

## Impact of Bank Size on the Performance of Deposit Money Banks in Nigeria

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### Abstract

*This paper empirically investigated the relationship between Bank size and the performance of deposit money banks in Nigeria. Specifically, changes in financial performance were examined on the basis of the relative effect on bank size, credit risk, liquidity risk, market risk, and operational risk. Panel data analysis technique was used in the estimation of the specified model. The fixed effects were adopted in the empirical analysis. The results from the empirical analysis revealed that Bank size, does not have significant relationship with deposit money banks performance in Nigeria. The other hypothesized variables, Credit risk, Market risk and Operational risk do not have any significant relationship with the performance of deposit money banks. Liquidity risk variable is a significant determinant of deposit money banks' performance in Nigeria in the period under investigation. On the bases of the outcome of the empirical analysis, this paper recommended that bank management should continuously lay more emphasis on liquidity risk management in order to ensure that banks have adequate cash to meet the depositors demand daily. The study also added a new clause to existing findings in the extant literature. Contrary to finding from other studies, this study has demonstrated that irrespective of the assets or size of a bank, it does not in any way determine its overall performance, what matters is the issue of liquidity risk. In addition, this study provides more evidence on the factors that determine bank performance of deposit money banks in Nigeria, this is the contribution to knowledge of this paper.*

**Keywords:** Bank size, Bank performance, Credit risk, Liquidity risk, Market risk, and Operational risk

### INTRODUCTION

#### 1.1 Background to the Study

Banks are very important and special institutions in every economy. The financial intermediary theory of banking states that banks exist because they perform certain special functions that other financial intermediaries cannot replicate. These special functions are the intermediating roles between savers (depositors) and the borrowers; that is, mobilizing idle financial resources from the surplus units (that is, savers, through the various accounting systems and bills discounting), and making this financial resources available to the deficit units (that is, fund seekers who are in need of funds - the borrowers) through loans and/or credits, and when they (the banks) invest in securities (Shanmugam & Bourke, 2015). This credit creation function has remained the primary function and main business of every banking industry in the world and has helped in accelerating the pace of a nation's economic growth and its long-term sustainability. But, in performing and sustaining these intermediating roles, the banks are invariably exposed to risk that may have a potential direct and/or indirect influence on their performance (Olagunju, David, & Samuel, 2016).

Risks in banking has been traced to the industrial revolution when projects required large capital outlays due to the fast growing commercial and production activities. Unable to meet these huge financial demands internally, many farmers, entrepreneurs and industrialists turned to the banks for help but many defaulted in repayment. In Nigeria, the emergence of indigenous banking (the era of free banking) in the 1900s saw many Nigerian nationalists and industrialists establishing their own banks mainly to assist Nigerians to access loans, because they (the farmers, traders and entrepreneurs) were discriminated against by the foreign owned banks. These created huge bad debts when many of the farmers, traders and entrepreneurs just like their European counterparts also defaulted in their loan repayments, causing unprecedented loss to the economy and the resultant indigenous banks' failure and distresses that characterized the era of free banking.

Similarly, during the economic recessions in the 80s and early 90s, banks were highly motivated to grant credits to clients who could easily express their creditworthiness so as to stem up the economy (Bryant, 2015); and with the deregulation of the banking sector in the late 90s, the demands for credit by borrowers assumed an unprecedented level. Thus, large amount of bad credits, as a result of the boom-time advances in the 1980s and the 1990s also led to financial crisis and banks' failures (Brown & Harvey, 2015 Bryant, 2015). The increasing deregulation in the

banking sector in the 2000s coupled with high competitive level in the banking sector, and the globalization of financial activities, made banks to look beyond their primary role of not only the taking of deposits and making loans, but the introduction of new financial products to satisfy customers, and meet the increasing pressures for more profits; however, these have contributed to the build-up of vulnerabilities such as high debt levels, non-performing loans and stretched asset valuations. According to Jorion, (2016), the increasing competition in the banking sector which has resulted to the current waves of financial innovations and changing characters of banking activity that have swept through the financial system since the 2000s has exposed the banks to a greater variety of risks.

In addition, the financial crunch of 2007-2008 led to the collapse of large financial institutions (those that were referred to as ‘too big to fail’); the after effect was the downturn in economic activities and the great recession of 2008-2012. The active phase of the recession was the European sovereign debt crisis: the subprime mortgage loans (Brookings, 2013); and was evident through a liquidity crisis thereby exposing the banks to a greater variety of risks; foreign exchange volatility risk, variable interest rates risk, market play risk, operational risk, liquidity risk and credit risk. Thus, Luy (2015), asserted that risk contain risks.

Financial risks, for clarity and simplicity purpose, is variously referred to as the risks associated with financing, such as defaults on loans and advances, volatility of interest rates, operational set back, liquidity risk and changes in foreign exchange rates. In other words, it is the risks that arise from giving out money to another person or entity, also resulting from changes in economic variables and/or changes in technology. It is also referred to as the uncertainty and potential financial loss to earnings and capital (Jorion, 2016). Hague & Wani (2015), define financial risks as an umbrella term of risks factors resulting to financial losses triggered by financial transactions. These umbrella of risks factors for banking sector majorly include Credit risk, Market risk, Liquidity risk, Operational risk and Capital risk, while Greuning & Bratanovic (2016), refers to financial risks as comprising of two types of risks: traditional banking risks and the non-traditional risks. Traditional banking risks or expected risks are those risks the banks are aware with reasonably certainty will occur, and arises from the basic functions of the banks; for example, the expected default rate of corporate loan portfolio, thus for every credits or loans issued by banks there are perceived risks involved. While the non-traditional risks or unexpected risks are those risks associated with unforeseen events and arise from the development in the banking environment domestically and globally, for example, bank regulations, losses due to a sudden downturn in the economy or fallen interest rates; usually, banks use their capital to deal with these kinds of losses. The Basel Committee on Bank Supervision (2008), classified banking risks into credit risk, market risk and operational risk. Crouhy, Galai & Mark (2016), also made another classification of banking risks to include market risk, credit risk, liquidity risk, operational risk, legal risk, business risk, strategic risk and reputation risk. The banking theory identifies four categories of risks which are linked with the credit policies of banks. These risks are: Liquidity risk, Market risk, Operating risk, and Credit risk (Kargi, 2015). These are in line with Santomero (2014), who asserts that the banking industry has long viewed the problem of risk management as the need to control these four categories of risks which make up most, if not all of their (banks) risks exposures as indicated viz: Non-Performing Loans (NPLs), Loan Loss Provision (LLP), Total Loan to Total Asset (TLTA), Total Loan to Total Deposit (TLTD), Total Liability to Total Asset (TLiTA), Degree of Financial Leverage (DFL), Inflation rate risk (INFRr), Interest rate risk (INTRr), and Operating Expenses risk (OPEXr). In consonance with the above, the major financial and non-financial risks encountered by the banking sector as per the Central Bank of Nigeria (2013) reports are Market risk, Operational risk, Credit risk and Liquidity risk (CBN, 2013).

The effects of risks have been observed to be cyclical where systemic risk triggers emergence of financial risks. Market risk causes liquidity risk and credit risk. Credit risk and liquidity risk together causes capital risk (Chen and Nasir, 2016). Haque and Wani (2015), observed that financial risks exist in an ecosystem of systematic risks where external financial risks causes internal risk during economic recession, and internal financial risks causes external risk during boom. However, the main economic function of banks involves taking financial risks so as to achieve an appropriate balance between risks and returns. Therefore better knowledge of the effects of these risks on bank performance could contribute to the better functioning of the banking sector. This insight has forms the main basis and major focus of this study.

Banking is a business and like all other businesses is set up for the purpose of earning income and profit maximization. It must be emphasized that banks earn incomes from their intermediary functions. However, no investor can maximize his or her returns without engaging in risk; thus, as banks intermediate, they face series of banking risks.

If banks should avoid these risks so as to minimize failure rates to zero, they limit the purpose of banking system to promote investors’ market value, which at the same time would be detrimental to the sustainability of the financial system (Greuning and Bratanovic, 2016). In this regards, the study sought to establish the effect of financial risks on the performance of deposit money banks in Nigeria. Furthermore, financial risks and performance are study to show the simultaneous effects of risks and profit, because they are interdependent. Their relationship is explained

by Hawley (1893), in his risk theory of profit, and Bowman (1979), in his paradox theory of risk and return, which, in practice are true.

Given this backdrop, this paper want to investigate the impact of Bank size on Deposit Money Banks' performance in Nigeria. This paper intend to establish the relationship between deposit money banks' performance and the size of Bank Nigeria.

### **Statement of the Problem**

The main aim of every financial institution is to generate profit in their operational activities so as to maintain soundness, stability, value and/or maximization of shareholders' wealth, but to attain these goals their exposure to risks has continued to be a source of concern. That the banking sector is bedeviled with so many banking risks challenges including non-performing loans or default risk (credit risk), liquidity crisis-problem of meeting their daily funds demand (liquidity risk), interest rates and foreign exchange rates fluctuations (market risk), and losses arising from operational high cost and systemic failure (operational risk); in spite of the tremendous growth of the sector as reflected in their huge annual profits after taxes being declared as shown in their profit or loss and other comprehensive income statements, these risks still has an edged in their performance as a result of the distresses, failure, merger and acquisition being recorded in the banking sector to date (as at Dec., 31<sup>st</sup> 2018). Credit is the largest component of the total assets of a Bank, the profitability of a bank depends on the ability of a bank to extend credit to the public. The total assets of a bank is proxy by bank size, thus the need or justification for this study.

Also, the studies on Bank size and deposit money banks performance in Nigeria are few and scanty, for example, studies by Kolapo, Ayeni, & Kolade, 2012; Obamuyi, Owoputi, Kayode & Adeyefa, 2015; Samuel, 2014; a study of this nature will therefore be an addition to the already few available ones for reference purpose.

From the statement of the problem above, the objective of the study was obtained. The main objective of this study is to examine the effect of Bank size on the performance of deposit money banks in Nigeria In terms of longitudinal scope, we have chosen the time horizon or time scope of nineteen years, that is, from 2000 – 2019 to enable us capture the effects of banks 'recapitalization on financial risks. The dependent variable was banks' performance, this was measured by Return on Assets (ROA); while the explanatory variables were limited to Bank size and four indicators of financial risks These are credit risk, liquidity risk, market risk, operational risk and bank size.

## **LITERATURE REVIEW**

### **The Risk theory of Profit**

This paper is hinge on " The Risk Theory of Profit" developed by Hawley (1893). This risk theory of profit is generally based on the risk and performance literature. Performance and financial risks are two components that have a two-way interaction. Each component is important to the other to sustain the operation of the firm. According to Hawley's risk theory of profit (1893), profit is considered to be the return of risk as an additional factor of production and have a positive relationship with risk. This means that the higher the factor (that is, risk), the higher the profit and the higher the distributable return for the risk.

The theory posits that profit is a reward for risk taking, that some risks are inherent in every business enterprise in view of the speculative nature; thus in the business of banking, the management has to bear the risk in order to get profit being the reward for the risk taking. But, the degree of risk varies according to different businesses. However, there is a positive relationship between risk and profit. This idea is supported by Aaker and Jacobson (1987), who argued that risk has a positive correlation with Return on Investment. This idea becomes true when the bank management take risk by relocating funds in high-risk-investments or loans with high returns; alternatively, the theory becomes fantasy when the banks face high risk and management fails to manage its occurrence and returns. Conversely, Bowman (1979), in his paradox theory of risk and return, propounded that risk and return have a negative relation because managers aimed at increasing returns and reducing risk at the same time. In reality, this idea is true when a bank fails to manage risk, the risk is high and the profit is low, and when the bank succeeds in managing risk, the risk is low and the profit is high. Instructively, the connection between individual risk and performance has been shown by much of the empirical literature.

Starting with credit risk, Athanasoglou, Brissimis, & Delis (2014), in their study on bank-specific determinants, industry-specific determinants and macroeconomic determinants of bank profitability, used the GMM technique for a panel data model for Greek banks covering the period 1997-2013.

The outcome of the study shows that financial risks but in the form of credit risk is a bank specific factor, that credit risk negatively affects the performance of conventional banks, thus the protagonists called for the efficient use of capital hence the application of the shiftability theory, commercial loan theory and anticipated income theory.

## **EMPIRICAL**

Additionally, Athanasoglou, Delis, and Staikouras (2016), studied the determinants of bank profitability in the South Easter Europe region over the period 2008-2012. They applied random effect model (REM) for Generalized

Least Square (GLS) estimation model since Hausman test indicates insignificant P-value. The results of the study show liquidity risk has positive but not a significant effect on Return on Asset (ROA) of banks, while credit risk has negative and significant effect on banks' ROA. Moreover, capital has positive and also significant effect on ROA.

In a similar study, Al-Tamimi and Al-Mazrooei (2017), conducted a study to investigate the most important risk(s) affecting the UAE's National and Foreign banks, involving a sample of 17 banks. The data used were sourced through questionnaires, and Pearson correlation and Ordinary Least Square (OLS) regression technique were used to test the data. The outcome of their findings was that the three most important types of risks facing the UAE commercial banks were foreign exchange risk, followed by credit risk as well as operating risk.

Furthermore, Jamil (2018), in her study examined the various types of risks (credit, liquidity, market and capital risks) which the Jordanian commercial banks are exposed to, and the strategies adopted by these banks to manage these types of risks finally appeared on Basel II Accord. The sample of the study was on 4 Jordanian banks during the period 2005-2017. The survey data method was used, and the pooled data regression method was used to analyze the data. The study outcome indicated that banks have the ability to consider and manage some types of risks, and there is statistical relationship between total risk and all types of risks. The study outcome therefore stressed that liquidity risk and credit risk have the most effect on total risk, and operational risk has the least effect on total risk compared to the other risks. However, the study failed to indicate the effect of risks on banks' performance

Imad (2018), investigated the bank-specific determinants of Jordanian Islamic banks' profitability. The study employed profit margin and Return on Assets (ROA) as indicators of banks' profitability. The independent variables used were capital adequacy, credit risk, liquidity risk, management efficiency, bank size, management expenses, non-interest earnings, market concentration, bank-industry size, inflation and economic growth. The result from the study reveals that credit risk has positive impact on Islamic banks' profitability. The finding is consistent with previous researches. However, other factors such as bank size, non-interest earning and efficiency of management expenses do not have any significant effect on Return on Asset (ROA) and profit margin of these banks.

In a similar vein, the study by Fauziah Hanim, Zarinah, Ahamed-Kameel, and Mohdazmi (2018), also aimed to analyze the relationship between financial risks and profitability of conventional and Islamic banks in Malaysia. They used panel data sources from 2006-2011. In the study, bank profitability is proxy by Return on Asset (ROA), Return on Equity (ROE) and Net Interest/Income Margin (NIM), whereas the independent variables were proxy liquidity risk, credit risk, interest rate risk, interaction between credit risk and interest rate risk, off balance sheet activities, bank size, bank capital, lag of ROA or ROE and GDP growth. The outcome of the study showed that credit risk has a major effect on Return on Asset and Return on Equity of the banks. They believed the outcome might be due to the move that banks are exposed to high risk loan, the higher the Non-Performing Loan and this eventually result in the decrease of conventional banks' earnings. Meanwhile, interest rate risk affect the conventional banks Return on Equity, but the effect is weakly significant and is insignificant for Islamic banks. Moreover, liquidity risk is insignificant in affecting the banks' performance as showed by comparison relationship vis-à-vis the Return on Asset and Return on Equity for both conventional banks and Islamic banks.

Pervin and Chowdhury (2018), emphasized that lower NPL ratio is the evidence of lower amount of loans being doubtful which in turn means a lower credit risk; that is, the lower the ratio, the better the asset quality, thus the lower the doubtful loans. Distinctively, the lower the credit risk, the better the performance of banks.

Since credit risk measures the default rate, a negative relationship is expected between Non-Performing Loan ratio and commercial banks' performance. However, empirical studies on this issue have produced mixed results. In Li's (2017) study, he investigated the relationship between credit risk and bank's profitability in the UK. The result of the work indicated that the profitability of the banks was negatively affected by credit risk and liquidity risk.

## **Research Methodology**

### **Research Design**

The paper examine the relationship between Bank Size and performance of deposit money banks in Nigeria, proxy by Return on Asset (ROA). The research design is hinge on ex' to facto longitudinal research design which uses both cross sectional elements and time series data. The scope of the paper covered period of nineteen years, from 2000-2019.

This choice period is to capture the impact of recapitalization of banks, also to have an extensive data and comprehensive data analysis that incorporated the various stages of economic trends on the impact Bank Size on the performance of Deposit Money Banks so as to come up with a generally acceptable findings and conclusion which Stimson (1985), best described as one of the best designs for the study of causation, next to a purely random experiment.

The paper relied mainly on secondary sources of data, from the Central Bank of Nigeria annual reports and statistical bulletin (various years), and Financial/Accounting annual reports and Statement of Profit or Loss

Accounts and other comprehensive income of the various Nigeria's deposit money banks for the period 2000 to 2019. The requirement was that all the deposit money banks were in operations within the study period, and has published accounts for the years period from 2000 to 2019.

### Techniques for Data Analysis

Correlation analysis was used to assess the variables that were highly correlated so as to avoid the problem of multi-collinearity which is a common problem in time series data. The data included time series and cross-sectional data that are pooled into a panel data set. This was estimated using panel data regression. The study data were organized and financial ratios were used. These were computed using Excel program in order to obtain the study variables. The financial ratios to be computed for each of the deposit money banks for the study period were then transformed into panel data regression technique to measure, describe and analyze the effect of Bank size on the performance of deposit money banks in Nigeria.

The balanced Panel data collection and estimation technique (regression statistical technique) was adopted. Panel data is defined as a data set with a cross section and a time dimension. The observed units are followed over time (time series effects), and taken together the repeated observations of one unit constitutes a panel. Other names for it are pooled data, micro panel data, longitudinal data, event analysis and cohort analysis. Panel data is adopted because it takes care of heterogeneity associated with individual banks by allowing for individual specific variables, also all the required data are available thus there are no need for projection or forecasting. By using both time series and cross sectional observations, panel data give more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency; especially suitable to study dynamic of change, and minimize bias due to aggregation. It also improves empirical analysis in such a way that it may not be possible if either only time series data or cross sectional data is used (Ogboi & Unuafé, 2013). Panel data is also employed because; it help to study the behavior of each of the banks over time and across space and then a regression is run over these two dimensions (Baltagi, 2005).

Econometrically, this setup we have adopted is as described in the following equations:

$$y_{it} = \alpha + \beta x_{it} + u_{it} \quad 1$$

Where:

$y_{it}$  = the dependent variable

$\alpha$  = the intercept term

$\beta$  = the  $k \times 1$  vector of parameters to be estimated on the explanatory variables, and

$x_{it}$  = the  $1 \times k$  vector of observations on the explanatory variables

$i$  = the number of banks: 1, 2, 3,.....nth

$t$  = the number of years: 1, 2, 3,.....t

Brookings (2013), specified that there are broadly two classes of panel estimator approaches that can be employed in financial research. The first one is the fixed effect model. This decomposed the disturbance term  $\mu_{it}$  in the equation (1) above into an individual specific effect,  $u_i$  and the remainder disturbance,  $\mu_{it}$  that varies over time and entities (getting everything that is left unexplained about  $y_{it}$ ). Therefore,

$$u_{it} = \mu_i + \mu_{it} \quad 2$$

The equation (1) above could be rewritten by substituting for  $u_{it}$  from (2) to obtain:

$$y_{it} = \alpha + \beta x_{it} + \mu_i + \mu_{it} \quad 3$$

$\mu_i$  as encapsulating all the variables that affect  $y_{it}$  cross-sectional but not vary over time can be thought of dummy variables (in this case, as control variable).

Instead of an entity fixed effects model there is possibility of having a time-fixed effects model. Such a model could be used where we thought that the average value of  $y_{it}$  changes over time but not cross-sectional. Hence, with time fixed effect, the intercepts would be admitted to change in time but would be presumed to be identical across entities at each given point in time.

A time-fixed effects model could be written as:

$$y_{it} = \alpha + \beta x_{it} + \lambda_t + u_{it} \quad 4$$

Where:

$\lambda_t$  = is a time-varying intercept that captures all of the variables that affect  $y_{it}$  and that vary over time but are constant cross-sectionally.

The second model is the random effect model which does not correlate with the individual regressors. A random effect model assumes that the unobserved difference is not correlated with explanatory variables. This model is appropriate when drawing inferences about the whole population. The benefit of using the random effects model is that regressors allowed time-invariant variables to be included (Greene, 2012), since pooled regression model assumed that all the institutions are the same which is not the case. The two models cater for heterogeneity or individuality among the institutions which allows each institution to have its own intercept value which is time invariant.

In deciding which of the model (fixed effect or random effect) to employ, Al-Khouri (2016), employed both the

random and fixed effect regression analysis for his research on the effect of risk characteristics specific to bank on the performance of banks from the Gulf Cooperation Council (GCC) countries. But, according to Brookings (2013), as to which model between the fixed and random is appropriate, is to run Hausmann test to determine the choice between the fixed and random effects approaches before regressing to address the objectives of the study, hence the Hausmann test.

### Hausmann Test

The Hausmann specification test of fixed and random effects enable us to select the appropriate model for the estimation. This test compares the fixed versus the random effects under the null hypothesis than the individual effects are uncorrelated with the order regressors in the model. The test statements are:

$H_0$ : that the individual effects are uncorrelated with the regressors.

$H_1$ : that the individual effects are correlated with the regressors.

If the test should give the indication that  $H_0$  is rejected, a random effect model will produce biased estimates, so a fixed effect model will be preferred.

### Model Specification

The study adopted Panel data (comprising cross-sectional and time series data) regression model in line with the models on similar works by , (2014); Ahmad and Ariff, (2016); and Kurotamunobaraomi, Giami & Obari, (2017).

The Panel regressive technique takes the form as:

$$P_{it}(\text{ROA}) = F(y_{it}, z_{it}) + e_{it} \quad 5$$

Where:

$P_{it}$  = is the performance (ROA) of bank i at time t.

$y_{it}$  = is the vector of variables (Bank size) characteristics of bank i at time t.

$z_{it}$  = represents features of the variables, and

$e_{it}$  = is the error term.

The empirical framework for the investigation of the connection between bank performance and Bank size (Bs) was given in the general form of panel multiple regression techniques as specified as follows:

$$P_{it}(\text{ROA}) = f(\text{BS}, \text{CR}_{it}, \text{LR}_{it}, \text{MKTR}_{it}, \text{OPEXR}_{it}) \quad 6$$

Equation 2 shows that potentially, Deposit Money Bank (DMBs') performance proxy by ROA is determined by BS, CR, LR, MKTR and OPEXR which form a plausible relationship in order to estimate the above equation (2); where:

$\text{ROA}_{it}$  = is the performance of bank i at time t.

BS = Bank size

$\text{CR}_{it}$  = is the measures of credit risk ratios of bank i at time t.

$\text{LR}_{it}$  = is the measures of liquidity risk ratios of bank i at time t.

$\text{MKR}_{it}$  = is the measures of market risk ratios of bank i at time t, and

$\text{OPER}_{it}$  = is the measures of operational risk ratios of bank i at time t.

From the above equation (2), and consistent with the study of Rao et al., (2007); and Saleem and Raheman, (2016), our model will maintain that bank performance proxy by ROA) is a function of Bank Size proxy by Total Assets :

Credit risk = f(NPLs, LLPs);

Liquidity risk = f(TL/TD, TL/TA);

Market risk = f(DFL, Irrr/Log NIM); and

Operational risk = f(NIMOPEX, OPEXTA).

However, since one variable is to be used as dependent variable in the study, and more than one variable as explanatory variables also in the study, the general forms of the panel multiple regression techniques derived from the equations were adopted to suit the hypotheses. Thus, the empirical model specification to be estimated was stated as followings:

### ROA Model

$$\text{ROA} = \alpha + \beta_1 \text{NPLR} + \beta_2 \text{LgTA} + \beta_3 \text{LLPR} + \beta_4 \text{TLTD} + \beta_5 \text{TLTA} + \beta_6 \text{DFL} + \beta_7 \text{LgNIM} + \beta_8 \text{NIMOPEX} + \beta_9 \text{OPEXTA} + e_{it}$$

Where:

ROA = Return on Asset;

LgTA = Log of Total Assets (Bank Size is proxy by Total Assets) ,

NPLs = Non-Performing Loans;

LLPs = Loan Loss Provisions;

TLTD = Total Loan to Total Deposit;

TLTA = Total Loan to Total Asset;

DFL = Degree of Financial Leverage;

LgNIM = Log of Net Interest Margin or measure as IRRR (that is, Interest rate risk);

NIMOPEX	=	Net Interest Margin to Total Operating Expenses;
OPEXTA <sub>it</sub>	=	Operating Expenses to Total Assets; and
eit	=	error terms.

### 3.11 Apriori expectation

Notwithstanding the general lack of consensus in the literature on the effect, impact or influence of Bank Size on deposit money banks' performance; theory suggest that an increased Bank Size is often associated with increase in bank profitability; hence, the a priori expectation in the model is that all the independent variables are expected to have a negative relationship on bank performance measured by Return on Asset (ROA) except bank size which is expected to have a positive relationship with bank performance. The mathematical expression is represented as  $\beta_1 - \beta_8 < 0$  ( $\alpha_1 < 0$ ); with the only exception of  $\beta_9$  where we expect positive relationship of  $\beta_9 > 0$  ( $\alpha_2 > 0$ ), meaning that a unit increase of the independent variables will bring about a decrease in ROA by a unit.

## RESULTS AND DISCUSSION

This section encompasses data analysis, presentation of results and discussion of findings. The analysis involves the use of both statistical and econometric methods to provide a rich background for investigating the effect of Bank size on deposit money banks' performance in Nigeria. Panel Data Analysis method was employed in econometric analysis. The discussions of findings follow each of the various analyses.

### DATA PRESENTATION

#### 4.2 ECONOMETRIC ANALYSIS (THE PANEL MODELS)

The standard test for the method of panel analysis adopted is the Hausman test for random effects. But since the biases in the pooled data could either come from cross sectional heterogeneity or time series (periodic) changes, the Hausman test reported in table 4.2 below was conducted (see appendix 3 and 4) to determine the best effects model to be adopted; the Chi-square statistic values for each of the models was significant. From the results, the statistic provides little evidence against the null hypothesis that there is no misspecification when the Fixed-effect model is employed for the estimates in values. Hence, the best method to apply for the model estimation was the Fixed-effect strategy.

**Table 4.2: Hausman Test for Panel Effects**

Test Summary	Chi-Sq. Statistic	Chi-Sq. df.	Prob.
Cross-section random	23.0892	8	0.0033

Source: Author's computation (2019)

#### 4.3 Estimation with DMBs Performance and Financial Risks Related Factors

The first set of analysis of the results is the estimation of the aggregate behaviour of deposit money banks (DMBs) financial performance in the face of changes in financial risks related factors (model 1). Another set of analysis (in the next section) deals with bank size and financial risks in relation to DMBs' Performance (model 2). Though the Hausman test has shown that the Fixed Effects (FE) estimates are more appropriate in the estimations, we include Random Effect (RE) estimate for the sake of robustness checks.

#### ROA Model : Estimation Bank size and Deposit Money Bank Performance

The model is shown to have a weak predictive ability as is shown in the R squared value of 0.22 percent. This shows that over 22 percent of the systematic variations in deposit money banks' performance were captured by changes in the explanatory variables at any given period. The adjusted R-squared value of 0.156 percent is also very low and it implies that the model has a weak predictive ability. The overall relevance of the model is observed by considering the F-statistic in the model. The F-value of 3.4386 is higher than those of model 1, and it equally passes the overall significance test at a very high level (1% significance level).

Thus, we cannot reject the hypothesis of a significant linear relationship between banks' performance and all the independent variables combined. It is therefore apparent that the combined effects of financial risks variables have significant impact on the performance of deposit money banks in the Nigerian economy over time.

**Table 4.3(b): Bank Size, and Deposit Money Banks' Performance Estimates (Dependent Variable = ROA)**

Variable	<i>Fixed Effects(EF)</i>			<i>Random Effects(RE)</i>		
	Coeff.	t-Stat.	Prob.	Coeff.	t-Stat.	Prob.
Constant	0.130948	1.936974	0.0536	0.053620	1.180321	0.2387
NPLR	-0.003229	-0.214110	0.8306	-0.012850	-0.915997	0.3603
LLPR	0.004871	0.118017	0.9061	0.018041	0.517046	0.6055
LTAR	0.027629	4.082026	0.0001**	0.028164	4.397456	0.0000
LDR	-0.000743	-3.564239	0.0004**	-0.000838	-4.109705	0.0000
LEVERAGE	-0.000403	-0.435667	0.6634	-0.001771	-2.560196	0.0109
IRRR	-0.018345	-0.933150	0.3515	-0.002975	-0.156577	0.8757
NIMTOPEXR	-0.002932	-1.590323	0.1128	-0.001784	-0.980792	0.3274
OPEXTAR	0.014338	0.508353	0.6116	0.012193	0.543978	0.5868
SIZE	-0.010854	-1.431469	0.1533	-0.003588	-1.207141	0.2282
R-squared	0.22			0.099		
Adj. R-squared	0.156			0.074		
F-statistic	3.4386	DW = 1.60		4.3602	DW = 1.488	

**Source: From Author's computation (2019) Note: \*\*1% level of significant; \* 5% level of sig.**

The coefficients of the variables of the estimation of the model results are quite interesting. The various coefficients of the four financial risks variables (credit risk, liquidity risk, market risk and operational risk) have the same outcome as in model above. In other word, liquidity risk as measured by LTAR and LDR is the only risk factor affecting bank performance. They are both significant at the 1% level. While the coefficient of LTAR has positive relationship with bank performance, those of LDR is negatively related with performance. The coefficients of the other hypothesized variables such as non-performing loans ratio (NPLR) and loan loss provisions ratio (LLPR), (LEVERAGE) and interest rate risk (IRRR), net interest margin to total operating expenses (NIMTOPEXR) and operating expenses to total assets (OPEXTAR) do not have any significant relationship with deposit money banks' performance in the country.

The coefficient of bank size (SIZE) is negatively signed and also failed the test at the 5% significance level. Although, bank size usually measured by the natural logarithm of total asset, its effect on financial risks and performance is generally agreed in the extant literature to be positive (Smirlock, 2008; Dong and Su, 2009). However, the opposite seems to be the case in this study. The result suggests that the size of a bank does not necessarily determine the overall financial performance of banks in Nigeria within the period of investigation. Thus, SIZE does not even make any significance difference between the two models. Therefore, it is apparent that banks' performance in Nigeria is mainly driven by liquidity risk measured by loan to total asset ratio (LTAR) and loan to deposit ratio (LDR). Thus, bank management and relevant regulatory authorities must consistently evolve the right policies that will ensure efficient management of bank's liquid assets in such a way that it will have the positive impact on overall performance of the Nigerian banking sector.

The overall results obtained from model 2 estimation are effectively acceptable because the D.W. statistic value of 1.60 is appropriate and it indicates the absence of multicollinearity, meaning there is evidence of autocollinearity among the variables specified in the model. Thus, the results are applicable for structural analysis as well as policy directions.

### Discussion of Findings

The core function of deposit money banks today is purely the efficient management of asset portfolio investments in order to maximize shareholders' wealth, by guaranteeing safety, returns on depositors' funds and confidence in

the system. Assets management in the banking sector is basically defined as the logical development and execution of a plan to deal with potential losses. Since the business of banking is regarded as profit making there is the need to focus on their asset management practices in order to effectively and efficiently manage their exposure to losses as well as to protect the value of assets. Also, the importance of the banking system is based on the fact that it ensures intermediation of funds or transferring necessary funds from the surplus unit to the deficit unit of the society, this is largely affected by the total assets of the bank proxy by bank size.

In this study, bank size (BSIZE) is measured as the log of total assets of the deposit money banks. From the empirical result bank size does not have any significant effect on the financial performance of deposit money banks in the country within the period of investigation. It was observed that bank size though negative, but failed the 5 percent significance test. This means that, the size of bank with respect to the total assets base is not a significant factor in the determination of financial performance of bank in Nigeria. This finding does not however conform with some existing findings in this regard ( Al-Tamimi & Al-Mazrooei, 2017; Jamil, 2018; Yoon & Jang, 2011; Ahmed, Takeda & Thomas, 2013; Abdullah et al, 2012; Fadzian, & Parman, (2017) which submitted significant positive relationship with financial performance. It however agree with those of Imad (2018), Akhtar (2011), Awojobi *et al.* (2011) and Said & Tumin (2014), who submitted that bank size does not have any significant impact on the financial performance of deposit money banks.

Thus, the empirical findings from this study has clearly shown that the two measures of liquidity risk, loan to total asset ratio (LTAR) and loan to deposit ratio (LDR) are the major factor influencing bank financial performance in Nigeria. Indeed, while loan to total asset ratio (LTAR) is seen to be positively related, loan to deposit ratio (LDR) is negatively related with bank financial performance. This finding corroborated the studies of Tafri *et al.*, (2016), Sufiyan and Habibullah (2013), Jamil (2018), Saleem & Rehman (2016) who find significant positive relationship between liquidity risk and bank performance.

These findings however disagreed with those of FauziahHanim, Zarinah, Ahamed-Kameel, & Mohdazmi (2018), Akhtar (2011) and Said & Tumin (2014) who find no significant relationship between liquidity risk and bank financial performance in their respective countries.

Market risk is a dominant source of income fluctuations in the banking system which comprises exchange rate, inflation and interest rate risks. It significant influence bank's financial performance. Hence, from the findings of this study, market risk (measured by degree of financial leverage (LEVERAGE) and interest rate risk (IRRR), though negatively signed, but do not have any significant impact on deposit money bank performance in Nigeria.

The operational risk variable was measured by net interest margin to total operating expenses (NIMTOPEXR) and operating expenses to total assets (OPEXTAR). Operational risk relates to the issues of precisely processing, settling and taking delivery on trades for the exchange of cash. From this current study, it is seen that operational risk does not have any significant impact on the overall performance of banks in Nigeria. Though, total operating expenses (NIMTOPEXR) was negative while that of operating expenses to total assets (OPEXTAR) positive but both variables were not significant. This finding is not in line with those of Francis and Hess (2015) and Mathuwa (2015) who find significant relationship between operational risks and performance. The finding also disagreed with those of Gikundi, Ondiek, Sawa and Musiege (2014) and Epetimehin and Obafemi (2015) in Nigeria who concluded a significant positive relationship between operational risk and financial performance of banks. and insurance companies. The result indicates that operational risk has positive effects on financial performance.

## SUMMARY, CONCLUSION AND RECOMMENDATIONS

### Summary and Conclusion

In this study, we empirically investigated the relationship between Bank size and the performance of deposit money banks (DMBs) in Nigeria. More specifically, changes in financial performance were examined on the basis of the relative effect on bank size, credit risk, liquidity risk, market risk, and operational risk size. The study specifically focuses on 18 deposit money banks listed on the floor of the Nigerian Stock Market for a period of 19 years (2000 to 2019) Econometric techniques were applied in the analysis of the data used in the study, in particular, the Panel data analysis technique was used in the estimation of the specified model. The fixed effects being the best performing effect in the relationships was adopted in the empirical analysis. The results from the empirical analysis revealed as follow, that:

Bank size, variable in the study failed the 5 percent significance level; as it does not have significant relationship with deposit money banks performance and financial risks in Nigeria.

Credit risk (measured by non-performing loans ratio (NPLR) and loan loss provisions ratio (LLPR) does not have any significant relationship with financial performance of deposit money banks in Nigeria. As it is seen to have failed the 5% significance level. Liquidity risk (measured by loan to total asset ratio (LTAR) and loan to deposit ratio (LDR) passes the 5 percent level of significance. Meaning that this variable is a significant determinant of deposit money banks' performance in Nigeria in the period under investigation. The effect of market risk (MKTr) on the performance of deposit money banks in Nigeria is not significant.

Market risk variables were measured by degree of financial leverage (LEVERAGE) and interest rate risk (IRRR). But from the empirical investigation, it was observed that the two measures for market risk (MKTr) do not in any way affect bank performance significantly in Nigeria at the 5% level of significance,

Operational risk (proxied by net interest margin to total operating expenses (NIMTOPEXR) and operating expenses to total assets (OPEXTAR)) do not have significant effect on deposit money banks performance in Nigeria. The two variables proxied for operational risks failed the 5% significance level,

### Recommendations

On the bases of the outcome of the empirical analysis of this study, the following useful recommendations for policy initiations, implementations, enforcements and directions should be made:

liquidity risk was the only factor determining deposit money bank performance in Nigeria within the period of investigation. The other hypothesized variables do not have any significant relationship with the performance of deposit money banks. Therefore, the bank management should continuously lay more emphasis on liquidity risk management in order to ensure that banks have adequate cash to meet the depositors demand daily, this will prevent loss of confidence, panic withdrawals and eventual bank failure..

The bank size was used as a proxy for total bank assets, the highest earning asset of deposit money bank is credit and credit risk measured by non-performing loans ratio (NPLR) and loan loss provisions ratio (LLPR) are positive and do not have significant impact on performance. The possible explanation for this could be that banks in Nigeria overtime, and because of the nature of their environment have not been able to manage their credit system well by making adequate provisions which also serve as shock absorber to mitigate the adverse effect of non-performing loans ratio (NPLR). Therefore, a more robust credit risk management systems that is fully in compliance with CAMELS and the prescribed ratio as provided by the regulatory institution (Central Bank of Nigeria), should be vigorously pursued in this regard. It is also recommend that the banks need to monitor the loan and advances to total deposits ratio frequently since it affects profitability.

### Contribution to Knowledge

The study also added a new clause to existing findings in the extant literature. Contrary to finding from other studies, this study has demonstrated that irrespective of the assets or size of a bank, it does not in any way determine its overall performance, what matters is the issue of liquidity risk. The study provides more evidence on the factors that determine bank performance of deposit money banks in Nigeria, it considers both bank-specific factors and macroeconomic determinants of Bank size, and finally, it evaluates how these factors affect the performance of commercial banks in Nigeria.

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