and bank performance in Nigeria as a case study. Data were gathered using annual reports of the sampling bank from 2010 to 2016 as part of a descriptive survey study. The Deposit Money Banks served as the study's research subjects. The statistical method utilized to analyze the hypotheses was the Pearson Coefficient of Correlation, which was done with the help of the SPSS. In Nigeria, the study came to the conclusion that there is no meaningful connection between credit risk management and bank performance. However, given the sensitivity of the banking industry, it is important to pay close attention to any signs of weak negative associations.

Felix and Claudine (2018) [16] looked into the connection between credit risk management and bank performance. Their findings suggested that the ratio of NPLs to total loans of financial institutions, which measures profitability, was inversely connected to ROE and ROA, leading to a drop in profitability

Timothy (2018) [37] examined the impact of NPLs on the financial health of a few particular Nigerian commercial banks. Financial institutions face a significant risk from NPLs all over the world. Financial institutions are required to evaluate their lending procedures as a result of the aforementioned. Hence, in this study, the determinants of Nigerian commercial banks' NPLs were examined using both bank-specific variables (return on asset) and macroeconomic variables (gross domestic product, unemployment rate, and exchange rate). This study uses an explanatory research design to pinpoint the causes and effects of NPLs and their determinants. In Nigeria, two commercial banks were arbitrarily chosen. Panel data from secondary sources were used in this analysis for the years 2010 through 2015. These numbers were gathered from

CBN statistical bulletins and yearly statements of accounts. In contrast to exchange rate and unemployment rate, which showed a negative association with ROA, the study indicated that GDP ratio had a positive link with ROA. The study, therefore, recommended that the government should maintain political stability and combat corruption at all levels, banks should have a good track of their customers regarding loans repayment and lastly the banks should employ sustainable manpower.

Al-Rdaydeh, Matar, and Alghzwai (2017) [5] looked into how financial risks affected the profitability of Jordanian banks (both conventional and Islamic) from 2006 and 2015. In this study, profitability was assessed using ROA and ROE, while liquidity and credit risks served as a proxy for financial risks. Panel data regression has been used in the study to evaluate the hypotheses. Results indicated that both Islamic and conventional banks' ROA and ROE were significantly impacted by credit risks. Both Islamic and conventional banks' associations between liquidity risk and ROE were determined to be minor. Both conventional and Islamic banks must consider the impact of liquidity risk on ROA. This finding makes it very evident to bank managers and the industry as a whole that taking on risky funding endeavours would result in increased funding losses, which will cause banks to significantly deplete their resources.

In their 2017 study, Liu, Ya-Chiang, Cheng-Hsien, and Wen-Min looked at how well banks perform in connection to their NPLs. The quality of loan assets is a significant and impacting element for banks' operational risk due to the rise in NPLs in recent years. The research methodology is to integrate the radial and non-radial measures of efficiency into the network production process framework with NPLs; this study utilizes network epsilon-based measure model to evaluate the banking industry performance to provide insight into what causes imperfectly competitive conditions for some banks. The results demonstrate that the banking sector grew consistently in three aspects of operation: operating performance, profitability performance, and risk management in the last five years of the subject period. Pursuing development in operations and profitability while taking risk management into account was unveiled in the findings. Also addressed are the benefits and possible uses of network data envelopment analysis for evaluating financial firms.

The impact of NPLs on the performance of a few commercial banks in Nigeria between 2000 and 2013 was explored by Ozurumba (2016) [34], with a focus on Access Bank, United Bank for Africa, and Union Bank of Nigeria Plc. The impact of NPLs, loan loss provisions, and loans and advances on bank performance as evaluated by ROA and ROE was particularly determined. Secondary data from the annual reports and accounts of the chosen banks for the study period were used in the study. Ratio analysis and the ordinary least squares approach were both used to analyze the data. The study's specific finding is that while loans and advances are positively correlated with ROA and ROE, respectively, and NPLs and loan loss provision are inversely correlated with both. The conclusion is that NPLs have a detrimental impact on commercial banks' performance that cannot be understated and pose a serious threat to the banks' ability to continue operating as corporate business entities. Based on the above findings, the work recommends that banks should maintain high credit standards while the Apex Bank and other regulatory agencies should maintain high

surveillance on banks' credit operations.

In Nigeria from 1994 to 2014, Etale, Ayunku and Etale (2016) [15] looked into the connection between NPLs and bank performance. To evaluate the data gathered for the study from the CBN, NDIC, and annual reports of listed banks, the study used the ADF Unit Root test and OLS techniques. The study's findings indicate that while SUL had a statistically negative negligible impact on ROCE, BAL and DOL had statistically negative significant influences on ROCE. These findings indicate that a high percentage of NPLs would negatively impact Nigerian banks' long-term performance. In order to lower the high proportion of NPLs in Nigeria's banking system, the study advised strengthening credit reporting agencies and supervising authorities.

The level of NPLs can be ascribed to both macroeconomic conditions and bank-specific factors, according to Ekanayake and Azeez's (2015) [12] investigation on the causes of NPLs at licensed commercial banks in Sri Lanka during the years 1999 to 2012. They noted that larger banks experience fewer loan defaults than smaller banks, and that banks with high credit growth have lower levels of non-performing loans. However, the study found with regards to the macroeconomic variables, that NPLs vary negatively with growth rate of GDP, while inflation was positively related to the prime lending rate. DP and M2 narrow money and intermediate money) influence the credit risk of the country's banking system.

Adebisi and Okike (2015) [1] looked into how NPLs affected Nigerian bank firms' profitability. The increased incidence of NPLs in Nigerian bank generated the current literature on quality of banks profitability. Though there have been reforms in the banking industry to ensure effective financial institutions, the bank shareholders' funds are affected by the NPLs. This study made use of secondary data obtained from the Annual Report and Statement of Accounts of the NDIC for a period of seven (7) years (2006- 2012). The statistical methods for regression were used to analyze the data. This indicates that the amount of NPL has no bearing on the enterprises' asset values. The second result indicated that there is a connection between the NPLs and ROE of Nigerian Banks, which has an impact on the owners' wealth maximization. It is advised that banks make sure their clients have reliable ways to pay back the loans, which should be monitored to ensure effectiveness.

In Kenya on the association between NPLs and profitability of microfinance banks (MFBs), Wangai, Bosire, and Gathogo (2014) [40] carried out in Kenya's Nakuru town's microfinance institutions. Credit risk served as the sole independent variable, and financial performance served as the sole dependent variable. The chosen research design was descriptive. The 66 credit and management staff members of the aforementioned microfinance banks made up the target population. The use of a census survey suggests that sampling was not done. A systematic questionnaire was utilized to obtain data from the respondents. Prior to beginning the main investigation, a pilot study was carried out. The instrument's reliability and validity were to be confirmed by pilot testing. The objective of the study was to evaluate both the instrument's content validity. The Cronbach alpha was used to evaluate the reliability. Respondents' perceptions of all research constructs were presented. On the other hand, inferential analysis made it possible to draw conclusions about NPLs and the study's microfinance institutions' financial performance. Statistics

tables that were used. Credit risk was proven to have a major impact on MFBs in Nakuru town's financial performance. The credit risk canceled out the MFBs' financial results. Increased credit risk was predicted to have a considerable negative impact on the financial performance of MFBs. To improve their financial performance, it is predicted that financial institutions, particularly microfinance banks, will be able to devise and implement more suitable methods to reduce NPLs thanks to the study's results and recommendations. Before receiving loans, it is advised that prospective borrowers be subjected to a comprehensive analysis to determine their credit worthiness. The investigation of the financial effects of NPLs in other financial organizations in Kenya, such as saving and credit cooperative societies, is advised by researchers.

Makri, Edson, Manuere, Clifford and Michael (2014) [26] identified the factors affecting NPLs of Euro zone's banking systems for 2000-2008 periods before the beginning of the recession. The study includes 14 countries as a sample out of 17 Euro zone countries. Among the parameters considered were GDP growth rate, fiscal deficit, public debt, unemployment, and loans to deposits ratio. The study utilizes difference Generalized Method of the Moments (GMM) estimation and found real GDP growth rate, ROA and ROE had negative relationship whereas lending, unemployment and inflation rate had positive significant effect on NPLs.

Ali and Iva (2013) [4] studied impact of bank specific factors on NPLs in Albanian banking system. They considered interest rate in total loan, credit growth, inflation rate, and real exchange rate and GDP growth rate as determinant factors. They used OLS regression model for panel data from 2002 to 2012 period. The finding reveals a positive association of loan growth and real exchange rate, and negative association of GDP growth rate with NPLs. However, the association between interest rate and NPL is negative but weak. And also, inflation rate has insignificant effect on NPLs.

The effect of bank-specific determinants on NPLs in the banking sector was examined by Albanian and Shingjergji (2013) [3] using a simple regression model for data analysis. In contrast to return on equity and loans to asset ratio, which had a negative but significant impact on NPLs, the study indicated that capital adequacy ratio had a negative but minor association with NPLs. Their research also revealed a substantial positive association between NPLs and total loan and net interest margin (NPLs).

Using a panel regression model, Ranjan and Chandra (2013) [35] examined the factors influencing the NPLs of Indian commercial banks and discovered that the lending rate had a favorable impact on NPLs (NPLs). This meant that an increase in NPLs was further fueled by changes in cost conditions brought on by increased interest rates (NPLs).

Ahmad and Ariff (2013) [2] looked at the main factors affecting deposit money banks' credit risk when compared to industrialized economies' banking systems. The study concluded that management quality is crucial in the cases of loan-dominant banks in emerging economies, and regulation is key for banking systems that offer a variety of products and services. Increases in loan loss provisions are seen as another important factor in determining possible credit risk. The study also showed that banks in emerging economies have more credit risk than banks in developed ones.

Using correlation and regression analysis Mohammad, Ammara, Abrar, and Fareeha (2012) [27] assessed the effects of selected independent factors on the economic determinants of non-performing loans. NPLs is significantly positively correlated with interest rates, the energy crisis, unemployment, inflation, and exchange rates, while GDP growth rate and NPLs have a strong inverse relationship. Real total loans have a substantial positive correlation with NPLs, although interest rates and GDP per capital have a significant negative correlation.

In their 2012 study, Epure and Lafuente looked at Costa Rica's banking sector's performance in the face of risk from 1998 to 2007. The findings demonstrated that efficiency increases occur in response to regulatory changes, risk explains bank disparities, and NPLs have a negative influence on efficiency and return on assets, while the capital adequacy ratio positively affects the net interest margin.

Kargi (2011) [23] examined how credit risk affected the financial success of Nigerian banks. Financial ratios were taken from the annual reports and accounts of sampled banks from 2004 to 2008 and examined using descriptive, correlation, and regression techniques as indicators of bank performance and credit risk. The results showed that credit risk management significantly affects the financial success of Nigerian banks. It came to the conclusion that the amount of advances, loans, NPLs, and deposits had an adverse effect on the profitability of banks, placing them at significant danger of illiquidity and distress.

Vogiazas and Nikolaidou (2011) [39] looked into the factors that contributed to NPLs in the Romanian banking industry from 2001 to 2010 during the Greek crisis. Their findings indicated that construction and investment expenditure, unemployment and inflation rate and the Romanians external debt to GDP and M2 narrow money and intermediate money) influence the credit risk of the country's banking system. Using quarterly data, Bofondi and Ropele (2011) [10] looked into the macroeconomic factors influencing the bad loans made by Italian banks between 1990 and 2010. They discovered that NPLs are correlated positively with lending rates and unemployment rates while negatively correlated with GDP growth rates.

Kithinji (2010) [24] evaluated how credit risk management affected Kenya's deposit money banks' profitability. For the years 2004 to 2008, information on credit volume, the proportion of NPLs, and profitability was gathered. The results showed that the quantity of credit and non-performing loans had little to no impact on the majority of Deposit Money Bank earnings, which suggests that factors other than credit and NPLs have an impact on profits.

3. Methodology
In conducting this research, the area of study focuses on some selected deposit money banks in Nigeria from which the data required for a thorough analysis were derived. The longitudnal/panel research design was adopted for this study since it involves the collection of extensive and cross-sectional data for the purpose of describing and interpreting an existing situation under study. The data were sourced from the annual report and accounts of the selected deposit money banks. Data were computed from the data extracted from the annual reports of the banks and ratios were

computed from the figures as reported in the annual reports from 2010-2021. The variables are sub-standard loan, doubtful debt, lost, loan to assets ratio (independent variables), and return on assets (dependent variable). The model used for this study was adapted from the work done by Bishnu (2020) [9]. His model is stated as thus:

$$ROE = f(NPL, CAR, LIQ, SIZE, INF) \qquad (1)$$

This present study functionally modified the above model to suit our objectives as thus:

$$ROA = F (SSD, DD, LOST, LAR) \qquad \text{Model 1}$$

Where:
ROA = Return on asset
SSD = Substandard debt
DD = Doubtful debt
LOST = Lost
LAR = Loan to assets ratio
E = Error term

The econometric equation of the model can be expressed as

$$ROA_{it} = \alpha + \beta_1 SSD_{it} + \beta_2 DD_{it} + \beta_3 LOST_{it} + \beta_4 LAR_{it} + \mu_{it} \qquad (2)$$

$$ROA = Bo + Log\ \beta_1 SSD + Log\beta_2 DD + Log\beta_3 LOST + Log\beta_4 LAR + \mu \qquad (3)$$

Where:
B_0 = constant intercept which shows the level of ROA
β_1 = coefficient of parameter SSD
β_2 = coefficient of parameter DD
β_3 = coefficient of parameter LOST
β_4 = coefficient of parameter LAR
μ_1 = the stochastic error term or disturbance variable.

4. Findings and discussion
4.1 Descriptive Analysis of Data
The variables' descriptive statistics are shown in Table 2. It shows the total number of observations, mean, median, maximum, minimum, standard deviation and sum of mean deviation. The mean values of the variables: ROA, SSD, DD, LOST and LAR, are 0.02, 1,430,835, 5,963,522, 2,544,222 and 0.41 respectively, while the median of the study variable are 0.01, 950715, 272649, 141913 and 0.44. The maximum values of the series are 0.124890 for ROA, 3.71E+08 for SSD, 1.03E+08 for DD, 3.69E+08 for LOST, and 0.617000 for LAR, whereas the minimum values are -0.020510, 339.0000, 328.0000, 0.000000 and 0.002660 respectively for ROA, SSD, DD, LOST and LAR. The standard deviation of the variables are 0.020850, 51563110, 13904696, 73145975 and 0.143229 for ROA, SSD, DD, LOST and LAR respectively. All variables, with the exception of LAR, have positive skewness, a measure of the asymmetry of the series' distribution around its mean. More than 3.0 is the value of the Kurtosis, which gauges how peaky the variable distribution is. The p-values of the Jarque-Bera for all the variables are significant at 5% level meaning that all the variables are normally distributed and free from any outlier that may affect the regression output.

Table 2: Descriptive Properties of Data

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	P-value	Obs
ROA	0.021149	0.015380	0.124890	-0.020510	0.020850	2.134581	10.21822	342.8513	0.0000	117
SSD	1430835	950715.0	3.71E+08	339.0000	51563110	5.533755	35.12426	5627.982	0.0000	117
DD	5963522	272649.0	1.03E+08	328.0000	13904696	4.320961	25.92810	2926.855	0.0000	117
LOST	2544222	141913.0	3.69E+08	0.000000	73145975	3.430730	13.85209	803.6317	0.0000	117
LAR	0.412198	0.439150	0.617000	0.002660	0.143229	-1.287536	4.360165	41.34511	0.0000	117

Source: Output data from E-views 10.0

Panel Unit Root Test
Levin, Lin and Chu (LLC) Test
The panel unit root test in Tables 3 and 4 emphasize that all the variable are stationary at first difference. The LLC test was performed at first difference at individual intercept and individual intercept and trend. The outcome of the panel unit root test using LLC demonstrates that every variable is stationary at first difference and free of the stationarity defect associated with the majority of time series data, allowing for the testing of the long-term co-integration relationship between the variables.

Table 3: LLC Test Result at First Difference: Individual Intercept

Variables	LLC Test Statistic	Pooled Coefficient	Pooled t-Stat.	Remark
ROA	-10.6227 (0.00)*	-1.60439	-14.602	Stationary
SSD	-3.21667 (0.00)*	-1.52481	-8.140	Stationary
DD	-4.91532 (0.00)*	-1.38393	-9.371	Stationary
LOST	-3.09171 (0.00)*	-1.23966	-9.687	Stationary
LAR	-4.13721 (0.00)*	-1.19557	-9.144	Stationary

Source: Output Data using E-view 10.0.

Table 4: LLC Test Result at First Difference: Individual Intercept and Trend

Variables	LLC Test Statistic	Pooled Coefficient	Pooled t-Stat.	Remark
ROA	-11.6121 (0.00)*	-1.70717	-17.497	Stationary
SSD	-10.0641 (0.00)*	-1.99425	-10.279	Stationary
DD	-9.71022 (0.00)*	-1.82685	-15.076	Stationary
LOST	-10.9407 (0.00)*	-1.37207	-9.577	Stationary
LAR	-6.94077 (0.00)*	-1.49005	-13.527	Stationary

Source: Output Data using E-view 10.0.

Panel OLS Analysis of Non-Performing Loans and Profitability of Selected Deposit Money Banks
The pooled OLS, fixed and random effect were the estimation approaches used. The result of the panel OLS estimations for the model is detailed in Table 5. The global and relative utility of the models were adopted in interpreting the output of the regression estimates. The Hausman test in Table 5 suggests that the random effect estimation is preferred to fixed effect due to insignificant p-value of the Chi-square. The outcome shows that there is a significant negative association between the DMBs substandard debt, loan to assets ratio, and return on assets. Similar to this, there is a strong positive correlation between the DMBs lost and return on assets. On the other hand, the selected Nigerian DMBs return on assets and questionable debt had a negligible positive association. A percentage increase in sub-standard debt and loan to assets ratio lead to a significant 1.1000 and 0.037 factor depreciation in return

on assets. Not the same vein, albeit insignificantly, an increase of one unit in losses causes a 3% increase in the return on assets of Nigerian deposit money institutions. Unimportantly, a unit rise in questionable debt causes a 15% increase in the DMBs return on assets.

The explanatory factors significantly and collectively explained 13.06% differences in return on assets of the chosen deposit money banks in Nigeria across the study period, according to the modified R-square value of 0.130599. Sub-standard debt, dubious debt, lost, and loan to asset ratio strongly explained the differences in return on assets, according to the F-statistic, which determines the overall significance joint effect of the independent variables, as the p-value (5.356287) is significant at the 5% level. The conventional test for autocorrelation in a model, the Durbin Watson statistic (1.77), indicates that the variables in the model are not serially correlated.

Table 5: Panel OLS of Profitability and Non-Performing Loans

Variables	Pooled OLS		Fixed Effect		Random Effect	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	0.034882	0.0000	0.036057	0.0000	0.035012	0.0000
SSD	-1.08E-10	0.0105	-1.30E-10	0.0046	-1.10E-10	0.0092
DD	2.15E-10	0.1598	2.36E-10	0.1494	2.17E-10	0.1576
LOST	7.17E-11	0.0333	8.15E-11	0.0197	7.29E-11	0.0303
LAR	-0.037101	0.0044	-0.040107	0.0041	-0.037423	0.0042
R-squared	0.157605		0.247427		0.160578	
Adjusted R-squared	0.127520		0.135659		0.130599	
S.E. of regression	0.019475		0.019384		0.019344	
Sum squared resid	0.042481		0.037951		0.041909	
Log likelihood	297.3558		303.9517			
F-statistic	5.238579		2.213755		5.356287	
Prob(F-statistic)	0.000663		0.010273		0.000553	
Durbin-Watson stat	1.783231		1.712930		1.772677	
Hausman Specification Test						
Chi-Sq. Statistic	3.507291					
P-value	0.476800					

Source: Output Data using E-view 10.0.
Note: Periods included: 12, Cross-sections included: 10, Total Number of Observations: 117

Granger Causality Effect Analysis
With regard to effect determination, the granger causality test was chosen. The essence of choosing the granger causality over ordinary least square regression is based on the fact that it takes into consideration the dynamic nature of variables. Furthermore, for a variable to have effect on another it must cause it move or granger cause it, and it is only the granger causality test that offers such tool of effect

assessment. The lag length selected was one (1) on the premises that the data applied were gotten from the financial statement of the bank were on yearly/annual bases. The result in According to Table 6, non-performing loans broken down into sub-standard debt, dubious debt, loss, and loan to assets ratio have no discernible impact on the DMBs profitability as assessed by return on assets. This is on the argument that causality do not flows from sub-standard debt, doubtful debt, lost, and loan to assets ratio to return on assets at 5% level of significance.

Table 6: Granger Causality Test on Profitability and Non-Performing Loans

Null Hypothesis:	Obs	F-Statistic	Prob.	Remarks
SSD does not Granger Cause ROA	107	0.93320	0.3363	No Causality
ROA does not Granger Cause SSD		0.67318	0.4138	No Causality
DD does not Granger Cause ROA	105	3.79939	0.0540	No Causality
ROA does not Granger Cause DD		0.62479	0.4311	No Causality
LOST does not Granger Cause ROA	107	2.00289	0.1600	No Causality
ROA does not Granger Cause LOST		0.01937	0.8896	No Causality
LAR does not Granger Cause ROA	110	0.54596	0.4616	No Causality
ROA does not Granger Cause LAR		1.08455	0.3000	No Causality

Source: Output Data using E-views 10.0

Discussion of Findings

Table 5 unveils the short-run relationship between non-performing loan and profitability of DMBs in Nigeria. It was disclosed that sub-standard debt and loan to assets ratio have significant negative relationship with profitability with reliance on return on assets. This result follows the side of previous researchers such as Osakwe, Ananwude and Nduka (2019) [33], Arif, (2020) [6], Bishnu, (2020) [9], Okoh, Inim and Idachaba (2019) [31], Jonathan and Michael (2018) [21], Felix and Claudine (2018) [16], Ozurumba, (2016) [34], Makri, Edson, Manuere, Clifford, and Michael (2014) [26], Wangai, Bosire and Gathogo (2014) [40]. Non-performing loans have been shown in studies by Epure and Lafuente (2012) [14] and Etale, Ayunku, and Etale (2016) [15] to negatively affect the profitability of banks that accept deposits. On the contrary, doubtful debt and lost were found to have positive relationship with profitability of banks which is in line with prior studies such as Ekanayake and Azeez (2015) [12], Albanian and Shingjergji (2013) [3], Saba, Kouser and Azeem (2012), Ahmad and Ariff (2013) [2] and Ali and Iva (2013) [4].

The granger causality test in Table 6 refutes the claim that non-performing loans in Nigeria's designated DMBs have a major impact on their profitability. This may be attributed to the off-balance engagements of deposit money banks in Nigeria which is used to cover up for debts written off. In addition, it may be attributed to the fact that most DMBs make a lot of profit based on the fee/charges from customers through financial innovation services provided by the banks. This non-significant effect of non-performing loans on profitability is in line with the researches of Oke and Wale-Awe (2018) [30], Kithinji (2010) [24] and Adebisi and Okike

(2015) [1]. However, it is in disagreement with Besmir & Muhamet (2021) [8], Eniafe, (2020) [13], Shahid, Gul and Naheed (2019) [36], Osakwe, Ananwude and Nduka (2019) [33], Kargi (2011) [23], and Oloruntoba, Zaid and Oluwafolakemi (2018) [32] who established the significant effect of non-performing loans on profitability of banks.

5. Conclusion and recommendations

This study examined the effect of non-performing loans on the profitability of selected Deposit Money Banks (DMBs) in Nigeria from 2010 to 2021. Non-performing loans threaten the profitability of banks, as it reduces both the bank's profit and its capacity to effectively and efficiently perform intermediation functions in the economy. The preliminary findings showed mixed and conflicting results on the connection between non-performing loans and DMBs profitability. Despite this, this study shows that non-performing loans did not significantly affect the profitability of some selected deposit money banks in Nigeria throughout the study period based on the results of the Granger causality test.

The study recommends as follows:

1. The significant negative association between sub-standard debts and profitability points to the need for banks' management to follow the guidelines in granting short-term loan (1-90 days duration) to customers. The issue that a client is a big customer in particular, and would not afford to lose it to another bank should be completely be kept off on credit activities of the banks.

2. DMBs are advised to diversify the lending to different sectors of the economy. Concentration of lending to a particular sector of the economy, for instance, oil and gas should be jettisoned to avoid an accumulation of doubtful debt when there is fluctuation in the price of oil in the international market.

3. The CBN notion of credit rating and scoring should be adopted by banks through the prudential guidelines in order to improve their credit administration and management which will eventually increase their profitability.

4. DMBs should put in place effective loan processing and aggressive loan recovery techniques so as to maintain sound and profitable banking. They should also source and receive sufficient information to enable a detailed assessment of the true risk profile of the borrowers.

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