ASSET-LIABILITY MANAGEMENT AND PERFORMANCE OF LISTED DEPOSIT MONEY BANKS IN NIGERIAplagra

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Background: The development of asset-liability management was a response to the challenge of financial intermediation risks. **Aim:** This research looked into how asset-liability management impacted the economic success of DMBs, as quoted on the NGX, over a decade. Information was gathered from these banks' financial statements from 2013 to 2022. **Methods:** Analysis used descriptive, correlation, panel, and generalized least square techniques. The study categorized asset-liability management into asset management and liability management, each with its own performance indicators. Asset management's indicators included Asset Coverage Ratio (ACR), Total Asset Turnover (TAT), and Working Capital Turnover (WCT); liability management's indicators were Cash Flow Ratio (CFR), Capitalization Ratio (CAPR), Current Ratio (CR), and Return on Asset (ROA). **Results:** The study found that measures like ACR and TAT, under asset management, positively and significantly affect ROA, whereas WCT, a measure of asset management, negatively and insignificantly affects ROA. **Conclusions:** Conversely, measures under liability management, such as CFR and CR, positively influence ROA, whereas CAPR negatively impacts it.

Keywords: Assets management; liabilities management, performance, deposit money bank

JEL Classification:

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Introduction

The long-term success of a financial institution, especially a bank, hinges on its ability to manage its assets and debts efficiently. Managing assets and debts (ALM) is vital for monitoring all the various bank activities. Banks deal with all sorts of risks, such as credit risk, changes in interest rates, and not having enough cash on hand. These risks include operational, legal, and foreign exchange risks. Onaolapo and Adegoke (2020) highlight three main risks at the heart of ALM: the risk of changing interest rates, not having enough cash, and not getting paid back. It's essential for a financial institution to fully understand these concepts without a structured ALM program. This comprehension enables the institution to evaluate the risk-return trade-off it is dealing with accurately.

The ALM system plays a vital role in managing market, trading, and liquidity risks, as well as in planning for profits and projecting growth (Tee, 2017). Banks cannot offer loans without having deposits, and their earnings are primarily from the interest on loans (Kazeem & Adeoye, 2020). How well a bank is doing financially is tied to how good it is at handling credit, showing just how important it is for a bank to have deposits in banking operations. To meet its goals, a bank must focus on effective ALM, especially in managing liquidity, interest rate, and credit risks (Kazeem & Adeoye, 2020). Banks can make better business decisions by considering these risks within a structured framework. ALM is a plan that sorts out various kinds and amounts of money stuff and debts, considering how complicated the money market can be (Onaolapo & Adegoke, 2020). Banks mainly earn from interest on loans after subtracting deposits and loan interest. However, it is crucial to remember that banks cannot lend without deposits, and their primary profit source is from loan origination. The financial success of a bank is linked to its credit management, which, in turn, depends on the availability of deposits. A bank must adopt suitable ALM strategies to achieve its goals, including managing liquidity, interest rate, and credit risks (Francis, 2007). This study aims to look into how the management of ALM affects the financial outcomes of deposit money banks in Nigeria.

The purpose of this research is to answer the following research questions:

1. How does assets management affect the financial performance of deposit money banks in Nigeria?
2. Is there relationship between liability management and financial performance of deposit money banks in Nigeria?

Theoretical background

ALM is a method organizations use to manage their finances to reduce risks. It involves making smart decisions to keep money, handle losses, and grow assets. This is important for banks to operate efficiently and grow, ensuring the economy stays stable and can handle any unexpected challenges. ALM is essential for banks to be successful and expand.

ALM focuses on matching when money comes in and goes out in banks, aiming to reduce risks. Banks usually borrow money for short periods but lend it out for longer, which can lead to problems with having enough cash. ALM also involves monitoring the financial situation, assessing risks, and deciding how to best manage assets and liabilities to earn more interest while staying within safe limits. The goal is to keep interest income stable over time and protect the bank's long-term value rather than altogether avoiding risks.

This study presents a variety of theories related to asset liability management. These theories include the liabilities management theory, theory of mismatch, portfolio theory, efficient frontiers and asset allocation theory, and financial hierarchy theory. Liability theory management is a fundamental idea that banks may meet liquidity demands by borrowing money from capital markets. The theory of mismatching, often known as the multi-dimensional model, is a broad method for analyzing insurance portfolios. This approach includes a collection of investment pools, some of which are made up of securities sensitive to changes in interest rates, while others are focused solely on stocks. Portfolio theory is a strategy for investing that aims to find the right balance between risk and potential return to achieve the highest possible profit from a collection of investments. The concepts of the efficient frontier and asset allocation suggest that investors must evaluate how risky investments affect the expected profit and the range of profits their portfolio could earn. On the other hand, financial hierarchy theory concentrates on how the value of a company's liquid assets relates to its overall worth and how these assets can enhance the company's financial structure over time.

Arhinful and Radmehr (2023) examined the impact of financial leverage on the financial performance of firms listed on the Tokyo Stock Exchange. The study used 257 firms from 2000 to 2021. The study used GMM to analyse the effect of financial leverage on the financial performance. The study found that debt financing has positive and significant impact on performance of firms.

In a study by Folake and Mfon (2021) on Nigerian life insurance companies, it was discovered that there was a strong link between how well these companies managed their assets and their profitability, with certain types of liabilities also connected to higher profits.

The research by Onaolapo and Adegoke (2020) looked into how ALM influenced the financial health of DMBs in Nigeria from 2005 to 2018. This research, which analyzed the financial statements of fourteen banks, revealed that how assets and liabilities were managed affected the bank's return on assets and investment, with the size of the bank, demand deposits, and borrowing activities all playing a role in investment.

Evans (2017) study on Ghanaian listed banks found that asset management positively impacts profitability, while liabilities management, primarily savings and fixed deposits, has significant adverse effects on commercial banks' profitability, based on a robust panel regression analysis of seven banks from 2008 to 2012.

Simatwa (2015) study on ALM in Kenyan commercial banks found that asset quality significantly impacts financial performance. Non-performing loans had an inverse relationship with economic performance, while increased liabilities impacted considerable performance. Operational efficiency was found to be substantially associated with bank performance. The study also revealed that ALM factors like loans, liability, and efficiency levels directly affect banks' performance.

Methodology

For this research, a quantitative approach is chosen to explore how the management of liabilities related to assets (ALM) affects deposit money banks' performance. The study used data to examine how handling debts connected to assets (ALM) affects deposit money banks' performance. The study will focus on all quoted deposit money banks in Nigeria. As of January 26, 2024, fourteen (14) banks were included on the NGX.

Table 1: Total Deposit Money Banks Listed

S/N	Banks
1	Access Holdings Plc
2	Ecobank transnational Incorporated
3	Fidelity Bank Plc
4	FCMB Group Plc
5	First Bank of Nigeria Limited
6	Guaranty Trust Holding Company Plc
7	Jaiz Bank Plc
8	Stanbic IBTC Holdings Plc
9	Sterling Financial Holding Company Plc
10	Union Bank Nigeria Plc
11	United Bank of Africa Plc
12	Unity Bank Plc
13	Wema Bank Plc
14	Zenith Bank Plc

Source: Author's computation (2024)

The study sample comprises solely quoted banking institutions in Nigeria Exchange Group (NGX). It considers enterprises that have been mentioned since 2012 and are still in existence whose financial report is accessible for the sample period (2013-2022). The information to be used will be gathered from the audited financial reports of the chosen bank from 2013 to 2022. The goal of the sample period is to ensure more banking institutions and the bank's economic reports are readily available. To ensure uniformity in the classification of banks, only banks listed on the NGX are considered.

Table 2: Selected Deposit Money Banks

S/N	Banks
1	Fidelity Bank PLC
2	FCMB Group Plc
3	First Bank of Nigeria Limited
4	Stanbic IBTC Holdings PLC
5	Union Bank Nigeria PLC
6	United Bank of Africa PLC
7	Unity Bank PLC
8	Wema Bank PLC
9	Zenith Bank PLC

Source: Author's computation (2024)

The aim of dividing Asset and Liability Management (ALM) into Assets Management (AM) and Liability Management (LM) is to distinctly demonstrate the impact of Asset Management (AM) on performance and the influence of Liability Management (LM) on performance. Therefore, the mathematical equations for the models in this study are as follows:

ROA = F(AM, Size) eqn 1a
ROA = F(LM, Size) eqn 1b

Model expansions of AM expressed in Mathematical function form are then classified into:

ROA = F(ACR, TAT, WCT, Size) eqn 2a
ROA = F(CFR, CAPR, ICR, Size) eqn 2b

In econometric modelling, expanding the AM into its components gives:

$= \alpha + \beta 1ACRit + \beta 2TATit + \beta 3WCTit + \beta 4FZt + \beta 5EPSit$ eqn 3a
$= \alpha + \beta 1CFRit + \beta 2CAPRit + \beta 3CRit + \beta 4FZt + \beta 5EPSit$ eqn 3b

Where:
ROA= Return on Assets, AM= Asset Management, LM= Liability Management, ACR= Assets Coverage Ratio, TAT= Total Assets Turnover, WCT= Working Capital Turnover, CFR= Cash Flow Ratio, CAPR= Capitalization Ratio, CR= Current Ratio, FZ= Firms' Size, EPS= Earnings per Share

The table below shows how the variables will be measured.

Table 3: Measurement of Variables

S/N	Variables Names	Variable Type	Proxy	Formula
1	Return on Assets (ROA)	Dependent Variable	Performance	Profit divided by Total Assets Edmonds (2020),
2	Asset Coverage Ratio (ACR)	Independent Variable	Asset Management	Total assets minus short-term liability divided by total debt (Folake & Mfon, 2021).
3	Total Asset Turnover (TAT)	Independent Variable	Asset Management	Sales are divided by total assets (Anjili, 2014).
4	Working Capital Turnover (WCT)	Independent Variable	Asset Management	Sales are divided by working capital (Simatwa, 2015).
5	Cash flow Ratio (CFR)	Independent Variable	Liability Management	Operating cash flow is divided by total debt (Greuning & Sonja, 2003).
6	Capitalization Ratio (CAPR)	Independent Variable	Liability Management	Non-current debt is divided by total assets (Simatwa, 2015).

7	Current Ratio (CR)	Independent Variable	Liability Management	Current assets are divided current liabilities (Anjili, 2014).
8	Firm's Size (FZ)	Control Variable	Firm's Size	Log of total assets (Simatwa, 2015).
9	Earnings per share (EPS)	Control Variable	Asset Management	Net income divided by the number of shares outstanding (Anjili, 2014).

Source: Author's computation (2024)

Results

Table 4: Descriptive Statistics

	ROA	ACR	TAT	WCT	CFR	CAPR	CR	FZ	EPS
Mean	0.036707	19.25637	0.108226	0.623396	0.496140	0.183729	1.747263	6.884712	0.859004
Median	0.018147	0.449213	0.100556	0.364335	0.070977	0.123781	1.059461	6.533624	0.480000
Maximum	0.282878	817.3471	0.574581	61.52778	9.941800	1.752215	16.51753	9.156459	5.010000
Minimum	-0.091003	-0.481563	0.003316	-74.34552	-0.748960	0.000764	0.098639	4.877377	-1.276200
Std. Dev.	0.062594	89.15931	0.078287	13.63862	1.612506	0.246143	2.647112	1.256354	1.076322
Skewness	2.366612	8.175081	2.821124	-1.163165	4.557704	4.375011	3.888625	0.262850	1.648992
Kurtosis	9.123945	73.05785	16.15488	19.01672	24.72840	25.98583	18.68951	1.814364	5.849913
Jarque-Bera	224.6479	19407.86	768.3214	982.3015	2082.053	2268.418	1149.923	6.307847	71.24513
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.042684	0.000000
Observations	90	90	90	90	90	90	90	90	90

Source: Author's computation (2024)

The mean, as shown in Table 4, shows the descriptive statistics for the ROA, ACR, TAT, WCT, CFR, CAPR, CR, FZ, and EPS, which are 0.036707, 19.25637, 0.108226, 0.623396, 0.496140. 0.183729, 1.747263, 6.884712 and 0.859004. This indicates the average for each variable. This is computed by dividing the total of each respective variables by the total number of observations. In Table 4, the median result for the ROA, ACR, TAT, WCT, CFR, CAPR, CR, FZ, and EPS for the listed banks throughout 2013-2022 using the panel data descriptive test analysis are 0.018147, 0.449213, 0.100556, 0.364335, 0.070977, 0.123781, 1.059461, 6.533624, and 0.480000 respectively This indicates the midpoint for each variable after the data have been arranged in ascending order or in descending order. The maximum value shows the value for each of samples ROA, ACR, TAT, WCT, CFR, CAPR, CR, FZ and EPS are 0.282878, 817.3471, 0.574581, 61.52778, 9.941800, 1.752215, 16.51753, 9.156459, and 5.010000 respectively while the minimum indicates the lowest value for each variable as -0.091003, -0.481563, 0.003316, -74.34552, -0.748960, 0.000764, 0.098639, 4.877377 and -1.276200as shown in Table 4.

The standard deviation tells us how much the numbers vary from the mean. If the standard deviation is little, it suggests the values were very close together around the mean. However, if it is enormous, the values are distributed across a greater range. The spread of the numbers in Table 4 for ROA, ACR, TAT, WCT, CFR, CAPR, CR, FZ, and EPS are 0.062594, 89.15931, 0.078287, 13.63862, 1.612506, 0.246143, 2.647112, 1.25635, and 1.076322, respectively. This means the numbers are pretty close to the average.

Skewness is a way to look at how the numbers are shaped. It can be positive, negative, or zero. The skewness for Table 4 for ROA, ACR, TAT, WCT, CFR, CAPR, CR, FZ, and EPS are 2.366612, 8.75081, 2.821124, -1.163165, 4.557704, 4.375011, 3.888625, 0.262850, and 1.648992, respectively. This shows how spread out the numbers are compared to the average. If it's positive, there are more numbers on the right side. If it is negative, there are more on the left side. If it is zero, there's an equal number on both sides.

Kurtosis is about how peaked the shape of the numbers is. It is a way to measure how much the numbers curve around the highest point. In a regular shape, if the kurtosis is over three, it is really peaked. If it's under three, it is not as peaked. If it is precisely three, it is a perfect peak. The kurtosis values for ROA, ACR, TAT, WCT, CFR, CAPR, CR, FZ, and EPS are 9.123945, 73.05785, 16.15488, 19.01672, 24.72840, 25.98583, 18.68951, 1.814364, and 5.849913, respectively. All the numbers are pretty peaked except for FZ, which is not as peaked.

The Jarque-Bera test test is employed to verify the goodness of fit. It looks at if the skewness and kurtosis match up with what we would expect from a regular shape. If the test says the skewness and kurtosis do not match, it means the numbers do not fit a regular shape. The Jarque-Bera test for ROA, ACR, TAT, WCT, CFR, CAPR, CR, FZ, and EPS are 224.6479, 19407.86, 768.3214, 982.3015, 2082.053, 2268.418, 1149.923, 6.307847, and 71.24513. The test says the numbers fit a standard shape because the probability for each number is less than 0.05, which is the level we are looking for. This means we can use these numbers for more detailed analysis.

Table 5: Correlation Matrix Result

	ROA	ACR	TAT	WCT	CFR	CAPR	CR	FZ	EPS
ROA	1.000000								
ACR	0.028334	1.000000							
TAT	0.336225	-0.169460	1.000000						
WCT	0.007638	0.050460	-0.049390	1.000000					
CFR	0.277407	0.729113	0.016817	-0.041246	1.000000				
CAPR	-0.206018	-0.150946	0.484159	0.004593	-0.177952	1.000000			
CR	0.153389	0.561643	-0.109495	0.118325	0.516620	-0.161145	1.000000		
FZ	-0.532784	0.147100	-0.073011	-0.098624	0.058093	0.012480	0.154228	1.000000	
EPS	0.489864	-0.108132	0.175140	0.006598	-0.002145	-0.052340	-0.033455	-0.413009	1.000000

Source: Author's computation (2024)

Table 5 describes the strength of relationship (strong or weak) between variables and their direction (either positive, negative or zero relationship). A positive indicate relationship indicates that as one negative relationship indicates that one variables decreases the other trends decrease.

Fixed Effect Method (Asset Management)

Table 6: Fixed Effect Result

Dependent variable: ROA				
Method: Panel Least squares				
Variable	Co-efficient	Std.Error	T-statistics	Prob
C	0.017724	0.097989	0.180876	0.8569
ACR	0.0000226	0.000042	0.533268	0.5954
TAT	0.088139	0.056949	1.547682	0.1259
WCT	-0.000012	0.000243	-0.049500	0.9607
FZ	-0.000639	0.014179	-0.045092	0.9642
EPS	0.015620	0.003991	3.913998	0.0002
R-Squared	0.800158			
Adjusted R-squared	0.765975			
F-Statistics	23.40777			
Prob(F-Statistics)	0.000000			
Durbin- Watson stat	1.886585			

Source: Author's computation (2024)

From the coefficient (see Table 6), The model's constant (α) is 0.0177, showing that ROA changes by 0.0177 when all other factors (ACR, TAT, WCT, Size, and EPS) remain constant. The β1 coefficient is 0.0000226, meaning an increase in the value of ACR leads to a 0.0000226 increment in ROA. Similarly, an increase in TAT results in a 0.088139 increase in ROA. A decrease in WCT lead to lowers ROA by 0.000012, a decrease in FZ by lead to lowers ROA by 0.000639, and an increase in EPS raises ROA by 0.015620.

A variable's statistical significance is ascertained by comparing the computed t-value to the t-table. The null hypothesis would be rejected if the computed t-value is smaller than the t-table value. The null hypothesis is accepted if it is greater.

For ACR, TAT, WCT, and FZ, the null hypothesis is not rejected, but for EPS, it is rejected, according to the t-table, at a level of significance of 0.05.

Decisions are made using the t-probability, which is greater than the t-statistic. The significance level is greater than 0.05 for ACR, TAT, WCT, and FZ, indicating that the null hypothesis is accepted. The null hypothesis is rejected for EPS since the p-value is less than 0.05.

The F-statistic, used to test multiple hypotheses, is rejected when its value exceeds the critical value of 0.05. This indicates that, for the listed Nigerian deposit money institutions, ROA is influenced by ACR, TAT, WCT, FZ, and EPS.

Determining the validity of a joint hypothesis is aided by the F-probability value. The null hypothesis is rejected if the F-probability is less than the significance level (0.05); otherwise, it is not rejected. In table 6, F-probability is less than 5%, the null hypothesis is rejected, demonstrating how all of the variables work together to affect the dependent variables.

The R-squared value indicates the data's fit to the model. An R-squared of 0.800158 indicates that the explanatory factors account for approximately 80.02% of the variation in the variable being investigated, leaving 19.98% unaccounted for as error.

The adjusted R-squared, 76.60%, is an adjusted version that considers how well the explanatory variables improve the model.

The Durbin-Watson test is a statistical method used to determine the presence of autocorrelation. There is autocorrelation if the DW statistic falls between the lower and upper values. In the result from the table above, the Durbin- Watson is 1.886585. The DW table indicates that the DW statistic does not fit within the specified range of 1.406 and 1.636, respectively. This means that autocorrelation is not present.

Table 7: Random Effect Regression Result

Dependent variable: ROA				
Method: Panel Least squares				
Variable	Co-efficient	Std. Error	T-statistics	Prob
C	0.116215	0.054584	2.129114	0.0362
ACR	0.0000285	0.0000417	0.682711	0.4967
TAT	0.104150	0.054926	1.896170	0.0614
WCT	-0.0000391	0.000243	-0.161131	0.8724
FZ	-0.015313	0.007629	-2.007224	0.0479
EPS	0.016440	0.003876	4.241165	0.0001
R-Squared	0.249498			
Adjusted R-squared	0.204825			
F-Statistics	5.585021			
Prob(F-Statistics)	0.000172			
Durbin- Watson stat	1.621009			

Source: Author's computation (2024)

From the coefficient, the constant (α) is determined to be 0.1162. When all variables (ACR, TAT, WCT, FZ, and EPS) are held constant, the Return on Assets (ROA) is set to 0.1162. The equation reveals that the coefficient for β1 is 0.0000285, suggesting that an increase in ACR corresponds to a 0.0000285 change in ROA. Similarly, the coefficient for β2 is 0.104150, indicating that a decrease in TAT leads to a 0.104150 change in ROA. Conversely, the coefficient for β3 is -0.000391, signifying that an increment in WCT will lead to a reduction in ROA by -0.000391. The coefficient for β4 is -0.015313, which denotes a decrease in ROA by -0.015313 for every change in FZ. Lastly, the coefficient for β5 is 0.016440, signifying an increase in ROA by 0.016440 for every change in EPS.

A T-test is conducted to ascertain the statistical significance of these variables. For this, the t-value from the t-table must be found. It is statistically significant to reject the null hypothesis if the computed t-value is smaller than the t-value in the t-table. On the other hand, the null hypothesis is not rejected if the computed t-value is higher than the t-value found in the t-table.

The t-table for the given parameters is t(0.05/2, 90-5) = 2.284. Based on the findings, the null hypothesis for ACR, TAT and WCT and FZ has not been rejected because the variable has t-statistic of 0.6827, 1.8962, -0.1611 and -2.0072 respectively. However, under EPS (t-statistic of 4.2412), the null hypothesis is not accepted.

When making judgments, the t-probability estimate is more valuable than the t-statistic. The null hypothesis is not rejected for ACR, TAT and WCT as the p-value is higher than the threshold for significance level (5% = 0.05). On the other hand, the p-value for FZ and EPS is lower than the significance level, indicating that the null hypothesis is rejected.

The joint hypothesis is tested using the F-probability figure with a threshold value of less than 5%. The null hypothesis is rejected, and it is shown that all factors jointly affect the dependent variables since the F-probability value is lower than 0.05.

In Table 7, R-squared value, the explanatory variables are responsible for 24.95% of the variation in the dependent variable. The error term explain the remaining 75.05% of the variance.

The Durbin-Watson test is employed to ascertain the presence of autocorrelation. This test examines both the upper and lower bounds of the observations. The data in the table above shows that the Durbin-Watson statistic is 1.621009. The Durbin-Watson table show an upper and lower limit of 1.406 and 1.636, respectively. Consequently, this suggests the existence of autocorrelation, as the DW statistic is within the range specified in the Durbin-Watson table.

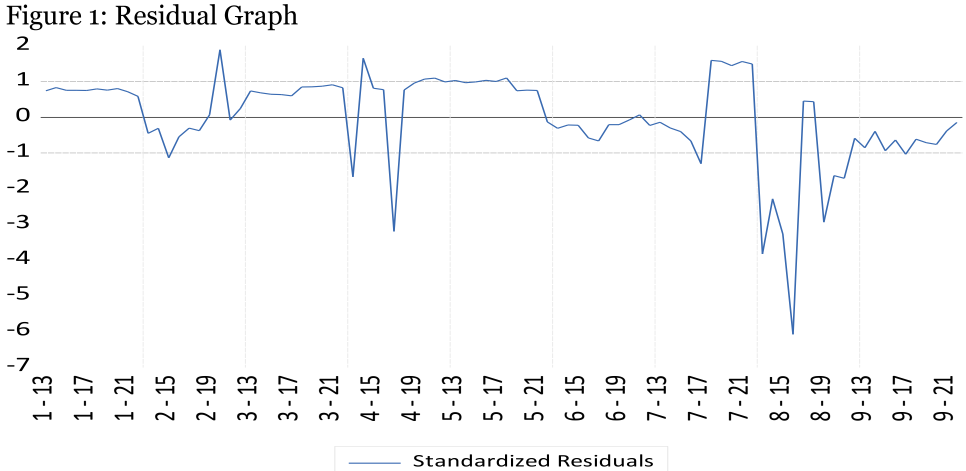
Table 8: Hausman Test Result
Correlated Random Effects - Hausman Test
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.251398	5	0.0684

Source: Author's computation (2024)

Hausman test is used to check if the random variable isn't connected to the other factors being examined. In Table 8, the Hausman test's p-value, which measures how likely the results are due to chance, is 0.0684. This is higher than the 1% mark, so we can't just throw out the idea that the random effect model is a good fit.

Figure 1: Residual Graph



Source: Author's computation (2024)

Heteroscedasticity test was carried out in order to determine the appropriate estimation regression model for the study. Figure 1 shows that there is presence of outlier in the variables. Outlier is an observation point that lies in an abnormal distance from other observation values in the sample. This shows that there is presence of heteroscedasticity in the variables which is not in line with the assumptions of ordinary least square. In other to make the model homoscedastic, the generalized least square method will be used.

Table 9: Generalized Linear Model Result

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.140826	0.033386	4.218176	0.0000
ACR	0.000120	5.75E-05	2.083501	0.0372
TAT	0.226257	0.065701	3.443748	0.0006
WCT	-0.000140	0.000370	-0.379671	0.7042
FZ	-0.021066	0.004425	-4t.760603	0.0000
EPS	0.016536	0.005170	3.198723	0.0014

Source: Author's computation (2024)

The constant (α) from the coefficient is 0.140826. When all the factors (ACR, TAT, WCT, FZ, and EPS) remain constant, the ROA will remain at 0.140826. From table 9, the coefficient for β1 is 0.000120. This suggests that as ACR increases, it would result in a 0.000120 increment in ROA, β2 factor is 0.226257, showing when TAT grows it would also result in the increment of 0.226257 in ROA, β3 factor is -0.000140, meaning a decrease in WCT would cause a 0.000140 decrease in ROA, β4 factor is -0.021066, showing a decline in FZ would lead to a 0.021066 decrease in ROA, and β5 factor is 0.016536, meaning that when EPS it would result in a 0.016536 increment in ROA.

The z-probability is more favorable for the decision compared to the z-statistic. For the z-probability, the WCT p-value is higher than the significance level of 5%, which means the null hypothesis is not rejected. While the factors ACR, TAT, FZ, and EPS the significance level is less than the p-value, suggesting that the null hypothesis is rejected.

Regression Analysis (Liability Management)

Table 10: Fixed Effect Regression Results

Dependent variable: ROA				
Method: Panel Least squares				
Variable	Co-efficient	Std. Error	T-statistics	Prob
C	0.061082	0.095348	0.640622	0.8569
CFR	0.003300	0.002430	1.358150	0.5954
CAPR	-0.023485	0.013551	-1.733028	0.1259
CR	0.001828	0.001606	1.1383	0.9607
FZ	-0.005518	0.013824	-0.399167	0.9642
EPS	0.015248	0.003877	3.932985	0.0002
R-Squared	0.811596			
Adjusted R-squared	0.779369			
F-Statistics	25.18370			
Prob(F-Statistics)	0.000000			
Durbin- Watson stat	1.768601			

Source: Author's computation (2024)

The constant (α) from the equation is 0.061082. When all the factors (ACR, TAT, WCT, FZ, and EPS) remain constant, the ROA value remains at 0.061082. From the equation, the β1 coefficient is 0.003300, showing that a change in CFR leads to a 0.003300 growth in ROA. The β2 coefficient is -0.023485, indicating that a change in CAPR results in a decrease of 0.023485 in ROA. The β3 coefficient is 0.001828, showing that a change in CR leads to an increase of 0.001828 in ROA. The β4 coefficient is -

0.005518, indicating that a change in FZ results in a decrease of 0.005518 in ROA. The β5 coefficient is 0.015248, showing that a change in EPS leads to an increase of 0.015248 in ROA.

If the p-value is less than 5%, we say we don't accept the null hypothesis. Here, the CFR, CAPR, CR, and FZ all have p-values over 5%, which means we do not reject the null hypothesis. On the other hand, for EPS, the p-value is under 5%, so we do reject the null hypothesis.

The F-probability figure looks at the same thing but with a threshold of 5%. If it's over 5%, we say the null hypothesis should be rejected. In Table 10, the F-probability value is under 5%, showing that all the variables together affect the dependent variables for the listed DMBs in Nigeria. The F-probability value is also used to see if two or more hypotheses are working together, with a threshold of 0.05. If it's over 0.05, we reject the null hypothesis. Here, the F-probability value is under 0.05, meaning all the variables together affect the dependent variables for the listed DMBs in Nigeria.

The R-squared value tells us how well the model fits the data, going from 0 to 1, with 1 being a perfect fit. In Table 10, the R-squared value is 0.811596, showing that about 81.16% of the variation in the dependent variable is explained by the independent variables. This means that 18.84% (100% minus 81.16%) of the changes in the variable is because of the error term.

The adjusted R-squared, an enhancement of the R-squared measure, fine-tunes the explanatory variable in the equation, only growing if the variable enhances the model beyond what is anticipated.

The Durbin-Watson test is employed to identify any correlation among the observations. The chart displays a Durbin-Watson score of 1.768601, whereas the DW chart presents a range of 1.406 to 1.636, suggesting no correlation since the calculated score aligns with the data provided in the chart.

Table 11: Random Effect Regression Results

Dependent variable: ROA				
Method: Panel Least squares				
Variable	Co-efficient	Std.Error	T-statistics	Prob
C	0.147437	0.049513	2.977708	0.0038
CFR	0.004014	0.002404	1.669264	0.0988
CAPR	-0.026295	0.013400	-1.962356	0.0530
CR	0.002032	0.001571	1.293099	0.1995
FZ	-0.018193	0.006963	-2.612901	0.0106
EPS	0.016083	0.003753	4.285725	0.0000
R-Squared	0.305413			
Adjusted R-squared	0.264069			
F-Statistics	7.387048			
Prob(F-Statistics)	0.000009			
Durbin- Watson stat	1.448302			

Source: Author's computation (2024)

The constant (α) from the coefficient is 0.147437. When all the variables (ACR, TAT, WCT, FZ, and EPS) are kept constant, the ROA value remains at 0.147437. From the equation, the β1 coefficient is 0.004014, showing that a change in CFR leads to a 0.004014 growth in ROA, while the β2 factor is -0.026295, indicating that a change in CAPR results in a decrease of 0.026295 in ROA. The β3 coefficient is 0.002032, meaning a change in CR leads to an increase of 0.002032 in ROA, the β4 coefficient is -0.018193, showing a change in FZ results in a decrease of –0.018193 in ROA, and β5 coefficient is 0.016083, indicating a change in EPS results in an increase of 0.016083 in ROA.

T-probability is utilized in decision-making processes based on the t-statistic. Should the t-probability surpass the t-statistic, the decision is made based on the t-probability. In this scenario, CFR, CAPR, and CR have t-probabilities surpassing the significance level (5%), indicating that the null hypothesis is not rejected. Conversely, EPS and FZ have t-probabilities falling below the significance level, suggesting that the null hypothesis is rejected for EPS, and the significance level is exceeded by the t-probability for FZ, indicating that the null hypothesis is rejected for FZ.

The combined theory is examined through F-probability figures, showing a value above 0.05, which suggests the null hypothesis should be dismissed. The outcome in Table 11 is 0.000009, which is less than 5%, showing that all factors together influence the outcome variables.

The R-squared figure in Table 11 shows that the explanatory factors account for 30.54% of the outcome variable's impact, while 69.49% is attributed to the residual error.

The adjusted R-squared, a tweaked version of R-squared, is applied to the model, increasing only if the explanatory factors enhance the model more than anticipated.

The Durbin-Watson test is used to verify the existence of autocorrelation in the data, with the findings showing a link between the highest and lowest values, as shown in the DW table.

Table 12: Hausman Effect Regression
Correlated Random Effects - Hausman Test
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	12.121450	5	0.0332

Source: Author's computation (2024)

Researchers often use the Hausman test to decide between fixed or random effect models by examining their connection with the model. If the p-value is less than the null hypothesis, it is considered significant, and if it is not, the null hypothesis is not deemed necessary.

Brook (2008) explains that the Hausman test determines if the random effect result is independent of the explanatory variables. Table 4.4.3 indicates that the p-value of the Hausman test is 0.0332, which is higher than a 1% significance level; therefore, the null hypothesis is accepted, indicating that the random effect model is appropriate.

Figure 2: Residual Graph

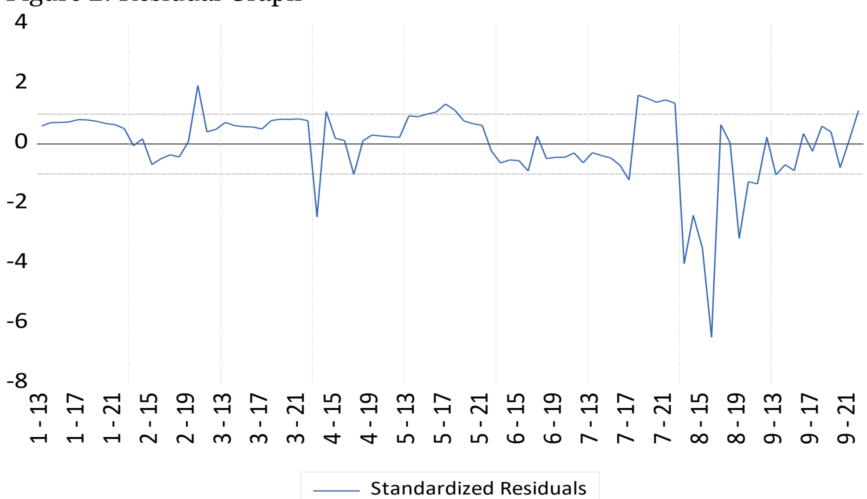


Figure 2 shows that there is presence of outlier in the variables. Outlier is an observation point that lies in an abnormal distance from other observation values in the sample. This shows that there is Heteroscedasticity in the variables which is not in line with the assumptions of ordinary least square. In other to make the model homoscedastic, the generalized least square model will be used.

Table 13: Generalized Linear Model Result

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.166955	0.032148	5.193285	0.0000
CFR	0.009108	0.003570	2.551298	0.0107
CAPR	-0.032680	0.020320	-1.608235	0.1078
CR	0.002087	0.002192	0.951795	0.3412
FZ	-0.021471	0.004333	-4.955495	0.0000
EPS	0.017947	0.005004	3.586494	0.0003

Source: Author's computation (2024)

The table 13 shows that the coefficient β1 is 0.009108, meaning that a change in CFR will lead to a 0.009108 increase in ROA. Similarly, β2 is – 0.032680, showing opposite direction movement between CAPR and ROA. This means that a change in CAPR will cause a reduction in ROA by 0.032680. β3 is 0.002087, indicating that a change in WCT leads to a 0.002087 increase in ROA. β4 is – 0.021471, showing that a opposite movement between FZ and ROA. This means that a change in FZ causes a reduction in ROA by 0.021471. Lastly, β5 is 0.017947, meaning that a change in EPS would cause increase in ROA by 0.017947.

For the z-probability, CAPR and CR have a p-value exceeding the significance level of 5%, suggesting that the null hypothesis is not rejected. Conversely, for CFR, FZ, and EPS, the level of significance is not up to the p-value, indicating that the null hypothesis is rejected.

Discussion of Findings

This study examined the influence of asset-liability management on financial performance of listed deposit money banks in Nigeria over the period 2013 – 2022. The study used GLM findings to make choice because it is better to the result from the fixed and random effect regression analysis.

The results indicate that the Asset Coverage Ratio (ACR) positively and significantly influences the financial performance of the publicly listed deposit money institutions in Nigeria. An increase in ACR signifies an enhancement in the functioning of deposit money banks. The study is against the finding of Arhinful and Radmehr (2023), Mesak and Imade (2019) and Kuncoro and Augustina (2017) but inline with Folake and Mfon (2021) and Kazeem and Adeoye (2020). Total Asset Turnover (TAT) has a positive and strong correlation with financial success, as assessed by return on assets. This indicates that when asset management methods with TAT enhance, the financial performance of the listed deposit money institutions in Nigeria would also improve. The study is against the findings of Deelstra and Janssen (2015) but in line with Onaolapo and Adegoke (2020). It was shown that Working Capital Turnover (WCT) has a negative and negligible correlation with the financial performance of the listed deposit money banks in Nigeria. This suggests that when asset management practices using WCT enhance, the financial performance of the listed deposit money banks in Nigeria would concurrently diminish. This result contradicts the findings of Abebe (2020) but inline with Onaolapo and Adegoke (2020).

The Cash Flow Ratio (CFR) is positively and strongly correlated with financial success as measured by return on assets. This indicates that when liability management methods with CFR enhance, the financial performance of the listed deposit money banks in Nigeria would also improve. This finding is in line with the a-priori expectation of this research which states a positive relationship between the variables as well as the findings from the works of Dada (2021) but against the findings of Onaolapo and Adegoke (2020). Capitalization Ratio (CAPR) shows a negative and negligible link with financial performance of the listed deposit money banks in Nigeria. This implies that when liability management procedures using CAPR improves, the financial performance of the listed deposit money institutions in Nigeria would also drop. This result, however, is in line with the findings of Dada (2021) but against the findings of Onaolapo and Adegoke (2020). Current Ratio (CR) shows a positive and insignificant link with financial performance of the listed deposit money banks in Nigeria. This implies that when liability management procedures with CR improves, the financial performance of the listed deposit money institutions in Nigeria would also drop. This finding is not in accordance with the a-priori expectation of this investigation. The current ratio gives insight into a company's liquidity and its capacity to pay down its short-term commitments. A greater current ratio implies a healthy liquidity situation, whereas a lower ratio may signify possible liquidity concerns. However, an overly high ratio can suggest underutilization of assets. The optimal current ratio varies by sector and firm, but typically, a ratio of 2:1 or greater is considered healthy.

Conclusion

The Asset Coverage Ratio really helped improve the bank's financial results, showing that it is important for determining a bank's performance. The Total Asset Turnover also boosts the bank's financial success, proving that it is a determinant of financial success. The Working Capital Turnover also helped the bank's financials, showing that this is a vital part of being financially sound. The Cash Flow Ratio also played an important role in the bank's financial health, proving that it's a good way to determine a bank's health.

On the other hand, Capitalization Ratio hurts the bank's performance, suggesting it doesn't help the bank succeed. Similarly, the Coverage Ratio negatively affects the bank's performance, showing that it harms a bank's health. In conclusion, this study showed that the Asset Coverage Ratio, Total Asset Turnover, Working Capital Turnover, and Cash Flow Ratio all positively impact the bank's performance. In contrast, the Capitalization Ratio and Current Ratio have the opposite effect.

Only data from Nigerian deposit banks and money banks were used in the study. The results have not considered banks from other nations. The study is further limited by the fact that certain banks do not have the data. As a result, the study sample's representativeness was eventually compromised and its size was decreased. The banking industry was the sole focus of this study, therefore results may differ in other industries. This indicates that it is unknown how ALM and financial success in other industries that use the model are related.

The study focused on DMBs in Nigeria from 2013-2022 but it has not benchmarked the findings with other countries. It is thus suggested a similar study to be done to bench the findings with deposit money banks in other countries. The study only concentrated on banks which represents only one sector of the economy. This left other sectors uncovered. A similar study in other sectors is desired to ensure full disclosure on the relationship between ALM and financial performances.

Acknowledgement

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