ABSTRACT
The performance of a banking institution is largely driven by its ability to increase its customers' patronage, retain them and manage its assets and liabilities to enhance optimal returns. This can be done through banks maintaining the return on assets and quality of assets for better performance. In Nigeria, despite the fact that banks are highly regulated, many have failed due to capital inadequacy and mismanagement. This study focuses attention on the effect of return on assets in the financial performance of deposit money banks (DMBs) quoted in Nigeria. This study adopted an ex-post facto research design. The target population for this research comprised 14 deposit money banks quoted in Nigeria which were in operation during the period: 2008 - 2017 for which secondary data were collected. The study employed ordinary least squares regression analysis. The findings of this research showed that capital adequacy has a positive and significant effect on financial performance using return on assets which indicated that an additional increase in capital adequacy ratio would cause return on assets to increase by 0.057. However, the effects of capital adequacy on financial performance of the banks studied are significant (p<0.05). The study concluded that capital adequacy is a key factor affecting the
The performance of a banking institution is largely driven by its ability to increase its customers' patronage, retain them and manage its assets and liabilities to enhance optimal returns. Banks function as a link between savers and borrowers and carry out all tasks related to the profitable and safe channeling of funds. Outside their intermediation roles, the performance of Deposit Money Banks (DMBs) has important implications for economic growth. Sound financial performance by DMBs rewards the stakeholders especially the shareholders on their investments. On the other hand, poor performance might cause bank collapse and failure that can hamper the economic development of the country (Dell’Ariccia & Marquez, 2004).

Financial performance in an organization demonstrates the proficient use of resources and the capacity to generate profit. It is of considerable interest to stakeholders, including customers, creditors, shareholders, government, and managers in that it: shows shareholders the return on capital invested; sends signals to customers of the organization's capacity to meet their needs; shows government the capacity of the organization to pay its tax; and shows managers the value of their effort and human capital invested in the organization (Aymen, 2013).

Notwithstanding the various reforms the Nigerian banking sector has gone through, banks have remained largely fragmented with substantial gaps in the financing of economic activities for private agencies. This is evidenced in their capital adequacy levels, risk, liquidity position, deposits and loans, loan loss provision, and high interest spread, among others. In addition, level of financial performance of the banking system is generally regarded as low and does not correspond to what is seen in many financial sectors in emerging economies such as South Africa, Malaysia, Singapore and even its West African neighbour, Ghana. Adequate capital is necessary and essential for DMBs to function efficiently because it provides safeguard against failure (Gudmundsson, Ngoka-Kisinguh & Odongo, 2013).

The key issues are the type and amount of capital required by a bank in order to have ample protection (Kou, 2008). Capital signifies...
the part of the bank’s liabilities that does not have to be repaid and consequently is seen as a cushion in a situation where the value of the bank’s assets falls (Thumbi, 2014). Banks do not make profit at all times, so capital is essential to act as a cushion when banks’ profits fall due to heavy losses but in the event that a bank’s asset value is lower than its total liabilities, the bank becomes insolvent (McAleer, 2009).

It becomes necessary for business to appreciate as to what creates performance in an organization, since the focus of every organization is so tied to its performance measurement (Dave & Sohani, 2012). Nzotta (2004) opined that the strength of a bank to a very large extent depends on the capital available to it. It is wholly visible in published accounts as it is the basis for making market judgments about capital and it has a crucial bearing on profit margins and banks’ ability to compete. The influence of capital adequacy on banks performance cannot be underrated since adequate capital directly and inevitably impacts the sum of funds available for loans, which always affects the manner and level of risk absorption (Ezike & Oke 2013). The need for capital adequacy for banks financial performance, therefore, cannot be overemphasized in Nigeria as well in other countries of the world. The objective of this study is to examine the effect of capital adequacy on the financial performance of deposit money banks quoted in Nigeria.

REVIEW OF RELATED LITERATURE

This part of the study shows the work of different scholars with the view to understand their opinion in order to adequately situate the current research work. The variables of interest in this study are Return on Assets (ROA) and Capital Adequacy.

Review of Concepts and Variables

One the best indicators used in the measurement of earnings is Return on Assets (ROA), which is the ratio of net income after taxes to total assets. Strong earnings and profitability outlook of banks reflect the capacity to sustain present and future operations. More specially, this determines the capacity to take in losses, finance its debts, pay dividends to its shareholders, and build up a sufficient level of capital. Being leading edge of defense against erosion of capital base from losses, the need for high earnings and profitability cannot be overemphasized. Although various indicators are used to serve the purpose, the paramount and most widely used indicator is Return on Assets (ROA) as opined by Vanhorne and Wachowicz (2008).

In the literature, bank profitability is usually measured by return on assets (ROA), return on equity (ROE), and/or net interest margins (NIM). For any bank, ROA depends on the bank’s policy decisions as well as unmanageable factors relating to the economy and
government regulations. Many regulators believe ROA is the best measure of bank profitability (Hassan & Bashir, 2003). Spanos, Zaralis and Lioukas (2004) took return on assets (ROA) to measure firm’s profitability while making an analysis about those factors which influence firm’s profitability. ROA gives an idea as to the level of competence of management in the use of the assets to generate earnings. ROA is calculated by dividing a company’s profit after tax by its total assets and expressed as a percentage.

Amahalu, Okoye, Nweze, Chinyere and Chirstian (2017) used ROA as the collective measure of banks’ performance, and also included return on equity (ROE) in their studies. Many regulators believe ROA is the best measure of bank profitability (Hassan & Bashir, 2003). Moreover, using ROE may not be the best applicable measure because equity alone is insignificant when looking at it in percentage terms in relation to shareholders’ investment in any bank. This significance of ROA was justified by Karanja and Nasieku (2016) and Apere (2016) as these authors contended that the perception of ROE as not a good measure of performance has made ROA the most common measure used in the evaluation of banks' performance.

The term capital adequacy expresses the capacity and efficiency of banks to measure, direct and control the risks it faces in order to measure, control and make decisions consistent with their strategies and policies towards strengthening the banks’ competitiveness. Capital adequacy is useful in the appraisal of banking services and analyzing their returns from operations, in addition to policy development and procedures necessary for the prevention of different types of risks, which arise as a result of technological and electronic revolution and increasing complexities in banking and competition among banks. Therefore, DMBs are mandated to provide enough capital to cover for any possible problems that may occur, and develop the right approach to ensure the survival of the bank with a higher percentage than the specified percentage and in order to avoid the intervention of monetary authorities to prevent its decline, which is known as corrective actions (Lone & Ahmad, 2017).

Capital adequacy is a significant parameter for adjudicating the strength and reliability of banking systems. Highly capitalized banks can absorb unexpected losses from poor risk assets and their costs of funds can also be minimized which ultimately can increase their profitability. Capital adequacy is an essential aspect of banks' capital structures in order to alleviate wide spread distress which may be systemic in nature and can even trigger contagion. Banks, as financial institutions and business establishments, gain more prospects in an atmosphere of adequate capital (Lone & Ahmad, 2017).

According to Sangmi and Nazir (2011), the adequacy of capital is adjudged on the basis of capital adequacy ratio (CAR). Capital
adequacy ratio demonstrates the internal power of the bank to overcome losses during challenging periods such as financial crisis. The capital adequacy ratio (CAR) is a measurement of a bank’s available capital expressed as a percentage of a bank’s risk-weighted credit exposures. The capital adequacy ratio, also known as capital-to-risk weighted assets ratio (CRAR), is used to protect depositors and promote the stability and efficiency of financial systems around the world (Sangmi & Nasri, 2010). Aburime (2008) stated that the bank level of safety of a bank will be attained through the high capital needed which enhances positive net benefit. The aim of capital adequacy requirement generally is to improve the soundness of a banking system by reducing the high incidence of bank failure; thereby curb the effects of a number of negative externalities that may arise in banks and similar financial institutions.

**Theoretical Framework**

This research is hinged upon the Incentive – based theory. This is to expound whether capital adequacy of DMBs can truly create a return that keeps capital intact yet yields interest or a profit which is assumed permanent. As per Incentive – based theory which asserts that holding banks’ assets and liabilities portfolios stable while there is higher capital would automatically entail a superior chances of performance.

This theory has been supported by Holmstrom and Tirole (1997) and Mehran and Thakor (2011). They revealed that capital either enhances a bank’s incentive to check its relationship with borrowers, decrease the probability of non-payment, satisfy asset-substitution, reduces moral hazard or lessen the attractiveness of risky products. Others, however, like Koehn and Santomero (1980), and Besanko and Kanatas (1996) with a contrast belief recommend that under certain situation increasing bank capital may be counterproductive because it perversely increases a bank’s risk taking (Berger & Bouwman, 2013).

This theory is relevant to this study because it explains why capital adequacy is critical to deposit money banks according to the studies completed by Calomiris and Meson (2003) and Calomoris and Wilson (2004) which established that capital enhances a bank’s viable point in expressions of asset and liability market which also progress performance and continuous existence. Some studies such as Calomiris and Powell (2001), and Kim, Kristiansen and Vale (2005) also suggest that higher-capital banks are capable to contend more successfully for deposits and loans (Berger & Bouwman, 2013).

**Empirical Review**

Tan and Floros (2012) identified determinants of bank profitability in China between 2003 and 2009 using bank level panel
The findings showed that the profitability of the Bangladesh banking system.

The study examined the effect of inflation on bank profitability, while controlling for widespread bank-and-industry-specific variables. Using ROA and NIM as dependent variables, the study found a positive correlation between bank profitability, cost efficiency, banking sector development, stock market development and inflation in China.

Ogboi and Unuafe (2013) investigated the impact of capital adequacy on bank financial performance in Nigeria between 2004 and 2009. They used panel data extracted from published financial statements of six of the twenty-one banks operating in Nigeria as at December 2009 and applied panel data techniques in estimation. With return on asset (ROA) as indicators of profitability and capital adequacy (CA), loans and advances (LA), non-performing loans (NPL) and loan loss provisions (LLP) as independent variables, their results showed that capital adequacy influenced bank financial performance positively. Their study however revealed an inverse relationship between loans and advances and bank profitability during the period under study.

Ikpefan (2013) investigated the impact of bank capital adequacy ratios, management and performance in the Nigerian commercial bank (1986–2006). The study captured their performance indicators and employed cross sectional and time series of bank data obtained from Central Bank of Nigeria (CBN) and Annual Report and Financial Statements of the sampled banks. The formulated models were estimated using ordinary least square regression method. The overall capital adequacy ratios of the study showed that Shareholders Fund/Total Assets (SHF/TA) which measure capital adequacy of banks (risk of default) have negative impact on ROA. The efficiency of management measured by operating expenses index is negatively related to return on capital. The implication of the study, among others, is that adequate shareholders fund can serve as a veritable stimulant in strengthening the performance of Nigerian commercial banks and also heighten the confidence of customers especially in this era of global economic meltdown that has taken its toll in the Nigerian financial system.

Abdullah, Parvez and Ayreen (2014) study examined the bank-specific, industry-specific and macroeconomic determinants of 26 DSE listed bank’s profitability in Bangladesh during 2008 to 2011. Panel data approach was used where bank profitability was calculated by return on assets (ROA) and Net interest Margin (NIM) as a function of bank specific, industry-specific and macroeconomic determinants. The findings showed that the profitability of the Bangladesh banking sector is determined by bank size, higher cost efficiency, capitalization, higher concentration, regardless of whether ROA or NIM was used as
the dependent variable. Credit risk and ROA have a negative relation, whereas the relationship with NIM is positive.

Lipunga (2014) evaluated the determinants of profitability of commercial banks listed in developing countries with Malawi as a case study for the period 2009–2012. Return on Assets (ROA) and Earnings Yield (EY) were used as measures of profitability. The study applied correlation and multivariate regression analysis which revealed that bank size, liquidity and management efficiency have a statistically significant impact on ROA but this was not the case for capital adequacy. In terms of Earnings Yield however, bank size, capital adequacy and management efficiency had a significant influence on bank performance but not liquidity.

Apere (2016) empirically investigated the relationship between Capital Adequacy of banks and Return on Assets of banks in Nigeria over the period 2001 to 2014. Descriptive Statistics and Correlation test was conducted to ascertain the strength of their relationship and it was observed that all the variables were stationary at their first differences, using the Phillip–Perron unit root test, and having determined the stationarity of the variables, the study further employed the Johansen Cointegration test and the Error Correction Model (ECM). The findings from the study revealed that there is a long-run significant and positive relationship between capital adequacy and return on assets of banks in Nigeria over the period under review.

Okumu and Oyugi (2016) studied on the factors influencing financial performance of savings and credit cooperative Societies (SACCOs) in Kisumu County, Kenya using CAMEL approach (i.e. capital adequacy, asset quality, corporate management efficiency and liquidity management) as independent variable and ROA as proxy for measuring the financial performance of the selected institutions as a dependent variable. The result showed that financial performance of SACCOs in Kisumu County was influenced by capital adequacy, asset quality, management efficiency and liquidity management.

Udom and Eze (2018) examined the effect of capital adequacy requirements on the performance of commercial banks in Nigeria. The study used secondary time series data sourced from the NDIC and CBN Annual and Bank Supervision Reports. The study employed the use of Ordinary Least Squares (OLS) regression method in analyzing the hypothesis of the study. The overall capital adequacy variables of the study shows that ASF, CRWA, TQC together have significant effect on the dependent variable, Return on Asset (ROA), which measures bank performance. The results further showed that capital adequacy impact positively on the financial performance of commercial banks in Nigeria. This implies that capital adequacy actively improve the financial performance of commercial banks and that sufficiency of capital and adequate management can translate to improved performance.
Muraina (2018) examined internal factors affecting profitability of Deposit Money Banks (DMBs) in Nigeria for the period of 2008–2016 using panel data of 14 listed banks drawn from the Nigerian Stock Exchange. The independent variables were proxied by Capital Adequacy, Credit Risk, and Inflation while profitability was proxied by Return on Assets (ROA). Correlational analysis was used to investigate the association among the variables. The result of the study showed that internal factors had significantly influenced the deposit money banks' profitability over the study period and that Capital Adequacy had a positive and significant relationship with the banks' profitability while Credit Risk had a negative and significant relationship with the banks' profitability during the study period.

Alele, Kadima and Otinga (2019) performed a study attempting to determine the effect of CAMEL elements on the profitability of Nigerian banks for the period 2001–2010. Ordinary Least Squares (OLS) method was adopted and the Statistical Package for Social Sciences (SPSS) was used in the analysis of the estimation techniques employed. Ratios relating to CAMEL system were considered the independent variables while Return on Assets (ROA) was the profitability ratio used as the dependent variable. The results of the study revealed that only the liquidity of the banks under consideration had a significant impact on bank profitability whereas capital adequacy, asset quality, management efficiency and earnings did not.

Figure 1: Conceptual Model

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Adequacy</td>
<td>Financial Performance</td>
</tr>
<tr>
<td></td>
<td>Return on Asset (ROA)</td>
</tr>
</tbody>
</table>

METHODOLOGY

Ex post facto research design was adopted in this study and secondary data were employed. Specifically, data were extracted from published financial statements of selected DMBs quoted on the Nigerian Stock Exchange (NSE), (various issues). The population of this study comprised deposit money banks quoted in Nigeria. Presently, there are twenty - one (21) of such banks out of which only 15 are...
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Figure 1: Conceptual Model

Independent Variable
Capital Adequacy

Return on Asset (ROA)

Dependent Variable
Financial Performance

METHODOLOGY
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1. Access Bank Plc.
2. Diamond Bank Plc.
3. Ecobank Nigeria Plc.
4. First Bank Nigeria Holding Plc.
5. First City Monument Bank Ltd.
6. Fidelity Plc.
8. STANBIC IBTC Plc.
10. United Bank for Africa Plc.
12. Unity Bank Plc.
13. WEMA Bank Plc.

Hypothesized Relationship
The hypothesized relationship is functionally expressed as follows:

\[ FP = f(CA) \]

Decomposing FP into its various components, it becomes:

\[ FP = ROA \]

While \( CA = CA \)

\[ ROA = f(CA) \]

Hence, the econometric model for the regression analysis is:

\[ ROA_i = \alpha + \beta CA_i + \mu_i \]

Where:
\( FP = \) Financial Performance
\( CA = \) Capital Adequacy
\( ROA = \) Return on Assets
\( \beta, \alpha = \) Coefficient of determinant
\( \mu = \) Stochastic error term
\( I = \) Cross sectional data
\( t = \) Time Series

RESULTS AND DISCUSSION OF FINDINGS
MODEL ANALYSIS: \( ROA_i = \alpha + \beta CA_i + \mu_i \)

Table 1: Regression tests Results for Model

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ROA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>0.0568***</td>
</tr>
<tr>
<td></td>
<td>(0.0111)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00916</td>
</tr>
<tr>
<td></td>
<td>(0.317)</td>
</tr>
<tr>
<td>F-Stat</td>
<td>26.02***</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.159</td>
</tr>
<tr>
<td>Observations</td>
<td>140</td>
</tr>
<tr>
<td>Number of crossed</td>
<td>14</td>
</tr>
<tr>
<td>Time Periods</td>
<td>10</td>
</tr>
</tbody>
</table>
Table 2: Diagnostics tests Results for Model

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hausman Test</td>
<td>1.43</td>
</tr>
<tr>
<td>Breusch and Pagan Lagrangian multiplier test</td>
<td>0.17</td>
</tr>
<tr>
<td>Pesaran’s test of cross sectional independence</td>
<td>13.036***</td>
</tr>
<tr>
<td>Seria correlation Test</td>
<td>75.235***</td>
</tr>
<tr>
<td>Heteroskedasticity Test</td>
<td>33.41***</td>
</tr>
</tbody>
</table>

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

In table 2 the Hausman test was carried out to determine whether fixed effect, random effect or pooled ordinary least square estimation technique is appropriate for the model. The result of the Hausmann test for model one is 1.43 with a probability value of 0.2319 which is greater than the significance value 0.05 indicating that random effect may be the appropriate estimation technique for this model. The study however went further to test the appropriateness of the random effect estimation technique by conducting the Breush and Pagan Lagrangian Multiplier test. The result of this test was 0.17 with a probability value of 0.3418 which is greater than the 5% level of significance. This indicated that random effect estimation technique is not appropriate for this model, thus, resulting into the pooled ordinary least square estimation technique.

The study also carried out the cross-sectional dependence test for this model. The table 2 showed the test result of 13.036 with a probability of 0.000 shows that the model is statistically significant at 1% level of significance. Also, the Breusch–Pagan / Cook–Weisberg test for heteroscedasticity was carried out to determine if the variance of the residual are constant. The test has a null hypothesis of constant variance of the residual. The result of the test showed a probability value of 0.00 which is lower than the 5% level of significance. This suggests that the study rejects the null hypothesis of constant variance of the residual and the presence of heteroscedasticity in the model. In testing for autocorrelation in the panel data, the Wooldridge test was conducted. This test has a null hypothesis of no first-order autocorrelation and its result in this model showed a probability value of 0.000 which is lower than the 5% level of significance. This suggests that the study rejects the null hypothesis hence, the presence of autocorrelation in the model. This study, therefore, in line with Hoechle (2007), ran the regression using the reg cluster () command to produce a robust standard error estimate for the estimated panel data model in order to remedy the econometric issues observed in the model.
The regression analysis estimates in Table 1 showed that Capital Adequacy (CA), has a positive effect on Returns on Asset (ROA). This is indicated by the sign of the coefficients, that is \( \beta_i = 0.057 > 0 \). The size of the coefficient of the independent variable showed that a 1 unit increase in Capital Adequacy (CA) will lead to a 0.057 unit increase in Returns on Asset (ROA). Furthermore, the R-squared showed that about 16% variations in ROA in this model is caused by Capital Adequacy (CA) while the remaining 74% variations in ROA are caused by other factors not included in the model. Also, \( f \)-statistics of 26.02 with a probability of 0.000 shows that the model is statistically significant at 1% level of significance.

**Discussion of findings**

Empirically, the findings of this research revealed that capital adequacy has significant relation towards financial performance of DMBs in Nigeria, and this goes in line with the theoretical expectation and in line with the findings of other authors. Banks with adequate capital are perceived to have more safety and such advantage can be translated into higher profitability. The higher the capital adequacy ratio, the more profitable a bank will be. A positive relation between capital adequacy and financial performance was suggested by Muraina (2018); Umoru and Osemwegie (2016); Torbira and Zaagha (2016), Apere (2016), Ogboi and Unuafé (2013) and Ikpefan (2013) and Demirgüç-Kunt, Laeven and Levine, (2003). However, the linkage between capital adequacy and financial performance provided a low explanatory power, an indication that the models between the two variables are weak or did not fit well.

**CONCLUSION AND RECOMMENDATION**

Adequate capital is contingent to better financial performance of the banks. It is the profitability factor among social and environmental considerations that make the bank sustainable to be able to operate in the long term serving the public, shareholders, government and nevertheless economy of the country and all stakeholders in large. This study has examined how capital adequacy affects the financial performance of deposit money banks in the Nigerian banking sector. It revealed that return on asset relates positively to financial performance of deposit money banks in Nigeria. Also, the result of the analysis showed significant relationship which indicates that return on asset is paramount to bank financial performance in Nigeria. Return on asset has featured in various ways such as providing cushion against losses not covered by current earnings. It has also been a confidence booster to the depositors, public and the regulatory authority in Nigeria. The study hereby recommends the following;
1. Central Banks should effectively regulate the capital and the resources owned by the Deposit Money Banks (DMBs) in Nigeria by ensuring that a certain level of capital is kept with the Central Bank of Nigeria (CBN) for DMBs’ financial soundness and stability. This will enable them to continue to absorb losses and manage risk exposure with shareholders.

2. There should be a constant review of minimum capital requirement of deposit money banks in Nigeria to the optimal level. Nigeria banks should be well capitalized to enable them enjoy access to cheaper sources of funds with subsequent improvements in profit levels. This would go a long way to help the public maintain confidence in the banks and also accommodate the credit needs of customers.

REFERENCES


