



Financial Risk and Profitability: Evidence from Liquidity Risk Exposure, Long-Term and Short-Term Liquidity Risk

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Authors' contributions

This work was carried out in collaboration between both authors. The study was designed by author AKA and he contributed immensely to the literature review. Author OYO developed the model and performed the statistical analysis of the study. Finally, both authors read and approved the final manuscript.

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ABSTRACT

The study examines the effect of liquidity risk exposure, long-term and short-term liquidity risk on the profitability of Deposit Money Banks. Expos-facto research design was used for the study. The study employed secondary data, sourced from the audited financial reports of the banks within the period of the study spanning from 2007 to 2016. The data were analyzed through panel data regression analysis. The study found that liquidity risk exposure has negative and insignificant effect on profitability of Deposit Money Banks. The study concluded that both short-term and long-term liquidity risk have positive effect on the profitability of deposit money banks. In view of this, the study recommends that the management of Deposit Money Banks should maintain short, medium and long-term cash forecasts in order to forestall problem of illiquidity and reduce liquidity risk.

Keywords: *Liquidity risk exposure; long-term liquidity risk; short-term liquidity risk; deposit money banks; profitability.*

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1. INTRODUCTION

Banks are the main components of the financial sector in an economy and play a valuable role towards economic growth [1]. However, the diverse operational nature of banks subjects them to various risks in their daily operations. In view of this, [2] posits that the two fundamental financial risks associated with the management of banks' resources are interest rate risk and the liquidity risk. This is due to the fact that both types of risk are caused by the uncertainty that characterizes the manner of customers' withdrawal of deposits. Thus, liquidity risk arises in the general funding of the banks' activities and in the management of the asset position. [3] is of the opinion that for the banking system to survive in crisis and competitive environment, management should revise operational procedures, reform administration procedures, upgrade information technology and develop risk management techniques. This corroborates with the assertion of [4], that risk management aspect is not only crucial for sustainability but also to the growth of the banking sector. Recognizing the importance of risk management, vast numbers of studies have been conducted most especially on liquidity risk and its impact on profitability of commercial banks but, despite the volume of the empirical work, there is no consensus on the impact of liquidity on banks' profitability. Thus, this lack of consensus has produced variety of ideas on how liquidity risk influences banks' profitability.

In the light of the above, this study charts a different path to document empirical evidence on liquidity risk exposure and its effect on profitability of Deposit Money Banks in Nigeria. Also, the study examines the effect of long-term and short-term liquidity risk on profitability. In line with these objectives, the fundamental questions in this study are:

- Does liquidity risk exposure have a significant effect on profitability of Deposit Money Banks in Nigeria?
- Does long-term liquidity risk have significant effect on profitability of Deposit Money Banks in Nigeria?
- Does short-term liquidity risk have significant effect on profitability of Deposit Money Banks in Nigeria?

In line with these research questions the following hypotheses are formulated:

- Liquidity risk exposure has no significant effect on profitability of Deposit Money Banks;
- Long-term liquidity risk has no significant effect on profitability of Deposit Money Banks.
- Short-term liquidity risk has no significant effect on profitability of Deposit Money Banks;

To answer these questions and test the formulated hypotheses, section two reviewed literature on liquidity risk and profitability, section three outlines the methodology adopted for the study. Data analysis and discussion were presented in section four while section five concludes the paper and proffer recommendations.

2. EMPIRICAL REVIEW AND THEORY

Liquidity risk is inability of the firm to meet all payments obligations when they fall due. The bank manages the liquidity risk with the purpose of maintaining an adequate liquidity, so as to cover at all times its commitments on all time bounds deposits, as well as to maximize the net interest income. Numerous researches have been conducted on liquidity risk and profitability and some of these are captured in this section. [5], conducted a study on liquidity risk in the Italian banking system with a sample of 675 Italian banks. The study found that larger banks have lower liquidity exposure. The study concluded that there is no significant difference in terms of liquidity risk exposure between banks specializing in real estate lending and other banks. The implication of this is that larger banks have a better reputation and so are less exposed to liquidity risk. This conforms to the findings of [6] on determinants of liquidity risk measured with different balance sheet indices using 22 banks during the 2006-2009. The study found that liquidity measures show a positive relationship with capitalization and with size. The study concluded that bigger banks present lower liquidity in line with the "too big to fail" theory, where it would seem that bigger banks are less motivated to hold liquidity since they rely on government intervention in case of shortages. [7], examined the nature and extent of the relationship between liquidity and profitability. A model of the perceived functional relationship was specified and estimated using correlation and regression analysis. The results indicated that while a trade-off existed between liquidity and profitability in banks with a negative but

insignificant impact, the two variables were positively correlated.

In a similar study conducted by [8], on the relationship between liquidity risk and bank market power, the study found that bigger banks, through lower capitalization and cost efficiency, endure a lower liquidity risk. The study concluded that listed banks usually hold more liquid assets than non-listed banks. [9], investigated the impact of liquidity management on the profitability of banks in Nigeria. Three banks were randomly selected to represent the entire banking industry in Nigeria and Elliot Rosenberg Stock (ERS) stationary test model was used to test the association of the variables under study, while regression analysis was used to test the hypothesis. The result showed that there is a statistically significant relationship between the variables of liquidity management and profitability of the selected banks. [10], critically examined the relationship between credit management, liquidity position and profitability of selected banks in Nigeria using annual data of ten banks over the period of 2006 and 2010 and found out that liquidity has significant positive effect on Return on Asset. [11], explored the efficacy of liquidity management and bank profitability performance in Nigeria. The study found that there was a statistically significant relationship between efficient liquidity management and bank performance. The study concluded that liquidity and profitability are indicators of bank risk management efficiency and cushion against losses not covered by current earnings.

In recent studies, [12], analysed the determinants of liquidity risk in Islamic banks. The study adopted panel data analysis and the results show a negative correlation between liquidity risk and cash ratio, as the cash balance can be used to meet any demands for liquidity from the bank's customers. The study concluded that the relationship between bank size and liquidity risk is not linear. [13], conducted a study on liquidity and profitability management in banking industry. The study made use of Pearson correlation co-efficient technique and the empirical results revealed that there is a statistically significant relationship between banks' liquidity, return on asset and return on equity. The study concluded that banks should evaluate and redesign their liquidity management strategy so that it will optimize returns to shareholders equity and also optimize the use of the assets. [14], examined the effect of liquidity risk on the financial performance of commercial banks in Kenya.

Panel data techniques of random effects estimation and generalized method of moments (GMM) were used. The study found that net stable funding ratio is negatively associated with bank profitability both in long-run and short-run while liquidity coverage ratio does not significantly influence the financial performance of commercial banks in Kenya both in the long-run and short-run. The study concluded that bank's management should pay required attention to liquidity management.

From all the studies reviewed, few studies have been conducted on the effect of liquidity risk exposure, short-term and long-term liquidity risk on banks' profitability and this justifies the importance of carrying out this study in order to contribute to the scanty empirical literature on liquidity risk exposure and banks' profitability. Thus, in conducting this study Hirigoyen theory will be adopted. This theory advocates that a low liquidity will eventually compromise high profitability and low return and making it harder to achieve a high liquidity level.

3. METHODOLOGY AND MODEL SPECIFICATION

Expos-facto research design is adopted in this study which is characterized with quantitative or numeric description of historical data. The population of the study comprises all the deposit money banks operating in Nigeria as at 31st December, 2017 and sample were drawn through census sampling technique. Thus, the sample of the study comprises of all the 15 deposit money banks listed at the Nigerian Stock Exchange as at 31st April, 2017. The source of data for the study is secondary and data were extracted from the audited financial statements of the sampled banks. The study used longitudinal balanced panel data using multiple regressions to examine the model of the study. The model specification incorporates liquidity risk variables and profitability variable. The liquidity risk variables included in the existing models comprise long-term liquidity risk, short-term liquidity risk and liquidity risk exposure while the profitability was proxy with return on assets. The model is specified below:

$$ROA_{it} = \pi_0 + \lambda_1 LTR_{it} + \lambda_2 STR_{it} + \lambda_3 LRE_{it} + \varepsilon_{it} \quad (3.1)$$

This is moderately consistent with the panel data regression model. Where ROA represents return

on assets, LTR represents long-term liquidity risk, STR represents short-term liquidity risk, LRE represents liquidity risk exposure, ε represents error term, λ_1 - λ_3 represents coefficients of independent variables, π represents the constant, t represents time covered and i represents listed deposit money banks. The variables used in this study are defined in Table 3.1 in the appendix. The study conducted a robustness tests such as a multicollinearity, correlation matrix and heteroscedasticity, in order to improve the validity of all statistical inferences of the study.

4. RESULTS AND DISCUSSION

Table 4.1 in the appendix reveals the mean, standard deviation, minimum and maximum values of the variables employed in the study. The mean values of ROA, LTR, STR, and LRE are .0080979, 1.379032, 1.092857, and .2273991 respectively. The common feature of these variables is that they all have positive mean values. This means of each of the variables displays increasing tendency throughout the sampled period. Another interesting characteristics of return on asset is that it ranges between -.5313 and .0817. This has explicitly revealed that there is situation where banks did not record profitability but the loss of -.5313 from their banking operation and the maximum profitability recorded during the period of investigation in this study is .0817. This highest profitability was declared in 2009 by Unity Bank Plc. while the minimum loss was realized by Wema Bank Plc. in 2008. In a different token, long-term liquidity risk ranges between .8402 and 7.129. By this range, it simply implies that there is fluctuation in the long-term liquidity risk in the banking sector. The short-term risk ranges from 1.1281 to 6.3708 and the liquidity risk exposure ranges from -.7638413 to .222484. However, the most volatile variable is short-term liquidity risk with a value of .6104183.

The interpretation of Pearson correlation coefficients followed Guilford rule of thumb which is < 0.2 is a negligible correlation, 0.2 to 0.4 is low correlation, 0.4 to 0.7 is a moderate correlation, 0.7 to 0.9 is a high correlation, and > 0.9 is a very high correlation. The result shows that the correlation between the independent variables and dependent variable used in the model is generally small. The largest correlation coefficients exist between the short-term and long-term liquidity risk (67.06%). The result shows that profitability (measured by return on

assets) positively correlated to long-term liquidity risk, short-term liquidity risk and liquidity risk exposure. Also, the correlation matrices reveal that long-term liquidity risk positively correlated to short-term liquidity risk but negatively correlated with liquidity risk exposure. More so, it is shown More so, it is shown that both short and long-term liquidity risk are negatively correlated with liquidity risk exposure. The correlation matrix reveals that no explanatory variables are perfectly correlated. This means there is absence of multicollinearity problem in our model. This was confirmed by Variance Inflation Factors (VIF) and Tolerance Values (TV). The result is presented in Table 4.3 in the appendix. This was confirmed by Variance Inflation Factors (VIF) which is less than 10 and Tolerance Values (TV) which is less than 1. Moreover, the study employs Breusch-Pagan-Goldfrey Test to test for existence of heteroscedasticity across the range of variables. The result was presented in appendix (Table 4.4) and confirmed that there is no heteroscedasticity since P-value is 0.000 which is less than 5%.

[15], specified that there are broadly two classes of panel estimator approaches that can be employed in financial research: fixed effects models and random effects models. The choice between both approaches is done by running a Hausman test. The result confirmed that the random effect model is appropriate since the p-value is greater than 0.05 and this is in line with the decision rule. Thus, the study interprets the random effect model and the result of the regression (see Table 4.6 appendix) shows that the coefficient of LTR is .003 approximately which implies that the long-term liquidity risk has positively an significant effect on profitability of Deposit Money Banks (measured as return on assets). Short-term liquidity risk displays a positive parameter but insignificant at 5 percent. Liquidity risk exposure appears insignificant and negatively influenced profitability of Deposit Money Banks. The result also shows that the R^2 value is 26.10% which indicates the percentage at which the dependent variable (profitability) is explained by the independent variables (long-term risk, short-term risk and liquidity risk exposure). Thus, these variables collectively influence profitability of Deposit Money Banks in Nigeria. The regression p-value of Wald chi2 (3) confirm the fitness of the model.

The study found that long-term liquidity risk has positive and significant effect on profitability. This does not conform to the findings of [16], and this

is not in tandem with a priori expectation or paradigm but the paradox is infixed in the Nigerian banking system. The plausible reason for this could be adduced to the fact that unavailability of long-term loan facility granted by Deposit Money Banks ushers in reasonable interest rate at the opportunity cost of meeting the short-term obligation. Also, the study reveals that short-term liquidity risk has positive but insignificant effect on profitability. This conforms to the findings of [16]. The explanation for this could be as a result of ability of Deposit Money Banks to raise the required funds by selling assets at a reasonable price or increase securitization and liabilities within the shortest period of time. The study found that negative effect exists between banks profitability and liquidity risk exposure. This implies that low level of liquidity risk exposure lead to high profitability and high level of liquidity risk exposure induces profit decline. This conforms to the findings of [17]. The explanation for this could result that Deposit Money Banks are exposed to some relative level of liquidity risk, due to the nature of their cash flow requirements to service customers on a daily basis, but the degree differs due to the nature of their portfolios, daily cash requirements, among others and this could erode depositors' confidence in the security of their funds.

5. CONCLUSION AND RECOMMENDATIONS

The study concluded that both short-term and long-term liquidity risk have positive effect on the profitability of deposit money banks. In line with this conclusion, the following recommendations are made in this study: The management of Deposit Money Banks should maintain short, medium and long-term cash forecasts in order to forestall problem of illiquidity and reduce the liquidity risk. This will not send a wrong signal to the depositors and enhance management ability to react to unexpected expenses and investment opportunity. Also, management should strike a balance between cash holdings and the marginal benefit of holding the cash and this will be at equilibrium with the marginal cost to avoid agency problems, reduce transaction costs, and give room for competitive advantages when unexpected negative changes in cash flows occur. However one of the limitations of the study is the use of static model due to the nature and availability of data. Thus, further researchers should adopt more robust statistical analysis such as Co-integration, Vector error correction

among others in order to capture the long-run and short-run relationship between the dependent and independent variables.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Schumpeter JA. The theory of economic development, Harvard University Press, Cambridge, MA; 1911.
2. Drigă I. Liquidity risk management in banking. *Revista Tinerilor Economisti (The Young Economists Journal)*. Online material; 2010.
3. Minh NTK. Risk Management for Commercial Bank in Vietnam, Master's Thesis, Berlin School of Economics and Law Open University, Berlin; 2014.
4. Greuning H, Bratanovic SB. Analyzing and Managing Banking Risk: A Framework for Assessing Corporate Governance and Financial Risk. 2nded. Washington, DC: The World Bank; 2003.
5. Giannotti C, Gibilaro L, Mattarocci G. Liquidity risk exposure for specialised and unspecialized real estate banks: Evidence from the Italian Market, of *Property Investment & Finance*. 2010;29(2):98-114.
6. Vodová P. Liquidity of Czech commercial banks and its determinants. *International Journal of Mathematical Models & Methods in Applied Sciences*. 2011; 6(5):1060-1067.
7. Obiakor RT, Okwu AT. Investigating liquidity –profitability relationship in business organisation: A study of selected quoted companies in Nigeria. *British J. Economics, Finance & Management Sciences*. 2011;1(2).
8. Nguyen M, Skully M, Perera S. Bank market power and liquidity, evidence from developed and developing countries. SSRN; 2012.
9. Ibe SO. The impact of liquidity management on the profitability of banks in Nigeria. *Journal of Finance & Bank Management*. 2013;1(1).
10. Kehinde OP. An empirical investigation of the liquidity-profitability relationship in Nigerian commercial banks. *J. Econ. & Sustainable Development*. 2013;(4)6.
11. Agbada AO, Osuji CC. The Efficacy of Liquidity Management and Banking

- Performance in Nigeria. *Int. Rev. Management and Business Res.* 2013;2.
12. Alzoubi T. Determinants of liquidity risk in Islamic banks. *Banks and Bank Systems.* 2017;12(3).
 13. Akinwumi IA, Micheal EJ, Raymond A. Liquidity and profitability management in banking industry. *Issues in Business Management & Economics.* 2017;5(6):88-98.
 14. Muriithi JG, Waweru KM. Liquidity risk and financial performance of commercial banks in Kenya. *International Journal of Economics & Finance.* 2017;9(3).
 15. Brooks C. *Introductory econometrics for finance.* 2nd edn., Cambridge University Press, New York; 2008.
 16. Ferrouhi EM. Bank liquidity and financial performance: evidence from Moroccan banking industry. *Business: Theory and Practice.* 2014;15(4):351–361.
 17. Saunders A, Cornet MM. *Financial institutions management. A Risk Management Approach (6th ed.).* McGraw-Hill Irwin; 2008.

APPENDIX

Table 3.1 Measurement of variables and a priori expectation

Variables	Types	Measurements	Source	A priori
Profitability measured by ROA	Dependent	Profit after tax divided by total assets	Farouk, (2014)	
Long-term liquidity risk	Independent	Ratio of liquid assets to Deposits	Ferrouhi (2014)	-
Short-term liquidity risk	Independent	Ratio of liquid assets to short term liabilities	Ferrouhi (2014)	+
Liquidity risk exposure	Independent	Ratio of financing gap to total assets	Ferrouhi (2014)	+/-

Source: Researcher compilation, (2017).

Table 4.1 Descriptive statistics

Variables	Mean	Std. dev.	Min	Max
Roa	.0080979	.0630787	-.5313	.0817
Ltr	1.379032	.5292289	.8402389	7.129984
Str	1.092857	.6104183	1.1281	6.37086
Lre	.2273991	.1601368	-.7638413	.222484

Note: ROA, LTR, STR, AND LRE are ellipsis for return on assets, long-term risk, short-term risk and liquidity risk exposure.

Source: Author's Computation from STATA 14.0

Table 4.2 Correlation analysis

Variables	Roa	Ltr	Str	lre
Roa	1.0000			
Ltr	0.0437	1.0000		
Str	0.0457	0.6706	1.0000	
Lre	0.0184	-0.0388	-0.0992	1.0000

Table 4.3 Multicollinearity test

Variables	VIF	1/VIF
Str	1.83	0.544974
Ltr	1.82	0.549557
Lre	1.01	0.888774
Mean VIF	1.56	

Source: Researcher computation from STATA output, (2017)

Table 4.4 Heteroskedasticity test

Statistics	Values
chi2(1)	366.42
Prob> chi2	0.0103

Source: Researcher computation from STATA output, (2017)

Table 4.5 Hausman test

Statistics	Value
chi2(4)	0.06
Prob>chi2	0.0958

Source: Researcher computation from STATA output, (2017)

Table 4.6 Dependent variables: return on assets

Variables	Coefficients	Std. error	Z-statistics	Prob.
Ltr	.0027602**	.0133755	-2.25	0.037
Str	.0034841	.0116389	0.30	0.765
Lre	-.00751	.0368111	-0.20	0.838
Constant	-.001224	.0178416	-0.07	0.945
R-square	0.2610			
Wald chi2(3)	0.44			
Prob> chi2	0.045			

*Note: The critical z-statistic at 5%=1.64, at 1%=2.33; * and ** denote significant at 1% and 5% respectively*

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