Effect of Liquidity Management on Profitability of Commercial Banks in Nigeria

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Abstract

Introduction: Commercial banks in Nigeria are more engrossed with profit maximization and as such they tend to neglect the importance of liquidity management. This eventually leads to financial indebtedness and consequently low patronage and deposit flight.

Purpose: This study examined the effect of liquidity management on profitability of commercial banks in Nigeria using data obtained from the financial statements of tier 1 banks over the period 1998 to 2018.

Methodology: The study employed the correlational research design and engaged the Johansen test with the vector error correction model to access the long run and short run relationship among the variables.

Findings: The results of the Johansen test revealed at most two cointegrating equations among the variables, while result of vector error correction revealed a positive effect of liquidity on return on asset and return on equity but a negative effect on net profit margin. Results revealed a fairly stable trend in the liquidity and profitability indicators from 1998-2018 and concluded that banks controlled enough liquidity to serve their obligations.

Unique contribution to theory, practice and policy: The study recommends that the central bank of Nigeria should maintain the regulation over the minimum liquidity of commercial banks as this affects their profitability.

Keywords: *Liquidity, profitability, vector error correction model, commercial banks.*

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1.0   Introduction

Bank is an organization for floating the fund for the public and giving customer goods and securities on credit. Commercial banks are central in financing economic activities in the various sectors of the economy and are the most influential commercial institutions that play a very important role in economic development (Doan & Bui, 2021; Umoh *et al*., 2021). One of the several attributes that determine the extent of performance of banks is liquidity which significantly functions in the smooth operation of the organization. According to Onyekwelu *et al*. (2018) liquidity is the ability of bank to fund her contractual responsibility as at due time, it is the bank's ability to immediately meet cash, cheques, other withdrawals obligations and legitimate new loan demands while abiding by existing reserve requirements. The concept of liquidity management has caught the attention of several professionals in the financial sphere across the globe especially as a result of the present financial circumstances and the state of global economy. Insufficient liquidity is one of the major reasons for bank failures, holding liquid assets has an opportunity cost of higher returns. Liquidity management becomes more challenging as commercial banks in Nigeria are more engrossed with profit maximization and as such they tend to neglect the importance of liquidity management which eventually leads to financial indebtedness with the consequence of low patronage and deposit flight. Commercial banks in Nigeria are challenged with liquidity management despite the tremendous growth in the sector. The inefficient liquidity management resulted in reduced public confidence in the banking sector and increased financial disintermediation which led to the economic recession experienced in 2015 - 2016 in every sector of the economy in Nigeria (Ajao, 2018).

Profitability of a bank on the other hand entails the capability to generate income which surpasses liability (Olagunju *et al*., 2012). Potential investors are concerned with the bank dividend and the appreciation in market price of stock so they pay more attention on the profitability ratios. Low profit margin would discourage the investors from investing as such managers are interested in measuring the operating performance in terms of profitability so that effective management could be in place to build the confidence of the potential investors in order to ensure success and the survival of the banking business. Also, equity investors are more concerned with the bank's ability to generate, maintain and increase income, the stakeholders expect the banks to increase lending in order to give them maximum return in money invested while the depositors expect the banks to keep much idle cash in order to meet their demand (Ibbih, 2018).

Primarily, businesses exist to make profit, which is also the case for commercial banks but as good as profitability is, it cannot be achieved without optimum liquidity (Idowu *et al.*, 2017). Lack of adequate liquidity in a bank is often characterized by the inability to meet daily financial obligations. Commercial banks are at the risk of losing deposits which erodes its supply of cash and thus forces the institution into disposal of its more liquid assets. Studies that investigated the relationship between liquidity and profitability of banks, (Olagunju *et al*., 2012; Ibe, 2015; Idowu *et al*., 2017; Kurotamunobaraomi *et al*., 2017; Onyekwelu *et al*., 2018; Kajola *et al*., 2019;) established that commercial banks in Nigeria face liquidity management dilemmas. Umoh *et al.,* (2021) opined that managing monies of a firm in order to maximized cash availability and interest income on any idle cash is a function of liquidity management. Similarly, Uremadu, 2012; Lartey, 2013; Shahchera, 2012; Bordeleau & Graham, 2010, Saleem & Rehman, 2011

examined the effect of liquidity management on profitability established that liquidity management and profitability of commercial banks are two sensitive issues in the operations and established a significant relationship between profitability and liquidity.

Commercial banks have to strike a balance between liquidity and profitability so as to attain financial equilibrium that will put both goals at optimum level but they face liquidity management dilemmas such as identifying the ideal mix or balance of profitability and liquidity. Choosing whether to invest in income generating investments or to prioritise liquidity stability, identifying the relationship between profitability and liquidity (its significance on bank's performance, magnitude of the relationship as well as its direction), the effects of liquidity on bank's profitability and identifying the major triggers or causes of liquidity problems in commercial banks are persistent issues that require precise evidences for appropriate decision making. Therefore this study seeks to employ the vector error correction model (VECM) and add to the existing body of knowledge by investigating the effect of liquidity. Thus, widen the understanding of how liquidity affects bank profitability in Nigeria. Also, findings from this study will provide empirical evidence for government and finance managers to make medium and long term decisions that would ensure stability of banking operations across commercial banks in Nigeria.

2.0 Materials and Methods

2.1 Data Source

Data used for this study was derived from Nigeria Tier 1 banks financial statements from 1998-2018. The sample of this study was confined to the Tier 1 banks because their Tier 1 banks capital displays robust financial strength showing the bank's core capital including equity capital and disclosed reserves. The selected Tier 1 banks for the study were First bank, United bank of Africa, Guaranty Trust bank, Zenith bank and Access bank.

2.2 Specification of the Model

The VECM and simple linear relationship using Return on Assets (ROA), Return on Equity (ROE) and Net Profit Margin (NPM) as dependent variable and Current Ratio (CUR), Cash Ratio (CASR), Quick Ratio (QR) and Capital Ratio (CAR) as independent variables was employed. Following Fagboyo *et al.* (2018), the functional profitability model is then specified as;

ROA = f (CUR, CASR, QR, CAR) ………………. (1)

ROE = f (CUR, CASR, QR, CAR) …………...… (2)

NPM = f (CUR, CASR, QR, CAR) ……………….. (3)

Where

ROA = Return on Assets

ROE = Return on Equity

NPM = Net Profit Margin

CUR = Current ratio

CASR = Cash ratio

QR = Quick ratio

CAR = Capital Ratio

f = functional notation

While ''U'' (error term) was be introduced to take care of variables not included in the model but affects profitability. Following Thursby (2010), the log linear form of dynamic model of equation 1, 2, 3 is specified as;

$$l_nROA = \beta_0 + \beta_1 l_n\text{CUR} + + \beta_2 l_n\text{CASR} + + \beta_3 l_n\text{QR} + + \beta_4 l_n\text{CAR} + U \dots (4)$$

$$l_nROE = \beta_0 + \beta_1 l_n\text{CUR} + + \beta_2 l_n\text{CASR} + + \beta_3 l_n\text{QR} + + \beta_4 l_n\text{CAR} + U \dots (5)$$

$$l_nNPM = \beta_0 + \beta_1 l_n\text{CUR} + + \beta_2 l_n\text{CASR} + + \beta_3 l_n\text{QR} + + \beta_4 l_n\text{CAR} + U \dots (6)$$

2.3   Unit Root Test

The stationary conditions of the data was tested applying the Dickey–Fuller (1979) test. Dickey and Fuller stretched the procedure of their test proposing an augumented version that contained more lagged term of endogenous variable to eradicate the autocorrelation. Following Yusuf *et al.* (2020) is test is performed as follows;

$$\Delta Y_t = \alpha_1 + \alpha_2 t + \delta y_{t-1} + \sum_i^m \theta \ \Delta y_{t-1} + \varepsilon_t \ \dots\dots\dots\dots\dots\dots (7)$$

Y_t = time series aggregate to be tested,

t = time or trend variable,

ε_t = pure white noise error term,

Δ = first deference operator,

α_1 = constant term,

α_2 = trend parameter,

δ = the parameter to be tested

$\sum_i^m \theta \ \Delta y_{t-1}$ = ADF term which removes any possible autocorrelation between Δy_t and ε_t.

The hypothesis is stated as:

Null Hypothesis: Series is not stationary

Alternative Hypothesis: Series is stationary

For the null hypothesis to be rejected indicating stationarity, it is expected that the t-statistic has to be higher than the critical values.

2.4 Johansen Co-integration Test

The Johansen co-integration test was applied to find out if there exist long run relationship between the variables.

$$y_t = \alpha + W_0 X_t + W_1 X_{t-1} + W_2 X_{t-2} + \ldots + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

Where

Y_t = profitability value at time period (t)

α = intercept

X_t = liquidity variable

ε_i = stochastic error term

W_{0-n} = lag weight placed on liquidity values in different periods

The hypothesis is stated as:

Null Hypothesis: No cointegrating equation

Alternate Hypothesis: There is a cointegrating equation

For the null hypothesis to be rejected i.e. indicating a cointegrating equation, the Trace and Max Statistics must be greater than 5% Critical Value

2.5 The Vector Error Correction Model (VECM)

In the event of co-integration, a vector error correction model (VECM) is performed because of it advantage of including both long-run and short-run information of the model.

Thus, y, x ~ I(1)

Where;

Y = dependent variable (profitability)

X = explanatory variables (liquidity)

$Y_t = \alpha_0 + \alpha_1 X_t + U_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$

Linearly,

$\tilde{U}t + (Yt - \bar{\alpha}_0 - \bar{\alpha}_1 Xt) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$

Cointegration exists if $\tilde{U}t \sim I(0)$

Vector Error Correction Model is then specified as:

$$ROA_t = C_1 + \alpha_1 ROA_{t-1} + \alpha_1 CUR_{t-1} + \alpha_1 CASR_{t-1} + \alpha_1 QR_{t-1} + \alpha_1 CAR_{t-1} \ldots\ldots.. (11)$$

$$ROE_t = C_1 + \alpha_1 ROA_{t-1} + \alpha_1 CUR_{t-1} + \alpha_1 CASR_{t-1} + \alpha_1 QR_{t-1} + \alpha_1 CAR_{t-1} \ldots\ldots.. (12)$$

$$NPM_t = C_1 + \alpha_1 ROA_{t-1} + \alpha_1 CUR_{t-1} + \alpha_1 CASR_{t-1} + \alpha_1 QR_{t-1} + \alpha_1 CAR_{t-1} \ldots\ldots... (13)$$

Where

ROA= return on assets

ROE= return on equity

NPM= net profit margin

CUR= current ratio

CASR= cash ratio

QR= quick ratio

CAR= capital ratio

C= constant

3.0 Results and Discussion

3.1 Unit Root Test Result

Table 1 indicates the order of integration of the variables in the model, this is in agreement with the primary requirement for interacting time series data (Herwartz & Siedenburg, 2008). Augumented Dickey Fuller test shows that current ratio, cash ratio, quick ratio, capital ratio, return on assets and net profit margin were stationary at first difference while return on equity was stationary at level.

Table 1: Stationarity Test (Dickey-Fuller test for unit root) for the Variables.

Variable	Test Stat.	1% CV	5% CV	10%CV	p value	Conclusion
CUR	-3.988	-3.750	-3.000	-2.630	0.0143	I (1)
CASR	-3.899	-3.750	-3.000	-2.630	0.0783	I (1)
QR	-4.862	-3.750J	-3.000	-2.630	0.0499	I (1)
CAP	-5.289	-3.750	-3.000	-2.630	0.0174	I (1)
ROA	-5.531	-3.750	-3.000	-2.630	0.0518	I (1)
ROE	-3.941	-3.750	-3.000	-2.630	0.0237	I (0)
NPM	-4.267	-3.750	-3.000	-2.630	0.0164	I (1)

Source: Financial Statement of Selected Banks (where CV represents Coefficient of Variation)

3.2 Cointegration Test Result

Presented on Table 2 is the Johansen test for co-integration which reveals that there exists a long run relationship among the variables. Comparing the values of trace statistics and the maximu Eugen values with the critical values indicates that there are at most 2 cointegrating equations in the model. With this result, the variables were then interacted to determine the effects of each of the explanatory variables on the response variable.

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Table 2: Johansen Test for Cointegration

Null Hypothesis	Trace Statistics	5% CV	Max Eigen V.	5% CV
R = 0	235.7449	124.24	114.9006	45.28
R ≤ 1	120.8443	94.15	59.1298	39.37
R ≤ 2*	61.7145	68.52	25.1998	33.46
R ≤ 3	36.5147	47.21	18.5674	27.07
R ≤ 4	17.9473	29.68	10.0230	20.97
R ≤ 5	7.9244	15.41	6.9613	14.07
R ≤ 6	0.9630	3.76	0.9630	3.76

Source: Author's Computation, 2021

3.3   Vector Error Correction Model Results

Table 3 indicates the result of vector error correction model (VECM). An optimal lag length of 3 was chosen for the estimation based on results of the final prediction error (FPE), Hannan-Quinn information criterion (HQIC) and Schwarz bayesisan information criterion (SBIC) selection criteria. As expected, the coefficient of error correction term ECT (-1) for ROA and ROE has negative sign and is statistically significant at 5% level. This conformed to our observation under Johansen cointegration test that there exist a long-run relationship between the dependent and independent variables. Results revealed that in the short term, ROA leaves a positive and significant effect of 0.2479 on itself. This means that the ROA with a lag of one year on the average gives an increase of 25% of ROA in the coming year. Similarly, current ratio has a positive effect of 0.2444 on ROA (-2) which means that an increase in current ratio 2 years earlier will lead to an increase of about 24% in ROA. Contrarily, cash ratio had a negative and significant effect of -0.9365 on ROA(-2) which means an increase in cash ratio 2 years earlier will lead to a decrease of about 93% in ROA.

The results also indicated that cash ratio had a positive effect of 1.6188 on ROE (-2) which means that an increase in cash ratio 2 years earlier will lead to an increase of about 161% in ROE. Conversely, an increase in quick ratio in the previous year will lead to about 16% decrease in ROE. Similarly, in the short term, NPM had a negative and significant effect of -0.0494 on itself (-2). This means that NPM with a lag of 2 years on the average gives a decrease of 4.9% on itself. Also, current ratio had a negative and significant effect of -0.3303 on NPM (-1) which means that an increase in current ratio in the previous year will lead to a decrease of about 33% in NPM. In the long run, current ratio had a positive effect on ROA while cash ratio had a negative effect on ROA and ROE. Similarly, current ratio had a negative effect on NPM. This is in agreement with Andhina *et al.*, (2017) who concluded in their study that a lagged increase in current ratio had a positive effect on ROA and a lagged increase in cash ratio had a positive effect on ROE.

Table 3: Vector Error Correction Model Results for ROA, ROE and NPM

VARIABLE	SHORT	TERM				
	ROA		ROE		NPM	
	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	Tstatistic
CointEq1	0.0615	0.40	0.2608	2.26	0.9604	2.05
DROA(-1)	0.2479*	0.57	0.0299	0.08.	-0.0494*	-1.43
DROA(-2)	0.2076	1.26	0.0173	0.34	-0.0531*	-1.04
DCUR(-1)	9.3287	0.19	-36.0927	-0.86	-0.3303*	-0.36
DCUR(-2)	0.2444*	0.13	-3.9152	-0.21	-1.0061	-0.04
DCASR(-1)	-3.8003	-0.17	1.6097	0.88	2.9409	7.68
DCASR(-2)	-0.9365*	-0.11	1.6188*	-0.19	0.6817	0.06
DQR(-1)	-5.2231	-0.20	0.1600*	0.84	2.6444	0.29
DQR(-2)	-2.1480	-0.22	-2.9390	-0.29	0.1374	0.01
DCAR(-1)	0.3095	0.08	0.4472	0.21	-1.2922*	-1.96
DCAR(-2)	0.6813	1.08	-1.7190	-1.84	-0.6674	-0.20
	LONG	TERM				
D_CUR(-1)	-3.2126*	- 0.05	-3.8560	-0.86	6.3273*	1.04
D_CASR(-1)	1.9825*	0.51	3.6770*	0.83	-3.3411	-1.16
D_QR(-1)	2.3530	0.65	1.8104	0.94	-1.6363	-0.82
D_CAR(-1)	-1.7468	-6.99	-1.8460	-2.95	-1.6942	-1.08
ECT(-1)	-0.035		-0.011		0.388	

Source: Author's Computation, 2021 *Sig. * $p < 0.1$*

4.0 Conclusion

This study investigates the effects of liquidity management on profitability using data from the financial statement of tier 1 commercial banks in Nigeria. The findings established that the banks controlled enough liquidity to serve their obligations. The banks had a steady increase in their liquidity and profitability indicators from 1998-2018. Liquidity had a positive effect on the profitability of the banks when measured with their ROA and ROE and had a negative effect on the profitability of the banks when measured with NPM. Hence, proper liquidity management will increase the return on assets and return on equity of commercial banks.

5.0 Recommendation

The study thus recommended that the banking industry regulator (the Central Bank of Nigeria), should maintain the regulation over the minimum liquidity of commercial banks which is currently at 30% as this has an impact on the profitability of commercial banks and therefore the long and short-term stability of the entire systems. Also, Central Bank of Nigeria should be encouraged to maintain a flexible Minimum Monetary Policy or discount rate so as to enable the commercial banks take advantage of the alternative measures of meeting the unexpected

withdrawal demands and reduce the tendency of maintaining excess idle cash at expense of profitability.

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