Effect of Liquidity on Performance of Deposit Money Banks

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Abstract
The study examines the effect of liquidity management on the performance of DMBs in Nigeria. The objective of the study is to determine the extent of relationship that exists between liquidity mechanism and DMBs performance in Nigeria from 2000 to 2015. The study employs Augmented Dickey Fuller Unit Root Test, OLS regression and Granger Causality. The result of the study revealed that liquidity mechanism is not significantly related to DMBs performance in the short run and long run. The granger result proves that liquidity mechanism hinder DMBs performance within the period under review in the study. Hence, the study recommends that DMBs should be given leverage of plugging back funds into investment to booster profitability while maintaining a level of liquidity ratio.
Keywords: DMBs, Liquidity, Banks Performance

1.0   Introduction

The Nigerian banking system has been plagued by high level of poor liquidity which prompted Central Bank of Nigeria to engage recapitalization process from 2Billion to 25Billion and allows banks to involve themselves in any kind of combination to maintain the required banking capitalization and a moderate liquidity in 2005 (Agbada & Osuji, 2013). These combinations have bolstered the banking base and activities of Nigerian banks among the elite banks of the world with a good liquidity ratio across the globe. However, the liquidity of banks have been viewed differently and measures have basically looked at ease with which banks meets repayments, cheques, withdrawal obligations and new loan demands overtime.

Deposit Money Banks in Nigeria have been playing their intermediation roles by absorbing surplus funds (saving surplus unit) and making them available for investment (saving deficit unit that needs funds for investment) within and outside the economy. The investment activities exposed the banks to risks and problems of defaults; and this prompt the bank to seek maximum profits on these investments via direct supervisory involvement in the investment. Their involvement is burn out of the ultimate needs to ensure that funds are recovered to meet the daily, weekly, monthly and yearly obligations to both the customers, companies and government parastatals. The ability of banks to maintain an appropriate liquidity stimulates the performance and efficiency of Deposit Money Banks in any economy; however, the intermediation function is threatened by the risk involved in their banking activities. According to Alshatti (2015), Deposit Money Banks are largely exposed to various types of risks attributable to liquidity management, which affect the performance and activity of these banks. These management are necessitated to avoid possibility of system collapse as stressed in Roman and Sargu (2015), when they post that liquidity management is seen to be of paramount importance, receiving great attention from policymakers, researchers and practitioners, taking into consideration that a liquidity shortage at a single so called "too big to fail" financial institution can lead to systemic contagion and instability.

Bassey, Toby, Bassey and Ekwere (2016) state that liquidity is the lifeblood of banks performance and inability to meets its liquidity obligations without a reasonable loss will affect their performance. Considering the growing public loss of confidence as a result of continuous intervention of Central bank on growing distress banks, this study aim to investigate how central banks liquidity management mechanism has affected the performance of Deposit Money Banks in Nigeria.

2.0   Review of Related Literature

2.1   Conceptual Framework

Liquidity is the swift robustness of Deposit Money Banks (DMBs) to meets rising financial obligations without any form of default or delay. Liquidity can be termed as a bank's capacity to fund increase in assets and meet both expected and unexpected cash and collateral obligations at a reasonable cost and without incurring unacceptable losses (Graham, 2013). According to Nwaezeaku (2006), liquidity in banking measures the availability of cash and the rate at which current assets are converted into cash to meet ordinary and extra – ordinary request. Thus, it is the bank's ability to immediately meet cash, cheques, other withdrawals obligations and legitimate new loan demand while abiding by existing reserve requirements.

Liquidity Management

Liquidity management mechanism is the mandatory requirement imposed on DMBs by the Central Bank to ensure that DMBs does not become easily insolvent. Thus monitoring DMBs' liquidity reduces the possibility of raising loans under unfavourable loan agreements, restrictions and at a high interest bearing costs. Liquidity

management in DMBs also reduces the incidence of bankruptcy and liquidation which are simply the result of illiquidity, and thereby, help to protect customers' deposits. The Central Bank thus develop framework to guide banks' management of their liquidity in line with international standards and best practices.

The Central banks manages the liquidity of DMBs using the following liquidity mechanism namely; Vault Cash (VC), Balances Held With CBN, Balances Held With Other Banks In Nigeria, Balances Held With Offices & Branches Outside Nigeria, Money At Call (MAC), Inter-bank Placement (IP), Placement with Discount Houses (PDH), Treasury Bills (TB), Treasury Certificates, Investment in Stabilization Securities, Bills Discounted Payable in Nigeria, Negotiable Certificates of Deposits (NCD), Bankers Acceptances (BA) and Commercial Papers (CP), Investments in FGN Development Stock and Industrial (Other) Investments (II).

Several researchers have question the need for excess of liquidity by banks, according Krool (2013) it is uneconomic and financially unreasonable for banks to allow excess idle cash in the vault or excess liquidity. Osborne, Fuertes, & Milner (2012) also question banks excess liquidity and further state that it affects DMBs profitability.

2.2   Theoretical Framework

There are numbers of literature on liquidity management mechanism and deposit Banks Performance in the literature. However, the theories will be discussed briefly while the main theory for the study will be elaborated in-line with the objectives of the study.

Anticipated Income Theory

This theory looks at loan portfolio as a source of liquidity. The theory encouraged Deposit Money Banks to treat long-term loans as potential sources of liquidity. The theory is however criticized as a source of liquidity but the anticipated income theory post that these loans are typically paid off by the borrower in a series of installments thus, the bank's loan portfolio provides the bank with continuous flow of funds that adds to the bank's liquidity. Moreover, even though the loans are long term, in a liquidity crisis the bank can sell the loans to obtain needed cash in secondary markets (i.e they are future money).

Financial Intermediation Theory

This theory identifies with the basic function of Deposit Money Banks and incorporates the option of easy mobilization of funds by banks as a major source of meeting liquidity functions. Financial intermediation function is a service performed by banks by linking economic agents with surplus funds and economic units with deficit funds. This is critical in capital formation for real investment (Allen & Santomero, 1998), reduction of informational asymmetries (Scholten & Wensveen, 2003). Intermediation provides banks with the capacity to mobilize deposits, provide credit and meet its liquidity functions (Diamond, 1984).

Shiftability Theory

This is an approach of Deposit Money Banks to maintain liquidity by shifting of assets to meets rising obligations. When a bank is short of ready money, it is able to sell its assets to a more liquid bank. The approach lets the system of banks run more efficiently with fewer reserves or investing in long-term assets. Under shiftability approach, the banking system tries to avoid liquidity crises by enabling banks to always sell or repo at good prices (Wikipedia, 2017).

Other theories also prevail like Liquidity Preference Theory, Commercial Loan theory, Trade-Off theory and Conventional Corporate Finance Theory e.t.c. Trade-Off theory state that higher liquidity may also reduce a bank's risk and hence the premium demanded to compensate investors demands (Osborne, Fuertes, & Milner, 2012), Conventional Corporate Finance Theories which view that a bank in equilibrium will desire to hold a privately optimal level of liquidity that just trades off costs and benefits implying a zero relationship at the margin. This study adopt the Trade-Off theory which post that central banks liquidity management imposition are aimed at having higher liquidity to manage the financial demands of the customers. This is evidenced in the work of Miller (2005) and Bussen (2009), as they state that central bank forces banks to hold liquidity in excess of their private optimal level and hence force banks above their internal optimal liquidity level. Allen and Marguez (2011) also argued that this may result in large voluntary liquidity buffer in competitive markets, since the higher liquidity is a more effective guarantee of the bank's solvency and therefore allows the bank to offer more surplus to borrowers. This theory was criticized by Flannery and Rangan (2008), who assert that indeed if banks are successful in attaining their optimal liquidity level there may in fact be no short-run relationship at all, since the standard first order conditions imply that any change in liquidity has no impact on profitability. This is corroborated by Osborne, Fuertes, & Milner (2012), who opined that bank' optimal liquidity level raises during periods of banking sector distress, since in such conditions the expected cost of bankruptcy rises. Consequently, it is expected that the average relationship between liquidity and profitability across banks will be cyclical. They further state that in a distressed environment banks tend to be below their optimal liquidity level, whereas during normal conditions, banks may either meet their optimal capital level or not, in which case the relationship would be approximately zero, or overshoot, in which case banks can increase profitability by reducing the liquidity level. However, the efficiency of banks, its survival and their onward performance improvement in the future are

more reflective in the situation of high liquidity of banks (Allen & Marguez, 2011). The effect of the theory is to increase bank's optimal liquidity level and the performance of the banks in the long run.

2.3   Empirical Review

Scores of research work has been done on this area of interest. However, conflicting results exist in the literature. According to Arif (2012), in his study of the effect of risk factors on the performance of 22 DMBs in Pakistani between 2004 to 2009. The findings of the study indicate that there is a significant impact of liquidity risk factors on the banks profitability. The study further state that an increase in deposits lead to increase in the bank's profitability in terms of reducing dependence on the central bank in meeting the customers' obligations and profitability is negatively affected by the allocation of non-performing loans and liquidity gap. However, this finding was contradicted by Kurotamunobaraomi, Giami and Obari (2017), who investigated the interrelationship between liquidity and corporate performance of banks in Nigeria for the period of 1984 to 2014. Their work utilized Cash Reserve Ratio, Liquidity Ratio and Loan-to-Deposit Ratio as proxies for liquidity; and Return on Shareholders' funds as the proxy for performance and subject them to Ordinary Least Square Regression, Johanson Cointegration, Granger Causality test and Error Correction Model. The study discovered that banks reserve ratio and loan-to-deposit ratio negatively impacted the banks performance within the period under review and the DMBs performance maybe as a result of the industry structure.

Umar, Muhammad, Asad, Muhammad and Mazhar (2015) also examine the impact of liquidity risk management on banks performance in Pakistan from 2009 to 2013. Their study used ordinary least square (OLS) to estimate the relationship of the study and discovered that Loan-Deposit ratio and Cash reserve ratio affect banks performance negatively within the period under study. In the same study by Agbada and Osuji (2013), they discovered that a significant relationship between efficient liquidity management and banking performance and that efficient liquidity management enhances the soundness of bank in Nigeria. This shows that banks liquidity management mechanism affect banks differently based on environmental factors. Further study on liquidity management and banks performance in Nigeria is shown in the study of Bassey, Toby, Bassey and Ekwere (2016) within the period 2000-2010. Their study investigates the relationship between the variables of bank performance and those of liquidity management using bank deposit, cash reserve requirement, bank investment and cash ratio as indicators. The findings of the study re-emphasize the fact that successful operations and survival of the banks are anchored on efficient and effective liquidity management. They therefore postulate that banks should not concentrate purely on deposits but rather other measures should be adopted to reduce illiquidity in this sector. Another African study carried out by Muriithi and Waweru (2017), examined the effect of liquidity risk on financial performance of 43 registered commercial banks in Kenya within the period of 2005 and 2014. Liquidity risk was measured by liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) while financial performance by return on equity (ROE). The study using Panel data techniques of random effects estimation and generalized method of moments (GMM) discovered that NSFR is negatively associated with bank profitability both in long run and short run while LCR does not significantly influence the financial performance of commercial banks in Kenya both in long run and short run. However, the overall effect was that liquidity risk has a negative effect on financial performance. This result is contradicted by the findings of Wambu (2013) who investigated the effect of liquidity on the profitability of 44 DMBs between 2008 and 2012 using the LCR and current ratio as proxy for liquidity on DMBs profitability. The study shows a positive relationship between profitability and liquidity of commercial banks in Kenya.

Ferrouhi (2014) analyze the relationship between liquidity risk and financial performance of Moroccan banks within the period of 2001–2012. The study using panel data regression analysis discovered that Moroccan bank's performance is mainly determined by 7 factors namely liquidity ratio, size of banks, logarithm of the total assets squared, external funding to total liabilities, share of own bank's capital of the bank's total assets, foreign direct investments, unemployment rate and the realization of the financial crisis variable.

In Malaysia, Said (2014) employ Pooled Ordinary Least Squares (POLS) and Fixed Effect estimations to analyze the impact of NSFR on Malaysian commercial banks profitability for the period 2005 - 2011. His study show that there exist positive relationships between NSFR and indicators of performance which were return on equity (ROE), return on assets (ROA) and net interest margin (NIM).

Roman and Sargu (2015) looking at the impact of determinants of liquidity risk of banks operating in a series of CEE countries (Bulgaria, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania) between 2004 to 2011. The study employed OLS regression analysis and discovered that depreciation of the loans portfolio had negative effect on the overall liquidity of the banks.

Looking at the Nigerian scenario, Ibe (2013) investigated the impact of liquidity management on the profitability of banks in Nigeria using Elliot Rothenberg Stock (ERS) stationary test model to test the run of association of the variables under study while regression analysis was used to test the hypothesis. The result of the study therefore shows that liquidity management is indeed a crucial problem in the Nigerian banking industry. This was supported by Kurawa and Abubakar (2014) in their study of the impact of liquidity on banks'

profitability in Nigeria. The systematic random sampling method was adopted to select five banks over the period 2003 – 2012. The linear regression analysis used reveals the absence of a significant impact between liquidity and profitability among banks in Nigeria.

Looking at the effect of liquidity on firm's performance, Saleem and Rehman (2011) discovered that each ratio (variable) has a significant effect on the financial positions of enterprises with differing amounts and that along with the liquidity ratios in the first place.

3.0   Methodology

This section stresses the methodology employed for the study. The process of research in this study entails identification of problem, hypothetical statements, collection and analysis of relevant data using the appropriate statistical tools.

Model Specification

The study used secondary data from the Central Bank of Nigeria (CBN) Statistical bulletin as well financial statements of the various banks in Nigeria and adapted two models to significantly take care of the objectives of this study. However, the researcher adopted and modifies the model by Adeniyi (2010) and Kurotamunobaraomi, Giami and Obari (2017), which are expressed thus;

$ROA = f(NPL, LR, CDR)$ and $RSF = f(CRR, LDR, LR)$

The model is modified thus;

$ROA = f(LR, CDR, LDR, LTAR)$ …………………………………………….i

$ROA = b_0 + b_1 LR + b_2 CDR + b_3 LR + b_4 LTAR + u_t$ ……………………ii

$ROE = f(LR, CDR, LDR, LTAR)$ …………………………………………….iii

$ROE = b_0 + b_1 LR + b_2 CDR + b_3 LR + b_4 LTAR + u_t$ ……………………iv

Where:

LR = Liquidity Ratio, LDR = Loan to Deposit Ratio, CDR = Cash to Deposit Ratio, ROA = Return on Asset, ROE = Return on Equity, LTAR = Loan to Asset Ratio, F = functional relationship, b_0 = Slope of the Regression Line,

b_{1-4} = Estimation Parameters and U_t = Error Term.

4.0   Presentation of Results and Analysis

Table 1: Summary of Unit Root result Using ADF

Variables	ADF statistics	TCV @ 1%	TCV @ 5%	TCV @ 10%	Order of Integration	Prob.
CDR	-5.317597	-4.004425	-3.098896	-2.690439	I(1)	0.0010
LDR	4.544312	-4.004425	-3.098896	-2.690439	I(1)	0.0038
LR	3.738391	-4.004425	-3.098896	-2.690439	I(1)	0.0161
LDAR	-5.207773	-4.004425	-3.098896	-2.690439	I(1)	0.0012
ROA	-4.047889	-3.959148	-3.081002	-2.681330	I(0)	0.0085
ROE	-4.969155	-3.959148	-3.081002	-2.681330	I(0)	0.0016

Source: Researchers computation using E-views 9.5

Table 1 show that the variables under consideration are stationary using ADF unit root technique. The variables are stationary at the same first difference for all the independent variables in CDR, LDR, LR and LDAR, while the remaining dependent variables are stationary at level for ROA and ROE. In all, the variables good for testing and study can proceed for further analysis.

Table 2: OLS Regression Analysis (Dependent variable: ROA)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CDR)	-4.065555	4.570527	-0.889516	0.3946
D(LR)	0.087207	1.219811	0.071493	0.9444
D(LDR)	1.009023	3.442389	0.293117	0.7754
D(LTAR)	0.058028	0.159926	0.362845	0.7243
C	-2.169328	5.928114	-0.365939	0.7220
R-squared	0.113298	F-statistic		0.319436
Adjusted R-squared	-0.241383	Durbin-Watson stat		1.937660

Source: Researchers computation using E-views 9.5

Table 3: OLS Regression Analysis (Dependent variable: ROE)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(CDR)	-56.63847	41.01784	-1.380825	0.1947
LOG(LR)	72.23894	77.06480	0.937379	0.3687
LOG(LDR)	-5.794897	25.86031	-0.224085	0.8268
LOG(LTAR)	8.042731	20.98714	0.383222	0.7089
C	-203.4129	337.0785	-0.603458	0.5584
R-squared	0.265573	F-statistic		0.994416
Adjusted R-squared	-0.001491	Durbin-Watson stat		1.997594

Source: Researchers computation using E-views 9.5

The table 2 and 3 show the short run relationship between the variables under consideration. The result of OLS regression of CDR, LR, LDR and LTAR on ROA are not significant at both individual level in t-test results and collective impact in f-test. The result also reveal that the coefficient of determination (R^2) = 0.1133 is very low and suggests strongly that the variation in ROA was accounted for with only 11.33% by the explanatory variables of CDR, LR, LDR and LTAR. The result signifies that major changes in banks performance are captured by variables outside the model. The probability values of the individual variables attest to the fact that the variables are insignificant. The Durbin Watson statistics however shows goodness of fit as there was no form of serial-correlation in the study thereby proving that the study is reliable for decision making and can be adopted for policy recommendation. The result of table 3 also showed the same direction of impact and relationship between the dependent variable and independent variables as table 2. The variables in CDR, LR, LDR and LTAR prove insignificant relationship with ROE both individually and collectively. They also showed that they didn't explain major changes in the performance of DMBs in the coefficient of determination (R^2) with output of 0.2656 reflecting 26.56% changes in the performance of DMBs are captured by the variables under consideration in the study, while the remaining 73.44% are influenced by variables outside the study. The Durbin Watson statistics show that the result of the study reliable at 1.9976 and show no sign of serial-correlation in the study.

Table 4: Pair-wise Granger Casuality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
ROA does not Granger Cause CDR	14	4.85058	0.0372
CDR does not Granger Cause ROA		0.92533	0.4311
ROA does not Granger Cause LDR	14	2.00249	0.1908
LDR does not Granger Cause ROA		0.54391	0.5984
ROA does not Granger Cause LR	14	4.80329	0.0381
LR does not Granger Cause ROA		0.20727	0.8166
ROA does not Granger Cause LTAR	14	0.06905	0.9338
LTAR does not Granger Cause ROA		0.43191	0.6620

Source: Researchers computation using E-views 9.5

Table 5: Pair-wise Granger Casuality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
ROE does not Granger Cause CDR	14	0.03713	0.9637
CDR does not Granger Cause ROE		0.82202	0.4700
ROE does not Granger Cause LDR	14	0.78669	0.4843
LDR does not Granger Cause ROE		0.11532	0.8924
ROE does not Granger Cause LR	14	2.42969	0.1433
LR does not Granger Cause ROE		0.84011	0.4629
ROE does not Granger Cause LTAR	14	0.39875	0.6825
LTAR does not Granger Cause ROE		0.30100	0.7472

Source: Researchers computation using E-views 9.5

From table 4 and 5, the independent variable in CDR, LR, LDR and LTAR was unable to granger-cause a change in ROA and ROE respectively but ROA granger cause CDR, LDR and LR except LTAR significantly within the study. However, in table 5 the ROE only granger causes LR while the remaining variables were not granger caused by ROE. This result further support the findings of the short run effect of liquidity measure on DMBs performance in Nigeria.

Conclusion and Recommendation

For the purpose of successful operations and survival of Nigerian DMBs, efficient and effective liquidity management must be adhered to. This will help to reduce cases of bank distress. However, the results show that

liquidity management in the Nigerian Deposit Money Banks hinders their performance and profitability in the short run. The various variables showed negative impact within the study proving that the variables prevent DMBs from taking advantage of the liquidity at its disposal and thus hampering their profitability in the long run. The finding is in tandem with Kurotamunobaraomi, Giami and Obari (2017), Kurawa and Abubakar (2014) and Ibe (2013) in Nigerian study, Muriithi and Waweru (2017) in Kenya study. However, the result was contradicted by the study of Said (2014) on Malaysia. Although our finding states that high liquidity ratio limits profitability of the bank, but since the survival of Nigerian DMBs depends on liquidity management, DMBs should not solely concentrate on the profit maximization concept but should also adopt measures that will ensure effective liquidity management. Thus, the study recommends that DMBs should be given leverage of plugging back funds into investment to booster profitability while maintaining a level of liquidity ratio.

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Data presentation

	ROA	ROE	LR	LDR	LTAR	CDR
2000	3.78	115.27	64.1	1.23	9.4	1.64
2001	4.82	57.41	52.9	1.35	12	1.92
2002	2.63	41.63	52.5	7.4	123	3.2
2003	2	29.11	50.9	6.9	19.2	3
2004	2.56	27.23	50.5	8.4	11.6	2.1
2005	0.75	4.81	50.2	7.8	21.9	4.4
2006	0.59	4.12	55.7	9.5	19.1	3.3
2007	5.92	36.83	48.8	7.8	48.3	3.6
2008	4.29	24.11	44.3	8.9	97	3.9
2009	-64.72	-9.28	40.9	7.8	87.6	5
2010	3.91	162.9	30.5	8.1	78.9	1.7
2011	-0.04	-0.28	25	5	90.1	2.1
2012	2.62	22.2	30	5.3	94.7	1.5
2013	2.15	19.14	30	5	99.7	1.1
2014	2.33	20.34	30	6.1	99.9	1.56
2015	2.91	23.7	30	6.2	98.5	2.12

Source: Central Bank of Nigeria (CBN) Statistical bulletin