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STRUCTURAL EQUATION MODELLING TO EVALUATE THE EFFECTS OF BANK LIQUIDITY AND FINANCIAL PERFORMANCE OF DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT

The developmental responsibility of deposit money banks in channeling funds from the surplus sector to the deficit sector is reliant of the liquidity volume of the banks which aid the bank's profitability and overall performance. The study examined the effects of bank liquidity on bank performance that was anchored on the liquidity management theory and profitability Trade-off of Liquidity. It employed the Structural Equation modelling technique on ten selected and listed deposit money banks in Nigeria. Panel data were sourced from financial statements of selected deposit money banks from 2018 to 2024. Bank size and loan-to-deposit ratio have positive significant effects on earnings per share. Larger banks are able to leverage their scale, widen market coverage and resource base to improve efficiency and profitability, ultimately enhancing shareholder returns. Banks that effectively transform deposits into loans are better positioned to generate interest income and sustain profitability. The findings emphasize the importance of growth strategies and prudent lending practices in driving shareholder wealth maximization. It is recommended that banks pursue deliberate expansion strategies that strengthen their asset base and enhance operational efficiency, thereby improving their overall performance and market competitiveness.

Keywords: Earnings per share, Net Interest Margin, Loan-to-deposit ratio, Liquidity ratio, Performance

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INTRODUCTION

The Deposit Money Banks are financial architecture in an economy that allows smooth exchange of goods and services simplifying payments and transactions, creation of funds to the deficit sector, to increase investments and establishment of new industries (Azzam and Al-maleeh, 2022). The Deposit Money Banks in Nigeria aids in the improvement of economic stability and growth (Alim, *et al.,* 2021; Nworie and Agwaramgho, 2023). Apart, from the banks intermediation responsibility, they also diversify depositors fund which creates risks, which liquidity risks stands to be the most critical risks in determining the going concern attributes of the bank and its developmental importance to the economy at large. Liquidity risk occurs when the deposit money banks do not have enough cash or availa-

ble fund to meet their customer's withdrawals, loan demands or other cash needs (Ojo *et al.,* 2022; Eltweri *et al,* 2024).

However, the attainment of bank liquidity and bank performance are two sides of a coin, because the operational competence of a bank to meet its cash/deposit demand, finance asset growth and convert its asset or securities to cash positively affect the financial performance of such bank, while also the internal capability to generate returns either from intermediation, investment in stock market or advisory services allows or equips banks to meet its liquidity responsibility effectively always (Ajayi and Lawal 2021; Al-Nimer *et al* 2024).

Studies like Joseph and Adelegan (2023), Haliru *et al* (2024), Nworie and Agwaramgbo (2023), Okeke (2024), Ajao and Iyekekpolor (2022) among others have examined how liquidity management contributes to financial performance but most of the empirics did not examine how the liquidity of banks affect the market based performance measures (earning per share) and book-based performance measures (Net Interest margin), knowing that the liquidity of banks may affect the book performance level and not transcend to their performance on the market floor. Methodologically, the Structural Equation Modeling captures the peculiarity of direct and indirect effects of the latent variable, offering a more comprehensive picture of the financial dynamics at play in the deposit money banks (Gadzo *et al.,* 2019; Kline, 2023).

Bank Performance is a multi-dimensional phenomenon that is attained through various channels by the tactical and strategic level management of the banks. It could be interest differentials, on loans and deposit, Investment opportunities outside the operation of the bank and other investment options that would generate a positive NPV for the banks. All these available sources are dependent on how the management utilizes the resources to ensure profitability is sustained per time, so as to avoid various types of risk, which liquidity risk is cogent among various risk exposure of the banks.

MATERIALS AND METHODS

The purposive sampling technique employed entailed ten deposit money banks selected from the Nigerian Stock Exchange. It was adopted to ensure the banks selected are well -established, publicly listed and possess a consistent financial over the study period (2018-2024). Data were sourced from the financial statement of the banks from 2018 to 2024, both years inclusive. The banks selected included: Access Bank, First Bank of Nigeria, WEMA, First City Monument Bank, Fidelity Bank, Guaranty Trust Bank, Stanbic IBTC, Union Bank, United Bank of Africa, and Zenith Bank. This sample includes well-established banks with diverse operational profiles, offering comprehensive insights into liquidity-performance dynamics. The models were adjusted to capture the peculiarities of Nwokoro *et al* (2023), and Adeolu (2023).

H_1= Liquidity ratio, loan-to-deposit ratio, and bank size have no significant impact on earnings per share

$$EPS_t = f(LQR, LDR, BS) \quad \text{.....1}$$

$$EPS_{i,t} = (\alpha_0 + \beta_1 LQR_{i,t} + \beta_2 LDR_{i,t} + \beta_3 BS_{i,t} + \mu_t) \quad \text{.....2}$$

$H_{1=}$ Liquidity ratio, loan-to-deposit ratio, and bank size have no significant impact on net interest margin

$$NIM_t = f(LQR, LDR, BS) \quad \text{.....3}$$

$$NIM_{i,t} = (\alpha_0 + \beta_1 LQR_{i,t} + \beta_2 LDR_{i,t} + \beta_3 BS_{i,t} + \mu_t) \quad \text{.....4}$$

Where;

Financial Performance (Dependent variables)

EPS=Earnings per share at time t

NIM= Net Interest margin at time t

Bank Liquidity (Independent variables)

LQR= Liquidity ratio n at time t

LDR= Loan to deposit ratio at time t

Control Variables

BS= Bank Size at time t

U= Disturbance term/White noise at time t
α = Intercept
$\alpha_1 - \alpha_3$ = Coefficient of the Independent Variables.

RESULTS AND DISCUSSION

The multi-collinearity table test validated the presence of similarities in variable, so as to reduce spurious parameters. The reliability test determined the extent to which the independent variables explained or predicts the outcome variables. The f-square showed the size of impact the independent variables have on the dependent variable. The path coefficient showed the significant level and magnitude of impact of each independent variable on the outcome variable.

Descriptive Analysis of bank liquidity and bank performance

The mean value of earnings per share was 8.63, median of 4.31; range of minimum of 0.06 and maximum of 127.6, standard deviation of 18.9, Kurtosis was leptokurtic at 23.8. (Table 2). Net Interest margin had a mean of 4.29, median of 3.79; range of minimum of 0.21 and maximum of 32.6, standard deviation of 3.80, Kurtosis was leptokurtic at 38.6. Liquidity ratio had a mean of 1.18, median of 3.79, range of minimum of 0.00 and maximum of 3.15, standard deviation of 0.54 and Kurtosis was platykurtic at 1.95. Loan-to- deposit ratio had a mean of 0.79, median of 0.61, range of minimum of 0.00 and maximum of 6.78, standard deviation of 1.01, Kurtosis was leptokurtic at 27.5. Bank size had a mean of 8.28, median of 8.62, range of minimum of 5.97 and maximum of 10.09, standard deviation of 1.23 and kurtosis of platykurtic at -1.19 (Table 2).

Table 1: Description of Variables of bank liquidity and bank performance

Variables	Description	Measurement
	Dependent Variables	
EPS Earnings per share	Earnings per share (EPS) is a financial metric that indicates the company profit allocated to each outstanding share of common stock. It is sourced from the final account of the banks.	$EPS_{it} = \frac{Pre.Stock\ Div_{it}}{No.of\ common\ shares\ out._{it}}$
NIM Net Interest margin	Net Interest margin (NIM) is a financial metric that measures the difference between the interest income earned by a bank. It is interest from its core lending and investment responsibilities.	$NIM_{it} = \frac{NII_{it}}{Av.earning\ assets_{it}} * 100$
	Independent Variables	
LQR Liquidity Ratio	Liquidity ratios are financial metrics used to assess a company's ability to meet its short-term obligations with its short-term assets.	$LQR_{it} = \frac{CA_{it}}{CL_{it}}$
LDR Loan-to-deposit ratio	The loan-to-deposit is a financial metric used in banking to evaluate a bank's liquidity and lending practices	$LDR_{it} = \frac{Total\ Loan_{it}}{Total\ Deposit_{it}}$
	Control Variable	
BS Bank Size	In most cases, bank size is usually measured as the total investment of an entity in non-current assets used to produce goods or employed in the delivery of its services. It is usually expressed as a natural log of total assets.	$BS_{it} = Ln\ \ Total\ Assets$

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Table 2: Descriptive Analysis of bank liquidity and bank performance

Name	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Excess kurtosis
EPS	8.635	4.310	0.060	127.620	0.060	127.620	18.996	23.858
NIM	4.294	3.792	0.217	32.699	0.217	32.699	3.804	38.650
LQR	1.189	1.179	0.002	3.153	0.002	3.153	0.547	1.957
LDR	0.793	0.615	0.001	6.786	0.001	6.786	1.015	27.598
BS	8.285	8.625	5.972	10.098	5.972	10.098	1.237	-1.191

EPS: *Earnings per share*; NIM; *Net Interest margin;* LQR: *Liquidity Ratio; LDR: Loan-to-deposit ratio; BS: Bank Size.*

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Multi-collinearity Test of bank liquidity and bank performance

All the values of the variables were at 1, which shows that there was no multicollinearity among the variables. The independent variables were therefore highly correlated with one another. This implies that the regression results are reliable for policy implications (Table 3).

Table 3: Multi-collinearity Test of bank liquidity and bank performance

Variables	VIF
Bank Size	1.000
Earnings per share	1.000
Loan-to-deposit ratio	1.000
Liquidity Ratio	1.000
Net Interest margin	1.000

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Reliability Test of bank liquidity and bank performance

The explanatory variables were able to explain the earnings per share at 0.429 and 60.1% after adjustment. Also, net interest margin was explained by explanatory variables at 0.518 and 36.6% after adjustment (Table 4).

Table 4: Reliability Test of bank liquidity and bank performance

	R-square	R-square adjusted
Earnings Per Share	0.429	0.601
Net Interest Margin	0.518	0.309

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F-square of bank liquidity and bank performance

The F-square shows the size of effect of the explanatory variables on the dependent variables. Bank size had a strong effect on earnings per share at 0.31% and net interest margin at 0.60 units (Table 5). Liquidity ratio had a strong effect on net interest margin at 0.41% and fair at 0.20 units for earnings per share. Loan-to-deposit ratio had a moderate effect on 0.30% and 0.30% (Table 5).

Table 5: F-square of bank liquidity and bank performance

	Bank Size	Earnings Per Share	Liquidity Ratio	Loan-to-Deposit Ratio	Net Interest Margin
Bank Size		0.312			0.601
Earnings Per Share					
Liquidity Ratio		0.206			0.416
Loan-to-Deposit Ratio		0.310			0.301
Net Interest Margin					

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Model Fitness of bank liquidity and bank performance

The Standardized Root Mean Square Residual (SRMR) value for the estimated model was 0.102, which, although was slightly above the recommended threshold of 0.08, indicated a moderate model fit rather than a perfect one (Table 6). This suggests that the discrepancies between the observed and predicted correlations are minimal but could be further improved. The Unweighted Least Squares discrepancy (d_ULS) value of 0.128 and Geodesic discrepancy (d_G) values of 0.660, respectively, imply that the model's estimated parameters reasonably approximate the observed data, confirming that no severe distortion exists in the model structure. The Chi-square statistic of 131.753 reflected the degree of difference between the observed and expected covariance matrices; while a lower value would indicate a better fit. This result still falls within an acceptable range for complex models. (Table 6). The Normed Fit Index (NFI) value of 0.459 was below the commonly accepted threshold of 0.90, suggesting that although the model captures some of the relationships among variables, there is limited improvement over the null model. Overall, the fitness indices collectively demonstrate that the model exhibits a moderate level of goodness-of-fit, implying that while the model is statistically sound, and further refinement may enhance its explanatory power (Table 6).

Table 6: Model Fitness of bank liquidity and bank performance

	Saturated model	Estimated model
Standardized Root Mean Square Residual	0.000	0.102
Unweighted Least Squares discrepancy	0.000	0.218
Geodesic discrepancy	0.000	0.660
Chi-square	-0.000	131.753
Normed Fit Index	1.000	0.459

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Path Coefficient of bank liquidity and bank performance

Bank size had positive significant effect on earnings per share. Loan-to-deposit ratio had positive significant effect on earnings per share. Bank size, liquidity ratio, and loan -to-deposit ratio had positive insignificant effect on net interest margin. Liquidity ratio had positive insignificant effect on earnings per share (Table 7). The findings indicate that larger banks in Nigeria are better positioned to enhance shareholder value, as their size allows for economies of scale, diversification, and stronger earning capacity, which translate into higher earnings per share. Also, the positive effect of the loan-to-deposit ratio on earnings per share indicated that banks efficiently converting deposits into loans can generate stronger interest income and profitability. The findings align with the Liquidity Management Theory (Table 7) which depicts the importance of maintaining adequate liquidity to enhance a bank's stability and performance. Larger banks, with stronger asset bases are better positioned to manage liquidity efficiently, enabling them to generate higher earnings per share. Inclusively, a higher loan-to-deposit ratio reflects effective liquidity utilization, supporting profitability while the insignificant effects on net interest margin suggest that liquidity management contributes more to overall earnings stability than to interest income specifically (Table 7).

CONCLUSION AND RECOMMENDATION

Larger banks are able to leverage their scale, widen market coverage and resource base to improve efficiency and profitability, ultimately enhancing shareholder returns.

Banks that effectively transform deposits into loans are better positioned to generate interest income and sustain profitability.

These findings emphasize the importance of growth strategies and prudent lending practices in driving shareholder wealth maximization.

It is recommended that banks pursue deliberate expansion strategies that strengthen their asset base and enhance operational efficiency, thereby improving their overall performance and market competitiveness.

Bank management should also implement robust credit policies to ensure that deposits are efficiently converted into loans, while minimizing default risks through proper monitoring and risk assessment frameworks.

Regulators are encouraged to support policies that promote healthy competition and financial stability, ensuring that growth does not compromise asset quality.

Table 7: Path Coefficient of bank liquidity and bank performance

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/ STDEV|)	P values
Bank Size -> Earnings Per Share	0.109	0.110	0.051	2.130	0.033
Bank Size -> Net Interest Margin	0.025	0.029	0.053	0.474	0.635
Liquidity Ratio -> Earnings Per Share	-0.080	-0.071	0.100	0.798	0.425
Liquidity Ratio -> Net Interest Margin	-0.127	-0.106	0.125	1.016	0.310
Loan-to-Deposit Ratio -> Earnings Per Share	-0.101	-0.104	0.036	2.830	0.005
Loan-to-Deposit Ratio -> Net Interest Margin	-0.026	-0.018	0.071	0.361	0.718

Author's Compilation, 2025

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