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Effect of Financial Risk on Profitability Performance of Quoted Deposit Money Banks in Nigeria

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Abstract

Exposure of businesses to risk has become a very serious issue for survival in life. Nigeria had for several years been experiencing one form of financial distress or the other. The series of poor performance experienced by financial institutions in Nigeria were attributed to inadequate risk management, poor monitoring systems and ineffective board members. This study examines the effect of financial risk on profitability performance of deposit money banks in Nigeria. The population comprise 22 deposit money banks and sample size of 14 deposit money banks in Nigeria. The proxies comprise of credit risk, interest rate risk, liquidity risk and return on asset of the sampled banks in Nigeria. The hypotheses were tested using panel random effect regression model after conducting some diagnostic tests such as Pearson correlation and Shapiro-Wilk normality test to accurately estimate the model. The results show that credit risk (CR), interest rate risk (IRR) and liquidity risk (LR) have significant effects on return on assets of deposit money banks in Nigeria. The study recommend that the deposit money banks in Nigeria should ensure that all the conditions required before granting loans to their customers should be met to enhance their profitability. Also, the banks should manage their liquidity risk by striking a balance between excess cash and cash trapping to enhance the profitability of the deposit money banks in Nigeria.

Keywords: **Financial Risk; Profitability; Performance; Quoted Deposit Money Banks**

Introduction

Risk is defined as anything that can create hindrances in the way of achieving of certain objectives. It can be because of either internal factors or external factors, depending upon the type of risk that exists within a particular situation. Risk in financial terms is a probability that the actual return may

differ from the expected return (Dionne, 2013). Financial risk is the possibility of losing money on an investment or business venture. The financial risk most commonly referred to is the possibility that a company's cash flow will prove inadequate to meet its obligations. Deposit money banks face financial risk due to various macroeconomic forces, changes to the market interest rate, credit default and the possibility of liquidity challenges among others. Risk management has a strong inspirational effect on the major shareholders to invest more in the organization. This investment is a weapon for a company to provide better business opportunities which ultimately leads to long-lasting competitive advantage. Ineffective risk management results in extra costs and costly lower tail outcomes on both the company and stockholders (Andersen, 2008). It is imperative to gauge risk with firms profitability performance.

Financial performance is a concept explaining the success of a firm or a reflection of the fulfilment of the organization's objectives. It describes how a firm had performed over a period of time. Firm performance refers to the firms' ability to achieve its goal through the application of available resources efficiently and effectively (Asat, Maruhun, Haron&Jaafar, 2015). This is expressed in as return on assets (ROA) which measures how much one naira of assets generates the net income. The company is more profitable when the return on assets (ROA) is high. Return on assets (ROA) expresses the corporate efficient management to generate the net income from the firms' resources (Khrawish, 2011).

In the dynamic world, business managers must be able to cope with the increasing volatility and turbulence of the environment due to globalization (Mgbere, 2009; Fiedler, 1996). Changes in the environment, therefore, can pose risks to the performance reliability of the organization (Oloyede, 2011).The objective of risk management in the firms is to maximize the potential of success and minimize the probability of future losses because the risk that becomes problematic can negatively affect cost, time, quality and profitability performance of firms. In this study, financial risk is proxy in terms of credit risk, interest rate risk and liquidity risk while profitability performance is measured in terms of return on assets.

Credit risk is one of the risks, banks are facing by the nature of their operations. The effectiveness of credit risk management and control enhance the level of profitability performance. According to Kolapo, Ayeni and Oke (2012), credit risk management is positively related to profitability of banks in Nigeria. Granting of credit facilities to customers by banks are associated with a high level of default of both capital and interest, which required effective credit management to minimize the credit risk and enhance the profitability performance.

Interest rate risk is factor that makes or mar the profitability performance of business enterprise. Banks that offer low saving rates to their customers below the prevailing inflation rate may be facing low customers deposit which may likelyaffect their loanable capital and hence profitability performance. Also banks that offer high lending rates to their customers, far above the prevailing inflation rate are equally affected with low credit accessibility by their customers and invariably profitability performance. Khawaja and Musleh (2007) asserted that an increase in interest rate depresses borrowers but increases performance. Liquidity risk usually arises from banks management inability to adequately anticipate and plan for changes in funding sources and cash needs. Efficient liquidity management requires maintaining sufficient cash reserves on hand while also investing as much funds as possible to maximize earnings. According to Sufian and Kamarudin (2012); and Dang (2011), an adequate level of liquidity is positively related to bank profitability performance.

The size of firms determine the level of their exposure to risk.Large firms in most cases take higher risk than small firms, though depending on their respective management risk appetite. Therefore, the firm size was controlled for in this study.

This study was carried out to fill the literature gaps regarding the methodological weaknesses of most previous studies which used ordinary least square regression method for their panel data technique. Also, these kinds of studies were mostly done in other countries other than Nigeria and to further use a long period as against the short periods used by most previous studies.

The financial crisis in the banking sector in Nigeria in 2009 which led to the financial sector reforms by the Central Bank of Nigeria (CBN) has made risk management and compliance to become top priorities for banks and other financial institutions. Financial sector players now realise that it is too costly to ignore risk management. To preserve the integrity and stability of the financial system, the CBN has mandated banks to implement an enterprise-wide risk management and Basel II. The Basel II Pillar 2 mandated supervisors to provide an extra set of eyes to verify that banks understand their risk profile and are sufficiently capitalised against risks that they face.

Nigeria banks had for several years been experiencing one form of financial distress or the other. The series of poor performance experienced by deposit money banks in Nigeria were attributed to inadequate risk management poor monitoring systems and ineffective board members (Dabari & Saidin, 2015). The Central Bank of Nigeria (CBN) audit report classified eight deposit money banks in serious financial grief (Sanusi, 2010). In all these instances, inadequacies of the risk management programmes were cited as the primary causes of poor firms' performance in Nigeria (IMF, 2013).

Despite, the growing consensus that deposit money banks will boost their performance by employing risk management as a strategic management tool, the empirical evidence confirming the relationship between risk management and firm performance is quite controversial (Grace, Leverty, Phillips &Shimpi, 2015). Of particular concern is that risk management characteristics in some specific organisations (and countries) settings have not been the subject of many research studies (Bhimani, 2009).

Most recent studies like Afzal, Raja, Imran and Saima (2018); Alhassan, Fred and Erasmus (2018); Isah (2018); Isabwa and Nelima (2019); Lelgo and Obwogi (2018); Mohiuddin and Shafir (2018); and Roni and Teddy (2019) which were conducted on risk management were done in other countries, with very few studies like Chuke and Chinedu(2018); and Ofeimun, Godwin and Okeke (2019) were done in Nigeria. The rapid and widespread adoption of market-based policies such as privatization and opening to foreign markets by developing economies place domestic business enterprises with strong competitive pressures both in the domestic and foreign markets (Hoskisson& Robert, 2000). As a result, private and public enterprises of developing economies see the need to develop strategies to cope with the economic and political changes. Strengthening the firm's management control systems help businesses to adopt and effectively implement risk management activities at the enterprise level. The Organization for Economic Co-operation and Development (OECD) has pinpointed failures in risk management as the most important cause of the financial crisis and noted that this failure was attributed to weaknesses in corporate governance and defaulting risk assessment. Kirkpatrick (2009) asserts that many boards failed to ensure that approved risk management procedures were implemented, whereas others were not made aware of exposure to risks at all.

The empirical works have shown that some of the studies like Chuke and Chinedu(2018); Lelgo and Obwogi (2018);Roni and Teddy (2019) use inappropriate statistical tools of ordinary least square regression technique for their panel data instead of panel regression technique which affects the reliability of their findings. Also, most of the studies like Chuke and Chinedu(2018);Enekwe, Eziedo and Agu (2017); and Kola and Yusuf (2017)conducted in Nigeria combined the data for both pre and post IFRS implementation together which may likely affect their findings. The empirical works have also shown that most of the studies like Afzal *et al* (2018); Chuke and Chinedu(2018);Isah (2018); and Mohiuddin and Shafir (2018) carried out in recent times of 2018/2019 regarding credit risk, interest rate risk, liquidity risk and profitability performance of quoted deposit money banks in Nigeria and other countries of the world were not current in their data used for the analysis as most of their data were within 2016 and below except very few studies like Lelgo and Obwogi (2018); and Ofeimun *et al* (2019).

Furthermore, these kind of financial risk and profitability performance studies in recent time were mostly carried out in other countries of the world more than Nigeria. These highlighted gaps in literature above call for further study in this area which necessitated this study, the effect of financial risk on profitability performance of quoted deposit money banks in Nigeria, to update the data up to 2018, use panel regression technique, cover only the periods of IFRS implementation in Nigeria and adding to the recent literature in this area in Nigeria.

The main objective of this study is to examine the effect of financial risk on profitability performance in quoted deposit money banks in Nigeria. Specifically, the study aimed at achieving the following specific objectives are to: (i) examine the effect of credit risk on return on assets of quoted deposit money banks in Nigeria; (ii) To evaluate the effect of interest rate risk on return on assets of quoted deposit money banks in Nigeria; and (iii) To assess the effect of liquidity risk on return on assets of quoted deposit money banks in Nigeria.

Research Hypotheses

In line with the specific objectives of the study, the following hypotheses are formulated in null form, as follow:
H_{01}: Credit risk has no significant effect on return on assets of quoted deposit money banks in Nigeria;
H_{02}: Interest rate risk has no significant effect on return on assets of quoted deposit money banks in Nigeria;
H_{03}: Liquidity risk has no significant effect on return on assets of quoted deposit money banks in Nigeria.

Conceptual Framework

Financial Risk

Shafiq and Nasr (2010) define financial risk as an identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor and control the probability and impact of unfortunate events. According to Christoffersen (2012), the risk is the possibility of unfavourable events occurring in future. Financial risk results from uncertainties associated with defaults on loans advanced, the volatility of interest rates, liquidity management and changes in foreign exchange rates. Decisions involving financial institution activities, therefore, have an element of risk, which has effects on the overall performance and value of the firm (Schonborn, 2010).

The Committee for Sponsoring Organizations (2004: 2) of the Trade way Commission defined Enterprises Risk Management (ERM) as: "a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity and manage risks to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives." ERM is a process for total risk management and is the focus of all strategic management efforts (Moody, 2003) to give companies a long-run competitive advantage.

Financial risk is the possibility of losing money on an investment or business venture. Shafiq and Nasr (2010) define financial risk as an additional risk borne by the shareholders due to the substitution of debt for common stock. This study defined financial risk as any fluctuation in the cash flows, financial results and the company's value due to the influence of different types of factors; mainly market ones, such as: interest rates, liquidity, credit default, exchange rates among others.

Financial Performance

Firm performance is a concept that explains the extent to which an organization achieves objectives. It indicates how organizations have been peering overtime (Saeidi, Sofian, Zaleha& Abdul, 2014). Firm performance is an indicator that helps to evaluate and measure how an organization succeeds in realizing business objectives to all its stakeholders (Antony & Bhattacharyya, 2010). Firm performance refers to firms' ability to achieve its goal through the application of available resources efficiently and effectively (Asat*et al*, 2015).

The return on assets is one of the measures of financial performance of firms and is argued in the literature as the most effective way of measuring financial performance because it relates profit with assets which comprises of both equity and debt capitals. Return on assets (ROA) indicates the management ability to acquire the deposit at wise price and invest in high profitable investment (Ahmed, 2009). This ratio expresses how much one naira of assets generates the net income. The company is more profitable when the return on assets (ROA) is high. Return on assets (ROA) expresses the corporate efficient management to generate the net income from institutional resources (Khrawish, 2011).

According to Wen (2010), the high return on assets (ROA) indicates the more corporate efficiency of the use of resources. This research adopted return on assets (ROA) as a financial performance measure. Return on assets is regarded as having prominence for accounting performance measure and it is a critical element of loan quality when determining bank performance. Return on assets reflects the ability of banks management to generate profits from assets the ratio may be biased due to off-financial position activities. This study defines financial performance in terms of return on assets which is profit after tax express over total assets of firms.

Credit Risk

Basel Committee on Banking Supervision (2001), defines credit risk as the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). Credit risk is an internal determinant of bank performance. The higher the exposure of a bank to credit risk, the higher the tendency of the banks to experience financial crisis and vice-versa. Among other risks faced by banks, credit risk plays an important role in banks' profitability since a large chunk of banks' revenue accrues from loans from which interest is derived. Credit risk is by far the most significant risk faced by banks and the success of their business depends on accurate measurement and efficient management of this risk to a greater extent than any other risks (Gieseche, 2004).

According to Chen and Pan (2012), credit risk is the degree of value fluctuations in debt instruments and derivatives due to changes in the underlying credit quality of borrowers and counterparties. Coyle (2000) defines credit risk as losses from the refusal or inability of credit customers to pay what is owed in full and on time. Credit risk is the exposure faced by banks when a borrower (customer) defaults in honouring debt obligations on the due date or at maturity. This study defines credit risk as a risk of default of repayment of both loan and interest thereof from the customers within an agreed period of time.

Interest Rate Risk

When corporate borrowing interest rate is greater than the market rate, the company may face interest rate risk. The interest rate factors measure as total loans and deposits (Al-Khouri, 2011).An investor may lose potential return if interest rates rise after committing to the particular interest rate. When interest rates change it affects the value of the instrument Basel Committee on Banking Supervision [BCBS](2000). Banks encounter interest rate risk in different ways including re-pricing risk which is the primary and most common form of interest rate risk that arise from timing differences in the maturity of banking corporation assets and liabilities (BCBS, 2000). The yield curve may likely shift due to changes in relationships between interest rates for different maturities of the same index which enhance profitability performance. This study defined interest rate risk as a potential for investment losses that result from a change in interest rates. Interest rate risk is the chance that an unexpected change in interest rates will negatively affect the value of an investment. An interest risk is a risk of losing money because of fluctuation in interest rates.

Liquidity Risk

Liquidity risk in banks is defined as the risk of being unable either to meet their obligations to depositors or to fund increases in assets as they fall due without incurring unacceptable costs or losses (Ismail, 2010). Liquidity risk is the possibility of negative effects on the interests of owners, customers and other stakeholders of the financial institution resulting from the inability to meet current cash obligations in a timely and cost-efficient manner. Liquidity risk concerns the inability of the company to reduce its liabilities and increase its assets. Liquidity risk of any company is measured taking the liquid assets over deposits (Al-Khouri, 2011).

Liquidity risk is the risk arising when security or asset cannot be traded quickly in the market to avoid a loss or to make some required amount of profit. It arises mainly because of the uncertainties involved in the trading of liquidity assets of an institution or organization. In simple words, it refers to a situation when a party cannot able to trade its asset in the market as because of nonparticipation of other parties involved in trading. It is very much important for those parties who want to hold their current assets with them and not interested in trading. Liquidity risk is the risk stemming from the lack of marketability of an investment that cannot be bought or sold quickly enough to prevent or minimize a loss (Clemens, Iman& Robert, 2015).This study defined liquidity risk as a risk of an inadequate cash resources to carry out the activities of an organization, which affects the profitability performance of deposit money banks.

Empirical Review

Isabwa and Nelima (2019) examine the credit risk and financial performance of banks listed at the Nairobi Securities Exchange, Kenya**.** They used a longitudinal research design while a population of 11 Commercial banks listed at the Nairobi securities exchange was used. Their data was analyzed

using Karl Pearson correlation and panel regression inferential statistical techniques. They found that there was a significantly strong correlation between credit risk and financial performance as proxied by ROE ($r = -.601$, $p = .003$). Their study also found that credit risk significantly affects ROE ($\beta = -.601$, $p = 007$, $\alpha < 0.01$). They further found that credit risk has a significant negative effect on banks financial performance. They recommended that the management of commercial banks should determine effective credit risk management strategies that could help in the reduction of loan default rates by customers.

Extensive loan underwriting should be conducted to avoid over or under the charge of prospective customers. Progressive implementation of the Basel Accord should be prioritized as opined by the Basel Committee submission on Banking Supervision. Credit risk inherent to the entire portfolio as well as the risk in individual credits as transaction practice should be managed well. Standardized approach, internal ratings-based approaches such as foundation and advanced approach should be considered by financial institutions when assessing credit risk. They used Karl Pearson correlation and panel regression inferential statistical techniques which are good methods for this kind of study that provide reliable results.

Roni and Teddy (2019) examine the effects of credit risk, operational risk and liquidity risk on the financial performance of banks listed in Indonesian stock exchange. Their population comprises of banks listed in Indonesian Stock Exchange in 2009-2017 while 5 samples collected by purposive sampling technique were used. They used ordinary least square multiple linear regression to estimate their model. They found that credit risk did not affect financial performance. Operational risk had a significant negative effect on financial performance. Liquidity risk had a significant negative effect on financial performance. They used an inappropriate statistical tool of ordinary least square regression technique to estimate their panel data which affects the reliability of their study.

Ofeimun, Godwin and Okeke (2019) examine liquidity risk management as a determinant of the financial performance of listed deposit money banks in Nigeria, from 2014 to 2018.They adopted descriptive, correlation and panel regression analysis as methods of data analysis. They found a significant positive relationship between liquidity risk management and financial performance of listed banks in Nigeria. They also indicate that credit risk management has a negative but insignificant influence on the level of profitability. Their study also indicates that operational risk management has a positive but not significant relationship with the financial performance of sampled banks. They recommended the need for deposit money banks to monitor and take a closer look at liquidity risk management and ensure adequate liquidity which will go a long way in improving the financial performance of the banks. They used adequate statistical tools of analysis to examine their panel data. Also, their study was carried out in 2018 and their data covered up to 2017 which enhance the currency of their study.

Chuke and Chinedu (2018)examine the impact of credit risk management on the performance of selected Nigerian Banks. The ex-post facto research design was adopted using a dataset for the period 2000–2014 collated from the annual reports and financial statement of the selected deposit money banks. Their hypotheses were tested using an ordinary least square regression model. They found that credit risk management had a positive and significant impact on total loans and advances, the return on asset and return on equity of the deposit money banks. The study recommended that bank managers need to put more efforts to control the non-performing loan by critically evaluating borrowers' ability to pay back. The regulator should strengthen its monitoring capacity in this regard. They used an inappropriate statistical tool of ordinary least square regression technique to estimate

their panel data; also, they combined data from both pre (2000-2011) and post (2012-2014) IFRS implementation in Nigeria which affects their study findings. Furthermore, even though their study was carried out in 2018 their data covered only up to 2014 which affect the currency of their study.

Lelgo and Obwogi (2018) investigate the effect of financial risk on financial performance of microfinance institutions in Kenya. They adopted a quantitative research design while 13 registered microfinance institutions as licensed by the Central Bank of Kenya as of 2018 were used. Secondary data were retrieved from the MFIs' annual financial reports spanning 5 years between 2013 and 2017. They used ordinary least square regression technique to estimate their model. They found that credit risk and liquidity risk have a significant effect on the financial performance of microfinance institutions in Kenya. They recommended that microfinance institutions should review their credit rating policies to improve performance and reduce non-performing loans. Also, to enhance their liquidity position, the microfinance institutions should maintain a sound level of current assets that can effectively cover their short-term obligations when they fall due. They used an inappropriate statistical tool of ordinary least square regression technique to estimate their panel data. However, their study was carried out in 2018 their data covered up to 2017 which enhance the currency of their study.

Alhassan, Fred and Erasmus (2018) examine the impact of interest rate spread on bank profitability in Ghana. They measured interest rate spread using net interest income (IntSp) and net interest margin (NIM) and bank profitability using Return on Assets (ROA) and Return on Equity (ROE). Secondary data were extracted from 24 banks over ten years while the panel regression technique was used to estimate the model. They found that there is a positive and statistically significant association between interest rate spread and bank profitability in Ghana. They used adequate statistical tools of analysis to examine their panel data.

Afzal, Raja, Imran and Saima (2018) examine interest rate and financial performance of banks in Pakistan. Annual data of seven years from 2007 to 2014 has been taken for 20 banks operating in Pakistan. They used Correlation and Ordinary Least Square Regression analysis to evaluate the impact of interest rate changes (INT), deposits with other banks (DWOB), advances and loans (ADV) and investment (INV) over the profitability indicators; return on assets (ROA), return on equity (ROE) and earnings per share (EPS). They found that deposits with other banks and interest rate are negatively affecting the profitability of banks, while advances and loans and investment are having a positive influence over the profitability of banks. They used an inappropriate statistical tool of ordinary least square regression technique to estimate their panel data. Also, their study was carried out in 2018 and their data covered only up to 2014 which affect the currency of their study.

Isah (2018) examines the impact of credit risk management systems on the financial performance of commercial banks in Uganda. Panel data for the period of 2006 – 2015 was used while a sample of 20 commercial banks was used. The study employs return on assets as a dependent variable and non-performing loans, growth in interest earnings and loan loss provisions to total loans as credit risk measures. Secondary data is sourced from the Bank scope database, African development bank and the central bank of Uganda. The study employs descriptive statistics, regressions and correlation analysis. Their panel regression models are to estimate the magnitude of the significance of credit risk management on the performance of commercial banks in Uganda. The study revealed that credit risk management has an insignificant impact on the performance of Ugandan commercial banks. The results portrayed that banks' performance was inversely influenced by non-performing loans which may expose them to large magnitudes of illiquidity and financial crisis. They recommended

that banks need to enhance their credit risk management techniques not only to earn more profits but also to maintain a qualitative asset portfolio and attention be given to non-performing loans, loan loss provision to total loans and growth in interest earnings that were found to be significant. Banks need to design appropriate credit policies that must handle all necessary conditions before advancing credit to their customers and also develop strong credit administration committees and teams that must conduct appropriate and sound loan appraisal evaluations and which must also monitor the loans throughout the required processes right from extending a loan to a customer up to the completion of loan repayments to mitigate credit risks. They used adequate statistical tools of analysis to examine their panel data. However, even though their study was carried out in 2018 their data covered only up to 2015 which affect the currency of their study.

Mohiuddin and Shafir (2018) examine the effect of liquidity risk on performance of Islamic banks in Bangladesh, for the period 2012 to 2016. In the study ROA and ROE are used as Bank performance measurement tools and Loan to deposit ratio, liquid risky asset to total asset, capital to total asset ratio are used as liquidity indicators. Correlation and panel regression analysis was used to establish the effect of liquidity on bank performance. They found a significant relationship between bank performance and liquidity indicators. They also found that there is a negative relationship between bank performance and liquidity indicators. They used a panel regression technique which is a good method for this kind of study that provides reliable results.

Kola and Yusuf (2017) take a look at financial risk and financial flexibility: evidence from deposit money banks in Nigeria. They used ex-post facto research design while secondary data were extracted from the audited financial reports of the banks within the period of the study covering ten years spanning from 2007 to 2016. Their data was analyzed using panel data regression analysis. They found that funding liquidity risk has a positive but insignificant effect on financial flexibility while solvency risk has a negative significant effect on financial flexibility. They recommended that management of Deposit Money Banks should strive towards expanding the customers' base to deposits frequency through the provision of enhanced financial services and this will enhance daily capital level in meeting their obligation. They used adequate statistical tools of analysis to examine their panel data but combined data from both pre (2007-2011) and post (2012-2016) IFRS implementation in Nigeria which affects their findings. Also, their study was carried out in 2017 and their data covered up to 2016 which enhance the currency of their study.

Enekwe, Eziedo and Agu (2017) examine the effect of liquidity risk on financial performance of selected quoted commercial banks in Nigeria, covering six (6) years from 2009 – 2014. They used an ex-post facto research design while variables such as net operating profit margin (NOPM) for dependent variables and Deposits, Cash, Liquidity-Gap, Non-performing loans (NPLs) and Leverage ratio (LEV) for independent variables. Their model estimation was executed using ordinary least squares technique. Descriptive statistics, Spearman rank-order correlation and regression analysis were applied for the analyses. They found that deposits, cash and non-performing loans have a positive relationship with a net operating profit margin (NOPM), while liquidity-gap and leverage ratio has a negative relationship with a net operating profit margin (NOPM) of selected deposit money banks. They further found that deposits, cash and non-performing loans have a significant effect on net operating profit margin (NOPM); while liquidity-gap and leverage ratio has no significant effect on net operating profit margin (NOPM). They recommended that banks should establish the required cash in each product segment and maintain the optimal level which will help in reducing the cash balance level and increase their customer deposit base through making the product accessible to more customers especially the low-income earners. At the same time, banks

should consider targeting the corporate clients who will be willing to retain a large cash base in the banks for a longer duration. They used an inappropriate statistical tool of ordinary least square regression technique to estimate their panel data; also, they combined data from both pre (2009-2011) and post (2012-2014) IFRS implementation in Nigeria which affects their study findings. Furthermore, even though their study was carried out in 2017 their data covered only up to 2014 which affect the currency of their study.

Gap in Literature

The empirical works have shown that some of the studies like Chuke and Chinedu (2018); Lelgo and Obwogi (2018);Roni and Teddy (2019) used inappropriate statistical tools of ordinary least square regression technique for their panel data instead of panel regression technique which affects the reliability of their findings. Also, most of the studies like Chuke and Chinedu(2018);Enekwe*et al* (2017); and Kola and Yusuf (2017)conducted in Nigeria combined the data for both pre and post IFRS implementation together which may likely affect their findings. The empirical works have also shown that most of the studies like Afzal *et al* (2018); Chuke and Chinedu(2018);Isah (2018); and Mohiuddin and Shafir (2018) carried out in recent times of 2018/2019 regarding credit risk, interest rate risk, liquidity risk and profitability performance of quoted deposit money in Nigeria and other countries of the world were not current in their data used for the analysis as most of their data were within 2016 and below except very few studies like Lelgo and Obwogi (2018); and Ofeimun*et al* (2019).

Furthermore, these kind of financial risk and profitability performance studies in recent time were mostly carried out in other countries of the world more than Nigeria. These highlighted gaps in literature above call for further study in this area which necessitated this study, the effect of financial risk on profitability performance of quoted deposit money banks in Nigeria, to update the data up to 2018, use panel regression technique, cover only the periods of IFRS implementation in Nigeria and adding to the recent literature in this area in Nigeria.

Theoretical Review

Modern Portfolio Theory

Modern Portfolio Theory (MPT) is a theory of investment which tries to maximize return and minimize risk by carefully choosing different assets (Markowitz, 1952). MPT is a mathematical formulation of the concept of diversification in investing, with the aim of selecting a collection of investment assets that has collectively lower risk than any individual asset. This is possible, in theory, because different types of assets often change in value in opposite ways. For example, when the prices in the stock market fall, the prices in the bond market often increase, and vice versa. A collection of both types of assets can therefore have lower overall risk than either individually (Mandelbrot & Hudson, 2004). The primary principle upon which Modern Portfolio Theory is based (MPT) is the random walk hypothesis which states that the movement of asset prices follows an unpredictable path: the path as a trend that is based on the long-run nominal growth of corporate earnings per share, but fluctuations around the trend are random. The MPT has important implications in terms of risk minimization by investing in portfolios that have lower overall risks. This study is anchored on the modern portfolio theory because the theory tries to maximize return and minimize risk by carefully choosing different assets. The theory emphasized the concept of diversification in investing, with the aim of selecting a collection of investment assets that has collectively lower risk than any individual asset.

Methodology

This study used descriptive research design to address the research objectives. This research design is used to examine the statistical relationship between two or more variables. The population of the study consists of all the registered deposit money banks in Nigeria with the Central Bank of Nigeria as at 31st December 2019 calendar year. The sample size of this study comprises of 14 operational deposit money banks in Nigeria, covering 2012-2018 based on the filter criteria stated below. These banks were selected for this study because it is one of the riskiest sector in Nigeria. The filter criteria for the banks included in the study from the banking sector are stated below: These conditions were specified to arrive at a definite sample size for this study.

(i) A bank must have been operational in Nigeria.
(ii) A bank must have its financial statements available and accessible for the period under study.

Based on this, the sample size for this study comprises of 14 banks.

The data were obtained from the annual reports and accounts of all the sampled deposit money banks in Nigeria, within the chosen period of this study. The technique of data analysis used for this study is panel random effect regression model. The study adopted this technique to establish the effect of financial risks (credit risk, interest rate risk and liquidity risk) on return on assets of deposit money banks in Nigeria. The data were analyzed using STATA 13 and the outcome was used to test the formulated hypotheses. This study used the same econometric style as used by Fauziah *et al* (2009). Various robustness tests were carried out to enhance the validity of the research results.

Profitability performance is proxy by return on assets (ROA) which is measure through profit after tax divided by total assets and is a function of three explanatory variables such as credit risk (CR), interest rate risk IRR) and liquidity risk (LR) with firm size (FZ) as a control variable.

Therefore;

$ROA = f(CR, IRR, LR, FZ)$……. (1)

The expression in equation one is express econometrically as follows:

$ROA_{it} = \alpha + \beta_1 CR_{it} + \beta_2 IRR_{it} + \beta_3 LR_{it} + \beta_4 FZ_{it} + e_{it}$…… (2)

Where:

β1, β2 and β3 are parameters to be estimated with a priori expectations.
ROA= Return on Assets
CR = Credit Risk
IRR = Interest Rate Risk
LR = Liquidity Risk
FZ = Firm Size
α = Constant
e = Error term
i = Firms
t = Periods

Table 3.1: Variables Measurement and Justification

Variable	Acronym	Type of variable	Measurement	Justification
Return on Assets	ROA	Dependent	Profit after tax divided by total assets.	Isah (2018)
Credit Risk	CR	Independent	This is non-performing loans divided by gross loans.	Roni and Teddy (2019).
Interest Rate Risk	IRR	Independent	This is total Loan divided by total Assets.	Fauziah, Zarinah, Ahamed and Mohd (2009); and Kihara and Mirie (2017).
Liquidity Risk	LR	Independent	Gross loans divided by total deposits.	Enekwe, Eziedo and Agu (2017); Lelgo and Obwogi (2018); Ofeimun, Godwin and Okeke (2019); and Roni and Teddy (2019).
Firm Size	FZ	Control	Natural log of total assets.	Isaac, Willy and Anthony (2017).

Source: Researcher's compilation, 2019.

Data Analysis and Results

The data analysis was carried out using Descriptive Statistics, Pearson Correlation, Shapiro-Wilk Normality Test, Hausman Specification Test and robust Random effect regression model.

Descriptive Statistics

Table 4.1 below is the descriptive statistics that summarizes the entire data sets.

Variable	Obs	Mean	Std.Dev.	Min	Max
ROA	98	.8083286	.4291049	.017070	3.090764
CR	98	.0926317	.2019124	.0701760	1.331604
IRR	98	.5556084	.8641479	.057238	8.352884
LR	98	.7338167	.5714878	.0355044	6.025419
FZ	98	9.150689	.4228832	7.053232	9.836582

Source: Researcher's Computation using STATA 13 software

Table 4.1 above shows that the return on asset (ROA) has a minimum value of .017070, a maximum value of 3.090764 and a mean value of .8083286 that is within the minimum and maximum values indicating a good spread within the period studied. The table also reveals that ROA has a standard deviation .4291049 that is less than the mean, which implies that it had a slow growth during the period under review. Table 4.1 above also shows that the credit risk (CR) has a minimum value of .070176, a maximum value of 1.331604 and a mean value of .0926317 that is within the minimum and maximum values indicating a good spread within the period studied. The Table also reveals that

CR has a standard deviation .2019124 that is more than the mean, which implies that it had a strong growth during the period under review.

Table 4.1 above equally shows that the interest rate risk (IRR) has a minimum value of .057238, a maximum value of 8.352884 and a mean value of .5556084 that is within the minimum and maximum values indicating a good spread within the period studied. The Table also reveals that IRR has a standard deviation .8641479 that is more than the mean, which implies that it had a strong growth during the period under review. Table 4.1 above further shows that the liquidity risk (LR) has a minimum value of .0355044, a maximum value of 6.025419and a mean value of .7338167 that is within the minimum and maximum values indicating a good spread within the period studied. The Table also reveals that LR has a standard deviation of .5714878 that is less than the mean, which implies that it had a slow growth during the period under review.

Table 4.1 above finally shows that the firm size (FS) has a minimum value of 7.053232, a maximum value of 9.836582 and a mean value of 9.150689 that is within the minimum and maximum values indicating a good spread within the period studied. The Table also reveals that FS has a standard deviation .4228832 that is less than the mean, which implies that it had a slow growth during the period under review.

Correlation Matrix

Table 4.2 below is the Pearson correlation matrix for the data set to show the extent of interdependent variables.

Variable	ROA	CR	IRR	LR	FZ
ROA	1				
CR	0.0021	1			
IRR	0.6718	0.0207	1		
LR	0.0065	0.0858	0.3726	1	
FZ	-0.3862	-0.2099	-0.4634	0.0190	1

Source: Researcher's Computation using STATA 13 software

Table 4.2 above represents the results of Pearson correlation coefficient of all variables included in this study. The table shows that there is a strong positive relationship of 67% between interest rate risk and return on assets. The table also shows that there is a weak positive relationship of .21% between credit risk and return on assets. The table further shows that there is a weak relationship of .65% between liquidity risk and return on assets. The table shows that there is a moderate negative relationship of -39% between firm size and return on assets. Table 4.2 indicates that none of the correlation coefficients among independent variables are larger than the value of .85. Thus, following the suggestions of (Hair, Tathan & Anderson, 2005), that unless correlation coefficients among independent variables exceed this threshold of 85%, multi-collinearity is unlikely a problem.

Shapiro-Wilk Normality Test

Table 4.3 below shows the results of the normality test conducted with the use of Shapiro-Wilk method.

Variable	OBS	W	V	Z	Prob>z
ROA	98	0.1468	68.677	9.367	0.00
CR	98	0.34797	37.328	7.831	0.00
IRR	98	0.19003	65.197	9.252	0.00
LR	98	0.30944	55.585	8.898	0.00
FZ	98	0.91551	6.801	4.246	0.00

Source: Researcher's Computation using STATA 13 software

Table 4.3 above shows that ROA, CR, IRR, LR and FZ have probability > z values that are less than 0.05 which signifies that they are not normally distributed around their means. Normality is all about the distribution of a series around its central mean and because all the five variables displayed abnormality in their distribution pattern, this study concludes that one of the basic assumptions of ordinary least square technique which allows only normally distributed series has been violated which necessitated the use of robust random effect regression model.

Hausman Specification Test

Considering that panel data are involved in this analysis, the Hausman specification test was conducted to give an insight into the appropriate test to be performed. From the Hausman test, the chi2 value of (2.27) and an insignificant probability value of (0.6856), therefore, the Random effect regression is preferred as against the use of a fixed effect regression.Table 4.4 below presents the result of a Hausman specification test conducted.

Chi2	2.27
Prob. Chi2	0.6856

Source: Researcher's Computation using STATA 13 software

Estimation Based on Robust Random Effect

Table 4.5 below is the robust random effect regression model conducted which was used for the estimation of this model.

Variable	Coefficients	z-value	Prob.
Cons.	-.1177341	-1.53	0.216
CR	.336764	12.01	0.000
IRR	.3954721	147.73	0.000
LR	-.2334701	-185.41	0.000
FZ	.0122623	1.50	0.135
Overall R-sq	0.809		
Wald Chi2	68108.30		
Prob. >Chi2	0.00		

Source: Researcher's Computation using STATA 13 software

Table 4.5 below indicated that 81% variation of profitability performance (ROA) is predicted by joint contribution of CR, IRR, LR and FZ (overall R-sq = 0.809). The rest of 19% is explained by other variables that were not included in this research model. This indicates that the model of the study is fit and the independent variables are properly selected, combined and used. This further implies that for any changes in the financial risk of listed deposit money banks in Nigeria; their profitability performance will be directly affected. The Wald Chi2 is 68108.30 with a P-value of 0.00 which signified that the model is perfectly fit for the study.

Test of Hypotheses

In order to examine the effect of financial risk on profitability performance in quoted deposit money banks in Nigeria, the formulated null hypotheses were tested using a random effect regression model.

H_{01} Credit risk has no significant effect on return on assets of quoted deposit money banks in Nigeria.

H_{02} Interest rate risk has no significant effect on return on assets of quoted deposit money banks in Nigeria.

H_{03} Liquidity risk has no significant effect on return on assets of quoted deposit money banks in Nigeria.

The results in Table 4.5 above shows the t-value of 12.01 and the corresponding probability value of 0.00 indicating that credit risk (CR) has a significant effect on return on assets of quoted deposit money banks in Nigeria. Based on this, the null hypothesis one which states that credit risk has no significant effect on return on assets of quoted deposit money banks in Nigeria is rejected.

The results in Table 4.5 above also shows the t-value of 147.73 and the corresponding probability value of 0.00 indicated that interest rate risk (IRR) has a significant effect on return on assets of quoted deposit money banks in Nigeria. Based on this, the null hypothesis two which states that interest rate risk has no significant effect on return on assets of quoted deposit money banks in Nigeria is also rejected.

The results in Table 4.5 above further shows the t-value of -185.41 and the corresponding probability of 0.00 indicated that liquidity risk (LR) has a significant effect on return on assets of quoted deposit money banks in Nigeria. Based on this, the null hypothesis three which states that liquidity risk (LR) has no significant effect on return on assets of quoted deposit money banks in Nigeria is further rejected.

Discussion of Findings

This study revealed that credit risk (CR) has a significant positive effect on return on assets of quoted deposit money banks in Nigeria. This means that an increase in credit risk will increase the return on assets of quoted deposit money banks in Nigeria, by .0336764. This finding is in line with the finding ofIsah (2018). However, the finding is not in agreement with the findings of Isabwa and Nelima (2019);Roni and Teddy (2019); Chuke and Chinedu (2018); and Sajedeh *et al* (2013).

The study also revealed that interest rate risk has a significant positive effect on return on assets of quoted deposit money banks in Nigeria. This means that an increase in interest rate riskwill increase the return on assets of quoted deposit money banks in Nigeria, by .3954721. This finding is in consonance with the findings of Alhassan *et al* (2018); and Kihara and Mirie (2017). However, the finding is not in agreement with the findings of Afzal *et al* (2018).

The study finally revealed that liquidity risk (LR) has a significant negative effect on return on assets of quoted deposit money banks in Nigeria. This means that an increase in liquidity risk will reduce the return on assets of quoted deposit money banks in Nigeria, by -.2334701. This finding is in line with the finding of Ofeimun *et al* (2019). However, the finding is not in line with the findings of Mohiuddin and Shafir (2018); and Enekwe *et al* (2017).

Conclusion

The deposit money banks in Nigeria must manage their credit risk effectively to enhance the profitability of their banks. The effectiveness of the management of credit risk will determine the amount and level of profits the banks will make in Nigeria. Also, the management of deposit money banks in Nigeria must sustain the management of their interest rate risk to enhance their profitability. Effective management of interest rate risk will enhance the profitability of deposit money banks in Nigeria. The management of deposit money banks in Nigeria must equally minimize their liquidityrisk in order to enhance the profitability banks in Nigeria. Effective management of liquidity riskthat will strike a balance between excess cash and cash trapping is required to enhance the profitability of deposit money banks in Nigeria.

Recommendations

The following recommendations are made:

1. The deposit money banks in Nigeria should ensure that all the conditions required before granting loans to their customers should be met to avoid default in order to enhance their profitability.
2. The management of deposit money banks in Nigeria should sustain the management of their interest rate risk to enhance their profitability. The high interest rate will scare away prospective borrowers and should be kept little above the prevailing inflation rate in Nigeria.
3. The banks should manage their liquidity risk by striking a balance between excess cash and cash trapping to enhance the profitability of the deposit money banks in Nigeria. Holding on to too much cash will reduce banks profitability level while shortage of cash in banks will equally reduce the profitability level, the need to strike a balance to enhance banks profitability level become expedient.

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