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LIQUIDITY MANAGEMENT AND QUOTED DEPOSIT MONEY BANKS FINANCIAL PERFORMANCE IN NIGERIA

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A B S T R A C

Liquidity Management is one of the most important duties in any company and thus it cannot be overlooked. Sound liquidity management is integral for financial institutions stability and profitability since deteriorating liquidity management is the most recurrent cause of poor financial performance. The aim of this study is to empirically explore the relationship between liquidity management and financial performance of listed deposit money banks in Nigeria. Panel data of the liquidity management and return on equity were collected from the annual report of eight listed international banks on Nigerian Exchange Group from 2010-2020. Ordinary least square regression analysis, Augmented Dickey Fuller Unit root test, Johansen co-integration test, lanrange multiplier test, error correction model were used in analyzing the data. The results indicate that liquidity management significantly relates to return n equity. The study there conclude that there is a strong positive relationship between liquidity management and financial performance and recommend that central bank Nigeria should critically review and follow-up or monitor the effectiveness of liquidity policy tools in banks and where necessary, appropriate sanctions placed on erring banks to ensure effective implementation of these policy tools in an attempt to achieve desired liquidity level.

K E Y W O R D S

Liquidity, financial performance, return on equity, banks, Nigeria.

Introduction

Long but large, a sound financial statement system is indispensable for a healthy and thrilling economy. The performance of any economy is to largest extant dependent on the performance of the banking sector (Lucky & Nwosi, 2015; Musgoki & Kadaso, 2021; Uremadu, 2022; Wilner, 2023). The African banking system and regulation relative to other parts of the world shows that the banking environment (encompassing depth, efficiency, penetration, innovation and competition) as well as regulation and supervision standards is relatively shallow and less penetrated. The difficulties in creating borrowers'

ability and willingness to repay, and lack of legal support for creditor rights limit banks' lending schemes, which contributes to shallow financial development. For example, in East and West Africa, the percentage of adults in public credit registry remains low on average, accounting for less than 1% and 3% of adult population respectively. Besides, in Africa, there is also low financial penetration less than a quarter of sub-Saharan Africa's population has access to a formal bank account. This indicates that; there is less financial inclusion particularly in low income communities and "the degree to which private individuals can access financial services is limited. In sub-Saharan Africa, only 21% of the adult population has bank account which is the lowest level of financial penetrations (Olagunju; Adeyanju & Olabode 2016; Kehinde, 2023).

Admassn and Asayehgn (2020) and Ibe (2023) stated that at present day, Nigerian banking sector is in a rudimentary and fragile state. It is relatively under developed, small, closed and characterized by a huge share of state/individual ownership. The financial intermediation level in Nigeria is very low, partially due to the public's lack of confidence in the banking sector. Besides, the problem of non-performing loan is wide spread among state owned banks in the early 1990s that contributed for their insolvency. It is also identified that the major determinants that led banks to insolvency were ineffective supervision, mismanagement and political interference with credit decisions. To date, through different reforms have been made by the government, the banking sector, yet is not competitive and efficient, nor is it capable of accelerating the economic growth of the country which remains marginal. In the Nigerian banking sector, loans are not priced competitively by taking into consideration the risk of the borrower and the return of the loan to the lending bank. This practice inevitably denies capital to efficiency firms and contributes to the build-up of non-performing loans in the state/individual owned banks portfolio (Admassu & Asayehgn, 2014; Nwaiwu, 2019). Nada (2012) cited in Muhabie (2015), the banking sector is affected by the global financial crisis. He argued that this crisis produces many adverse effects towards banks. Some to mention, stagnation of the sector, decline in profitability, increased of the non-performing assets and loans, past due receivables, loan loss provision and deterioration of other key indicators of banks' performance. Furthermore, the financial performance analyses were made by different previous researchers on long aged banks by giving less attention for the banks that were emerged latter periods.

A number of empirical studies have consequently looked at the relationship between asset quality and financial performance. Empirical studies in this area include the works of Bassey and Moses (2015); Paulimo and Mwamba (2018), Nwaiwu and Joseph (2021). These empirical studies argue that there is a positive relationship between asset quality and financial performance. On the other hand, the findings Edem(2017), Paulimo and Musanba (2018) contract most of the earlier evidence on the impact of asset quality on financial performance. However, not only did these studies yield conflicting results and conclusions, perhaps due to the methodologies adopted in analyzing their research data, but more importantly, the time frame considered in many of them was rather short. Above all, the contexts of these empirical studies were different from Nigeria. These observed limitations have left a trial on knowledge gap in the literature, thus warranting the need for a more systematic examination of the relationship between asset quality and financial performance from the standpoint of Nigeria. This underscores the need for these empirical studies.

The remainder of this paper is organized as follows. Section 2 provides a review of the related literature, research question and hypothesis. Section 3 discusses the research methodology, section 4 presents the

results and discussion, section 5 wraps up the paper with conclusion and recommendation, limitation and suggestion for further study.

Theoretical Framework

The theoretical framework is generally seen as bedrock on which knowledge is constructed for research work. It provides a platform for understanding and guiding the discussions that underlie the study. In this study, the following theories formed a platform on which the empirical study is placed.

Liability Management Theory

This liquidity theory holds that it is unnecessary to observe traditional standards since reserve money can be borrowed or obtained in the money market using short term debt instruments whenever a bank experiences reserve deficiency. According to Adeyinka(2014), it does not mean that the bank manages only its liabilities and passive with respect to its assets (Agbada & Osaji, 2013; Kehinda, 2023).
Rather, the theory continues to recognize that the asset structure of the bank has a prominent role to play in proving the bank with liquidity. But the theory takes a one dimensional approach to liquidity and argues that the bank can also use its liabilities for liquidity purposes. A bank wants liquidity for deposit withdrawal purpose and also to meet the reasonable loan requests to its customers. Not only are bank loan profitable but a bank that won't grant loans to its depositors when they need funds is not likely to keep those depositors for very long.

Buffer Theory of Capital Adequacy

Buffer Theory of Capital Adequacy as propounded by(Calem and Rob, 1996) theorized that capital adequacy ratio constrains profitability of banks and that regulators make banks hold a buffer of excess capital to reduce the probability of failure. The theory explained that under the legal capital requirements, a bank approaching regulatory minimum capital ratio might have incentive to boost capital and reduce risk in order to avoid the regulatory costs triggered by a breach of the capital requirements. The theory expounded that banks may prefer to hold a „buffer of excess capital to reduce the probability of falling under the legal capital requirements, especially if banks capital adequacy ratio is very volatile. The theory posited that poorly capitalized banks might be tempted to take more risk in the hope that higher expected returns will help them increase their capital while the aggressive banks may try to extend the frontiers of imprudent management policy" by operating with less capital base in violation of the regulatory guidelines. This theory is relatively relevant to the Nigerian banking sector in which capital requirements constitute the main banking supervisory instrument. And where the Central Bank of Nigeria usually conducts on-site examination or at times delegates this task to external auditors to exert regulatory pressure on banks to achieve the objective of the capital adequacy ratio which Rime (2001) explained is to force banks internalizing losses and decreasing moral hazard.

Shiftability Theory

The theory assumes that assets need not be tied on only self-liquidating bills, but also held in other shiftable open-market assets, such as government securities (Moti, Masinde &Mugenda, 2012). It must be noted that the shiftability theory did not replace the commercial loan theory or made it to be invalid. Instead, the shiftability theory took a more general view of the banking business by broadening the list of assets deemed legitimate for bank investment. The stability theory does not say that commercial

loans are not the only appropriate asset. The ability to shift its assets to someone else at a predictable price. Thus, for example, it would be quite acceptable for a bank to hold short-term open market investments in its portfolio of assets. The shiftability theory, profound effect on banking practices can hardly be denied.

What it did, basically was to redirect the attention of bankers and the banking authorities from loans to investments as a source of bank liquidity. Indeed, proponents of the theory argued that the liquidity of short-term, commercial loans was largely fictional in any case. According to Kargi (2011), as with the commercial loan theory, however, the shiftability theory contained a serious flaw. The defect of the theory was simply this: Although one bank could obtain needed liquidity by shifting is assets, the same thing was not true of all banks taken together.

Financial Performance

Financial performance in an organization demonstrates the proficient use of resources and the organization capacity to generate profit. It is of considerable interest to stakeholders, including customers, payables, shareholders, government and mangers in that it shows shareholders the return on capital invested, return on assets, return on equity, earnings per share and profit after tax, send signals to customers of the organization capacity to meet their needs, shows government the capacity of the organization to pay its tax; and shows mangers the value of their effort and human capital invested in the organization (Zhang, 2012; Lucky, Nwosi, 2015).

Return on Equity

Return on equity shows the profitability to shareholders of the firm after all expenses and taxes (Van,Horne&Wachowicz, 2018). It measures the amount the firm is earning after tax for each naira invested in the firm. In other words, ROE is net earnings per Naira equity capital. It is also an indicator of measuring managerial competence (Rose, 2017). Higher ROE means better managerial performance; however, a higher return on equity may be due to debt (financial leverage) or higher return on assets. Financial leverage creates an important distinction between ROA and ROE in that financial leverage always expands ROE. This will always be the case as long as the ROA (gross) is greater than interest rate on debt (Olaganja; Adeyanju & Olabode, 2016). Usually, there is higher ROE for high growth companies.

Musgoki and Kadubo (2021), Pouded (2022) published his work that ROE was used extensively for measuring whether value was being created for shareholders. The reason behind the adoption of ROE as a measure was that it gave more reliable results than earnings per share (EPS) (Reimann, 2019). As it is important to consider how investors value the shares of a company, (Reimann, 2019) considered a number of strategy consulting firms and found that they focus their measurements on the spread between ROE and the cost of equity. If the spread is positive, it indicates that a company has advantageous growth opportunities. Reimann (2019) also identified changes to accounting conventions (policies) as being a problem when using ROE as a performance measure. It was also recognized that financial measures such as ROE may be too short-term and that longer-term measures, perhaps more qualitative, must be adopted as well. Reimann (2019) found that ROE still left 66 percent of the variation in share prices unexplained, indicating a large degree of unreliability.

Another problem with the use of ROE, as identified by (Finegan, 2015) is that it does not consider the timing of cash flows. For that reason, the free cash flow model is often cited as a better means to determine whether shareholder value is being created. Finegan (2015) also stated that investors 'go far beyond earnings in evaluating performance'. Therefore, the managers of a company cannot rely on earnings figures alone to measure performance, unless they want to wait for investors' reactions to see how they are performing. Copeland, Koller & Murrin (2016) argue that ROE is a short-term performance measure and that too much focus on it can lead a company to overlook long-term growth opportunities that might increase shareholder value. A company may also be able to improve its ROE, while at the same time earning a return that is below its weighted average cost of capital (WACC), and thereby destroy value (Poudel, 2022)

Empirical Review

Wilner (2023). Capital adequacy ratio and banking risks in the Nigeria money deposit banks. The study empirically examined the relationship between capital adequacy and banking risk. A sample of twelve banks out of twenty banks in the Nigeria banking industry were studied from 2017-2021 periods. The study employs multiple regression, serial correlation and multicollinearity based on Durbin Watson result to analyse data. It also adopts value to risk to estimate capital adequacy ratio of banks. This means when risk level rises, capital adequacy ratio falls in the Nigeria banking industry. The study recommends that Nigeria should adopt a risk based approach in the management of capital instead of using paid-up capital and retained earnings as currently proactive, hence there is a significant relationship between capital adequacy ratio and banks risks. It also recommends that banks should adopt pragmatic approach as increase in deposits does not necessary result in increase in capital adequacy ratio so as to guarantee the safety and security of depository.

Uremadu (2022), study the impact of asset quality on bank performance: The case of Egypt. The study investigates the impact of asset quality on cost of intermediation and profitability of Egyptian banking industry. Using a sample of 28 banks consolidated from financial statements and micro finance data from world bank indicators (WBI) between 2016-2020 period, the empirical study employed two alternative measures of asset quality and profitability variables. The profitability variables uses return on asset (ROA) and return on equity (ROE), while asset quality variables were loan and advance and capital adequacy. The empirical analyze cross-sectional and time series data using cross-section and panel data estimators and then present the generalized method of moments (GMM) estimator. Finding indicates that capital adequacy variable (capital/assets), loan and advance has a positive and significant impact on return on assets and return on equity. The overall empirical results support the central bank efforts to enforce asset quality towards improving the performance of the banking sector in Egypt. The empirical study recommend that higher capital requirements, reduction in implicit cost and increase in size of banks leads to banks profitability in the post-regulation period.

Mohammed etal (2015), Kioko, etal(2017), study capital adequacy and banks profitability: Empirical evidence from Nigeria. The study investigates the impact of capital adequacy on banks profitability of domestic and foreign banks in Nigeria. It combines the use of 518 questionnaire administered to bank staff with a response rate of 76% basically to obtain primary data and published financial reports of studied banks between the 2016-2020 periods. The study use survey design in line cross-sectional research design. It also uses linear regression to analyze the primary data and panel data to analyze the secondary data analyzed revealed a positive and significant relationship between capital adequacy and

profitability of banks. This simply means that capital adequacy is important in the determination of banks profitability in the Nigerian commercial banks. Findings, also revealed that capitalization and profitability are indictors of bank risk management efficiency and cushion against losses not covered by current earnings. The study recommends that the regulatory authorities should ensure the sustainability of the gains of banking sectors reforms. They recommend further that mere risk management framework should be drawn as this will have positive effect on banks profitability in the Nigerian banking industry.

Deborah (2020), DGL(2023). The role of capital requirements on bank competition and stability: The case of Kenyan banking industry. The study investigates the role of capital requirements on banks competition and stability in Kenyan for 2020-2021 periods. The study estimates the fixed effects panel regression model for the 36 commercial banks operating in the Kenyan banking industry suing Lerner Index and Panzar and Rosse H-statistics as a measure of competition. The study use return on equity to capture bank performance and stability and the estimation results shows a positive relationship supporting the evidence that capital regulation improves the overall financial stability and performance of banks. Findings from the study also indicate that the panel estimates shows significant non-linear effect of core capital on competition. The log of core capital is positive and significant while squared log of core capital is negative and significant. This however means that an increase in core capital reduces completion up to a point and then increases competition indicating that the benefits of increasing capital requirements on competitiveness will yield benefits once banking sector consolidation start. Okofor., Ikechukwu and Adebimpe (2020), study the effect of capital adequacy on banks performance. The empirical study analyses the impact of banks capital adequacy on earnings and profitability of banks in Nigeria using panel data of sample 10 strong and 10 weak banks between 2010-2013 periods. The study uses least square Dummy variables (LSDV) model to estimates the variables. Findings show that bank earnings is invariants to factors such as bank assets and bank size but highly driven by liquidity and capital adequacy. They recommended that the consolidation of bank's capital base was right and suggest more robust and strategic regulatory framework in the effective management of liquidity and bank capital base to share-up bank performance in Nigeria.

Hieffeman and Fu (2022), investigate the impact of capital adequacy requirements on performance of scheduled commercial banks. The study compares the performance measured in terms of return on assets (ROA) of public sector banks and Indian private banks with foreign banks operating in India and capital of risk weighted assets ratio (CRAR), non-interest income (NII) and net interest margin (NIM). The study scope is on schedule commercial banks in India (excluding Regional rural banks) over the period 1997-2007. Using the least square Dummy variable (LSDV) model, findings indicate that capital adequacy ratio increases the profitability of scheduled commercial banks in India. This support other studies findings that adequate capitalized banks face low cost of going bankruptcy. The findings also suggest that in a market driven economy, the studied commercial banks net interest margin is under pressure and have to devise other sources of income to remain relevant in the market. The study recommends that banks should enhance customer's confidence by maintaining (retaining) and increasing the capital risk weighted assets ratio (CRAR) to the minimum of 9 percent as prescribed by RBI. This is because maintaining adequacy level of CRAR reduces the risk of depositors.

This study seeks to offer answer to question about liquidity management and n performance specifically, the study to seek to provide answers to the following research question.

RQ_1: What is the nature of relationship between liquidity management and return on equity of listed deposit money banks in Nigeria?

The above research question land to the following hypothesis.

H_{01}: There is no significant relationship between liquidity management and return on equity of listed deposit money banks in Nigeria.

Methodological Analysis

The research design applied is causal comparative design which attempts to identify the cause – effect relationship between two or more variables. The study is to explore the causal relationship between liquidity management and listed deposit money banks financial performance and the study made use of panel data sourced from the annual reports of the 8 listed deposit money banks in the Nigerian Exchange Group (NXG) over the period of 2010-2020.

Model Specification

The model specification in this study is this study based empirical study on the relationship between liquidity management and listed deposit money banks financial performance. Consequently, the model specifications were formulated in the following functional forms as:

$ROE_{it} = f(LQM_{it})$ (i)

Expanding into the mathematical model as follows:

$ROE_{it} = \beta_{oit} + \beta_1 LQM_{it}$ (ii)

Transforming equation II to econometric model as;

$ROEit = \lambda_{oit} + \lambda_1 LQM_{it} + \mu_{it}$ (iii)

Where:

ROE_{it} = Return on equity within the period of study

LQM_{it} = Liquidity Management within the period of study

β_{oit}, λ_1 = Coefficient of the independent variable to the dependent variable within the period of study.

μ_{it} = Error Term within the period of study

it = P within the period of study

Apriori Expectation.

Return on equality are employed as a proxy to measure the dependent variable which is financial performance while interacting with the independent variable liquidity management. In summary, the apriori expectation were stated as follows:

$$\frac{\delta LQM_{it}}{ROE_{it}} > O$$

Statistical tools

The estimation techniques used to test the relationship between the variables are ordinary least square regression analysis, Augmented Dickey Fuller unit Root test, Johansen co-integration test, likelihood ratio test, Hausman specification test, Lagrange multiplier test and Error correction model with the aid of E-view statistical package version 12.

Results and Discussion

The following results reveal the relationship between the dependent and independent variable in this study as specified in the regression models.

Descriptive Statistics

Table 1 Descriptive statistics of pooled values of return on equity and liquidity management for 8 listed international deposit money banks over the period f 2010-2020.

Table 1: Descriptive Statistics of Pooled values of Return on Equity (ROE), and Liquidity Management Ratio (LQM), for all 8 quoted international deposit money banks over the period of 2010 to 2020

	ROE	LQM
Mean	0.098864	1.456647
Median	0.070000	1.335000
Maximum	0.860000	4.280000
Minimum	0.020000	0.230000
Std. Dev.	0.106008	0.586699
Skewness	4.713944	1.840555
Kurtosis	32.26953	8.728759
Jarque-Bera	3467.164	170.0206
Probability	0.000000	0.000000
Sum	8.700000	128.1849
Sum Sq. Dev.	0.977686	29.94680
Observations	88	88

Liquidity Management Ratio (LQM) shows an average value of 1.46. This means that, the deposit money banks manage liquidity properly. The low standard deviation value of0.5867 shows that, the Liquidity Management Ratio (LQM) of the industry has undergone mild changes overtime. The positive skewness coefficient of1.84shows the tendency of the Liquidity Management Ratio (LQM) of deposit money banks to increase overtime, while the Kurtosis value of8.73 shows a large rate of increment in the LQM position of the selected international deposit money banks. The normality test probability value of 0.00000 is observed to be less than the 0.05 (5%) significance level shows that the trend of the CAR is not normally distributed.

Graphical Representation of Trends

To further enable the visualization and appreciation of the study data, the graphical trends of employed variables are presented below as follow;

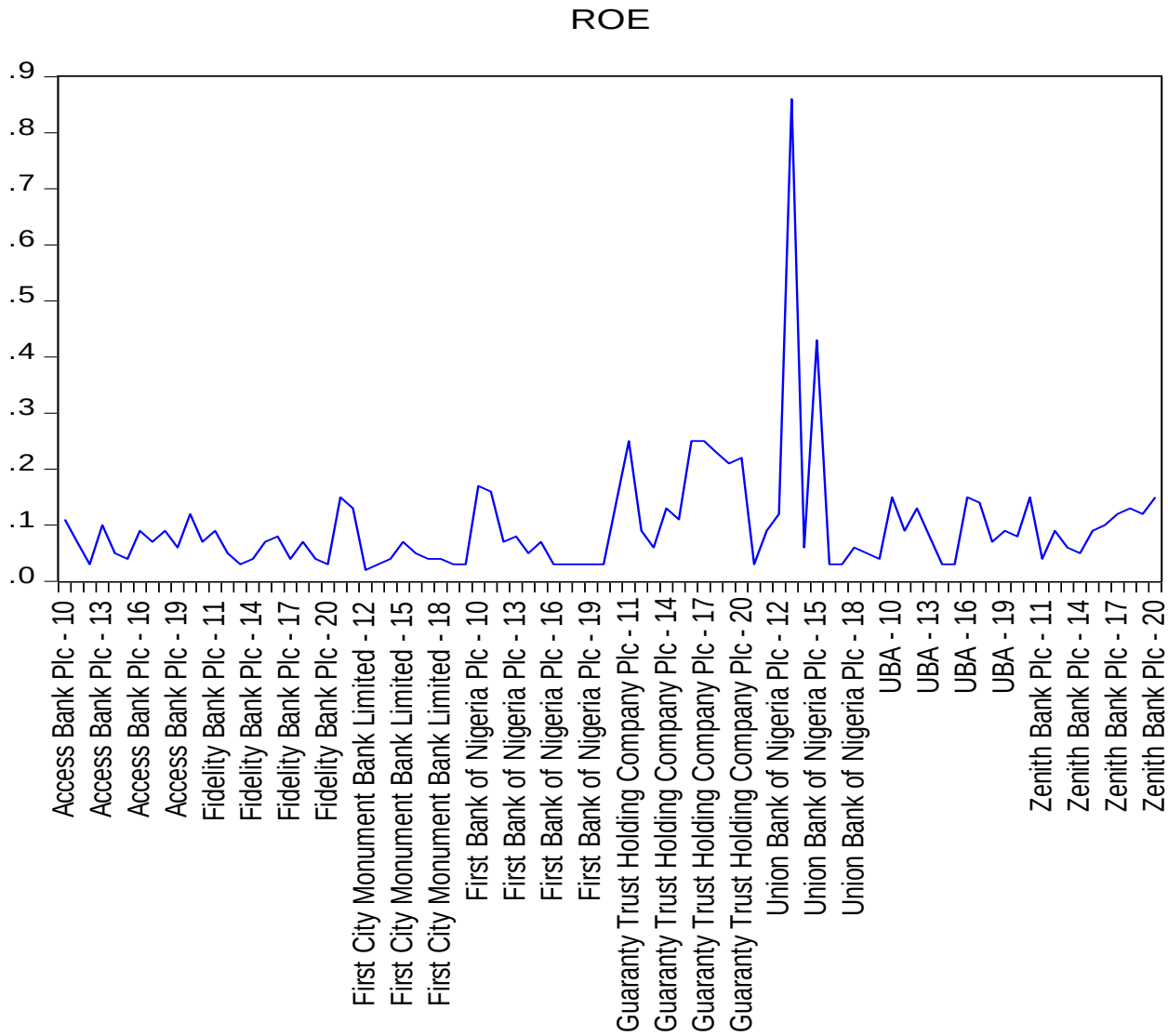

Figure 1: Pictorial Representation of the Panel trend of Return on Equity (ROE) of sampled 8 quoted deposit money banks in Nigeria. From Figure 1 above, it can be observed that only one quoted deposit money banks significantly outperformed the market in terms of the return on equity which is Union Bank Plc (being the modal ROA), while other companies that performed around the market mean. Overall, the firms are visually observed/seen to have fluctuating return on equity.

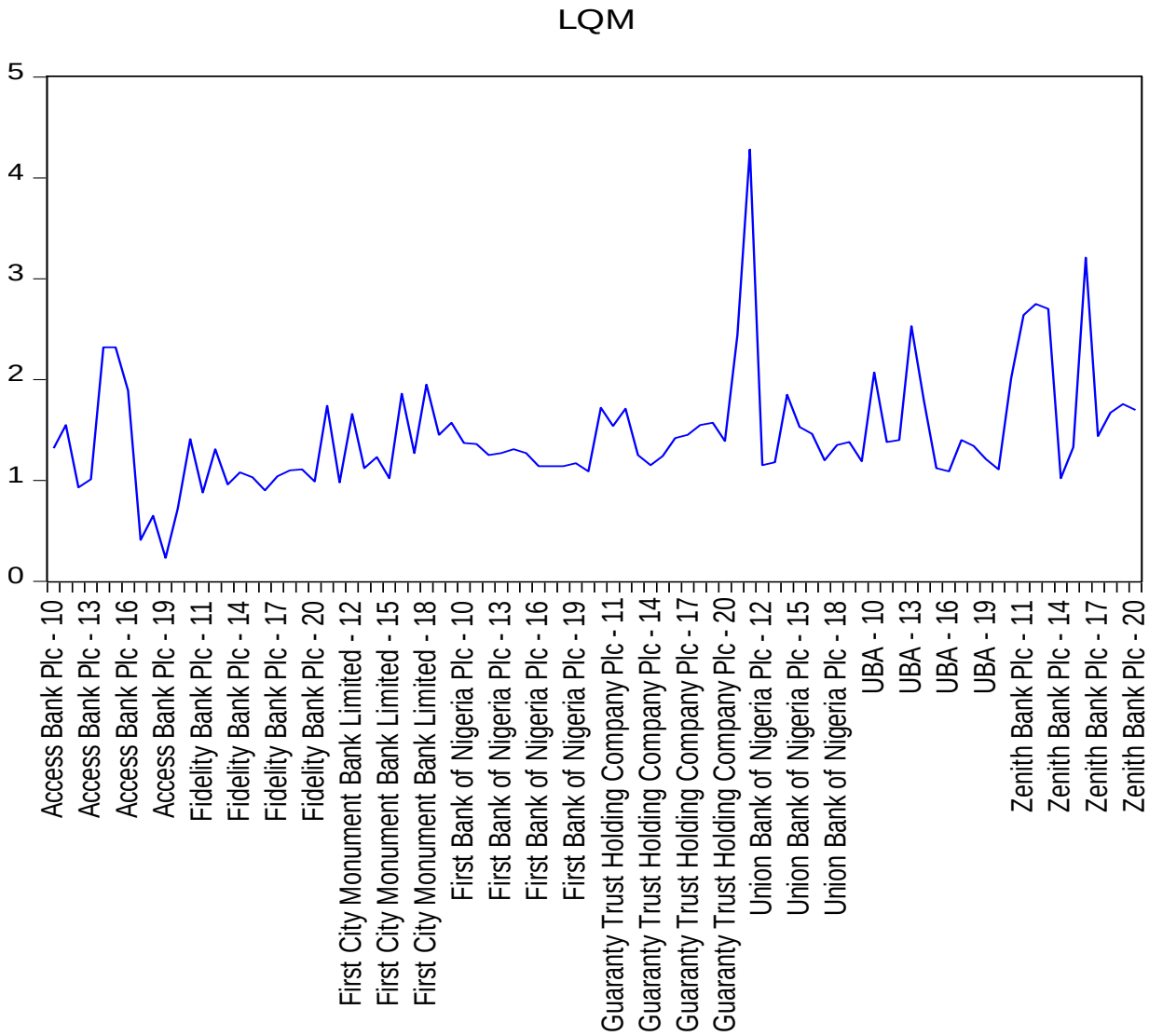

Figure 2 Pictorial Representation of the Panel trend of Liquidity Management Ratio (LQM) of sampled 8 quoted deposit money banks in Nigeria. For the Liquidity Management Ratio (LQM), only two outliers are observed as attributable to Union Bank Plc and Zenith Bank Plc which can be seen to have better LQM structure than the industrial average as seen from Table 2. Other companies on this list are observed to expend on LQM around the industry mean.

Pooled Effect (Model 1)

To evaluate the nature of short run relationship between employed variables using a single constant parameter across the various cross-section, the pooled effect is presented as follows;

Model 1: Return on equity Equation (ROE)

Table 2: Pooled Effects Regression Output for Model 1–Return on equity Equation (ROE)

Dependent Variable: D(ROE)
Method: Panel Least Squares
Date: 02/4/22 Time: 08:57
Sample: 2010 2020
Periods included: 11

Cross-sections included: 8
Total panel (unbalanced) observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.236831	0.494621	9.153632	0.0000
D(LQM)	-1.09E-07	3.37E-07	-0.455341	0.5473

R-squared	0.373395	Mean dependent var	7.530775
Adjusted R-squared	0.343700	S.D. dependent var	10.59331
S.E. of regression	10.51333	Akaike info criterion	7.559771
Sum squared resid	73541.79	Schwarz criterion	7.504350
Log likelihood	-3451.391	Hannan-Quinn criter.	7.573145
F-statistic	0.375757	Durbin-Watson stat	0.940150
Prob(F-statistic)	0.717173		

Table 2 above shows the pooled effect of the third model (Return on equity). The R-Square value of 0.373395 shows that, in this effect, all employed predictor variables such as capital adequacy ratio (CAR), liquidity management ratio(LQM, account for only 34.37% of variations in the dependent variable i.e. financial performance as measured using the Return on equity of the sampled 8 deposit money banks. The Durbin-Watson Statistics value of 0.940150 is seen to be very low and shows positive serial correlation which is bad and shows overlap between the trends of the employed predictor variables. The F-statistics value of 0.375757 at a probability value of 0.717173 which is greater than the 0.05 significance level shows a weak model. From the coefficients and significance level, the study observes that; Capital Adequacy Ratio (CAR) shows a positive (7.77E-05) but insignificant (0.4445> 0.05) influence on the Return on equity of sampled deposit money banks over the study period, which means that, a unit increase in Capital Adequacy Ratio (CAR) is likely to have a 7.77E-05 unit increase in ROE. Liquidity Management Ratio (LQM) shows a negative (-1.09E-07) and insignificant (0.5473> 0.05) influence on the Return on equity of sampled deposit money banks, which shows that, a unit increase in Liquidity Management Ratio (LQM) is likely to have a -1.09E-07 unit decrease in ROE.

Fixed Effect (Model 1)

Effects are fixed if they are interesting in themselves or random if there is interest in the underlying population. Therefore, the fixed effect seeks to evaluate the model considering each case (deposit money banks effect). This is therefore presented as follows;

Table 3. Fixed Effects Regression Output for Model 1 – Return on equity (ROE).

Dependent Variable: D(ROE)
Method: Panel Least Squares
Date: 02/4/22 Time: 08:45
Sample: 2010 2020
Periods included: 11
Cross-sections included: 8
Total panel (unbalanced) observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.734016	0.456544	17.46165	0.0000
D(LQM)	6.56E-07	1.64E-04	0.357103	0.7321
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.666566	Mean dependent var		6.630766
Adjusted R-squared	0.637641	S.D. dependent var		10.57331
S.E. of regression	6.014334	Akaike info criterion		7.101703
Sum squared resid	37167.76	Schwarz criterion		7.564614
Log likelihood	-3334.567	Hannan-Quinn criter.		7.367147
F-statistic	6.016753	Durbin-Watson stat		1.633136
Prob(F-statistic)	0.000000			

Table 3 above shows the fixed effect of the third model (ROE). The R-Square value of 0.666566 shows that, in this effect, employed independent variables (i.e. Liquidity Management Ratio (LQM), account for only 66.66% of variations in the dependent variable i.e. financial performance as measured using the Return on equity of the sampled 6 deposit money banks. The Durbin-Watson Statistics value of 1.633136 is seen to be within the relevant range and therefore shows the presence of negative serial correlation which is acceptable. The F-statistics value of 6.016753 at a probability value of 0.000000 which is less than the 0.05 significance level and therefore shows a viable model. Liquidity Management Ratio (LQM) shows a positive (6.56E-07) and insignificant (0.7311> 0.05) influence on the Return on equity of sampled deposit money banks, which shows that, a unit increase in Liquidity Management Ratio (LQM) is likely to have a 6.56E-07 unit increase in ROE. The fixed effect results cannot be accepted without the diagnosis test, which will enable the determination of the optimal effect. We therefore proceed to the next effect (Random Effect).

Random Effect (Model 3)

Random effects models will estimate the effects of time-invariant variables.

Table 4 Random Effects Regression Output for Model 3 – Return on equity (ROE).

Dependent Variable: D(ROE)
Method: Panel EGLS (Cross-section random effects)
Date: 02/4/22 Time: 07:46
Sample: 2010 2020
Periods included: 11
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.637747	0.777333	7.737177	0.0000
D(LQM)	5.43E-07	1.73E-07	0.276767	0.7666
Effects Specification				
			S.D.	Rho
Cross-section random			7.132352	0.4420
Idiosyncratic random			7.014234	0.5570
Weighted Statistics				
R-squared	0.350462	Mean dependent var		2.770777
Adjusted R-squared	0.275747	S.D. dependent var		7.777755
S.E. of regression	7.006675	Sum squared resid		41274.71
F-statistic	0.074351	Durbin-Watson stat		1.651363
Prob(F-statistic)	0.777756			
Unweighted Statistics				
R-squared	-0.003273	Mean dependent var		7.620776
Sum squared resid	72754.74	Durbin-Watson stat		0.734502

Table 4 above shows the random effect of the third model (Return on equity). The R-Square value of 0.350462 shows that, in this effect, all employed predictor variables such as Liquidity Management Ratio (LQM), account for only 35.05% of variations in the dependent variable i.e. financial performance as measured using the Return on equity of the sampled 8 deposit money banks. The Durbin-Watson Statistics value of 0.734502 is seen to be very low and shows positive serial correlation. The F-statistics value of 0.074351 at a probability value of 0.777756 which is greater than the 0.05 significance level shows a weak model. From the coefficients and significance level, the study observes that; but Liquidity Management Ratio (LQM) shows a positive (5.43E-07) and insignificant (0.7666> 0.05) influence on the Return on equity of sampled deposit money banks, which shows that, a unit increase in Liquidity Management Ratio (LQM) is likely to have a 5.43E-07 unit increase in ROE The study cannot accept the result of this effect until we employ our diagnosis test to know if it is the optimal model. This therefore makes us proceed to the next effect (Fixed Effect).

Diagnostic test

It is improper to manually choose the optimal effect manually. Some diagnostic test have been created to enable research determine the best effect between the pooled, fixed and random effect. These test includes the Likelihood Ratio test, Hausman Specification Test, and the Lagrange Multiplier Test.

Likelihood Ratio Test (Compares Pooled and Fixed)

This test seek to select the best effect between the Pooled and Fixed effect. The null hypothesis supports the pooled effect.

Model 1: Return on equity (ROE)

Table 5: Likelihood ratio test output for Model 1 – Return on equity (ROE).

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	7.489563	(8,9)	0.0000
Cross-section Chi-square	433.647024	65	0.0000

Table 5 which shows the Likelihood ratio test shows a Cross-section F-statistics value of 7.489563 at a probability level of 0.000 which is less than the 0.05 (5%) significance level shows the rejection of the null hypothesis. This therefore shows that the best model is the fixed effect, which represents the alternate hypothesis in this case. This therefore shows that the fixed effect in light of the pooled effect is more superior.

Hausman Specification Test

This diagnostic test pits the random effect against the fixed effect. The null hypothesis in this case is the Random Effect. Therefore, a retained null supports the random effect, while a rejected null hypothesis supports the fixed effect.

Model 1: Return on equity (ROE)

Table 6: Hausman Specification Test output for Model 1 – Return on equity (ROE).

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.386492	4	0.0057

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LQM	-0.000000	-0.000000	0.000000	0.5474

Table 6 shows the Hausman Specification test which seeks to examine the most valuable effect between the random and fixed effect. The Cross-section random Chi-Square statistics value of 6.386492 at a probability level of 0.0057 which is less than the 0.05 significance level leads to the rejection of the

null hypothesis. This shows that the fixed effect remains the paramount effect in the model. The study therefore moves on to determine the long run effect using the fixed effect.

Lagrange Multiplier Tests (Compares Random to Fixed effect)

Table 7: Lagrange Multiplier Tests output for Model 1 – Return on equity (ROE).

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided
(all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	450.6159 (0.0000)	6.021546 (0.0056)	450.6545 (0.0000)
Honda	25.05940 (0.0000)	7.146110 (0.0019)	16.59465 (0.0000)
King-Wu	25.05940 (0.0000)	9.146110 (0.0025)	6.207052 (0.0000)
Standardized Honda	25.62127 (0.0000)	6.564644 (0.5402)	11.42569 (0.0000)
Standardized King-Wu	25.62127 (0.0000)	0.564644 (0.5402)	4.422665 (0.0000)
Gourierioux, et al.*	--	--	450.6545 (< 0.01)

*Mixed chi-square asymptotic critical values:

1%	7.289
5%	4.321
10%	2.952

Using the lag range multiplier test output in Table 7, it can be observed that all probability levels point to the significance of the fixed effect model. This therefore further reinforces the optimal nature of the fixed effect. The study will therefore proceed to subsequent test using the fixed effect technique so as to ensure that future results are valuable.

Error Correction Model (Model 3- Return on equity):

Table 8: Error Correction Model Summary for Model 1

Dependent Variable: ROE
Method: Panel Least Squares
Date: 02/4/22 Time: 08:49
Sample: 2010 2020
Periods included: 11
Cross-sections included: 8
Total panel (unbalanced) observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.624018	0.458544	16.46165	0.0000
LQM	8.15E-05	1.2E-05	6.205651	0.0000
ECM(-1)	-0.626421	0.120382	-5.228680	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.888586	Mean dependent var	8.620886
Adjusted R-squared	0.828641	S.D. dependent var	10.56321
S.E. of regression	8.014234	Akaike info criterion	8.101602
Sum squared resid	38188.68	Schwarz criterion	8.584614
Log likelihood	-2234.568	Hannan-Quinn criter.	8.286148
F-statistic	8.016853	Durbin-Watson stat	1.833128
Prob(F-statistic)	0.000000		

The above error correction estimate in table 8 shows that the Adjustment displays the expected negative sign based on its output of -0.626421, this signifies that the discrepancies between the short and long run can be adjusted backwards by approximately 62.64% annually towards maintaining equilibrium in both long and short run. The coefficient of determination (R^2) displays a value of0.888586 which shows that in the long run, the predictors variables jointly account for approximately 88.86% of variations in the criterion i.e. The level of Asset quality (ASQ) systems adequately captures the movement of employed criterion i.e. Return on equity. All variables were found to be statistically significant as deduced from the all their respective probability level which were lower than the 0.05 (5%) significance level. The f -statistics probability level of 8.016853 at a probability level 0.00000 which is less than the 0.05 (5%) significance level and shows a great fit of the linear panel model while the Durbin Watson statistics value of 1.833128is identified to be within the relevant range.

Hypotheses Testing

The t-statistics and probability level are used to test the significance of employed variables in the long run individual hypotheses stated in the null and alternate form as follows.

$H0_1$: Liquidity Management Ratio does not significantly relate to return on equity in quoted deposit money banks.

$H0_1$: Liquidity management ratio significantly relates to return on equity in quoted deposit money banks.

Utilizing the Error correction estimate in Table 6, it can be seen that the t-statistics coefficient of liquidity management ratio(LQM) of 6.205651 is greater than ±1.98/2and at the probability level of 0.0000 which is lower than the 0.05 significance level and therefore shows that this variable is statistically significant. The study therefore rejects the null hypothesis and accepts the null hypothesis that Liquidity Management Ratio (LQM) significantly affect Return on equity in quoted deposit money banks. Liquidity Management Ratio (LQM) shows a positive and significant (0.0000 < 0.05) influence on the Return on Equity of sampled deposit money banks, which shows that, a unit increase in Liquidity Management Ratio (LQM) is likely to have a 7.15E-05 unit increase in ROE in the long run. This empirical finding is consistent with several study findings. It include the works of Zainudi., Mahdzan and Leong (2018). It is in line with apriori expectation which infact projected significant effect on predictor and criterion sub-variables.

Conclusion and Recommendations

This study underpins with evidence the fact that there exist a strong positive relationship between efficient liquidity management and financial performance in terms of return on equity. Therefore the need for efficient management liquidity management in the banking industry cannot be over emphasized particularly for reasons of maximizing profit levels and concurrently remaining liquid. For the banking industry in Nigeria, there is the need to emphasize the need to remain liquid. The study buttresses the fact that efficient liquidity management can significantly influence returns n equity and as well relate positively to financial performance and thus its stability.

The high number of illiquid banks in the Nigerian banking industry as seen in recent times appears to attest to the fact that most banks in the Nigeria do not either place emphasis on strategic liquidity management or are deficient in it. Even though they may be efficient, most businesses in the Nigerian economy are transacted purely on cash basis such that managing liquidity effectively become cumbersome. Effective liquidity management creates good public confidence in the financial system of a country and good public confidence prevents a "run" on the banking system and consequently on the liquidity state of banks. Since economic laws and variables from this study and other related researchers have attested to the fact that there is correlation between efficient liquidity management and banking performance, the poor liquidity state of Nigerian banks could be hanged on management. Therefore, there is the need to formulate policies that will enhance effective liquidity management in the banking industry in Nigeria and the public usage of cash.

Below are the recommendation of the study:

i) The need to replace being practiced in the advance economies of the world. Investing on human capital may be beyond just employees but also frequently creating an interactive forum where bank clients could be sensitize on a variety of activities they indulge in that are capable of hindering effect liquidity management.

ii) The need to invest on human capital by banks as it offers the highest returns in terms of increasing performance and it also enhances the level of competence of the employee.

iii) Regulatory authority should put in place appropriate policy with compliance measures to check high volume cash transaction and cash hoarding prevalent in the economy. This is important because liquidity management is cumbersome and may be ineffective in an economy that operates solely on large volume of cash transaction or conducts a large proportion of its transactions in cash. The central bank of Nigeria should critically review and follow-up or monitor the effectiveness of liquidity policy tools in banks and where necessary, appropriate sanctions placed on erring banks. This may be so in order to ensure effective implementation of these policy tools in an attempt to achieve desired liquidity level while it may be true that CBN is effectively enacting and reviewing liquidity management tools such as the open market operation cash reserve requirement, liquidity ratios, monetary policy rate among as often been stated in the annual and economic reports, compliance by the beneficiary banks is not guaranteed as banks returns to the regulatory authority has been reportedly falsified over times.

Limitation and Suggestion for further studies

The findings of the current study are applicable only to eight international deposit money banks in Nigeria which were in operation as at December 2020 and therefore it is hard to generalize these findings to all financial institutions. Including microfinance banks and only return equity and liquidity management were used for this study. Further studies should adopt more variables spanning from 2020-2023.

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