

**ASSET LIABILITY MANAGEMENT AND PERFORMANCE OF
DEPOSIT MONEY BANKS IN NIGERIA AND GHANA****Achori, Emmanuel**

Babcock University, Ilishan, Ogun State, Nigeria

Dada, Samuel

Babcock University, Ilishan, Ogun State, Nigeria

Ogundajo, Grace

Babcock University, Ilishan, Ogun State, Nigeria

ABSTRACT

This study examines the effect of ALM on the performance Return on Assets (ROA) and Return on Equity (ROE) of DMBs in Nigeria and Ghana. The study used ex-post facto research design. The population comprised 18 DMBs licensed in Nigeria and 22 DMBs licensed in Ghana as at 31st December 2021. Purposive sampling technique was adopted to select a sample of 10 DMBs each with relevant data from Nigeria and Ghana. Validated data were obtained from the annual reports of the banks for the period 2007-2021. The reliability of data was premised on the statutory audit and approval of the Financial Statements by the regulatory agencies in Nigeria and Ghana. Data were analyzed using descriptive and inferential statistics. The findings showed that while ALM had insignificant effect on ROA of DMBs in Nigeria ($Adj.R^2 = 0.297$, $W(3, 143) = 3.62$, $p > 0.05$) and Ghana ($Adj.R^2 = 0.372$, $W(3, 143) = 3.13$, $p > 0.05$), ALM with control variables exerted significant effect on ROA of DMBs in Nigeria ($Adj.R^2 = 0.296$, $W(6, 143) = 29.70$, $p < 0.05$) and Ghana ($Adj.R^2 = 0.394$, $W(6, 143) = 33.41$, $p < 0.05$). ALM exerted significant effect on ROE of DMBs in Nigeria ($Adj.R^2 = 0.327$, $W(3, 146) = 4.17$, $p < 0.05$) and Ghana ($Adj.R^2 = 0.351$, $W(3, 146) = 3.68$, $p < 0.05$). ALM with control variables had significant effect on ROE of DMBs in Nigeria ($Adj.R^2 = 0.293$, $W(6, 143) = 6.38$, $p < 0.05$) but an insignificant effect on ROE in Ghana ($Adj.R^2 = 0.337$, $W(6, 143) = 1.94$, $p > 0.05$). The study concludes that ALM affected performance of DMBs in Nigeria and Ghana. The study recommended that the management of DMBs in both countries should continuously adopt ALM to improve performance.

Keywords: Asset liability management, Deposit money banks, Loan deposit ratio, Net interest margin, Return on assets and Return on equity

1.0 INTRODUCTION

Companies seek to improve their performance in any way possible. The winning card can be held by those who endeavour to obtain and sustain performance. Thus, competing in a continuously changing environment, it is very necessary to comprehend and monitor performance (Taouab & Issor, 2019). Therefore, performance measurement is essential in today's complex business (irrespective of the type, nature, and volume diversity) as it defines what achievement is made over a period (Kwarbai & Akinpelu, 2016). To evaluate banks' performance, profitability should not be the only measure. Other performance metric as efficiency and productivity are rapidly being adopted by banks in Nigeria and Ghana (Amidu & Harvey, 2017). To add to these, in the modern world,

market share, cash flow and economic value-added benefit are trending indicators of banks' performance (Gamsakhurdia & Maisuradze, 2017).

Most times, when the analysis of banks performance is done, the focus is mainly about various types of the ratios or level of the Non-Performing Loans of the banks (Meena & Dhar, 2014). However, banks are consistently seeking to optimize their profitability and liquidity objectives through adoption of creation sound management of mismatches between the timing of cash inflows and cash outflows to avoid the effect of interest rate risk and liquidity risks. A comprehensive Asset-liability Management (ALM) policy framework focuses on bank profitability and long-term viability by targeting the net interest margin (NIM) ratio, return on equity and Net Economic Value (NEV), subject to balance sheet constraints. The ability to obtain maximum profits depends on the feasible set of assets and liabilities determined by the management and the unit costs incurred by the bank for producing each component of assets (Nzongang & Atemnkeng, 2006).

Onaolapo and Adegoke (2020) examined the Asset Liability Management and Performance of Listed Deposit Money Banks in Nigeria. The study used panel data regression to analyze the secondary data extracted from the annual reports and accounts of fourteen (14) banks for the period of 2005-2018. The study found that bank size has positive significant effect on Return on Assets (ROA). In the same vein, Idris and Bala (2018) carried out a study on the effect of firm specific characteristics on profitability of listed Foods and Beverage companies in Nigeria. Their finding revealed that firm specific characteristics have both positive and negative significant effects on profitability measured by stock market returns.

Despite the continuous increase in the Banks' profitability year on year in both Nigeria and Ghana, the Return on Assets and Return on Equity have been low and unstable over the years thereby causing stakeholders to be disgruntled. In this study, performance will be measured with efficiency using Return on Assets which is considered as how banks efficiently uses its assets to generate profits. Hence, the main purpose of this study is to assess the effect of Asset Liability Management on the Performance of Deposit Money Banks in Nigeria and Ghana.

2.0 REVIEW OF LITERATURE

2.1 Conceptual Review

Performance

Performance is a great achievement in a particular area of activity. The term "performance" is used in different areas; there is talk of economic performance, financial, technical, sporting, social. Etymologically, the word "performance" comes from the Latin "*performare*" which means to complete a given activity proposed. But the meaning comes from the English word "to perform" which means to make something that requires a certain ability or skill. Performance is currently experiencing a high degree of complexity and to specify its contents, it must consider several sides of activities. Taking a look from the global performance of an entity, it is useful criteria for shareholders because they are the ones who invest and assume the greatest risk and as a

consequence, the company must first meet their expectations. (Colpan, & Morck, 2022; Paligorova, 2021).

Onalapo and Adegoke (2020) explained that the measure of performance is a controversial issue due to its multi-dimensional meanings. Erasmus and Makina (2017) argued that performance measures like profitability and liquidity among others provided a valuable tool to stakeholders to evaluate the past financial performance and the current position of a firm. This term is also used as a general measure of a firm's overall financial health over a given period and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation. Bank's performance has often been measured by either the use of a profitability index (Fatihudin, Jusni & Mochklas, 2018; Abdullahi, Ardo, Hassan & Ibrahim, 2021) and/or the stock price of the bank (Oshadare, Idolor & Adelowotan, 2022; Adenomon, Maijamaa & John, 2020; & Okoebor, 2022).

In the first decade of the twenty-first century, the definition of organizational performance principally focused on the capability and ability of an organization to efficiently exploit the available resources to achieve accomplishments consistent with the set objectives of the company, as well as considering their relevance to its users (Peterson, Gijbsbers, & Wilks, 2019). Verboncu and Zalman (2017) appreciated that performance is a particular result obtained in management, economics, and marketing that gives characteristics of competitiveness, efficiency, and effectiveness to the organization and its structural and procedural components. Subsequently, in the second decade of the twenty second century, performance now centres on achieving strategic plans using specific performance metric such as Profitability, efficiency and value addition.

Asset Liability Management (ALM)

Deposit money banks are exposed to various risks and these risks affect their short-term profitability, their long-term earnings and long run sustenance capacity. Therefore, ALM models should primarily aim to stabilise the adverse impact of the risks on the financial institutions to have good performance. The focus of ALM is described in terms of faces where two faces exist: an accounting one that emphasises on net interest (short run) and an economic one that stresses on the value of bank equity in the long run. Asset and liability management is the one of major problems in banking and one of the ways for managing the risk inherent in banking business is through Asset liability management. (Corporate Finance Institute, 2022). ALM plays a very important role bringing together the different activities of the bank. Appropriate liquidity and balance sheet management is a key factor in ensuring the going concern factor of bank's business. Asset and Liability management (ALM) refers to a practice used by financial institutions to mitigate financial risks resulting from a mismatch of assets and liabilities. ALM strategies employ a combination of [risk management](#) and financial planning and are often used by organizations to manage long-term risks that can arise due to changing circumstances. Most often, the mismatches are a result of changes to the financial landscape, such as changing [interest rates](#) or liquidity requirements. (Corporate Finance Institute, 2022).

2.1.1 Theoretical Framework

This study is explained by the following theories:

(a) Commercial Loan Theory

The commercial loans theory also called the real bills doctrine theory is the oldest theory of the basic business activities of banks, which states that banks should only grant self-liquidating short-term loans and commercial papers to clients (Hosna & Manzura, 2019). The theory of commercial loans is designed to guide banks and influence them logically and convincingly about the banking lending process and general economic activities. The strong reliance of the principle of this theory and its follow-up is an engine and directed to the display of liquidity to influence all economic activities. Some banks whose liquidity is mainly coming from customer deposits considered that short-term loans are the most appropriate because customer deposits are retractable at any time and that their time nature is short-term. This shows that this theory does not serve banks that maintain good reserves by moving towards supporting developing economies and financing medium- and long-term loans such as industrial and real estate lending and thus creating a gap in economic development that depends on long-term financing of development sectors.

(b) The Anticipated Income Theory

This theory was proposed by Prochanow in 1944. Prochanow (1949) conducted a comprehensive study on loans and bank assets through which he developed a new theory on loans called “Anticipated Income Theory”. The anticipated theory focuses mainly the long-term loans and advances. In a study carried out by (Afriyie & Akotey, 2018), they concluded that regardless of the borrower's character and his business nature, the Bank plans to repay borrowers their loans through their expected profits and not by monetizing or selling their assets as in the commercial loans theory or by transferring or selling existing loans to other lenders.

However, the anticipated income theory assumes that banks should lend to their applicants based on their expected income and not based on the current values of their assets. What is striking about the anticipated Income theory is its view of the future of loans and banking facilities that are being repaid or transferred to liquidity through cash flows or expected profits of the borrower's business and projects.

Market Power Theory

Market power theory emanated from Bain (1951). The market power theory assumes that extra profits results from a higher market concentration which allows commercial banks to collude and earn supernormal profits which arise due to the firms’ portfolio of differentiated products that also increases the market share and market power in determining prices for products (Mirzaei, Liu & Moore, 2018).

Market power in antitrust cases also can come from deception, significantly imperfect or asymmetric information, unduly large transaction costs, or from other types of market failures that usually are associated with consumer protection violations. In antitrust cases, when these "consumer protection" market failures are present, market power can arise even if no firm has a market share large enough for a finding of traditional market share based market power.

Asset Liability Management theory

According to Emmanuel (2017), since the early 1960s, the loan portfolios of commercial banks have been affected by the emergence of a new theory, which became known as the liability-management theory. This is one of the important asset liability management theories and says that there is no need to follow old ALM norms like maintaining liquid assets, liquid investments. The theory is supported by Kosmidou, Zopounidi and Sollenberger. Lately, banks have focused on liabilities side of the balance sheet. According to this theory, banks can satisfy ALM needs by borrowing in the money and capital markets. The fundamental contribution of this theory was to consider both sides of a bank's balance sheet.

The core functions of Asset liability management consist of managing maturity gaps and mismatches while managing interest rate risk within the overall mandate prescribed by ALCO. The five key responsibilities and some usual activities initiated by the Asset liability management team include: managing structural gaps. This aspect of Asset Liability management stresses the importance of balancing maturities as well as cash flows on each side of balance sheet (i.e. deposits and loans) It strategizes dynamically on balancing the gaps, issuing timely guidelines to adjust focus on right product types and tenors, and actively involve Asset liability committee in this process.

2.2 Empirical Review

Several authors have examined Asset Liability Management and Profitability of Banks in both developed and developing economies using different concepts and methodologies. However, few works had been done on the comparative study of the impact of Asset Liability Management on the Performance of Deposit Money Banks in Nigeria and Ghana. Thus, this section examines a few of these studies in line with the set objectives of the study in terms of Performance measured with Profitability, efficiency and economic value addition due to the paucity of literature.

For instance, Onalapo and Adegoke (2020) examined the Asset Liability Management and Performance of Listed Deposit Money Banks in Nigeria. The study used panel data regression to analyze the secondary data extracted from the annual reports and accounts of fourteen (14) banks for the period of 2005-2018. The study found that bank size has positive significant effect on Return on Assets (ROA). In the same vein, Idris and Bala (2018) carried out a study on the effect of firm specific characteristics on profitability of listed Foods and Beverage companies in Nigeria. They studied 9 firms out of a population of 21 firms using OLS regression for a period of 7 years from 2007-2013. Their finding revealed that firm specific characteristics have both positive and negative significant effects on profitability measured by stock market returns.

Evans (2019) studied a significant number of banks which folded up during the Ghanaian banking financial crisis of 2017-2018. The author took a step backward to present the significant drivers of the profitability of banks in Ghana. Obtaining panel data from the banks' websites, the Ghana Statistical Service (GSS), and the Ghana Stock Exchange (GSE), the regression analysis was used to assess the drivers of profitability of banks in Ghana. The findings showed that the bank-specific variables had no combined effect on profitability.

Nyamador (2021) studied liquidity management in financial performance of Banks in Ghana from 2014 to 2018. The specific objective of the study was in respect of analysing the effect of liquidity and liability management on financial performance of listed banks. Financial performance was mainly measured by using returns on assets, returns on equity, profit margin and net interest margin. The study found that the excessive increase in banks' liquidity and the conservative approach to managing liquidity by holding more of banks deposits and assets in liquid form negatively affects financial performance. The study further found that liability management of banks by way of accumulating more debts and deposits and investing them in long term assets or holding them in liquid form negatively affect short term profits. This conclusion was supported by Obaleye (2018), Idamoyibo et al (2021) and Rezaul (2021) while Drechsler (2018) opposes the result and found deposit does not affect short term profitability.

Khan and Ali (2016) investigated the impact of liquidity ratio on the profitability of the commercial banks in Pakistan for the period 2008 - 2014 using secondary data. The results found that there is a positive and significant relationship between liquidity and profitability of commercial banks in Pakistan. Larrey et. al (2018) investigated the impact of liquidity on the profitability of the listed banks in Ghana's stock exchange for the period 2005 to 2010. The results found that the liquidity and financial performance of the banks in Ghana have a positive weak relationship. Abdullah & Johan (2017) investigated the impact of liquidity on commercial banks' performance in Bangladesh for five periods of time using panel data for the investigation. The results of the research clearly stated that there is not any significant relationship between liquidity and profitability of the listed commercial banks in Bangladesh.

Shrestha (2019) studied the impact of ALM on profitability of 7 private commercial banks in Nepal between 2007 and 2014. The study used SCA model and the result of pooled OLS regression analysis showed that loans, advances and fixed assets and other assets yield more return. While the cost rate of deposits and other liabilities negatively affect profitability. This result is in contradiction with a study of Sayeed and Hoque (2017). They examined the impact of ALM on 16 domestic commercial banks in Bangladesh over the period 1995–2015. The study found that a savings deposit yields a positive return to the bank. They argued that this is the case when the bank charges a high service fee and pays only nominal interest rates. The study also shows that for public banks, time deposits have a greater impact on net operating income than all liabilities.

On the other hand, Negash and Veni (2019) examined the impact of ALM on the profitability of 11 commercial banks in Ethiopia for the period 2010–2017. The result of the random effects regression models shows that the coefficient of fixed assets and non-interest bearing liabilities contradicted the SCA hypothesis. In other words, all assets generate positive net operating income after tax, but fixed assets have a negative and significant effect. On the liabilities side, all liabilities except non-interest bearing liabilities have a significant negative effect on profitability. Studies by Belete (2018) and

Abebe (2022) support this result. He used a pooled OLS regression analysis to examine the impact of ALM on ROE of Ethiopian and sub-Saharan African region banks respectively.

3.0 METHODOLOGY

The research design used to carry out this study is the ex-post facto design. The study population consist of eighteen (18) DMBs in Nigeria and twenty-two (22) DMBs in Ghana licensed by Central Bank of Nigeria and Bank of Ghana as at 31st December 2021. A sample of ten (10) deposit money banks were selected each from both countries. The sample banks were chosen using the purposive sampling technique. Secondary data was used in this study and data were gathered from the annual reports of the sampled banks for the period 2007 to 2021 . The multiple regression model was used to assess the influence of the independent variable (Asset Liability Management) on the dependent variable (performance). The model is shown below:

$$ROA_{it} = \beta_0 + \beta_1 LDR_{it} + \beta_2 CUR_{it} + \beta_3 NIM_{it} + \varepsilon_{it} \text{-----Equation 1}$$

$$ROA_{it} = \beta_0 + \beta_1 LDR_{it} + \beta_2 CUR_{it} + \beta_3 NIM_{it} + \beta_4 AGE_{it} + \beta_5 SIZ_{it} + \beta_6 INF_{it} + \varepsilon_{it} \text{--Equation 2}$$

$$ROE_{it} = \beta_0 + \beta_1 LDR_{it} + \beta_2 CUR_{it} + \beta_3 NIM_{it} + \varepsilon_{it} \text{-----Equation 3}$$

$$ROE_{it} = \beta_0 + \beta_1 LDR_{it} + \beta_2 CUR_{it} + \beta_3 NIM_{it} + \beta_4 AGE_{it} + \beta_5 SIZ_{it} + \beta_6 INF_{it} + \varepsilon_{it} \text{-----Equation 4}$$

Where:

ROA = Log of Return on Assets

ROE = Log of Return on Equity

LDR = Log of Loan to Deposit Ration

CUR = Log of Current Ratio

NIM = Log of Net Interest Margin

AGE = Log of Bank Age

SIZ = Log of Bank Size

INF = Log of Inflation

ε_i = error term

i represent the sampled Banks

t means the duration of the study

Table 1: Summary of the Variable Measurements

VARIABLES	ABBREVIATION	CATEGORY OF VARIABLES	MEASUREMENT	SOURCE
Loan to Deposit ratio	LDR	Independent Variable	Log of Aggregate loans and advances divide Total customers' deposit and bank's deposit in other banks	Mamati and Ayuma, (2017)
Current ratio	CUR	Independent Variable	Log of CUR = Current Assets divide Current Liabilities	Nwaobia, Jayeoba & Ajibade (2015)

Net Interest Margin	NIM	Independent Variable	Log of NIM = Interest Income – Interest Expense	Brock and Rojas-Suarez (2000)
Bank's Age	AGE	Independent Variable	Log of AGE = Number of years each of the DMB has been in operation.	Yameen, Farhan and Tabash (2019)
Bank's Size	SIZ	Independent Variable	SIZ = Natural logarithm of the company's total asset for the year under consideration.	Kartikasari and Merianti (2017)
Inflation	INF	Independent Variable	Log of INF = Inflation rate x Total Deposit	Oyebanji, Adeigbe, Akintoye & Ogundajo (2019)
Return on Assets	ROA	Dependent Variable	Log of ROA = $\frac{NOPBITD}{Average\ Total\ Assets}$ NOPBITD = Net operating profit before interest and tax but after depreciation and amortization Average total assets = Total assets for current year + Total assets for previous year / 2	Owolabi and Alu (2012)
Return on Equity	ROE	Dependent Variable	Log of ROE = $\frac{Net\ profit\ after\ tax}{Shareholders'\ funds}$	Cole, A.A. & Akintola, A.F (2021)

Source: Researcher's Study, 2023

4.0 DATA ANALYSIS AND DISCUSSION OF FINDINGS

Both the descriptive and inferential statistics results are discussed here:

Table 2: Descriptive Statistics

	MEAN		STD. DEV		MIN		MAX	
	NIG	GHA	NIG	GHA	NIG	GHA	NIG	GHA
ROA	0.365	0.804	0.749	1.064	-3.297	-4.088	1.726	2.889
ROE	2.001	2.565	1.510	1.008	-2.409	-1.943	5.444	5.336
LDR	0.608	-0.595	0.171	0.460	0.188	-1.928	1.113	0.227
CUR	-1.506	-1.478	0.699	0.508	-3.293	-3.176	0.052	0.047
NIM	17.135	11.638	3.928	1.366	0.000	7.180	19.620	14.455
AGE	3.805	3.158	0.634	0.730	2.833	0.693	4.956	4.220
SIZ	21.058	14.175	1.034	1.388	16.863	9.910	22.991	16.728
INF	18.445	15.417	1.270	2.249	12.371	9.084	20.900	18.698

Source: Researcher's Computation (2023)

Table 2 shows that the mean values for the data set of Loan to Deposit Ratio (LDR) for Nigeria is 0.608 while it is -0.595 for Ghana. The standard deviation for Loan to Deposit Ratio is 0.171 and 0.460 for Nigeria and Ghana respectively. This shows that the average Loan to Deposit of Nigeria is positive while that of Ghana is negative. This shows that

DMBs in Ghana keeps more Deposit which is not converted to Loans to be used by the public. However, for DMBs in Nigeria, the LDR is below the CBN regulatory LDR of 65% in Nigeria while there is no regulatory LDR in Ghana. While the average NIM, AGE, SIZ and INF are better in Nigeria than Ghana, the performance measured with ROA and ROE are better in Ghana than Nigeria. This may be due to optimization of resources of assets and equity in DMBs in Ghana than Nigeria.

Test of Hypotheses

Research Hypothesis: Bank age, Bank size and inflation do not significantly moderate the effect of Asset and Liability Management on the Return on Assets of Deposit Money Banks in Nigeria and Ghana

Table 3: Regression and Post-Estimation Results for Hypothesis

MODEL ONE – NIGERIA					MODEL ONE - GHANA			
Random-effects GLS Regression Kraay					Random-effects	GLS	Regression	
Variable	Coeff	Std.	T-	Pro	Coeff	Std. Err	T-Stat	Prob
Constant	1.223	1.621	0.75	0.03	1.418	1.204	1.18	0.239
LDR	-	0.339	-1.72	0.79	0.098	0.201	0.49	0.624
CUR	0.183	0.089	2.06	0.08	-0.271	0.179	-1.52	0.129
NIM	-	0.015	-0.26	0.01	1.041	0.148	7.04	0.000
AGE	-	0.205	-2.34	0.18	-0.267	0.300	-0.89	0.372
SIZ	0.153	0.116	1.32	0.25	-0.754	0.127	-5.94	0.000
INF	-	0.075	-1.13	0.45	-0.104	0.099	-1.05	0.239
Adj. R ²	0.2993				0.2232			
Wald Stat	F (6, 143) = 15.90 (0.014)				F (6, 143) = 56.60 (0.000)			
Hausman Test	chi ² (6) = 4.90 (0.557)				chi ² (6) = 9.71 (0.1372)			
LM Test/	F (3, 121) = 1.22 (0.2757)				F (3, 121) = 22.73 (0.000)			
Heteroskedasti	chi ² (1) = 296.71 (0.000)				chi ² (1) = 19.030 (0.000)			
Serial	F(1, 9) = 2.811 (0.1279)				F(1, 9) = 33.616 (0.0003)			

Source: Researcher’s Work (2023)

Dependent Variable: ROA @5% significance level

ROA = f(LDR, CUR, NIM, AGE, SIZ, INF)

$$ROA_{it} = \beta_0 + \beta_1LDR_{it} + \beta_2CUR_{it} + \beta_3NIM_{it} + \beta_4AGE_{it} + \beta_5SIZ_{it} + \beta_6INF_{it} + \varepsilon_{it}$$

$$ROA_{it} = 1.223 - 0.583 LDR_{it} + 0.183 CUR_{it} - 0.003 NIM_{it} - 0.481 AGE_{it} - 0.153 SIZ_{it} - 0.084 INF_{it} + \varepsilon_{it} \text{ -----Nigeria}$$

$$ROA_{it} = 1.418 + 0.098 LDR_{it} - 0.271 CUR_{it} + 1.041 NIM_{it} - 0.267 AGE_{it} - 0.754 SIZ_{it} - 0.104 INF_{it} + \varepsilon_{it} \text{ -----Ghana}$$

Post-Estimation Results (Nigeria)

In order to determine the most appropriate method of estimating the regression Model for DMBs in Nigeria among pooled OLS, fixed effects and random effects results as presented in Table 3, the Hausman test was carried out; and the result showed the p-

value of 0.56, that is, 56 percent which is greater than the 5 percent level of significance chosen for the study which confirms there is random effect. To confirm the RE, Testparm test was further conducted. The result of the testparm with probability value of 0.2757 being insignificant confirm the position of the Hausman test and suggest Random-effects GLS Regression. Hence, Random-effects GLS Regression was adopted for the estimation of Model in Nigeria.

After determining the most appropriate estimating technique, the study carried out the three diagnostic test applicable to panel study, which are heteroscedasticity test and serial correlation test. The heteroskedasticity, checking for the instability of the residuals of the model; with the probability value of 0.00 negates the null hypothesis of the test which states that “the model is homoscedastic”, this indicates that the model exhibited heteroscedastic nature meaning the residuals of the model are unstable over time. The model coefficients and residuals were checked for auto correlation problem using Wooldridge test and with the probability value of 0.1279, it revealed that the coefficients and the residual of the model are uncorrelated and thus, there is absence of serial correlation problem in the model. Due to the presence of both the heteroscedasticity and cross-sectional dependence problem in the model, Random-effects Regression with Driscoll-Kraay Standard Error was used for the estimation of the model.

Post-Estimations Test Results (Ghana)

In a bid to determine the most appropriate method of estimating the regression Model for DMBs in Ghana among pooled OLS, fixed effects and random effects results as presented in Table 3 above, the Hausman test was carried out; and based on the result of the test with the *p-value* of 0.137, that is, 13.7 percent which is more than the 5 percent level of significance chosen for the study revealed that fixed effects is not the most appropriate estimator according to its null hypothesis which states that there is absence of unsystematic difference in the model coefficients; thus, the study could not reject the null hypothesis.

Although, the Hausman test result revealed the inappropriateness of fixed effects; however, the confirmation of the result of the Hausman test was carried out using ‘testparm’ test for fixed effect’ as this test helps to decide the appropriate model between the fixed effects and Pooled OLS regression. The results of the test with *p-value* of 0.00, which is less than the significance level of 5 percent; confirmed that fixed effect is not appropriate in estimating the model hence the adoption of Random-effects Regression with Driscoll-Kraay Standard Error.

The model was tested for heteroskedasticity and serial correlation to examine the robustness of the model. Heteroskedasticity test helps to examine whether the variations in the residuals of the model are constant over time or not; the null hypothesis states that the standard errors of the model are constant over time. This test was carried out using Breusch-Pagan/Cook-Weisberg test and the result of the heteroskedasticity with *p-value* of 0.000 which is lower than the 5 percent level of significance selected for the study is an indication of the presence of heteroskedasticity; that is the residuals of the model are not stable over time, thus the model is heteroscedastic.

Also, serial correlation test was carried out to determine the existence of autocorrelation among the residuals and the coefficients of the model. According to Baltagi, (2021), autocorrelation problem causes the standard errors of the coefficients to be smaller than their actual value and the coefficient of determination (R-squared) to be higher than normal. The null hypothesis of the test states that there is no serial correlation (no first order of autocorrelation). The test was carried out using Wooldridge test and the result with *p-value* of 0.000 (that is, 0 percent) which is less than the significance level of 5 percent is an indication that serial correlation problem does exist in the model. The study rejected the null and it was concluded that there was first-order autocorrelation. As a result of heteroscedasticity and existence of serial correlation problems in the model, Random-effects Regression with Driscoll-Kraay Standard Error was adopted to estimate the effect of Asset Liability Management on Return on Assets in DMBs in Ghana.

$$ROA_{it} = \beta_0 + \beta_1LDR_{it} + \beta_2CUR_{it} + \beta_3NIM_{it} + \beta_4AGE_{it} + \beta_5SIZ_{it} + \beta_6INF_{it} + \varepsilon_{it}$$

Model in Table 3 above evaluated the effect of moderating role of bank age, bank size and inflation in the effect of Asset Liability Management on the Return on Assets (ROA) in Deposit Money Banks in Nigeria and Ghana. The regression estimates results revealed that: for DMBs in Nigeria, LDR has a negative and insignificant effect on ROA ($\beta = -0.583, p = 0.791$). The negative value of its coefficient implies that a percent increase in LDR (Loan to Deposit Ratio) will lead to 0.583 percent decrease in Return on Asset. This is not exactly the same situation with DMBs in Ghana where LDR has a positive but insignificant effect on ROA ($\beta = 0.098, p = 0.624$). The positive value of its coefficient implies that a percent increase in LDR (Loan to Deposit Ratio) will lead to 0.098 percent increase in Return on Asset of DMBs in Ghana. Therefore, DMBs of Nigeria have negative effect of Loan to Deposit Ratio on Return on Assets while DMBs in Ghana has positive insignificance effect of LDR on ROA.

Furthermore, Table 3 reveals that for DMBs in Nigeria, CUR has a positive but insignificant effect on ROA ($\beta = 0.183, p = 0.086$). The positive value of its coefficient implies that a percent increase in CUR (Current Ratio) will lead to 18.3 percent increase in Return on Asset of DMBs in Nigeria. However, for DMBs in Ghana, CUR has a negative and insignificant effect on ROA ($\beta = -0.271, p = 0.129$). The negative value of its coefficient implies that a percent increase in CUR (Current Ratio) will lead to 27.1 percent decrease in Return on Asset. Therefore, the effect of Current Ratio on both DMBs in Nigeria and Ghana totally differs as Nigeria shows a positive effect while Ghana shows a negative effect.

NIM (Net Interest Margin) has a negative and significant effect on NIM ($\beta = -0.003, p = 0.019$) revealing that a percent increase in NIM would yield 0 percent decrease in NIM of DMBs in Nigeria. However, for DMBs in Ghana, NIM has a positive and significant effect on ROA ($\beta = 1.041, p = 0.00$). The positive value of its coefficient implies that a percent increase in CUR (Current Ratio) will lead to 1 percent decrease in Return on Asset. Therefore, the effect of Current Ratio on both DMBs in Nigeria and Ghana totally differs as Nigeria shows a negative effect while Ghana shows a positive significant effect.

Table 3 also revealed that Age (AGE) has a negative and insignificant effect on ROA ($\beta = -0.481, p = 0.185$); which means that a percentage increase in AGE will lead to a decrease of 48.1 percent in ROA of selected DMBs in Nigeria. Similarly, for DMBs in Ghana, Age (AGE) has negative and significant effect on ROA ($\beta = -0.267, p = 0.37$); which means that a percentage increase in AGE will lead to a decrease of 26.7 percent in ROA of sampled DMBs in Ghana. This suggests that the effect of Age on both DMBs in Nigeria and Ghana are similar with negative significant relationship with ROA. Also, the effect of Age on ROA is negatively higher in Nigeria than Ghana.

Additionally, Table 3 revealed that Size (SIZ) has a positive significant effect on ROA in Nigeria ($\beta = 0.153, p = 0.259$); which means that a percentage increase in Size will lead to a further increase of 15.3 percent in ROA of DMBs in Nigeria. However, for DMBs in Ghana, Size (SIZ) has negative and significant effect on ROA ($\beta = -0.754, p = 0.00$); which means that a percentage increase in SIZ will lead to a decrease of 75.4 percent in ROA of sampled DMBs in Ghana. This suggests that the effect of Size on DMBs in Nigeria differs from Ghana. SIZ in Nigeria was positive and insignificant while SIZ in Ghana had negative significant effect.

Finally, Table 3 showed INF had a negative and insignificant impact on ROA in Nigeria ($\beta = -0.084, p = 0.451$) indicating that a percent increase in INF would result to 8 percent decrease in ROA in Nigeria. Similarly, for DMBs in Ghana, INF (Inflation) showed negative and insignificant effect on ROA ($\beta = -0.014, p = 0.239$) indicating that a percent increase in INF would result to 1 percent decrease in ROA.

Summarily, moderating variables of LDR, NIM, AGE and INF had negative effect on ROA of DMBs in Nigeria while other explanatory variables (CUR and NIM) and moderating variables (SIZ) reflected positive effects. However, Loan to Deposit Ratio, Current Ratio, Net Interest Margin, Age, Size and Inflation insignificantly influenced ROA while only (Net Interest Margin) exerted significant effect on ROA for DMBs in Nigeria. For DMBs in Ghana, LDR and NIM showed positive effects on ROA of DMBs in Ghana while CUR, AGE, SIZ and INF showed negative effects on ROA. NIM and SIZ are the only proxies which showed significant impact on ROA of DMBs in Ghana while LDR, CUR, AGE and INF had insignificant effect ROA on DMBs in Ghana.

The result of the F-stat with probability value of 0.01 and 0.00 Nigeria and Ghana respectively imply that all the proxies of the independent variables jointly and significantly impacted ROA of DMBs in Nigeria and Ghana. The value of the coefficient of multiple determination of 0.299 means that all the proxies of the independent variables are jointly responsible for 29.9% changes in ROA while the remaining changes in ROA (70.1%) are caused by other factors outside the scope of this model. However, for DMBs in Ghana, the value of the coefficient of multiple determination of 0.223 means that all the proxies of the independent variables are jointly responsible for 22.3% changes in ROA while the remaining changes in ROA (77.7%) are caused by other factors outside the scope of this model.

Decision

At a level of significance 0.05 and degree of freedom of Wald Stat (6, 143), the result of the Wald-statistics is 15.9 while the probability value is 0.014, which is less than the adopted level of significance of 0.05. Therefore, the study failed to accept the null hypothesis which states that “Bank age, Bank size and inflation do not significantly moderate the effect of Asset and Liability Management on the Return on Assets of Deposit Money Banks in Nigeria” and the alternate hypothesis that “Bank age, Bank size and inflation significantly moderate the effect of Asset and Liability Management on the Return on Assets of Deposit Money Banks in Nigeria” is accepted.

For Ghana, at a level of significance 0.05 and degree of freedom of Wald Stat(6, 143), the result of the Wald-statistics is 56.6 while the probability value is 0.000, which is less than the adopted level of significance of 0.05. Therefore, the study failed to accept the null hypothesis which states that “Bank age, Bank size and inflation do not significantly moderate the effect of Asset and Liability Management on the Return on Assets of Deposit Money Banks in Ghana” and the alternate hypothesis that “Bank age, Bank size and inflation significantly moderate the effect of Asset and Liability Management on the Return on Assets of Deposit Money Banks in Nigeria” is accepted. The objective of this model has been achieved, the research question answered, and the research hypothesis tested. This result is consistent with the *a priori* expectation of this model.

5.0 CONCLUSION AND RECOMMENDATIONS

This study was carried out with the main objective of examining the effect of Asset Liability Management on the Performance of Deposit Money Banks in Nigeria and Ghana. The result shows that Asset Liability Management has a significant effect on the performance of deposit money banks in Nigeria and Ghana. The study concluded that ALM affected performance of DMBs in Nigeria and Ghana. The study recommends that the management of DMBs in both countries should continuously adopt ALM to improve performance.

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