Effect of Capital Adequacy on the Financial Performance of Deposit Money Bank

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Abstract: The study examined the effect of capital adequacy on the financial performance of deposit money banks in Nigeria. Specifically, the study examined the effect of liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan and advance (LA) on the return on asset of deposit money banks in Nigeria. The study made use of secondary data which were collected from the annual financial statement of ten (10) randomly selected deposit money banks in Nigeria, spanning through 2007 to 2017. Descriptive, correlation, panel unit root, panel least square regression analytical techniques such as pooled, fixed and random effect and granger causality. The evaluation techniques used were T-test, probability test, F-test, the Hausman test and residual for cross-sectional independence of the fitted models. Panel regression result revealed that capital ratio (CR) and loan & advance (LA) led to increase in return on asset to the tune of 45.80 and 46.45 percent respectively. The liquidity ratio (LR) and investment ratio (IR) reduced the return on asset of the deposit money banks by 6.73 and 12.89 percent respectively. An examination of the result on the individual selected deposit money banks showed that capital adequacy positively influences the return on asset of FIRB, ACCESS, DIAM, IBTC and WEMA by 0.21, 0.21, 0.76, 1.87 and 0.78 percent respectively. Thus, capital adequacy reduced the average return on asset of UBA, FIDB, STER, FCMB and UNITY by 0.23, 0.00, 2.77, 0.33 and 0.52 percent respectively. The Hausman test with asymptotic chi-square value 7.442 < 9.488 and the probability value of 0.849 > 0.05 revealed that fixed effect model for the effect of capital adequacy on the financial performance of deposit money banks was better than the random effect model. Other evaluation analytical techniques established the statistical significance of capital adequacy measured in examining the financial performance of deposit money banks in Nigeria. The study concluded that adequate and good management of capital would stimulate and improve the financial performance of deposit money banks in Nigeria. The study recommended that regulatory authorities should ensure that banking reform processes are sustained through proper management of banks liquidity and investment.

Keywords: Capital adequacy, return on asset, granger causality, deposit money bank, Nigeria.
1. Introduction

Banking system play an important part in capital formation, for this fact, banks should be more concerned. This was one of the key functions of the Central Bank of Nigeria. Ezike and Oke (2013), and this latter led to banks’ consolidation in 2004 (CBN, 2010). Banking sector in Nigeria witnessed breath-taking post consolidation growth in 2005 and this brought lot of threats for the banking sector in Nigeria and also its regulators. Before now, there is strong assertion that Banking sector in Nigeria was a very tool in combating global financial crisis. There is a global financial meltdown which was caused by imbalanced economy due to lack of corporate governance, absence of investors and deficient disclosures of financial position of banks, (Aburime & Uche, 2008).

Bank capital is the difference in the value of the bank’s asset and its liabilities, or debts. The asset portion of a bank’s capital includes cash, government securities, and interest-earning loans while the liabilities sections of bank’s capital includes loan-loss reserves and any debt it owes. A bank’s capital; can be bought off as the margin to which creditors are covered if the bank would liquidate its assets. (Adam, 2019) Banks capital can be in form of issues and paid-up share is money with which the business of banking is started. Overtime, the capital funds of the bank reflect the accumulated capital. Capital adequacy (also known as capital requirement or regulatory capital) is the amount of capital a bank or other financial institution has to hold as required by its financial regulator. This is usually expressed as a capital adequacy ratio of equity that must be held as a percentage of risk-weighted assets.

Different method has been used to determine banks’ capital adequacy in Nigerian Banking industry but bank capitalization is current issues in economies today and this led to how to resolve the problem of unsound bank, enhance efficient management of the banking system, provide better funding for banks’ lending activities, reduce non-performing loans and advances, increase profitability, reduce risk, to ensure quality asset management and to put banks in a strong liquid position to meet customer’s obligation at all times (Soludo, 2004). For instance, the crisis that was pervasive in the Nigerian banking system in the mid-1990’s and early 2000 was majorly due to illiquidity in the banking system which later led to the loss of customers’ confidence in the banking industry. This propel CBN to raise the minimum paid up capital of banks to N25 billion with aimed to strengthening the Nigerian banking industry. It is imperative for banks to meet up the required level of capital for sound and safe banking.

Bank performance refers to how successful a bank utilizes its operating resources to earn income. Purpose of any firms include banks is to have reserve and create wealth for its shareholders, and this can only happen when bank’s return on equity (ROE) is greater than its cost of equity. Generally, Performance is a relationship between the profits generated by the enterprise and investments that contributed to the achievement of these profits, and profitability ratios measure the efficiency with which a company turns business activities into profits. Return on assets measures the ability to use assets to produce net income. The financial deed of most of the banks in Nigeria over some years has been unimpressive. In line with Abreu and Mendes, (2002), profit before tax (PBT) of the banking system in Nigeria reduced between 2000 and 2005, and since 2006 there is progressive decline. The profit before tax which was 80.8 percent in 2000 reduced with a loss value of 13.95%. Even when the profit before tax peaked at 287.62 percent in 2007, it further declined to 49.14 percent in 2008. (Obamuyi, 2012). By implication, the environment for Nigerian banks to make profits is sinking. The decline in profits could be attributed to the worldwide economic crises although in 2005, the Central Bank of Nigeria (CBN) increased the lowest amount of capital that is required by banks to stay in business to N25 billion (Somoye, 2008).

Towards the end of year 2018, Skye bank was taken over by Polaris Bank Limited due to the failure of the bank to meet up with minimum thresholds in critical Prudential and adequacy ratios, which culminated in the Bank's permanent presences at the CBN lending window and also failure of bank to perform the objectives as provided by the regulator (CBN): to save depositors' funds; to ensure that the Bank is a going concerned; and to stem the imminent job losses of staff if a liquidation option had been adopted. (CBN,2018).

Based on this, the study therefore investigated the effect of capital adequacy on financial performance of deposit money banks in Nigeria, using Panel approach for period of 2007 through 2017 focusing on Return on Asset (ROA) as a proxy for dependent variable (Banks Performance) while,
Liquidity ratio, capital ratio, investment ratio, Loan and Advance, as a proxy for independent variable (capital adequacy of deposit money banks)

2. LITERATURE REVIEW
2.1 Conceptual Literature
2.1.1 Capital Adequacy
Capital adequacy refers to the idea of re-arranging banks’ existing capital structures in order to restructure the banking system against widespread distress. If adequate capital is well managed by banking sector, it can creates an opportunity for better standards in banking industry and later lead to better performance. Olalekan and Adeyinka (2013). Capital adequate of a bank is very important in the light of the global financial crisis where bail out measures is now being employed by the regulatory authorities to keep the financial system afloat. Even, there is existing levels of capital adequate to be considered for the increasing levels of risk and this has been an issue of debate between bankers and the supervisory authorities. Globally, Basle Committee’s indicates minimum capital adequacy ratio to be eight percent (80%) of banks ‘credit taken as the benchmark of measuring the capital adequacy of a bank. This suggesting that for every Naira given as credit a bank needs eight kobo capital.

Deposit money banks in Nigeria are encouraged to maintain a higher level of capital which is commensurate with their risk profiles. CBN mandated that all banks should have themselves credit rated by a credit rating agency and the credit rating must be done on a regular basis, that is, the credit rating should be updated on a continuous basis from year to year, within six months from the date of close of each financial year and the rating report complete in all respects must be submitted to CBN. Banks should also disclose their credit ratings prominently in their published annual reports (CBN, 2010).

2.2.2 Bank Profitability
Bank profitability is the ability of a bank to generate revenue in excess of cost, in relation to the bank’s capital base. A sound and profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. (Brissimis, Athanasoglou, and Delis, 2005). Profitability in general is a relationship between the profits generated by the enterprise and investments that contributed to the achievement of these profits. (chron.com) Profitability examines how successful a bank utilizes its operating resources to earn income. It also provides reasonable clue to the effectiveness of bank’s operation (Mensah and SebeYeboah, 2014).

2.2 Theoretical Review
2.2.1 Buffer theory of capital adequacy
The buffer theory of Calmed and Rob (1996) predicts that a bank approaching the regulatory minimum capital ratio may have an incentive to boost capital and reduce risk in order to avoid the regulatory costs triggered by a breach of the capital requirements. Banks prefer to hold a ‘buffer’ of excess capital to reduce the probability of falling under the legal capital requirements, especially if their capital adequacy ratio is very volatile. Capital requirements constitute the main banking supervisory instrument in Nigeria. The CBN intervenes little in banks’ activities but does directly conduct on-site examination and at times delegating this task to external auditors. By contrast, a breach of the capital requirements is considered a major infringement of banking legislation and is not tolerated by the CBN. The withdrawal of some banking license at the expiration of the recent capitalization of banks in Nigeria in 2005 is a pointer to this fact. Banks will require more capital if deposits are not fully mobilizing from the public. Capital is more reliable, dependable and can be used for long term planning. Ability of banks to mobilize enough deposits obviates the capital base from being eroded. Thus, poorly capitalized banks are tempted to take more risks in the hope that higher expected returns will help them to increase their capital. This is one of the ways risks relating to lower capital adequacy affects banking operations. In the event of bankruptcy of a bank, the risks are absorbed by the bank, customers and Nigeria Deposit Insurance Corporation (NDIC). At present NDIC pays a maximum of N200,000 to a customer in the event of bank failure. Hence, customers are concerned about capital position of banks at all times. Banks are expected to insure and pay 15/16 of customer’s deposit
liabilities multiplied by 1% to NDIC to enable their customers benefit from the scheme. The above practice of NDIC in Nigeria is applicable to other countries but varies in amount. The higher the return on assets the better is bank liquidity and capital adequacy.

Summarily, the study is anchored on the buffer theory of capital adequacy as it directly promotes good capital management of deposit money banks

2.2.2 Empirical Review

Goddard (2004) carried out a thorough study on effect of capital adequacy on profitability of banks. The study revealed that a high capital adequacy ratio had significant effect on banks operating and further shows a negative relationship between the equity to asset ratio and a bank’s performance.

Ranga (2012) carried out studied on the impact of minimum capital requirements on deposit money banks performance in Zimbabwe. A sample of twenty-seven senior bank executives were used as the population of the study and the information gathered were analysed using descriptive, correlation method and regression analysis. The findings revealed a significant and positive relationship between deposit money banks capitalization and its performance.

Similarly, Onaolapo and Olufemi (2012) investigated the effect of capital adequacy on the profitability of the Nigerian banking sector using OLS estimation technique. Secondary data were collected on the measured of capital adequacy ratio and bank performance variables for a ten- year period, 1999-2008 and an Augmented Dickey Fuller to test for stationary and a pair wise granger causality test were adopted for the study. Findings revealed that the bank performance variables tested, return on Capital Employed (ROCE), Return on Assets (ROA), Efficiency Ratio (ER) does not have significant effect on capital adequacy of the banking sector.

Olalekan and Adeyinka (2013) investigated the impact of capital adequacy on Nigerian banks’ performance. The study specifically, examined the effect of capital adequacy on profitability of deposit taking banks in Nigeria with the focused on effect of capital adequacy of both foreign and domestic banks in the country and their profitability. The study makes used of primary data through administered of questionnaire. The study revealed that there a non-significant relationship between capital adequacy and bank’s profitability.

Also, Ezike and Oke (2013) examined the impact of the adoption of the capital adequacy standards on the performance of Nigerian banks. The study measured capital adequacy standard with loans and advances, shareholders fund, total assets and customer deposits. While, the performance of banks was measured by Earnings per share and profit after tax. The study employed the OLS estimation techniques, the study revealed that capital adequacy standards exert significant impact on bank performance.

Ejoh and Iwara (2014) assessed the impact of capital adequacy on deposit money banks’ profitability in Nigeria, spanning through 1981-2011 with five selected banks. The study utilized the Engle and Granger two steps procedure in co/integration and the t-statistics to determine significance. The study revealed that capital adequacy plays an important role in explaining bank returns on assets a measured of bank profitability.

Ayayalin and Karakaya (2014) investigated impact of banks’ capital on profitability and risk level for Turkish banking sector between 2003 and 2011. The two step system generalized method of moment technique for dynamic panel was applied and the study revealed that, there was a positive and negative relationship between capital and profitability.

Ikpefan (2015) examined the impact of bank capital adequacy ratios, management and performance in the Nigerian commercial banks. The study used both cross sectional and time series of bank data. The study employed OLS regression analytical techniques. The study revealed that the ratio of the Shareholders Fund to Total Assets which measured the capital adequacy had a negative impact on Return on Assets and efficiency of management measured by operational expenses indices was negatively related to return on capital.

Ugwuanyi and Enah (2015) examined effect of bank capital requirement on bank performance. A simple ratio analysis and least square statistical technique were used by comparing the performance of bank for five years before and five years after the 2005 recapitalization exercise. The result showed that most of the bank performance evaluation indicators for the pre-capitalization means were better
than the post capitalization means and the t-test showed that the difference between the two means at 5% level of significance was not statistically significance. This implies that recapitalization without a conducive and sound macro-economic environment does not always transform to enhanced bank performance.

Torbira and Zaagha (2016) investigated the impact of capital adequacy indicators, the ratio of shareholders’ fund to banks’ total deposits and the ratio of shareholder funds to bank total assets on bank financial performance measured by net profit margin, earnings per share and return on assets in Nigeria. The analysis done using Augmented Dickey Fuller unit root test and the Granger causality test revealed the existence of significant long run relationship between bank financial performance variables and capital adequacy indicators in the Nigerian banking industry. It was further revealed that capital adequacy strongly and actively stimulated and improved the financial performance of banks in Nigeria.

Ini and Eze (2018) investigated the effect of capital adequacy requirements on the performance of deposit money banks in Nigeria. The study used secondary time series data, which was sourced from the NDIC and CBN Annual and Bank Supervision Reports. The study employed Ordinary Least Squares (OLS) regression analytical techniques. The study revealed that capital adequacy had a positive impact on the financial performance of deposit money banks in Nigeria. Thus, implies that capital adequacy strongly and actively stimulates, improve and grow the financial performance of deposit money banks and that sufficiency of capital and adequate management can translate to improved performance.

Distinctively, due to the reform programmes over the years in the banking sector and inconsistency in the results obtained by various researchers, there is a need to investigate the existing relationship between the capital adequacy and the financial performance of the deposit money banks in Nigeria. Therefore, this study investigated the effect of capital adequacy on financial performance of deposit money banks in Nigeria, by using Panel approach between 2008 and 2017 with focus on Return on Asset (ROA) as a proxy for dependent variable (Banks financial performance). Liquidity ratio, capital ratio, investment ratio, Loan and Advance serve as proxies for independent variable (Capital adequacy of deposit money banks)

3. Research Methods

The study relied heavily on secondary data, which were sourced from the CBN Bulletins and financial statements of the selected banks. The population for the study is twenty-one existing deposit money banks in Nigeria. Ten (10) banks were randomly selected from the population. The study covered 10 years, spanning from 2008 to 2017. The selected banks are Diamond bank; First bank; Fidelity bank; First City Monument bank; Access bank; Stanbic IBTC; Sterling bank; United bank for Africa; Unity bank, and Wema bank.

Model Specification

The study adopted model of Jalloh M. A (2017), which stated as follows:

\[ PAT = F (OC, LA, TA, CD) \] ………………………………………………………………(1)

\[ Y_{PAT} = \beta_0 + \beta_1 OC + \beta_2 LA + \beta_3 TA + \beta_4 CD + \epsilon \] ………………………………………(2)

Where, \( PAT = \) Profit after tax, \( OC = \) Owners’ capital; \( LA = \) Loans and advances, \( TA = \) Total assets, \( CD = \) Customer deposits, \( \beta_0, \beta_2 \) coefficients of the variables and \( \epsilon = \) Error terms. However, the model was re-modified and stated in linear forms below:

\[ ROA_{it} = \alpha_0 + \alpha_1 LR_{it} + \alpha_2 CR_{it} + \alpha_3 IR_{it} + \alpha_4 LA_{it} + \mu_i + \epsilon_{it} \] ………………………………………(3)

Where:

\( \text{ROA} = \) Return on asset
\( \text{LR} = \) Liquidity ratio
\( \text{CR} = \) Capital ratio (capital/total asset)
\( \text{IR} = \) Investment ratio (Net credit facilities / Total deposits)
\( \text{LA} = \) Loan and Advance
4. Result and Discussion

Table 1: Descriptive Analysis

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>LR</th>
<th>CR</th>
<th>IR</th>
<th>LA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.013137</td>
<td>0.687765</td>
<td>0.120877</td>
<td>0.191337</td>
<td>0.390839</td>
</tr>
<tr>
<td>Median</td>
<td>0.016000</td>
<td>0.710000</td>
<td>0.102569</td>
<td>0.088000</td>
<td>0.338110</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.111000</td>
<td>1.499000</td>
<td>0.534430</td>
<td>2.441000</td>
<td>0.765310</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.253000</td>
<td>0.031500</td>
<td>0.023936</td>
<td>0.008000</td>
<td>0.084130</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.035936</td>
<td>0.170084</td>
<td>0.071510</td>
<td>0.311705</td>
<td>0.159199</td>
</tr>
<tr>
<td>Skewness</td>
<td>-4.033633</td>
<td>-0.194064</td>
<td>2.428026</td>
<td>4.623126</td>
<td>0.442088</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>32.36426</td>
<td>10.46060</td>
<td>13.05169</td>
<td>30.82766</td>
<td>2.400173</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>3825.279</td>
<td>232.5467</td>
<td>519.2406</td>
<td>3403.660</td>
<td>4.756500</td>
</tr>
<tr>
<td>Probability</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.092713</td>
</tr>
</tbody>
</table>

Source: Data Analysis (2019)

Table 1, showed the descriptive analysis results on the effect of capital adequacy on financial performance of deposit money banks in Nigeria, spanning through 2008 and 2017. The return on asset (ROA) was used to capture the financial performance of deposit money banks under investigation while liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan and advance (LA) were used as variables to capture bank capital adequacy. The result revealed that the average return on asset (ROA), liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan and advance (LA) to be 1.31, 68.8, 12.1, 19.1 and 39.1 percent respectively. This result implies that emphasis must be put on how the return on asset can be improved through the liquidity ratio, capital ratio, investment ratio, and loan and advance by deposit money banks under study. The standard deviation values of 3.59, 17.01, 7.01 31.1 and 15.92 percent respectively revealed the rate at which the return on asset (ROA), liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan and advance (LA) were been deviated from their respective average or expected value.

Also, it was discovered that return on asset (ROA) and liquidity ratio (LR) were negatively skewed with skewness coefficient of -4.03 and -0.19 respectively and thus have a distribution with a long tail to the left while capital ratio (CR), investment ratio (IR) and loan and advance (LA) with skewness coefficient of 2.43, 4.62 and 0.44 respectively were positively skewed and thus have a distribution with a long tail to the right. However, the kurtosis of the financial variables showed that return on asset (ROA), liquidity ratio (LR), capital ratio (CR) and investment ratio (IR) were with kurtosis coefficient indexes of 32.36, 10.46, 13.05 and 30.83 respectively were mesokurtic. The Jarque-Bera and probability values 0.00, 0.00, 0.00 and 0.00 revealed that the return on asset (ROA), liquidity ratio (LR), capital ratio (CR) and investment ratio (IR) were statistically significance in examining the effect of capital adequacy on the financial performance of deposit money banks in Nigeria.

Table 2: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>LR</th>
<th>CR</th>
<th>IR</th>
<th>LA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1.000000</td>
<td>-0.195924</td>
<td>0.097158</td>
<td>-0.161554</td>
<td>0.158735</td>
</tr>
<tr>
<td>LR</td>
<td>-0.195924</td>
<td>1.000000</td>
<td>-0.327075</td>
<td>0.443187</td>
<td>0.091449</td>
</tr>
<tr>
<td>CR</td>
<td>0.097158</td>
<td>-0.327075</td>
<td>1.000000</td>
<td>-0.020570</td>
<td>-0.219499</td>
</tr>
<tr>
<td>IR</td>
<td>-0.161554</td>
<td>0.443187</td>
<td>-0.020570</td>
<td>1.000000</td>
<td>-0.153014</td>
</tr>
<tr>
<td>LA</td>
<td>0.158735</td>
<td>0.091449</td>
<td>-0.219499</td>
<td>-0.153014</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Source: Data Analysis (2019)

Table 2 showed the degree of relationship that exist between the capital adequacy captured by liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan and advance (LA) and the return on asset (ROA) used to proxy the financial performance of deposit money banks under consideration in Nigeria. From Table 2, it was discovered that a positive correlation was revealed between return on asset (ROA) and capital ratio (CR) and return on asset (ROA) and loan & advance (LA) with correlation coefficient of 0.10 and 0.16 respectively. A negative correlation was revealed between
return on asset (ROA) and liquidity ratio (LR) as well as return on asset (ROA) and the investment ratio (IR) with correlation coefficient of -0.20 and -0.16 respectively.

Also, there was a positive correlation between the liquidity ratio (LR) and investment ratio (IR) and liquidity ratio (LR) and loan and advance (LA) with correlation coefficient of 0.44 and 0.09 respectively. It was also discovered that a negative correlation existed between liquidity ratio (LR) and capital ratio (CR), capital ratio (CR) and investment ratio (IR), capital ratio (CR) and loan & advance (LA) and investment ratio (IR) and loan & advance (LA) with correlation coefficient of -0.33, -0.02, -0.22 and -0.15 respectively. This implies that an increase capital ratio (CR) and loan and advance (LA) led to better performance of money deposit banks. On the other hand, increase in liquidity ratio (LR) and the investment ratio (IR) led to decline in the performance of money deposit banks measured by return on asset. This further implies that there is a need for better investment strategy that can enhance the financial performance of deposit money banks in Nigeria.

### Table 3: Panel Unit Root Test for the Variables

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<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Levin, Lin &amp; Chu t*</td>
<td>-8.270</td>
<td>0.000</td>
<td>-7.563</td>
<td>0.000</td>
<td>-3.057</td>
<td>0.001</td>
<td>-2.959</td>
<td>0.002</td>
<td>-4.315</td>
<td>0.000</td>
</tr>
<tr>
<td>Im, Pesaran &amp; Shin W-stat</td>
<td>-2.176</td>
<td>0.015</td>
<td>-2.377</td>
<td>0.009</td>
<td>-0.966</td>
<td>0.167</td>
<td>-0.2075</td>
<td>0.418</td>
<td>-2.412</td>
<td>0.008</td>
</tr>
<tr>
<td>ADF - Fisher Chi-square</td>
<td>37.552</td>
<td>0.010</td>
<td>41.133</td>
<td>0.004</td>
<td>29.357</td>
<td>0.081</td>
<td>26.382</td>
<td>0.154</td>
<td>40.300</td>
<td>0.005</td>
</tr>
<tr>
<td>PP - Fisher Chi-square</td>
<td>48.004</td>
<td>0.000</td>
<td>43.102</td>
<td>0.002</td>
<td>38.442</td>
<td>0.008</td>
<td>52.567</td>
<td>0.000</td>
<td>56.678</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Source:** *Data Analysis (2019)*

Result in Table 3, showed that all the variables were stationary. The return on asset (ROA), liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan & advance (LA) were all stationary at level at both cross section and individual level during the period under investigation. This was evidenced as the probability of Levin, Lin and Chur t statistic values: 0.000, 0.000, 0.001, 0.002 and 0.000; Philip Perron (PP) test statistic values: 0.000, 0.002, 0.008, 0.000 and 0.000 for each of the variables was less than the probability of the error margin 0.05 allowed for the estimate in this study. This result implies that; a short run equilibrium relationship exists among the variables under investigation. Thus establish the stability and the reliability of paneled regression model using return on asset (ROA) as a measured money deposit bank performance and capital adequacy captured by liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan & advance (LA) during the period under study.
Table 4: Panel Least Square

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.01652</td>
<td>0.4495</td>
<td>-0.03274</td>
<td>0.0040</td>
<td>0.12211</td>
<td>0.0549</td>
</tr>
<tr>
<td>LR</td>
<td>-0.33062</td>
<td>0.0004</td>
<td>-0.06732</td>
<td>0.0360</td>
<td>-0.27394</td>
<td>0.0001</td>
</tr>
<tr>
<td>CR</td>
<td>0.41136</td>
<td>0.0010</td>
<td>0.45803</td>
<td>0.0006</td>
<td>0.43420</td>
<td>0.0040</td>
</tr>
<tr>
<td>IR</td>
<td>-0.07121</td>
<td>0.1523</td>
<td>-0.12885</td>
<td>0.0023</td>
<td>-0.08267</td>
<td>0.0555</td>
</tr>
<tr>
<td>LA</td>
<td>0.40388</td>
<td>0.0000</td>
<td>0.46449</td>
<td>0.0050</td>
<td>0.41394</td>
<td>0.0010</td>
</tr>
</tbody>
</table>

Effects Specification

<table>
<thead>
<tr>
<th></th>
<th>S.D.</th>
<th>Rho</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>0.00763</td>
<td>0.0454</td>
</tr>
<tr>
<td>Idiosyncratic random</td>
<td>0.03501</td>
<td>0.9546</td>
</tr>
</tbody>
</table>

Cross-section Pooled | Cross-section fixed | Cross-section random
---------------------|---------------------|---------------------
UBA -                | -0.00227            | 0.00032            |
FIDB -               | -0.00019            | 0.00041            |
STER -               | -0.02773            | -0.00851           |
FIRB -               | 0.00213             | 0.00141            |
ACCESS -             | 0.00213             | -0.00022           |
DIAM -               | 0.00759             | 0.00240            |
FCMB -               | -0.00325            | -0.00097           |
IBTC -               | 0.01873             | 0.00456            |
UNITY -              | -0.00516            | -0.00170           |
WEMA -               | 0.00778             | 0.00229            |
R-squared            | 0.67997             | 0.73101            | 0.66690 |
Adjusted R-squared   | 0.63019             | 0.70806            | 0.62521 |
F-statistic          | 190.3401            | 128.6157           | 160.7753 |
Prob(F-statistic)    | 0.00011             | 0.00030            | 0.0010  |

Source: Data Analysis (2019)

Table 4, showed the result of the pooled, fixed and random effect panel regression output. It was discovered from the results that a linear relationship exists between the capital adequacy and financial performance of deposit money banks in Nigeria. Specifically, the result showed that capital ratio (CR) and loan and advance (LA) were positively related with return on asset (ROA) a measure of financial performance while liquidity ratio (LR) and investment ratio (IR) negatively related with the return on asset (ROA) of deposit money banks under consideration in Nigeria. This result further revealed from the pooled effect model that the capital ratio (CR) and loan and advance (LA) led to increase in return on asset to the turn of 41.14 and 40.39 percent respectively. The liquidity ratio (LR) and investment ratio (IR) value of -0.3317 and -0.0712 implies that the liquidity ratio (LR) and investment ratio (IR) reduced the return on asset of deposit money banks by 33.17 and 7.12 percent respectively during the period under investigation. From the fixed effect model, it was discovered that capital ratio (CR) and loan and advance (LA) led to increase in return on asset to the turn of 45.80 and 46.45 percent respectively. The liquidity ratio (LR) and investment ratio (IR) reduced the return on asset of deposit money banks by 6.73 and 12.89 percent respectively during the period under investigation. However, from the random effect model, it was revealed that capital ratio (CR) and loan and advance (LA) increased the return on asset by 43.42 and 41.39 percent respectively. The liquidity ratio (LR) and investment ratio (IR) reduced the return on asset of deposit money banks by 27.39 and 8.27 percent respectively during the period under investigation.

The result from the pooled effect model revealed that the probability values of 0.000, 0.001 and 0.000 < 0.05 for the estimated parameter for liquidity ratio (LR), capital ratio (CA) and loan and advance (LA) respectively were statistically significant in determining the financial performance of...
deposit money banks. However, the probability values of 0.152 > 0.05 revealed the statistical insignificant of the investment ratio (IR) in examining the financial performance of deposit money banks in Nigeria. Fixed effect model showed that the probability values of 0.036, 0.000, 0.002 and 0.005 < 0.05 for all the estimated parameter such as liquidity ratio (LR), capital ratio (CA), investment ratio (IR) and loan and advance (LA) respectively were statistically significant in determining the financial performance of deposit money banks. In random effect model, it was discovered that the probability values of 0.000, 0.004 and 0.000 < 0.05 for the estimated parameter of liquidity ratio (LR), capital ratio (CA) and loan and advance (LA) respectively were statistically significant in determining the financial performance of deposit money banks in Nigeria. However, the probability values of 0.056 > 0.05 revealed the statistical insignificant of the investment ratio (IR) in examining the financial performance of deposit money banks in Nigeria.

A thorough examination of the fixed effect model results based on the individual selected deposit money banks showed that capital adequacy positively influences the return on asset of FIRB, ACCESS, DIAM, IBTC and WEMA by 0.21, 0.21, 0.76, 1.87 and 0.78 percent respectively. However, capital adequacy under consideration reduced the average return on asset of UBA, FIDB, STER, FCMB and UNITY by 0.23, 0.00, 2.77, 0.33 and 0.52 percent respectively in Nigeria. From the random effect model, the individual selected deposit money banks showed that capital adequacy positively influence the return on asset of UBA, FIDB, FIRB, DIAM, IBTC and WEMA by 0.03, 0.04, 0.14, 0.24, 0.46 and 0.23 percent respectively. However, capital adequacy under consideration reduced the average return on asset of STER, ACCESS, FCMB and UNITY by 0.23, 0.02, 0.10, and 0.17 percent respectively in Nigeria. The Idiosyncratic random error term with rho value of 0.955 revealed a strong correlation between the individually selected deposit money banks and cross sectional error term.

The adjusted R-squared of 0.63, 0.71 and 0.63 for pooled, fixed and random effect model respectively showed that 63, 71 and 63 percent variation in the performance money deposit bank in Nigeria measured by return on asset can be explained by the capital adequacy. Thus, it implies the importance of adequate capital in enhancing the financial performance of deposit money bank in Nigeria. Above all, the probability of the F- statistics 0.000 < 0.05 showed that the pooled, fixed and random effect panel model fitted in this study were valid, reliable, appropriate and acceptable for determining the effect of capital adequacy on the financial performance of deposit money banks in Nigeria. Therefore, this result led to the Hausman Test that was presented in table 5 below.

### Table 5: Correlated Random Effects - Hausman Test

<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq. d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>7.442184</td>
<td>4</td>
<td>0.8492</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Fixed</th>
<th>Random</th>
<th>Var(Diff.)</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR</td>
<td>-0.006732</td>
<td>-0.027394</td>
<td>0.000316</td>
<td>0.2450</td>
</tr>
<tr>
<td>CR</td>
<td>0.045803</td>
<td>0.043420</td>
<td>0.001180</td>
<td>0.9447</td>
</tr>
<tr>
<td>IR</td>
<td>-0.012885</td>
<td>-0.008267</td>
<td>0.000060</td>
<td>0.5510</td>
</tr>
<tr>
<td>LA</td>
<td>0.046449</td>
<td>0.041394</td>
<td>0.000318</td>
<td>0.7770</td>
</tr>
</tbody>
</table>

**Source:** Data Analysis (2019)

Table 5, showed the result of Hausman Test for the cross-section random effect. The chi-square value 7.442 < 9.488 and the probability value of 0.849 > 0.05 revealed that fixed effect model for the study was better than the random effect model. Also, the probability value for the variance differed for each of the estimated parameter such liquidity ratio (LA), capital ratio (CA), investment ratio (IR) and load and advance (LA) which were 0.245, 0.945, 0.551 and 0.777 > 0.05 also affirmed the inappropriateness of random effect model in examining the effect capital adequacy on the financial performance of deposit money banks measured by return on asset. Thus, the use of fixed effect model as the most efficient, consistent, sufficient and unbiased model led to the residual cross-sectional dependence test presented in Table 6.
null hypothesis: No cross-section dependence (correlation) in weighted residual

Periods included: 10
Cross-sections included: 10
Total panel (unbalanced) observations: 99
Test employs centered correlations computed from pairwise samples

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breusch-Pagan LM</td>
<td>49.55365</td>
<td>45</td>
<td>0.2965</td>
</tr>
<tr>
<td>Pesaran scaled LM</td>
<td>-0.574096</td>
<td>0.5659</td>
<td></td>
</tr>
<tr>
<td>Pesaran CD</td>
<td>3.262107</td>
<td>0.0011</td>
<td></td>
</tr>
</tbody>
</table>

Source: Data Analysis (2019)

Table 6 result showed the residual cross-section dependence using Breusch-Pagan LM. Thus, Breusch- Pagan LM statistic value of 49.554 and the probability value of 0.297 > 0.05 showed that cross-section dependence cannot be rejected. Hence, it implies that there was cross-section dependence among the capital adequacy variables and financial performance of selected deposit money banks in Nigeria.

5. Implication of the Findings and Conclusion

A thorough examination of the effect of capital adequacy on the financial performance of deposit money banks revealed an equilibrium relationship among the capital adequacy and deposit money banks financial performance variables under investigation and according to Torbira & Zaagha (2016) investigation on the impact of capital adequacy indicators, the ratio of shareholders fund to banks’ total deposits and the ratio of shareholder funds to bank total assets on bank financial performance measured by net profit margin, earnings per share and return on assets, there is a significance equilibrium relationship between bank financial performance variables and capital adequacy indicators in the deposit money banks. Thus, established the stability and the reliability of panel regression model using return on asset (ROA) as a measured deposit money bank financial performance and capital adequacy captured by liquidity ratio (LR), capital ratio (CR), investment ratio (IR) and loan & advance (LA) during the period under study. Hence, capital adequacy strongly and actively stimulated and improved the financial performance of deposit money banks in Nigeria.

The result of the panel regression model on the effect of capital adequacy on the financial performance of deposit money banks in Nigeria revealed that a linear relationship exists between the capital adequacy and the financial performance of deposit money banks in Nigeria. In specific term, the result showed that capital ratio (CR) and loan & advance (LA) were positively related with return on asset (ROA) a measured of financial performance thus, according to Ranga (2012), it can be emphasized that minimum capital requirements had a significant and positive relationship with deposit money banks financial performance. Also, Ezike and Oke (2013) investigation on the impact of the adoption of the capital adequacy standards on the performance of Nigerian banks affirmed that capital adequacy standards exert significant impact on bank performance. Ejoh and Iwara (2014) investigation on the impact of capital adequacy on deposit money banks’ profitability in Nigeria also affirmed that capital adequacy plays an important role in explaining bank profitability.

In contrary, the study of Olalekan and Adeyinka (2013) revealed the insignificance relationship between capital adequacy and banks profitability and such capital adequacy did not play a key role in determining profitability of deposit money banks. Also, the liquidity ratio (LR) and investment ratio (IR) negatively related with the return on asset (ROA) of deposit money banks under consideration in Nigeria. This result further revealed that the liquidity ratio and investment ratio reduced the return on asset of deposit money banks during the period under investigation. According to the study of Ikpefan (2015) on the impact of bank capital adequacy ratios, management and performance in the Nigerian deposit money banks established that the ratio of the shareholders’ fund to total assets which measured the capital adequacy had a negative impact on return on assets. The efficiency of management measured by operational expenses indices was negatively related to return on capital. The probability values revealed that the estimated parameter for liquidity ratio (LR), capital ratio (CA), investment ratio (IR) and loan and advance (LA) respectively in the model were statistically significant in determining the financial performance of deposit money banks.
A thorough examination of the result based on the individual selected deposit money banks showed that capital adequacy positively influences the return on asset of FIRB, ACCESS, DIAM, IBTC and WEMA respectively. Thus, according Ini and Eze (2018) capital adequacy positively impact on the financial performance of deposit money banks in Nigeria. Therefore, capital adequacy strongly and actively stimulates, improve and grow the financial performance of deposit money banks and that sufficiency of capital and adequate management can translate to improved performance. However, in contrary to Ini and Eze (2018), it was discovered that capital adequacy under consideration reduced the average return on asset of UBA, FIDB, STER, FCMB and UNITY respectively in Nigeria. The study revealed that variations of the return on asset a measured of performance of deposit money banks in Nigeria can be explained by the capital adequacy and it implies that adequate capital is important in enhancing the financial performance of deposit money banks in Nigeria.

Thus, this study concludes that capital adequacy is an important factor when examining the financial performance of deposit money banks in Nigeria. Adequate capital function in various ways, including provision of avenue against losses not covered by current earnings. It also serves as confidence booster to the depositors, both the public and the regulatory authorities in Nigeria. The empirical result of this study shows that deposit money banks with high capital ratio have access to more capital, perceived to have more safety and such advantage can be translated into better financial performance of deposit money banks thus, the higher the capital ratio, the better the financial performance of deposit money banks in Nigeria. Since, capital adequacy has positive effect on the performance of deposit money banks as revealed in this study, it can be emphasized that capital adequacy will be instrumental in promoting the soundness and safety of deposit money banks in Nigeria. This implies that adequate and good management of the bank capital can stimulate and engender improved financial performance of deposit money banks through efficient management deposits. Based on the findings from this study and the conclusion drawn, it was recommended that, the regulatory authority should ensure that banking reforms processes can be sustained through proper management of banks liquidity and investment. This will go a long way in helping the public to maintain confidence in the deposit money banks and also accommodate the credit needs of customers.

6. Reference
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