Impact of Risk Asset Management on Financial Performance of Listed Deposit Money Banks in Nigeria

Amakwe, Rose-Mary Ngozi [a++*], Nwankwo Arinze Henry [a], Ndukwe Orji Dibia [a#], John Uzoma Ihendinihu [b#] and Ude Obasi Ogbu [a]

[a] Department of Accounting, Faculty of Economics and Management Sciences, Abia State University, Uturu, Nigeria.
[b] Department of Accounting, College of Management Sciences, Michael Okpara University of Agriculture, Umudike, Umuahia, Abia State, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The financial feat of Deposit Money Banks (DMBs) in Nigeria is influential to its economic growth and development. DMBs generally play a vital role in the development of the economy. The major role of a bank is embedded in its intermediation function of transferring funds from surplus units to the deficit units through lending activities. This study investigated the effect of risk asset management on the financial performance of selected listed DMBs in Nigeria. The study applied a

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[++]*Postgraduate Student;*
[#]*Professor;*
Corresponding author: Email: nwankwo.arinze@abiastateuniversity.edu.ng;

descriptive and ex-post facto research design. The sample size was twelve (12) listed deposit money banks selected from a population of all the listed deposit banks within the period of study from 2012-2022. Data for the study were extracted from secondary sources, specifically annual reports and accounts of the selected deposit money banks for the period. Data generated for this study were analysed using the panel Generalised Method of Moments (GMM) of the E-Views 10 statistical package. The results revealed that loans and advances, as well as investment securities, have a significant positive influence on the return on equity of DMBs in Nigeria. The values of m-statistics for both AR (1) and AR (2) of -0.980663 and 0.035556 have proven to be insignificant at 5% level (p-values of 0.3268 and 0.9716 are both > 0.05). Therefore, the null hypothesis that proposes the absence of serial correlation is not rejected, and it is concluded that there is no serial correlation in the series. The probability of the J-statistic of 8.380227 is reported as 0.397237, and this affirms the validity of the model as supporting evidence for the results obtained using the first differences transformation. The study concluded that risk asset management has a significant positive impact on the financial performance in accordance with the A priori expectation of the study. The study therefore recommends that risk assets of deposit money banks should be consistently analysed and classified to reduce the level of non-performing loans, while resources should be channelled in the area of loans and advances and in investment securities as they impact positively on the returns generated by listed deposit money banks in Nigeria.

1. INTRODUCTION

The banking sector is central to the growth of any economy, but its impact depends on the level of resources available via its ability to create loans and advances. One of the fundamental functions of banks is to mobilise and direct available savings and funds to economic areas that have liquidity deficits and demand for these savings through credit activity. Thus, their performance is critical in discharging this responsibility (Kumshe et al., 2024). The financial feat of Deposit Money Banks in Nigeria is influential to its economic growth and development (Abu et al., 2016). However, Olarewaju and Adeyemi (2015), as quoted by Wisdom et al (2021), asserted that DMBs generally play a vital role in the development of the economy. The major role of a bank is embedded in its intermediation function of transferring funds from surplus units to the deficit units through lending activities (Kajola et al., 2018). This highly demanding function of the banks came with associated risks, ranging from credit risk, liquidity risk, operational risk and so on. These risks affect the quality of assets traded by the banks; hence, their impact on the financial condition of banks is critical (Kayode et al., 2015). Sulaiman (2001), cited in Kayode et al. (2015), discloses that the inability of the bank's management to identify problem assets remains a serious deficiency among the Nigerian banks. This is probably due to ignorance or the desire to

have a robust financial status. This leads to the presentation of accounts that do not reflect the true financial condition of the institution, giving overstated profits from which dividends and taxes are paid (Alagbe & Yinus, 2025). When such acts of negligence are discovered by the regulators, the affected banks are usually required to make up for the shortfall in provisions with adverse consequences in their financial reports. Consequently, this negatively affects the banks by eroding the profit of subsequent periods with resultant losses, causing serious damage to their capital adequacy ratios and ultimately the quality of the assets of the banks (Ojo, 2010, cited in Kayode et al., 2015). Financial markets have become highly institutionalised. A vast literature examines whether actively managed funds outperform passively managed ones. A related literature investigates whether the growth of passive funds has made markets less efficient and whether efficiency increases in the ratio of active to passive (Buffa et al., 2022).

Interest accumulates from loans and advances given by banks, including deposits made by customers. The difference between the two interests forms their profit or loss. The banks can only leverage on this profit if the borrowers do not default in paying either the principal or the interest, or both. However, there is the possibility of default on the part of the borrower (Inegbedion

et al., 2020). This underscores the need for adequate management of risk assets by Nigerian banks to enhance financial stability.

Deposit Money Banks are the backbone of the financial system, which provides capital for job creation, infrastructure, and overall growth of the system, leading to general economic development (Edem, 2017). Financial innovation has been used by many banks as a formidable strategic variable to outweight any form of competition among the deposit money banks, by which banks can improve their performance while simultaneously being able to maintain their effectiveness in the market (Ibekwe, 2021). However, since the inception of the banking system in Nigeria, many banks have allegedly failed due to the problem of poor risk asset management. In addition, the early phase of the global financial crisis that started in 2007 indicates that many banks, notwithstanding their adequate capital capacities, had some challenges due to inadequate risk asset management. To this end, management of risk assets of banks is crucial to their survival and growth of the economy (Graham & Bordeleau, 2010) cited by Onyekwelu et al. (2018).

Ogundele et al. (2021) stated that statistics from the Nigeria Deposit Insurance Corporation (NDIC) reveal that non-performing loans increased in 1997, from N0.01 trillion to N2.09 trillion in 2009, decreased to N0.65 trillion in 2015, increased to N2.36 trillion in 2017, and decreased to N1.79 trillion in 2018. Indicating more amounts on rise despite policies by the government, such as "Know Your Customers" (KYC) introduced by the Basel Accord Committee. These non-performing loans stagnate real estate growth, reduce banking liquidity and credit expansion, all of which have direct negative implications on the banks' operations. Similarly, investment securities are among the risk assets traded within the banking sector. Risk is always a major factor to be considered in any transaction involving financial intermediation. Management is exposed to some level of risk when making most decisions about some investment portfolios, and these decisions are crucial to the performance of the affected businesses, hence the need for caution in trading on such risky assets by financial institutions (Ndubuisi & Amedu, 2018).

Finally, the sensitivity of banking activities and incessant crises characterising the banking industry attracted a global response in the form of the Basel Accords. The first was in 1988, known as Basel I, and subsequently, Basel II fixed a minimum capital adequacy ratio at 8% and lastly, in 2010, Basel III raised it to 10.5% of the risk-weighted assets of the banks. This policy was made in pursuance of promoting stability and efficiency of the financial system through direct reduction of any likelihood of insolvency of the banks (Abba et al., 2018). Most of these risk assets' greatest task of management has been discerned to be the booking of these risk assets for creditworthy customers who will meet maturing obligations as they fall due (Akande & Alalade, 2019). It is against this background that this study is geared towards determining the extent to which risk asset management impacts the financial performance of Nigerian deposit money banks in Nigeria.

1.1 Statement of the Problem

Deposit money banks operate on financial intermediation by creating loans and advances from surplus units, and transferring to deficit units to receive interest as returns. This singular service by banks is associated with various risks, ranging from credit risk, liquidity risk, and market risk. The fact that loans and advances keep the banks liquid and also generate returns pushes them to continuous trading on this risk asset, hence increasing the chance of defaults. However, the quest to capture a large portion of the market in this very important business has landed many banks in crises such which led to the financial distress experienced in the sector from the period of 2008 to 2009.

Loans and advances provided by deposit money banks are expected to be settled both principal and interest in accordance with the specified agreement reached with the customers. Unfortunately, any default in repayment at the specified period may lead to an increase in non-performing loans or complete bad debt, which may ultimately dwindle the financial strength of such banks. Furthermore, Taiwo et al. (2017) relate the establishment of the Asset Management Corporation of Nigeria (AMCON) to tackle the problem of bad and doubtful debts arising from these risk assets traded by deposit money banks. The Central bank authorities in December 1987 established Basel I and II accords to counteract some of the activities of deposit money banks, including a constant rise in non-performing loans and advances. The committee placed emphasis on the banks meeting the capital adequacy requirement to

mitigate against credit risk (Greuning & Sonja 2003, as cited in Abubakar et al., 2019).

However, financial institutions' existence and survival are threatened by poor management of various risks, which could lead to poor financial performance. Since the inception of banking institutions in Nigeria, many banks have failed due to traceable problems of poor risk management vis-à-vis inadequate management of risk assets, hence the integration of appropriate risk asset management practices into Nigerian deposit money banks as a sacrosanct to their survival and growth.

However, investment securities are also risk assets traded by deposit money banks in Nigeria, which also face price volatility in the market, which can equally affect the profitability of a bank. Adegbie and Dada (2018) posit that failure to adequately manage risk assets and liquidity risk will invariably lead to failure to harness the benefits of growth in quality assets, achieving high profit, paying dividends to equity owners, as well as meeting other objectives of other stakeholders.

The above scenario has become a worrisome situation to the finance industry, this is also supported by the empirical studies with diverse findings such as Apochi and Baffa (2022) "evaluation of credit risk and financial performance of deposit money banks in Nigeria found non-performing loan ratio negatively impacting on return on asset in a significant manner"; contrary to Wisdom, Obiajulu et al (2021) investigated "liquidity management implications for financial performance of Nigerian deposit money banks which revealed a significant positive relationship between the current ratio of the banks and their return on assets"; Furthermore, in 2020, Inegbedion et al while assessing risk management and financial performance of banks in Nigeria equally found among others that non-performing loan ratio to have a negative impact on return on average asset and average equity: Also, Olugboyega et al. in 2019 evaluated "the effect of credit risk management on financial performance of Nigerian listed banks and found out that non-performing loan to total loan ratio has a significant positive impact on both return on asset and return on equity while non-performing loan to total deposit ratio has a significant negative effect on return on asset and return on equity". These conflicting results in recent times

still point to the fact that the effect of risk asset management on financial performance in Nigerian deposit money banks remains a topic that needs further investigation to enable the researcher to take a position, as well as bring the literature and data up to date.

Objectives of the study:

The main objective of the study is to determine the impact of risk asset management on the financial performance of listed deposit money banks in Nigeria. However, the specific objectives are as follows:

i. To evaluate the impact of loans and advances on the return on equity (ROE) of listed deposit money banks in Nigeria.
ii. To investigate the impact of investment securities on the return on equity (ROE) of listed deposit money banks in Nigeria.

Research questions:

In addressing thespecific research objectives above, the following questions were raised:

i. To what extent do loans and advances impact the return on equity (ROE) of listed deposit money banks in Nigeria?
ii. What is the impact of investment securities on the return on equity (ROE) of listed deposit money banks in Nigeria?

Research hypotheses: The study investigated the following hypotheses formulated in null form.

H_{01}: Loans and advances do not have any significant impact on the return on equity (ROE) of listed deposit money banks in Nigeria.

H_{02}: Investment securities do not have any significant impact on the return on equity (ROE) of listed deposit money banks in Nigeria.

2.CONCEPTUAL FRAMEWORK

The diagram below illustrates the breakdown of the independent and dependent variables. However, the following concepts were reviewed: Risk asset, risk asset management, and financial performance.
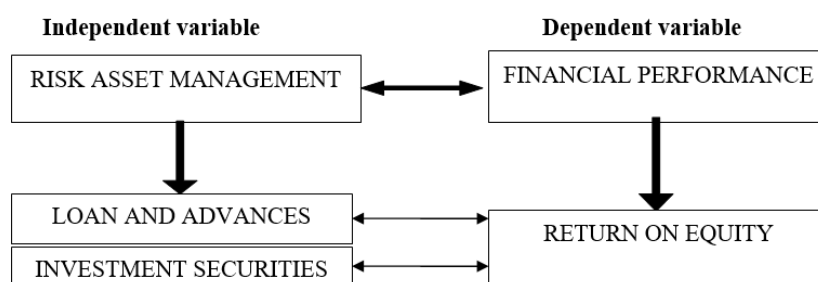
Independent variable		Dependent variable
RISK ASSET MANAGEMENT	⟷	FINANCIAL PERFORMANCE
LOAN AND ADVANCES	⟷	RETURN ON EQUITY
INVESTMENT SECURITIES	⟷	

Fig. 1. Analysis of Dependent and Independent Variables
Source: Researcher design, (2025)

Risk asset: An asset is something of monetary value that provides a stream of income or benefits to its owner, which could be subject to capital gains or losses. "An asset is defined by the Conceptual Framework for financial reporting as a resource controlled by the entity as a result of a past event and from which future economic benefits are expected to flow into the entity" (IASB, 2010, cited in Bereh et al., 2020). If an asset loses its ability to generate future economic benefit through depreciation or amortisation and impairment, it shall be treated as an expense in the income statement. As a matter of principle, any asset that falls out of the control of an entity or no longer has the ability to generate future economic benefits to the entity is to be de-recognised as such (IAS 16, 2008; IAS 36, 2008 cited in Bereh et al., 2020).

Any item that has some monetary value is an asset, and when there is the likelihood that that monetary value may not be realised, it is risky. Any asset that has some element or carries a degree of risk is referred to as a risk asset. It is an asset that has a significant degree of price volatility, such as equities, commodities, high-yield bonds, real estate and currencies. When the price of an asset is subject to constant changes based on market forces, that asset is said to be risky in nature, for instance, loans and advances. According to Bereh et al. (2020), banks' assets are basically loans and advances, investments and non-current assets, while their liabilities include deposits in the form of savings, both current and fixed term, as well as owners' equity.

Risk assets are crucial and necessary for the solvency or survival of the financial institutions, especially deposit money banks. Illiquidity of banks can lead to loss of businesses, which will ultimately reduce potential returns. This is because a high liquidity position helps the bank

to meet financial commitments, including funding of loans and advances that could equally enhance profitability via interest on such loans (Onyekwelu et al., 2018). These investments and loans, and advances fall among the basic risk assets that generate the majority of the returns of a bank; hence, their management is critical to the survival and growth of the bank, viz-a-viz the enlarged economy. Hamisu et al. (2021) assert that the success of a bank depends on how efficiently it manages its risk assets in relation to other types of risks, ranging from market risk, liquidity risk, operational and political risk. Risk assets traded by banks include assets affected by changes in interest rates, credit quality, repricing opportunities such as loans and advances, investment portfolios, real estate, and other assets relating to off-balance sheet transactions (Kayode et al., 2015).

There are many risk assets in which Nigerian deposit banks trade. However, this study shall restrict its scope to loans and advances as well as investment securities. These were chosen because, according to Kayode et al. (2015), the relationship between bad credit policy, weak management, inadequate internal supervision, as well as poor lending practices, seems to be the most serious causes of distress in Nigerian financial institutions. Assessment of the quality of these risk assets is sacrosanct to the well-being of any deposit money bank.

Risk asset management: Management is an act of planning, organising, controlling, coordinating, and leading with the aim of achieving a particular goal, while risk is the possibility that an actual outcome will be different from the expected outcome of an event or transaction. Therefore, risk management has been defined as the identification, assessment, coordination, prioritisation of risk, as well as effective and efficient application of resources to monitor,

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control and possibly minimise the probability of any negative outcome or to maximise the actualisation of positive results (Paulinus & Jones, 2017). A risk asset, as described earlier, is any asset that has an element of risk. However, risk asset management is the act of applying the management principles to risk assets to ensure that the desired outcome is actualised. It is the identification, assessment, coordination, and prioritisation of risks associated with assets traded in the financial institution which are affected by price volatility and their effective and efficient application in order to prevent any negative outcome. Furthermore, Amakwe (2016) describes risk asset management as the act of identifying potential risk assets, measuring them and taking precautionary measures to ensure that no negative outcome is realised or that such a negative outcome is reduced to the barest minimum. However, different organisations, including financial institutions, use different financial models when assessing the creditworthiness of potential borrowers in order to minimise default risk. The most commonly used is the "5c's of credit" of financial analysis tools, namely: character, capital, capacity, condition and collateral (Machiraju, 2004; cited in Nwanna & Oguezue, 2017).

Loan and advances: When an organisation or individual decides to seek funds for the expansion of a business or the purchase of land, the best option is a loan, but when an institution seeks to raise a short-term fund to pay salaries, purchase materials and other office expenses, an advance is the best. A loan is a fund that is borrowed with the expectation of paying back with interest on a specific due date, while an advance is a means of funding by a bank to other institutions to meet their short-term needs, which are often less than one year. For this study, loans and advances are merged as one, thus undergo the same application process.

A loan is a type of credit vehicle in which a particular sum of money is lent to a second party for future repayment of the principal amount and sometimes with additional interest. It may be in the form of personal, commercial, secured or unsecured loans. Also, it may be a one-time amount or an open-ended line of credit up to a specified limit. The ability of a bank to provide loans and advances requires the existence of a highly liquid and readily transferable stock of financial assets.

However, a major determinant of credit risk in deposit money banks is the ratio of non-performing loans to total loans, which reveals the quality of a bank's loan portfolio. This is the percentage of the total loans and advances that are on the verge of going bad. A higher ratio indicates that the management of such a bank is not efficient in evaluating loan applications. Furthermore, it sends a signal of higher probability that most of the loans might not be recovered. According to banking guidelines as explained by Nwanna and Oguezue (2017), "there are three categories of non-performing loans, namely: sub-standard, doubtful and lost; furthermore, licensed banks are expected to make adequate provisions for perceived losses based on the credit portfolio classification system in order to reflect their true financial condition (known as loan loss provision either specified or general)".

Investment securities: Investment securities are traceable financial assets such as equities, fixed income instruments and so on, that are sourced with the expectation of holding them for profit motive. Banks often purchase marketable securities to hold in their portfolios for resale at a return. Investments in securities earn interest or dividends depending on whether they are in debt or equity instruments. It also provides banks with the merit of liquidity in addition to the profits realised via capital gains when sold. However, an investment portfolio may be exposed to different risks; accordingly, Kayode et al. (2015), a bad portfolio may attract liquidity problems. Abu-Rumman et al (2021) risk reductions are one of the determinants of banks' returns in securities, therefore necessary for banks to meticulously select their investment securities portfolio.

Financial performance: Financial performance explains the extent to which any set financial objectives have been or are being realised. It measures the result of an organisation's operations and policies in quantitative terms. "It is a measure of how well a firm uses its assets from the primary mode of business to generate income" (Wisdom et al., 2021). Furthermore, Ogundele et al (2021) describe "financial performance as a measure of an organisation's overall financial health over a specified period of time". In addition, Apochi and Baffa (2022) define "financial performance as a measure of how a bank uses its assets from the major objectives of operation to generate profit". It is the ability of a bank to generate new resources from daily operations over a specific period of time

(Rajkumar & Hanitha, 2015, as cited in Abubakar et al., 2019). Financial performance has been described by Inegbedion et al (2020) as a subjective measure of how well an organisation can deploy its assets from the primary mode of business to generate returns.

"Financial performance is the holistic assessment of a firm's financial well-being, which can be measured with different performance indicators such as earnings per share, return on capital employed, return on equity, return on assets, and profit after tax. It is imperative to analyse the financial statements periodically to determine the financial status and well-being of an organization".

Return on equity (ROE): The return on equity (ROE) is the ratio of net income to total equity, indicating profit to the shareholders on the book value of their investments. It measures the rate of return for ownership interest, that is, the shareholders' equity or owners of common stock. It is referred to as the fiscal year net income (after preferred stock dividend, before common stock dividend divided by total equity. It explains how good a business is at generating returns on the investment it received from its shareholders. ROE, usually expressed as a percentage, is a measure of financial performance calculated by dividing the net income by the shareholders' equity. It depicts how efficient an organisation or bank is at generating profits from each unit of shareholders' equity, also known as net assets or assets minus liabilities. In the finance industry, "it measures the bank's profitability by calculating how much profit is generated with the money invested by shareholders. It is the best and most common measure of profitability as it does not consider factors such as timing of cash flows or turnovers" (Angela, 2016, as cited in Nwanna & Oguezue, 2017).

Investors use ROE to determine if they are getting a good return on their investment, as it is used to evaluate how efficiently equity funds are utilised. It is advisable to compare the ROE of a firm to that of the industry's ROE average, and also vital to combine it with other financial ratios to get a complete and informed picture of the firm for proper evaluation purposes. It is also worth mentioning that a high ROE could mean that a firm is more successful in generating profit internally. However, it does not fully show the risk associated with the return. For the purpose of this research,

$$\text{ROE} = \frac{\text{NI}}{\text{SHE}}$$

Where;

ROE = Return on Equity
NI = Net Income
SHF = Shareholders' equity

Theoretical review: This study made use of shift-ability theory and credit risk theory to enhance the theoretical understanding of the topic under investigation.

Shift-ability theory: This theory was propounded in 1918 by M.G. Moulton in the course of publishing his article, Commercial Banking and Capital Formation. It states that a bank's liquidity is well maintained if it holds quality assets that could be transferred, marketed or sold to other lenders for cash (Wuaveet al., 2020, and Onyekwelu et al., 2018). The emphasis of this theory is on the ability to transfer these risk assets to another or a source at a price. The theory assumes that assets can also be held in other transferable open-market portfolios such as government securities and the like, and not just tied to self-liquidating short-term loans (Inegbedion et al., 2020; Mot et al., 2012; as cited in Onyenwe, 2019).

The theory promotes constant liquidity within the bank by prompt transfer or shifting of assets from surplus to deficit. By doing so, the banking system runs more efficiently. Hence, Adegbie & Dada (2018) posit that a bank is guaranteed future liquidity if the facility is secured with assets that can be sold in an open market at a price. Shift-ability theory encourages banks to hold short-term open market investments in their portfolio of assets and also, more importantly, redirects the attention of bankers and the authorities from loans to investment (Onyenwe, 2019). It explains that transferability, marketability and shiftability of banks' assets are a basis for ensuring liquidity. A bank's liquidity will be enhanced if it always has highly marketable securities to sell at a discount to a ready buyer (Onyekwelu et al., 2018; Wuave et al., 2020). This theory is relevant to this study as it lays emphasis not only on short-term loans and advances but also on transferability, marketability and shiftability of securities or a portfolio of assets.

Credit risk theory: Credit metrics is a credit risk model that the development was developed by

David M. Rowe and finalised by J. P. Morgan in the early 1990s. This model originally uses statistical techniques such as credit ratings, credit spread, correlations and so on to gather historical data on credit transactions in order to determine the credit risk of a portfolio.

However, the risk of default in payment of either the principal or interest or both of a loan or advance is credit risk, which is the lender's risk. Credit risk theory lays emphasis on the lender testing the credit worthiness of individual potential borrowers. It could extend to compelling the prospective borrower to take insurance via mortgage or get guarantees of third parties, or paying high-interest risk. This is due to the fact that the risk to be taken should be directly proportional to the interest rate, hence the higher the risk, the higher the interest rate to be paid by the borrower (Owojori et al., 2011, as cited in Inegbedion et al., 2020). Deposit Money Banks are encouraged to apply all forms of credit models to analyse potential borrowers. The choice of credit risk model depends on the organisational needs and the type of credit exposure, thus some firms can combine two or more models to gain a more competitive advantage over others regarding risk/portfolio management.

Credit metrics have impacted the finance industry by encouraging the use of quantitative methods and risk management practices in credit risk assessment, hence their significance in this study.

Empirical review:

Previous investigative studies related to the topic under investigation were reviewed to support the study as follows:

Usman and Aliyu (2023). **"Impact of Credit Risk Management on Financial Performance of Deposit Money Banks in Nigeria: A Conceptual Review.** The objective of this study is to conceptually assess the impact of credit risk management on the financial performance of Deposit Money Banks in Nigeria". The methodology of this work is qualitative, and hence, over 35 journals and publications were reviewed. Return on Equity (ROE) and Return on Asset (ROA) were used as the performance indicators, while Loans-to-Deposit Ratio (LDR), Non-Performing Loans (NPL) and Capital Adequacy Ratio (CAR) were used as credit risk management indicators. The findings revealed

that credit risk management has a significant impact on the financial performance of Deposit Money Banks in Nigeria. It is therefore suggested that to enhance financial performance and minimise the risk of non-performing loans in the future, banks must watch very carefully the loans' performance and analyse thoroughly the clients' credit history and ability to pay back their debts prior to any approval of loan applications. Furthermore, banks should continuously improve their asset utilisation, liquidity, and techniques of managing operating costs, improve the impact of capital adequacy, and the use of deposits for lending activities from a weak positive impact to a significant positive impact on their profitability. The researchers recommend that future studies on credit risk management influence on banks' financial performance should consider more independent variables and longer periods of study, such as twenty or thirty years, to have more accurate and generalised results.

Natufe and Evbayiro-Osagie (2023) "credit risk management and the financial performance of deposit money banks: This study examined credit risk management and return on equity of Nigerian deposit money banks (DMBs), twelve (12) years (2010–2021) post-adoption of the common accounting year-end as mandated by the Central Bank of Nigeria (CBN) in 2009. Our data set comprises independent variables of capital adequacy ratio (CAR), liquidity ratio (LQR), loan-to-deposit ratio (LDR), risk asset ratio (RAR), non-performing loans ratio (NPLR), loan loss provision ratio (LLP), and size (SZ). Our dependent variable is the return on equity (ROE). Using a panel data regression analysis, we found that CAR, RAR, NPLR, and SZ are the significant determinants of ROE. We also found that Nigerian DMBs now significantly rely on offshore borrowings in Eurobonds to create risk assets to overcome the CBN's restriction on using local depositors' funds to create risk assets". Furthermore, we found that shareholders of DMBs with international banking licenses in Nigeria within the study period were not significantly more compensated for their risk exposure than investors in risk-free assets (treasury bills). Therefore, the CBN should continue strengthening its regulatory functions with regular reviews that would compel improvements of the DMBs' credit risk management systems to mitigate the likely failure of the credit life cycle of granted loans. Additionally, a review of its current regulatory cash reserve ratio of 37.5% is imperative to

reduce DMBs' dependence on offshore funding and its associated foreign exchange risk.

Also, Umar et al (2022), "effect of credit risk on financial performance of listed deposit money banks in Nigeria. Thisstudy examines the effect of credit risk on the financial performance of listed money deposit banks in Nigeria". The studyutilised return on equity (ROE) as a proxy for financial performance, while credit risk was represented by non-performing loan ratio (NPLR), loan loss provision (LLP), capital adequacy ratio (CAR) and loans and advances to total deposit (LATD). The study adopts a correlation research design and utilises secondary data extracted from the published accounts of the 14 listed money deposit banks in Nigeria from 2011 - 2020. Multiple regression was used for data analysis, and results revealed LLP and CAR as having a direct and significant relationship with ROE, while NPLR and LATDhave an insignificant effect on ROE. The study therefore recommends, among others, that quoted money deposit banksshould raise the loan loss provision reserves to enable them to give additional loans and absorb credit losses if they arise.

As well, Apochi and Baffa (2022) "credit risk and financial performance of deposit money banks in Nigeria: moderating role of risk management committee. This study examined the risk management committee's role in the effect of credit risk on the financial performance of 13 deposit money banks in Nigeria from 2012 to 2021". The financial distress theory was adopted for the study. The study adopted a census sampling technique. A regression model is used to analyse the panel data. The multiple regression result revealed that credit risk has a negative and significant effect on financial performance. The moderating role of the risk management committee revealed that credit risk has a positive and significant impact on the financial performance of deposit money banks in Nigeria. The study recommends that DMBs in Nigeria should continue improving their risk management policies to enable good credit facility procedures for borrowers, also the board of directors should actively participate in managing the credit facilities for customers.

Also, Ogundele et al (2021) "credit risk management and financial performance of Deposit Money Banks: Evidence from Nigeria. The study examined the effect of credit risk management on the financial performance of

deposit money banks in Nigeria with the view to knowing what influence non-performing loans of deposit money banks have on return on assets". The study employed the Autoregressive Distributed Lag on the variables between 1995 and 2019. The findings show that non-performing loan as a percentage of total loans has a negative and significant effect on return on assets. It was also found that capital adequacy possessed a positive but not significant effect on return on assets, while the liquidity ratio had a negative influence on return on assets. The study concluded that credit risk management is a fundamental and vital aspect of deposit money banks, and its proper monitoring could help foster financial development. It was recommended in the study that deposit money banks should employ modern techniques in the performance of their financial intermediation function.

In addition, Hamisu et al. (2021) "credit risk management and financial performance of selected banks in Nigeria. This study examines the effect of credit risk management on the financial performance of some listed Deposit Money Banks (DMBs) in Nigeria, spanning the period 2015 - 2019. The study used the Ordinary Least Squares (OLS) regression estimation technique. Findings of the study discovered that loans and advances have a significant influence on Return on Asset (p<0.05). However, the study found non-performing loans to have an insignificant association with ROA (p>0.05). Consequently, this study recommends that rigorous credit risk management practices should be encouraged by the regulatory authorities in order to ensure the long-term survival of deposit money banks in Nigeria. Furthermore, Nigerian DMBs need to put in place modern strategies to curtail their exposure to credit risk and improve their financial performance with a view to protecting the interests of investors and other stakeholders".

Furthermore, Effiong and Ejabu (2020), "Liquidity risk management and financial performance: are consumer goods companies involved? The study examines the effect of liquidity risk management on the financial performance of consumer goods companies. It was aimed at establishing the extent of concern of consumer goods companies in the management of their liquid cash, cash defensive intervals, long-term debts, and quick ratios, for the purpose of turning around their financial performance. Data were obtained from the annual reports and accounts of the studied

companies and were converted to liquidity measurement parameters. Analyses were done using multiple regression analysis methods, and findings show that long-term debts, quick ratios, and cash defensive intervals have a significant effect on EPS and ROA, while cash ratio and long-term debts affect ROCE only. Specifically, it was empirically established that there exists a significant relationship between liquidity risk management and the financial performance of consumer goods companies. Findings further reveal that companies' non-concerned attitude to liquidity risk management affects the financial performance of consumer goods companies significantly. The study recommends that consumer goods companies should incorporate a clear liquidity risk management approach in their strategic policy framework and communicate the same to all functional units".

Still, Inegbedion et al (2020) "Risk management and the financial performance of banks in Nigeria: The study examined risk management and financial performance of banks in Nigeria, with a focus on commercial banks. The broad objective of the study was to ascertain the effect of risk asset management on the optimal financial performance of commercial banks in Nigeria. The study is a longitudinal survey, so the ex-post facto research design was applied. Research data were analysed using the generalised method of moments (GMM) and the Vector Error Correction Model, after testing and adjusting the data for stationarity and Cointegration. The research findings were: Banks' profitability is significantly influenced in the short run by liquidity risk and in the long run by credit risk, capital adequacy risk, leverage risk and liquidity risk. Furthermore, profitability measured by ROA was found to be positively related to liquidity risk but negatively related to credit risk. Arising from the findings, there is a need for effective risk management, especially credit, capital adequacy, leverage and liquidity risks, to enhance the profitability of banks".

Also, Abubakar et al. (2019). "Credit risk management and financial performance of quoted deposit money banks in Nigeria. This study analysed the impact of credit risk management on the financial performance, using evidence from the annual reports/financial statements of 10 quoted deposit money banks in Nigeria during a 7-year period from 2010- 2016. The study was carried out using ex-post facto and longitudinal research designs. Descriptive statistics were used in the presentation of data,

while fixed effects panel estimator was applied in assessing the impact of credit risk management variables as capital adequacy ratio (CAR); non-performing loans ratio (NPLR); cost-to-income ratio (CIR); return on asset (ROA); liquidity ratio (LR) and loans-to-deposit ratio (LDR) on the financial performance surrogated by return on equity (ROE). Regression results from the fixed effects model (FEM) reveal that CAR, ROA and LDR have a positive and significant impact on the financial performance; while NPLR, CIR and LR have no significant impact on the financial performance measured by the ROE. The study concludes that the total regulatory capital held by banks vis-à-vis the risk-weighted assets, as measured by CAR, is sufficient. Following this conclusion, it is therefore recommended that banks that are yet to adhere to the minimum 10% CAR for national banks and 15% for international banks, as suggested by the Central Bank of Nigeria (CBN), should do so or even surpass the minimum benchmark in order to increase shareholders' wealth represented by ROE. In this regard, CBN should increase CAR to at least 13% and 18% for national and international banks, respectively.

In addition, Olugboyega et al (2019), Effect of Credit Risk Management on Financial Performance of Nigerian Listed Deposit Money Banks: This study empirically explored the effect of credit risk management on the financial performance of ten listed deposit money banks in Nigeria for the period 2005-2016. Credit risk management, the independent variable, was surrogated by three parameters-Non-performing Loan to total Loan Ratio (NPLLR), Non-performing Loan to total Deposit Ratio (NPLDR) and Capital Adequacy Ratio (CAR). Return on assets (ROA) and return on equity (ROE) were used as proxies for financial performance. Using the Random effects generalised least squares (GLS) regression as a data estimation technique, the study revealed that all three credit risk parameters have a significant relationship with ROA and ROE (p< 0.05). Based on the findings, the study recommended that the management of deposit money banks should develop rigorous and robust credit policies that will enable banks to effectively assess the creditworthiness of their customers. The regulatory agencies should also come up with modern credit risk measurements, identification and control. Prompt and necessary action should also be taken against the management of any bank that flouts their credit risk guidelines in order to avoid unpleasant distress in the financial system".

Furthermore, Adegbie and Dada (2018), "Risk assets management, liquidity management and sustainable performance in Nigerian deposit money banks. The study evaluated the effect of risk assets and liquidity management on the sustainable performance of Deposit Money Banks in Nigeria. The study adopted both the ex-post factor and survey research methods. The population of this study comprised the Deposit Money Banks operating in the banking industry, while the samples were three banks in addition to the Central Bank of Nigeria as sample representatives. Primary data were used to obtain opinions of respondents, while secondary data were used to analyse the actions taken by the managers. Both descriptive statistics and regression analysis were used for the analyses with the aid of the Statistical Package of Social Sciences (SPSS). All analyses were based on a level of significance of 0.05, and four hypotheses were tested. The findings showed that there are strong relationships between risk asset management, liquidity management and sustainable performance in Nigerian Deposit Money Banks. With R2 of 0.738, t-statistics of 2.526 and p-value of 0.000, non-performing loans have significant negative impact on the assets of Deposit Money Banks in Nigeria; With R2 of 0.807, t-statistics of 14.755 and p-value of 0.000, low cash deposit has a significant negative impact on the capital of Deposit Money Banks in Nigeria; With R2 of 0.725, t-statistics 11.718 and p-value 0.000, non-compliance with CBN's stipulated cash balance requirement has a significant negative impact on the profitability of Nigeria Deposit Money Banks; and with R2 of 0.671, t-statistics of 10.303 and p-value of 0.000, inadequate liquidity management has a significant negative impact on the dividend payment of Nigeria Deposit Money Banks. The study concluded that effective risk asset management and liquidity management remain the nucleus of the banking industry to maintain sustainable performance. The study recommended that the regulatory authority should enforce compliance with monetary policies; that banks should institute effective and quality risk asset and liquidity management in order to maintain financial stability and sustainability".

Still, Nwanna and Oguezue (2017) "effect of credit management on the profitability of deposit money banks in Nigeria. The study examined the nexus between credit management and profitability (ROA) of Deposit Money Banks (DMBs) in the Nigerian context for the period of 2006 to 2015. Secondary data were sourced from the Central Bank of Nigeria Statistical Bulletins and the Annual Reports of all the existing DMBs studied. The study employed a multiple regression technique in analysing the data that was gathered; the analysis was done using ordinary least squares with E-View 9 Econometric tool. The study found that loans and advances and loan loss provision have a positive and insignificant effect on profitability, while non-performing loan has a negative and insignificant effect on profitability. The overall estimates of the two regressions have a good fit and are statistically adequate. The R-squared, which measures the overall goodness of fit of the entire regression, shows the value of 84% and 79% in models one and two, respectively. While the Durbin Watson statistic with value of 2.808450 and 2.499545 shows that there is no autocorrelation among the considered variables, and the overall regression is statistically significant. Thus, the study concluded that sound credit management heightens profitability and holds the financial strength of the DMBs. It was recommended that DMBs should put in place sound credit management policies and practices. Issue recoverable loans and advances and provide for loan losses for the desired credit risk exposure and increased profitability".

As well, Paulinus and Jones (2017), "Financial risk management and corporate performance of deposit money banks in Nigeria. This study examined the effect of financial risk management on the corporate performance of deposit money banks in Nigeria. In order to achieve the objective of the study, data were extracted from annual reports and accounts of fifteen (15) deposit money banks quoted on the Nigerian stock exchange, the period covered in the study is 2012-2016. Data for financial risk management proxied by bank size was extracted, and corporate performance was represented by return on equity. In testing the research hypothesis, the study adopted both descriptive statistics and simple regression techniques analysed with the aid of Statistical Package for Social Sciences (SPSS) version 20. The findings revealed that bank size has an insignificant effect on the return on equity of deposit money banks in Nigeria during the year under review. Consequent upon this study, it was recommended that the CBN and other regulators should endeavour to enforce risk identification, assessment, measurement and control mechanisms, in line with best global practices, in

order to avoid financial crisis and also improve on banks' performances".

Gap in the literature: There is considerable literature related to risk asset management and the financial performance of deposit money banks in Nigeria, but with so much inconsistency in results, not using investment securities as it proxy for risk assets. However, no single previous study reviewed used investment securities as a proxy for risk assets, a major gap that this study has filled.

In addition, the above conflicting results from prior studies reviewed in the empirical section point to the fact that there is a gap that this study has bridged. Furthermore, the above earlier studies cover periods till 2020, leaving another gap to be filled in terms of period of coverage. This study equally adopted the Panel Generalised Method of Moments (GMM) Regression model of E-view10 that differs from those adopted by preceding studies. All these are gaps filled in this study

3. METHODLOGY

Research design: This study made use of an ex-post facto research design as the research is trying to ascertain the cause and effect that exists between risk assets management and the financial performance of licensed Deposit Money Banks in Nigeria. Ex-post facto research design examines past occurrences in order to understand a current state, as this study uses past data already in existence to establish the current position.

Selection of data: This study made use of secondary data.

Collection of data: A secondary source of data was employed in this study. The study collected its secondary data from the audited annual reports and accounts of the selected Deposit Money Banks to assess the effect of risk assets management on the financial performance of DMBs in Nigeria from 2012 to 2022.

Population of the study: The population of this study, therefore, consists of all the deposit money banks listed on the floor of the Nigerian Exchange Group within the period of this study, from 2012-2022.

Sample size determination: In this study, a sample size of twelve (12) listed DMBs was selected from the population based on judgmental sampling. The sample size of twelve

(12) DMBs is in line with the work of Fuller (1976), which stated that it is common in research studies to use at least 10% of the study population as a sample size, because it is proven to be more than adequate in a research project. For this reason, the study made use of 59% of the population as the sample size.

Sampling techniques: The DMBs selected for this study were chosen based on the criteria that they were listed banks whose data within the period of study, 2012-2022, were available. Judgmental sampling technique was adopted to select the sample size of 12 DMBs in Nigeria, from where dependent and independent variables were deduced specifically from their financial statements.

Operational measures of variables: Two main categories of variables used in this study, the dependent variable, financial performance, which was proxied as return on equity, and the independent variable, risk assets management was proxied by loan and advances and investment securities.

Data analysis techniques: The study made use of descriptive and Panel Generalised Method of Moments (GMM) Regression model of E-view10 to analyse the data collected.

Model specification:

The model specification used in this study followed the typical panel multiple regression format, functionally specified as follows:

$$Y_{it} = f(X_{1it}, X_{2it}, X_{3it,............}, X_{nit})\text{...............} \quad (1)$$

Where;

Y_{it} =   The dependent variable of company i in time t.
X_{it} =   The series of independent variables of company i in time t.
ROE   =   Return on equity
LAD   =   Loan and advances
INV   =   Investment securities
U =   Error term

4. RESULTS

Data presentation: The data generated for this study from the financial statements of the selected Deposit Money Banks were descriptively presented in Appendix 1.

Data analysis: The data were descriptively analysed and presented below: the result of

descriptive statistics indicates that none of these variables were normally distributed.

Table 1 reveals that the mean values of ROE, LADV, and INV are 0.120460 and 849189.8 and 278526.1, respectively, for the period covered by the study, indicating that the average value of ROE of the series is 0.12%, while that of LADV and INV is 849189.8% and 278526.1%. The higher percentage of the mean value of LADV implies that the Banks have a preference for LADV.

The standard deviation indicates the dispersion from or spread of the series from its mean values. LADV and INV have the highest dispersion of 936014.3 and 375755.7, respectively; however, ROE has lower dispersion with it mean of0.547613.

On the other hand, Skewness, which depicts the asymmetry of the distribution around the mean, reveals that ROE, LADV and INV have long right tails (Positive skewness). Skewness of a normal distribution is zero.

Kurtosis explains the flatness or peakness of the distribution of the series. The statistics reveal that ROE, LADV and INV are not normally distributed as their values exceed the acceptable value of three (3) and are thus leptokurtic peaked relative to normal.

Furthermore, the statistical significance for the Jarque-Bera Probability (JB) of all the variables as reported in Table 1 is less than 0.05, hence we reject the null hypothesis that the series are normally distributed.

Test of hypotheses: In testing the two hypotheses formulated in section one of this study, the results in the Panel Generalised Method of Moments (GMM) test below were used.

Test of hypotheses one and two:

Generalised Method of Moments (GMM) Estimates of the Effects of loans and advances and investment securities on the return on equity (ROE): wo approaches to Generalised Methods of Moments/Dynamics Panel Data (GMM/DPD) estimation exist in E-views - the First Differences and System Approaches. Three regression estimates were estimated, namely the Pooled OLS, the Fixed Effect OLS and the First Differences transformation, in order to select the most appropriate approach. The choice is based on the comparative value of the coefficients of the lag of the dependent variable in the three estimates. The results obtained from the ROE regression model are shown in Appendices 2, 3, and 4, with the extracts summarised in Table 2.

Since -0.237289 (1st Difference Coefficient of the Lag of the dependent variable - ROE (-1) is higher than -0.070829 (Fixed Effect Coefficient of the Lag of the dependent variable), First Difference GMM is preferred as the result shows that this dynamic transformation of GMM is not downward biased.

Table 3 provides a summary of the GMM test results of the effects of loans and advances, and investment securities on the return on equity (ROE) based on 1st differences GMM transformations.

Table 1. Descriptive analysis of ROE, LADV and INV

	ROE	LADV	Investments
Mean	0.120460	849189.8	278526.1
Median	0.108636	563779.0	162161.0
Maximum	4.683737	4868472.	2187065.
Minimum	-3.944444	0.000000	0.000000
Std. Dev.	0.547613	936014.3	375755.7
Skewness	1.272464	1.694924	2.768598
Kurtosis	60.51100	6.296299	11.89871
Jarque-Bera	18226.95	122.9616	604.1619
Probability	0.000000	0.000000	0.000000
Sum	15.90070	1.12E+08	36765443
Sum Sq. Dev.	39.28429	1.15E+14	1.85E+13
Observations	132	132	132

Source: Output from E-view 10, 2025.

Table 2. Selection Criteria between First Difference and System Panel GMM Regression for ROE Model

Regression Approach	ROE(-1) Coefficient	Remarks	Decision
Pooled OLS	0.001360	Upper bound	1st Diff. GMM
Fixed Effect OLS	-0.070829	Lower bound	is preferred
1st Differences GMM	-0.237289	System GMM is preferred if ROE (-1) Coefficient from 1st Diff. GMM < Lower bound Coefficient, otherwise 1st Diff. GMM is used.	since -0.237289 is not lower than -0.070829

Source: Extraction from the author's computation in Appendices 2 to 4.

Table 3. Test results of the effect of loans and advances, and investment securities on the return on equity (ROE) of DMBs in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	-0.237289	0.004484	-52.92369	0.0000
LNLAD	0.055099	0.002196	25.08722	0.0000
LNINV	0.104242	0.002186	47.68222	0.0000
Effects Specification				
Cross-section fixed (first differences)				
Mean dependent var	0.012105	S.D. dependent var		0.675457
S.E. of regression	0.622775	Sum squared resid		34.13067
J-statistic	7.727780	Instrument rank		11
Prob(J-statistic)	0.460503			

Source: Extraction from the author's computation in Appendix 4

Table 4. Arellano-bond serial correlation test on ROE model

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-0.980663	-15.615523	15.923431	0.3268
AR(2)	0.035556	0.004324	0.121598	0.9716

Source: Extraction from the author's computation in Appendix 5.

Table 5. Results of Panel GMM Estimation based on Orthogonal Deviations Transformation for ROE Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	-0.206564	0.010543	-19.59340	0.0000
LNLAD	-0.021031	0.007311	-2.876736	0.0050
LNINV	0.130621	0.009238	14.13922	0.0000
	Effects Specification			
Cross-section fixed (orthogonal deviations)				
Mean dependent var	-0.059951	S.D. dependent var		0.453043
S.E. of regression	0.467282	Sum squared resid		19.21499
J-statistic	8.380227	Instrument rank		11
Prob(J-statistic)	0.397237			

Source: Extraction from the author's computation in Appendix 6.

Table 3 provides results to evaluate the validity of the ROE model using the J-statistic of 7.727780. The probability of the J-statistic is reported as 0.460503. Since the probability of J-stat is greater than the threshold of 0.05 set for the study, this result shows that the model is valid and can be relied upon in predicting the effect of loans and advances and investment securities on the return on equity. The value of the beta coefficient for LADV of 0.055099 implies that a unit increase in the number of loans and advances value will lead to about a 0.06% increase in the return on equity of the selected Deposit Money Banks in Nigeria if other factors

are held constant. In the same vein, a unit increase in investment securities values (INV) will result in a 0.10% increase in return on equity of the banks. Post estimation test to check for possible existence of autocorrelation problem in the model was conducted using the Arellano Bond Serial Correlation test, and the results are shown in Table 4.

The values of m-statistics for both AR(1) and AR(2) of -0.980663 and 0.035556 have proven to be insignificant at 5% level (p-values of 0.3268 and 0.9716 are both > 0.05). Therefore, the null hypothesis that proposes the absence of serial correlation is not rejected, and we conclude that there is no serial correlation in the series. The Orthogonal deviations transformation option of GMM was carried out to evaluate the consistency of the results obtained, and the outcomes are shown in Appendix 6 with extracts reported in Table 5.

The probability of the J-statistic of 8.380227 is reported as 0.397237, and this affirms the validity of the model as supporting evidence for the results obtained using the first differences transformation. The effect of INV on ROE is shown to be positive and significant as obtained under the first differences transformation, although the results for LADV differed from the test results obtained using the orthogonal deviations. The substantial concordance of the results obtained from the two approaches provides statistical evidence that the estimated parameters from the first differences transformation can be used in testing H_{01} and H_{02} formulated for the study.

5. DISCUSSION

Results on the assessment of the impact of risk assets management (made up of loans and advances and investment securities) on financial performance (made up of return on equity) as reported above are discussed below.

Impact of loans and advances on the return on equity of DMBs in Nigeria: "The result on the impact of loan and advances on the return on equity of selected Deposit Money Banks in Nigeria showed that loan and advances have positive and significant impact on the return on equity", this finding is in line with the results of Hamisu et al. (2021) Apochi and Baffa (2022), Usman and Aliyu (2023) and Natufe and Evbayiro-Osagie (2023)who studied "credit risk management and financial performance of

Deposit Money Banks in Nigeria and discovered that credit risk management has a significant impact on financial performance of Deposit Money Banks' in Nigeria". But in contrast to the findings of Umar et al (2022), "who studied the effect of credit risk on the financial performance of listed deposit money banks in Nigeria and indicated that NPLR and LATDhave an insignificant effect on ROE".

Impact of investment securities on the return on equity of DMBs in Nigeria: "The result on the impact of investment securities on the return on equity of selected Deposit Money Banks in Nigeria revealed that the investment securities have positive (0.104242) and significant (0.0000) impact on return on equity", this finding is consistent with the works of Adegbie and Dada (2018) and Olugboyega et al (2019) effect of credit risk management on financial performance of Nigerian listed deposit money banks which found that all the three credit risk parameters have a significant relationship with ROE (P < 0.05). But in contrast to the finding of Abubakar et al. (2019), who studied credit risk management and financial performance of quoted deposit money banks in Nigeria and revealed that NPLR, CIR and LR have no significant impact on the financial performance measured by ROE. In the same vein, Nwanna and Oguezue (2017) effect of credit management on the profitability of deposit money banks in Nigeria and the result revealed that loans and advances and loan loss provision have a positive and insignificant effect on profitability.

6. SUMMARY OF FINDINGS

Findings of this study are summarised as follows:
  i.   The study revealed that loans and advances have a significant positive impact on the return on equity of selected Deposit Money Banks in Nigeria.
  ii. It also discovered that investment securities have a significant positive impact on the return on equity of selected Deposit Money Banks in Nigeria

7. CONCLUSION

Management of risk assets is very fundamental in the functioning of deposit money banks, as its impact can affect the operations of the DMBs and the economy in general. Therefore, this study evaluated the impact of risk assets management on the financial performance of

selected Deposit Money Banks in Nigeria. The result revealed that loans and advances have a significant positive impact on return equity, signifying that loans and advances have been supportive in a significant way in generating return on equity in DMBs of Nigeria. Likewise, a similar result was also obtained that investment securities have a significant positive impact on the return on equity, indicating that investment securities are cheering and, of course, consequential in engendering returns on equity of selected DMBs in Nigeria. In a nutshell, it means that investment securities and loans and advances are some of the key determinants of returns on the selected banks. Therefore, the study concluded that risk asset management has a significant positive impact on the financial performance in accordance with the A priori expectation of the study.

8. RECOMMENDATIONS

Based on the findings, the study recommended as following;

   i. The urgent need for deposit money banks in Nigeria to intensify competence in risk assets analysis to reduce the level of non-performing facilities, since the impact on returns is not friendly.

   ii. From the outcome, it is clear that investment securities and loan and advances are determinants of Banks' returns, thus the need to increase the amount invested in this all important areas to make expected returns. Therefore, the study advises that sufficient funds be deployed in this all-important intermediate function.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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The research is conceptually rich in the literature. As mentioned as part of the constraints encountered by this study, there are not many studies on the topic, risk asset management. Paucity of literature on this topic thus its choice by the researcher to fill the gap, and this goal has been achieved. Also, the findings of this study will facilitate its better understanding as well as cover the period gap to the present period.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX 1. Descriptive Statistics of Raw Data for the Study

	ROE	LADV	INVESTMENTS
Mean	0.120460	849189.8	278526.1
Median	0.108636	563779.0	162161.0
Maximum	4.683737	4868472.	2187065.
Minimum	-3.944444	0.000000	0.000000
Std. Dev.	0.547613	936014.3	375755.7
Skewness	1.272464	1.694924	2.768598
Kurtosis	60.51100	6.296299	11.89871
Jarque-Bera	18226.95	122.9616	604.1619
Probability	0.000000	0.000000	0.000000
Sum	15.90070	1.12E+08	36765443
Sum Sq. Dev.	39.28429	1.15E+14	1.85E+13
Observations	132	132	132

Descriptive Statistics of Transformed One Dependent Variable and Independent Variables of the Study

	ROE	LNLAD	LNIN
Mean	0.160251	13.23858	12.03793
Median	0.110290	13.44509	12.19715
Maximum	4.683737	15.39829	14.59807
Minimum	-0.012132	8.114025	8.284757
Std. Dev.	0.441303	1.438977	1.392540
Skewness	9.919932	-1.655315	-1.025910
Kurtosis	102.2108	6.089131	4.022478
Jarque-Bera	46916.81	93.97211	24.08738
Probability	0.000000	0.000000	0.000006
Sum	17.62757	1456.244	1324.172
Sum Sq. Dev.	21.22758	225.7013	211.3693
Observations	110	110	110

APPENDIX 2. Pool Panel OLS Regression Result on ROE Model

Dependent Variable: ROE
Method: Panel Least Squares
Date: 02/15/25 Time: 22:08
Sample (adjusted): 2013 2022
Periods included: 10
Cross-sections included: 11
Total panel (unbalanced) observations: 103

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	0.001360	0.076700	0.017726	0.9859
LNLAD	0.070357	0.045828	1.535247	0.1279
LNIN	-0.007808	0.047713	-0.163634	0.8704
C	-0.686095	0.430039	-1.595424	0.1138
R-squared	0.045211	Mean dependent var		0.148973
Adjusted R-squared	0.016278	S.D. dependent var		0.465626
S.E. of regression	0.461821	Akaike info criterion		1.330781
Sum squared resid	21.11456	Schwarz criterion		1.433100
Log likelihood	-64.53521	Hannan-Quinn criter.		1.372224
F-statistic	1.562603	Durbin-Watson stat		2.180757
Prob(F-statistic)	0.203272			

APPENDIX 3. Fixed Effect Panel OLS Regression Result on ROE Model

Dependent Variable: ROE
Method: Panel Least Squares
Date: 02/15/25 Time: 22:11
Sample (adjusted): 2013 2022
Periods included: 10
Cross-sections included: 11
Total panel (unbalanced) observations: 103

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	-0.070829	0.079670	-0.889033	0.3764
LNLAD	0.009373	0.063727	0.147087	0.8834
LNIN	0.062017	0.059668	1.039368	0.3014
C	-0.709911	0.807567	-0.879074	0.3817
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.170154	Mean dependent var		0.148973
Adjusted R-squared	0.048940	S.D. dependent var		0.465626
S.E. of regression	0.454089	Akaike info criterion		1.384706
Sum squared resid	18.35153	Schwarz criterion		1.742824
Log likelihood	-57.31234	Hannan-Quinn criter.		1.529756
F-statistic	1.403751	Durbin-Watson stat		2.324812
Prob(F-statistic)	0.173465			

APPENDIX 4. First Differences GMM Transformation Regression Result ROE Model

Dependent Variable: ROE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 02/15/25 Time: 22:16
Sample (adjusted): 2014 2022
Periods included: 9
Cross-sections included: 11
Total panel (unbalanced) observations: 91
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument specification: @DYN(ROE,-2) LNLAD(-1) LNIN(-1)
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	-0.237289	0.004484	-52.92369	0.0000
LNLAD	0.055099	0.002196	25.08722	0.0000
LNIN	0.104242	0.002186	47.68222	0.0000
	Effects Specification			
Cross-section fixed (first differences)				
Mean dependent var	0.012105	S.D. dependent var		0.675457
S.E. of regression	0.622775	Sum squared resid		34.13067
J-statistic	7.727780	Instrument rank		11
Prob(J-statistic)	0.460503			

APPENDIX 5. Arellano-Bond Serial Correlation Test Result on ROE MODEL

Arellano-Bond Serial Correlation Test
Equation: EQ03
Date: 02/15/25 Time: 22:32
Sample: 2012 2022
Included observations: 91

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-0.980663	-15.615523	15.923431	0.3268
AR(2)	0.035556	0.004324	0.121598	0.9716

APPENDIX 6. Orthogonal Deviations GMM Transformation Regression Result on ROE Model

Dependent Variable: ROE
Method: Panel Generalized Method of Moments
Transformation: Orthogonal Deviations
Date: 02/15/25 Time: 22:36
Sample (adjusted): 2014 2022
Periods included: 9
Cross-sections included: 11
Total panel (unbalanced) observations: 91
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument specification: @DYN(ROE,-2) LNLAD(-1) LNIN(-1)

Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE(-1)	-0.206564	0.010543	-19.59340	0.0000
LNLAD	-0.021031	0.007311	-2.876736	0.0050
LNIN	0.130621	0.009238	14.13922	0.0000
	Effects Specification			

Cross-section fixed (orthogonal deviations)

Mean dependent var	-0.059951	S.D. dependent var		0.453043
S.E. of regression	0.467282	Sum squared resid		19.21499
J-statistic	8.380227	Instrument rank		11
Prob(J-statistic)	0.397237			

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https://pr.sdiarticle5.com/review-history/143538