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Original Research Article

Liquidity and Profitability Dynamics: Evidence from the Nigerian Banking Sector

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Abstract

The study examines the effect of liquidity management on profitability in ten deposit money banks in Nigeria between 2008 and 2017. Return on asset served as a proxy for profitability while four variables- current ratio, loan to deposit ratio, deposit to asset ratio and liquidity ratio surrogated for liquidity management. Using Random effects generalised least squares as estimation technique, results reveal a positive and statistically significant relationship between two liquidity management proxies (current ratio and liquidity ratio) and return on asset. The study did not find empirical evidence in support of loan to deposit ratio ($t = 1.0650$, $p = 0.2896$) and deposit to asset ratio ($t = -0.6507$, $p = 0.5168$) as having influence on profitability of the selected banks, as results produced insignificant relationship with profitability (t). The study recommends that for sustainable profitability to be achieved, board of directors and top financial managers of banks should put in place robust framework that will efficiently manage their banks' liquidity. Specifically, utmost attention should be taken on management of current ratio and liquidity ratio as well as investment of excess liquidity in short-term assets such as treasury bills and certificates.

Keywords: Bank-specifics, Deposit money banks, Liquidity, Nigeria, Profitability

JEL Classification Codes: G21, G32

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1.0 INTRODUCTION

The banking sector of most developing economies is a panacea to economic growth and its subsequent sustainability given the intermediation role performed by the sector which involves channeling of fund from the surplus unit to the deficit unit to finance feasible and viable investment. The sector through this intermediation of fund is able to finance the real sectors that are germane to the attainment of the desired level of economic growth and its sustainability. Efficient financial intermediation requires banks to design effective and efficient financial management strategies so as to balance the nexus between liquidity and profitability as drawing attention on one at the expense of the other may result in banks' failure (Idowu, Essien & Adegboye, 2017).

Profitability, according to Owolabi and Obida (2012), depicts the ability of a firm to generate revenue in excess of attributable costs incurred in generating revenue from all its activities. Profit is a successful outcome of prudent combination and utilization of business resources deployed to its operating activity. Profitability in the banking sector just as in other businesses is one of the cardinal measures of financial performance. It is one of the main parameters used in measuring the efficiency of the appointed managers as it indicates the efficiency of the management to utilize resources at their disposal in generating positive net return; even though profitability does not in all cases justify efficiency as other factors, such as the state of the economy, exchange rate, inflation rate and interest rate (Gharaibeh, 2015 and Islam and Nishiyama, 2016), which are outside management control can influence profit or firms may not make sufficient profit that is proportionate to the assets deployed (Ilaboya & Ohiokha, 2016).

Profitability and liquidity are powerful tools that are useful for efficient and effective financial intermediation as the two variables

depict the strength of the sector. While liquidity measures the extent at which bank can respond to withdrawal need of depositors, attend to loan request from borrowers and also being able to meet up with daily obligations. Profitability on the other hand depicts the will of banks to generate positive net return from successful operation. The going concern status as well as shareholders wealth maximization are significantly anchored on profitability and as such, banks activities particularly the operating activity should be conducted in a manner that is compatible with profit making so as to sustain its going concern and as well compensate the shareholders in form of dividend payment or improvement in market price per share which has a far reaching effect on motivating them to invest more in the banking sector (Nuhiu, Hoti & Bektashi, 2017).

In the same vein, profitability can also influence the future ability of banks to advance loans and advances for productive investment as retained earnings of current year can be used in improving next year liquidity position of banks. The three fundamental activities of operating, investing, financing of any profit oriented enterprise are evaluated for effectiveness and efficiency based on their ability to generate optimum profit with the ultimate goal of maximizing shareholders wealth.

Discussion on liquidity management and profitability in the banking sector has recorded novel outcomes from researchers both in developed and developing economies. In Nigeria, Osuji (2013), Bassey and Moses (2015), Duruechi, Ojiegbe, Otiwu (2016) and Edem (2017), viewed liquidity management and performance from macroeconomic perspectives with little done on individual banks' specific proxies. Even among few studies that are individual bank specific, such as Obiakor and Okwu (2011), Ibe (2013), Kehinde (2013) and Idowu, *et al*, (2017)), conflicting and mixed findings were reported.

Arising from the foregoing, the present study aims to conduct an empirical investigation on effect of liquidity management on banks' profitability in Nigerian business environment, with special attention on bank specific variables as proxies for liquidity management.

2.0 LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES

Theoretical Framework

Liquidity - profitability dynamics studies in financial management are predicated upon commercial loan theory, anticipated income theory and liquidity-profitability trade-off theory. These theories are explained in turn.

Anticipated loan theory: This was put forward by Prochanow in 1944. It accords preference to the expected income of the borrower in planning the liquidity of the short-term loan granted by banks with no regard to the nature of the business of the borrower. The expected future earnings serve as the security for the amount granted as loan as against securing the loan on machinery, inventory of goods and land and buildings. The loan amount is paid in installment using the potential earnings of the borrower. This theory is very crucial to liquidity management as it emphasizes the earnings potential of borrowers as against securing the loan on assets which may not be easily converted into cash. The major weakness is that in the case of the inability of the borrowers to make sufficient earnings or when losses are repeatedly incurred, it may affect their ability to pay back the loan.

Commercial loan theory: It was introduced by Adam Smith. It states banks can improve liquidity by granting only short term self-liquidating loan. The theory ensures the liquidity of the banking sector by encouraging them to advance loan to traders alone as against financing for real estate, consumption and .the traders therefore are granted credit to finance their working capital and repay back after the completion

of the trade cycle. The payback period is the difference between when loan granted to traders are invested in the trade and when the goods bought for resale are sold. This theory is based on the short payback period of loan advanced to traders which is significantly anchored on the high rate of turnover of traders' businesses.

Liquidity-profitability trade-off theory:

This states that there is opportunity cost for a bank either pursuing to be liquid or profitable. Under this theory, banks that choose to be liquid will not be profitable and vice-versa. As the two fundamental goals cannot be achieved together, for banks to be solvent and maintain its going concern status, there is a need to institute an efficient financial management practices that will balance the liquidity and profitability trade off so that bank can be optimally liquid and profitable. The major argument against this theory is that it based banks ability to make profit on granting substantial part of its liquid resources as loan from which it can earn interest income. However, as banks have diversified into other areas of revenue generation, such as cost on transaction, the availability of sufficient liquidity which posits the bank be able to attend to the withdrawal demand of its depositors may make the bank to attract more customers and as they perform transactions involving cost on transaction, this untimely increase revenue with subsequent positive effect on profitability.

Related Empirical Studies

Lartey, Antwi, and Boadi (2013) used a sample size of seven listed Ghanaian banks for period 2005-2010 to find out the relationship between liquidity and profitability. Result obtained from the regression shows the existence of positive but insignificant effect of liquidity on profitability of the sampled banks.

Abdullah (2014) focused on the listed banks in Bangladesh by using data from annual reports which spanned between 2009 and

2013 to determine the effect of liquidity management on profitability. Result revealed that liquidity management has no significant effect on profitability of the sampled banks.

Alshatti (2015) explored the effect of liquidity on profitability of 13 commercial banks in Jordan for the period, 2005-2012. Regression result revealed a positive relationship between quick ratio, investment ratio and profitability, while an indirect association was obtained between capital ratio, liquid ratio and profitability.

Dahiyat (2016) researched into the effect of liquidity and solvency on profitability of fifteen Jordanian Banks for financial years 2012-2014. The result obtained from the regression revealed that liquidity exerts significant negative effect on profitability of Jordanian banks.

Idowu, *et al.*, (2017) focused on the effect of liquidity management on financial performance of listed deposit money banks in Nigeria. The research made use of data extracted from the annual reports of 4 sampled banks from 2007 and 2016. The result revealed that liquidity management has significant positive relationship with profitability when proxied by return on equity while it was return on asset was found not to be significant.

Akhter (2018) analysed the influence of liquidity and profitability on operational efficiency of 30 Bangladeshi banks for 2011-2016. The study revealed that liquidity and profitability combined significantly to influence operational efficiency of the banks.

Bordeleau and Graham (2019) analysed the effect of liquid asset on profitability of banks in the USA and Canada. Result provided that profitability is improved for banks that hold some liquid assets up to certain point before bank's profitability starts to diminish.

Hypotheses Development

In developing the hypotheses of the study, four independent variables were used to capture liquidity management. They are: liquidity (cash and treasury bill/total deposit), current ratio which is the current assets/ current liabilities, deposit to asset ratio and loan to deposit ratio.

Current Ratio (CR): This is the proportion of banks' current asset to its current liabilities. It shows the strength of the bank in meeting the short term maturing obligations to the claimants of those obligations. The following hypothesis is tested:

Ho₁: Current ratio has no significant relationship with profitability.

Loan to deposit ratio (LDR): As the primary activity of banks is channeling of fund from the surplus economic unit to the deficit economic unit through the process of financial intermediation. Loan to deposit ratio reflects the proportion of loan and advances to the customer. It is an important variable that depicts the tradeoff between liquidity and profitability as banks that aim to generate more profit achieve this by granting more loan facilities to customers while banks that is primarily concerned with liquidity reduces its loan and as such the loan to deposit ratio in this case will be low. The following hypothesis is formulated:

Ho₂: Loan to deposit ratio has no significant relationship with profitability.

Deposit to asset ratio (DAR): Deposit to asset ratio shows the proportion of a bank's asset to total asset ratio. It is an important variable in liquidity management as the ratios tells us the claims against a bank which can be demanded at any time. For a bank to be on the safer side, the ratio should be low which implies that banks has sufficient asset can conveniently accommodate depositors claim from their assets. The following hypothesis is tested:

Ho₃: Deposit to asset ratio has no significant relationship with profitability.

Liquidity ratio (LQR): This is the ratio of cash (plus treasury bills) to total deposit. This ratio depicts the cash and near cash investment with short term maturity. It is a useful tool for measuring the liquidity of the banking sector as it shows the extent of cash a bank can instantaneously use in meeting up with withdrawal demand of its depositors. The following hypothesis is tested:

Ho₄: Liquidity ratio has no significant relationship with profitability.

3.0 METHODOLOGY

Research Design and Source of Data

Ex post facto research design was adopted. It is considered appropriate as data for the study relate to events which have happened in the past.

Relevant data used for the study were obtained from secondary source through published accounts of banks.

Population, Sample and Sampling Technique

Population of the study is 15 listed deposit money banks in Nigeria as at December 31, 2018. A sample of ten banks which represents about 67% of the entire population was chosen through purposive sampling technique. These banks are GTBank Plc., UBA Plc., Access Bank Plc., Zenith Bank Plc., First Bank Plc., Sterling Bank Plc., Diamond Bank Plc., Fidelity Bank Plc., Wema Bank Plc., and Unity Bank Plc.

Data Analysis Instrument

The study used panel data and multiple regression analysis was adopted in testing the four hypotheses.

Description of Variable

Dependent Variable

Return on asset (ROA) is the independent variable used to capture profitability in this study. It is a measure of how the

management has efficiently utilized the banks resources at their disposal in generating positive returns. Some other prior researchers like, Ben-Caleb, Uwuigbe and Uwuigbe (2013), Alshatti (2015), Okaro and Nwakoby (2016), Salim and Bilal (2016), Idowu, *et al.*, (2017) and Yunos, Ghapar, Ahmad and Sungip (2018), have used it as a proxy for profitability.

Independent Variables

Liquidity ratio (cash and treasury bill/total deposit), current ratio which is the current assets/ current liabilities, deposit to asset ratio and loan to deposit ratio are the four variables used as proxies for liquidity management. This follows the studies of Bassey and Moses (2015), Maqsood, Anwar, Raza, Ijaz, and Shouqat (2016), Idowu *et al.*, (2017) and Akhter (2018).

Control Variables

In an attempt to obtain unbiased and robust analytical results, two control variables which are likely to influence profitability are introduced into the model. The control variables are growth rate in deposit (GRD) and firm size (FSZ).

Model Specification

Equation 3.1 shows the specific model of the study.

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 LDR_{it} + \beta_3 DAR_{it} + \beta_4 LQR_{it} + \beta_5 GRD_{it} + \beta_6 FSZ_{it} + e_{it} \quad (3.1)$$

Where,

ROA_{it} = Return on asset of firm i in period t of firm i in period t ; CR_{it} = Current ratio of firm i in period t ; LDR_{it} = Loan to deposit ratio of firm i in period t ; DAR_{it} = Deposit to asset ratio of firm i in period t ; LQR_{it} = Cash and treasury bill as a proportion of total deposit of firm i in period t ;

GRD_{it} = Growth rate of deposit of firm i in period t ; FSZ_{it} = Firm size of firm i in period t ; e_{it} = error term

4.0 RESULTS AND DISCUSSION

Descriptive Statistics

Table 1: Summary of Descriptive Statistics

Variable	Mean	Minimum	Maximum	Standard Deviation	Skewness	Kurtosis
ROA	0.0159	-0.1051	0.0799	0.0216	-2.010	11.140
CR	1.1089	0.4754	2.1815	0.2235	1.438	6.576
LDR	0.6930	0.0002	1.1209	0.2469	-1.005	0.901
DAR	0.4059	0.0006	0.9813	0.3597	-0.188	-1.884
LQR	0.2110	0.0000	0.6221	0.1370	0.739	0.306
GRD	0.9439	-0.9999	1.0564	0.3098	0.282	4.683
FSZ	9.0261	7.7636	9.7353	0.4089	-0.605	-0.164

Source: Authors' computation (2019)

As shown in Table 1, the mean profitability (ROA) of the selected banks is 1.59% and this ranges between -10.51% and 7.99%. Credit ratio (CR) averaged 1.1: 1, with maximum value of 2.18: 1 and minimum value of 0.48:1. The mean Loan to deposit ratio (LDR) is 69.3% and it ranges between 0.02% and 112.09%. For every N100 asset value of the selected banks, on the average N40.59 represented the proportion of deposit. Liquidity ratio (LQR) has a mean value of 21.1% and this ranges between 0% and 62.21%. The growth in deposit (GRD) has a mean of 0.94 and average bank size is approximately N1 billion (log inverse 9.0261). The variable with the highest variability from the mean is firm size with standard deviation of 0.4089 and the one with the least variability is ROA with standard deviation of 0.0216.

Multicollinearity Test

The absence of multicollinearity among the explanatory variables is a basic tenant in the use of multiple regressions. Two methods (Variance Inflation Factor, VIF and Tolerance Value TV) are used to test this. According to Rumsey (2007), Wooldridge(2009) and Gujarati and Porter(2009), if an explanatory variable will

have multicollinearity issue with other variables if it has VIF of above 10 or TV of less than 0.1. Result of multicollinearity test is provided in Table 2.

Table 2: Result of Multicollinearity Test

Variable	VIF	Tolerance
CR	1.294	.773
LDR	1.108	.902
DAR	1.212	.825
LQR	1.887	.530
GRD	1.082	.924
FSZ	1.840	.543
Average	1.404	.750

Source: Authors' computation (2019)

As seen in Table 2, no explanatory variable has VIF of more than 10.0 or TV of less than 0.1. Specifically, VIF ranges between 1.082 and 1.887, with an average value of 1.404. Similarly, TV ranges between 0.530 and 0.924, with average value of 0.750. This confirms absence of multicollinearity among the study's variables.

Correlation Matrix

Correlation matrix shows the association between the variables used in the study and this is depicted in Table 3.

Table 3: Correlation

	ROA	CR	LDR	DAR	LQR	GRD	FSZ
ROA	1						
CR	.262*** (0.008)	1					
LDR	-.012 (0.904)	-.166* (0.099)	1				
DAR	-.221** (0.027)	-.297*** (0.003)	-.073 (0.468)	1			
LQR	.257** (0.010)	-.062 (0.538)	-.116 (0.250)	-.219** (0.028)	1		
GRD	.248** (0.013)	.106 (0.294)	-.059 (0.559)	-.058 (0.564)-.	-.058 (0.564)-.	1	
FSZ	.417*** (0.000)	.192* (0.056)	-.008 (0.936)	-.184* (0.067)	.599*** (0.000)	.162 (0.107)	1

*, **, and *** show significant at 10%, 5% and 1% levels, respectively

Source: Authors' computation (2019)

From Table 3, a direct association between current ratio (CR) and profitability (ROA) exist and this is significant at 1% level. Similarly, Liquidity ratio (LQR), Growth in deposit ratio (GRD), and Firm size (FSZ) individually has a direct association with ROA. However, Deposit to asset ratio (DAR) has a negative association with ROA at 5% level, while Loan to deposit ratio (LDR) has an indirect but insignificant association with ROA.

The major defect of correlation matrix is

that it only shows the direction of relation between two variables, not strength of relationship. Hence, it cannot be used as a means of making unbiased inferences. This flaw is mitigated in this study by the employment of regression analysis.

Regression

In this study, a multivariate regression exercise was conducted using the Fixed effects least square (FELS) and Random effects generalised least square (REGLS) models. Table 4 presents the results.

Table4: Regression Results

Variable	Fixed coefficient	effects t-stat	prob	Random coefficient	effects t-stat	prob
Constant	-.0859	-.9800	.3299	-.1124	-1.5522	.1240
CR	.0341	3.1950***	.0020	.0299	2.9308***	.0043
LDR	.0109	1.2526	.2138	.0090	1.0650	.2896
DAR	-.0121	-.7424	.4599	-.0066	-.6507	.5168
LQR	.0130	2.0020**	.0481	.0423	2.4768**	.0152
GRD	.0151	2.4260**	.0174	.0149	2.4349**	.0168
FSZ	.0062	.5970	.5521	.0096	1.1174	.2667
R ²	.4406			.2153		
Adj. R ²	.3407			.1647		
F-stat	4.4102***			4.2529***		
Prob (F-stat)	0.0000			0.0008		
Durbin-Watson	1.9737			1.8261		
Observations	100			100		

*, **, and *** show significant at 10%, 5% and 1% levels, respectively

Source: Authors' computation (2019)

Results of the two techniques show consistency. Current ratio (CR), liquidity ratio (LQR) and growth in deposit (GRD) exhibit positive and significant relationship with profitability (ROA). However, Hausman (1978) specification test was adopted to determine the appropriate model to be used for unbiased inferences.

Result of Hausman’s Specification Test

Hausman test suggests that FELS and REGLS estimates do not differ substantially. According to Wooldridge (2009), if the *prob* value of Hausman Chi-square is statistically significant ($p < 0.05$), the estimation based on the results of the FELS will be better, otherwise the REGLS.

Table5: Hausman Test Summary

Model	Dependent variable	Chi-square statistic	Chi-square degree of freedom	prob
1	ROA	7.4770	6	0.279

Source: Authors’ computation (2019)

Table 5 reports that the *prob* value is 0.279 ($prob > 0.05$) and is not statistically significant. Thus, the test favours the use of the result of the Random effects for making unbiased inferences.

Discussion of Findings

Following the outcome of the Random effects GLS model as provided in Table 4, the Durbin-Watson value is 1.8261 and within acceptable threshold of 1 and 3 (Asaeed, 2005 and Gujarati and Porter, 2009), suggesting absence of serial autocorrelation among the residuals of the explanatory variables. F-stat value is 4.2529 and this is significant at 1% level ($p = 0.0000$) shows that the model as a whole is fit.

From Table 4, the relationship between current ratio (CR) and profitability (ROA) is direct and significant at 1% level. This is in accordance with studies conducted by Kosmidou, Tanna and Pasiouras (2005) and Maqsood *et al.*, (2016). It is however not in line with prior works of Ben-Caleb *et al.*, (2013), Bassey and Moses (2015), Salim and Bilal (2016) and Fagbayo, Adeniran and Adedeji (2018) which produced negative and insignificant relationship between CR and ROA. The outcome of the study confirms that liquidity management affects profitability of Nigerian banks when current ratio is used as a proxy for liquidity management. The null hypothesis 1 is

hereby rejected.

Loan to deposit ratio (LDR) exhibits a positive relationship with profitability (ROA), but is statistically insignificant. This finding is consistent with the works of Bassey and Moses (2015) and Salim and Bilal (2016) and it clearly suggests that when LDR is used as a proxy for liquidity, liquidity management does not influence profitability of Nigerian banks. The null hypothesis 2 is hereby failed to be rejected.

Table 4 reveals that deposit to asset ratio (DAR) has a negative and insignificant relationship with profitability. It indicates that when DAR is adopted as a liquidity management proxy, it has no influence on the profitability of Nigerian banks. The null hypothesis 3 is therefore failed to be rejected.

Liquidity ratio (LQR) as shown in Table 4 has a direct and significant relationship with profitability (ROA) at 5% level. This suggests that when a bank is liquid, it will not only be able to honour its obligations to its customers as at when due, it will also be able to invest the excess liquid fund to generate additional earnings. This outcome is supported by the works of Uremadu (2012), Kehinde (2013), Lina, Munther and Rania (2015) and Bordeleau and Graham (2019) and provides evidence that LQR (liquidity management proxy) influences the

profitability of Nigerian deposit banks. The finding however contradicts the studies of Chen, Kao, Shen and Yeh (2010), Alshatti (2015) and Okaro and Nwakoby (2016) that produced indirect association between liquidity ratio and profitability. Null hypothesis 4 is hereby rejected.

For the control variables and consistent with prior study of Anarfi, Abakah and Boateng (2016), growth in deposit (GRD) has a direct and significant relationship with profitability, while firm size (FSZ) showed a positive but insignificant relationship with profitability (Kolapo, Ayeni & Oke, 2012, Samad, 2015, and Kajola, Adedeji, Olabisi & Babatolu, 2018).

By combining all the results from this study, it can be deduced that efficient liquidity management affects the profitability of Nigerian deposit money banks. This is in line with prior studies of Lina *et al.*, (2015), Basse, Tobi, Basse and Ekwere (2016), Idowu *et al.*, (2017), Bagh, Razzaq, Azad, Liaqat and Khan (2017), Akhter (2018) and Bordeleau and Graham (2019).

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusion

The study examined the effect of liquidity management on profitability of ten deposit money banks in Nigeria for the financial years, 2008-2017. This represented 100 firm-year observations. The major finding of this study is that two liquidity management variables (current ratio and liquidity ratio) have direct impact on the profitability of the selected banks during the period of study. However, the study could not provide empirical evidence in support of the other two liquidity management proxies (loan to deposit ratio and deposit to asset ratio) as important liquidity management proxies that could influence the profitability of banks.

Recommendations

Following from the outcome of the study, it is hereby recommended that boards and corporate managers of listed banks in Nigeria take special interest in liquidity management of their organisations in order to achieve profitability. Specifically, the management of current ratio and liquidity ratio should be taken seriously. Furthermore, excess liquidity resulting from operations should be invested in short-term investment facilities such as treasury bills and certificates in order to generate additional earnings which ultimately lead to improvement in profitability level.

Suggestion for Further Study

For future studies, increasing the sample size and study time frame may produce more robust results. Effects of other proxies of liquidity management, such as capital ratio, cash ratio, investment ratio, loans to total assets ratio, etc. on profitability should also be investigated. Similar studies can also be done in other financial sectors (insurance, microfinance banks, pension funds, etc.) of the Nigerian economy and those of other emerging economies.

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