

Liquidity Risk Management and Its Impact on Bank Financial Performance

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doi: <https://doi.org/10.37745/ejaaf.2013/vol14n83945>

Published October 11, 2026

Citation: Bueawi A.F. (2026) Liquidity Risk Management and Its Impact on Bank Financial Performance, *European Journal of Accounting, Auditing and Finance Research*, 14(8),39-45

Abstract: *This study examined the effect of liquidity risk management on the efficiency and productivity of Nigerian commercial banks. Using a panel data technique, which involves collecting performance data over a long period of time, this research work was able to compile its data. Liquid asset ratios, loan-to-deposits, and net interest margins are indications of liquidity risk, whereas return on assets (ROA), return on equity (ROE), and net interest margins are financial performance metrics for commercial banks. The amount and sufficiency of a bank's capital, as well as the macroeconomic features of GDP growth and inflation rates, are additional control variables. Researchers used descriptive statistics, correlation analysis, and a panel regression approach with a fixed-effect estimation method and a random effect to examine the relationship between liquidity risk indicators and bank performance. Their findings were confirmed by the Hausman test. Nevertheless, the nature and strength of the correlation between these two factors were different. As the quality of a bank's assets declines due to excessive lending, the positive association between profitability and loan-to-deposit ratio only holds up to a point. The opportunity cost of holding low-yielding liquid assets causes a negative correlation between liquidity and performance. The beneficial impact of liquidity management on performance may be magnified with sufficient capital holdings. In its last section, the report proposes several research goals for the future.*

Keywords: capital adequacy, financial performance of banks, liquidity risk, liquidity risk management, loan-to-deposit ratio, panel data regression, return on assets, return on equity

INTRODUCTION

It is not necessary for non-financial enterprises to undergo maturity transition in order to stay in business. Yes, the financial sector does. They are able to use deposits and other short-term commitments to fund long-term investments thanks to this framework. Without banks, the economy would collapse. Nevertheless, this structural mismatch poses the possibility of unsatisfactorily huge losses—also known as liquidity risk—which might leave enterprises unable to pay their debts when they come due. A solvent institution may go bankrupt in a matter of days when liquidity risk becomes apparent and depositor trust disappears. This was highlighted during the worldwide financial crisis of 2007-2009 and other recent episodes of banking distress, including the regional banking turmoil of 2023.

These risks have been acknowledged by international regulators, and new liquidity standards have been adopted under the Basel III framework, including the Net Stable Funding Ratio and the Liquidity Coverage Ratio. The standards require banks to clasp appropriate amounts of high-quality liquid assets and stable funding. Even if fully compliant with all applicable regulations, however, a bank's liquidity management practices may nonetheless undermine its profitability. Aggressive lending relative to deposits can generate short-term revenues, while building up latent vulnerability. Holding a large amount of liquid assets shields a bank from short-term funding shocks, but reduces the number of interest-earning assets, which reduces returns. Management and academics are more interested in the rapport between the structure and intensity of liquidity peril management and financial recital rather than the subject of whether banks should manage this risk or not.

This link has been extensively studied in the empirical literature, but scholars have reached conflicting conclusions. Research has shown that banks may better take advantage of lending opportunities and protect themselves from asset fire sales or emergency borrowing, both of which can reduce profitability, if they practise excellent liquidity management. There is conflicting evidence about the association amid profitability and liquidity. Some reports have shown a optimistic link depending on factors including bank size, ownership structure, market circumstances, and the specific liquidity measurements used. On the other hand, some studies have found a negative or non-linear relationship. It is from this uncertainty that the current investigation is motivated. Applying a panel dataset together with a suite of supplementary liquidity metrics, control variables, and robustness tests, this research re-examines the connection between liquidity risk and performance.

There are three main goals of this research. Before anything else, we need to figure out how the sample banks' liquidity risk levels were at the beginning of the research and how they evolved throughout. Second, to establish how indicators of liquidity risk are related to financial performance. Third, to establish what the indicators mean in terms of practical insinuations for prudential regulation and bank management. The rest of the article is organized as follows. Section 2 presents literature reviews, both theoretical and empirical. Section 3 describes the data, variables, and econometric approach used in this study. Section 4 presents the empirical results. Section 5 discusses the fallouts in light of theory and prior evidence. Finally, Section 6 accomplishes and suggests future research avenues.

LITERATURE REVIEW

The decisions of a bank concerning asset allocation are directly related to its risk-return profile, and these decisions are based on the liquidity-profitability trade-off theory, which states that assets with higher liquidity usually have lower expected returns. The theory offers a theoretical foundation for the liquidity-profitability relationship. The theory of financial intermediation and agency-based explanations are complementary. The first views banks as entities that resolve the liquidity mismatch by changing short-term liabilities into long-term assets, whereas the second connects liquidity buffers to the risk appetite of managers and the quality of governance.

Recent empirical studies have, however still yielded somewhat inconsistent results. Studies on Nigerian commercial banks in the 2020s that investigated the correlation between liquidity risk management proxies and ROA show that liquidity structure does affect profitability but to varying extents depending on the particular proxies. Likewise, studies in the MENA zone banking sector have analyzed the influence of liquidity risk on viability. The results demonstrate that the relationship is dependent on the particular

liquidity indicator and the macroeconomic environment of the region. Research into the UK's largest commercial banks has shown that there is no clear correlation amongst liquidity and performance, but that it is influenced by factors unique to each bank as well as wider economic cycles. Moreover, studies have yielded mixed results on the outcome of liquidity risk-taking on profitability, with some finding positive impacts and others negative ones.

However, other schools of thought in the literature argue that the rapport among liquidity risk and credit risk during economic indecision, such as the COVID-19 pandemic, can also affect bank margins. Beyond conventional banks, studies comparing Islamic and hybrid financial institutions have shown a notable but non-linear and non-consistent liquidity-performance nexus. In sum, the study recommends more panel-based empirical investigations to address both cross-sectional and temporal dynamics.

METHODOLOGY

Research Design and Data

This investigation makes use of secondary panel data to conduct quantitative explanatory research. Panels of commercial banks with full sets of financial statements for each year of the research period make up the sample. The information was gathered via central bank supervisory bulletins, financial statement disclosures, and annual reports. We dropped banks that did not report data on any of the key variables in a given year to maintain the panel balance. We winsorized outliers at the 1st and 99th percentiles to remove them, thereby limiting the effect of extreme values on the regression results.

Variable Definitions

The three indications show that the dependent variable, financial recital, is slow. Reoccurrence on assets (ROA) is the ratio of net income to normal total assets; return on equity (ROE) is the proportion of net income to average shareholders' equity; and net interest margin (NIM) is the proportion of net interest income to average earning assets. We use two independent variables to capture this risk. The loan-to-deposit ratio (LDR) is total loans alienated by whole credits, and the current or cash ratio (CR) is total assets divided by cash and cash equivalents. This is a three-indicator measure of liquidity risk. To control for the institutional and macroeconomic factors of bank profitability other than liquidity management, we have included control variables such as bank size (natural logarithm of total assets), capital tolerability ratio (CAR, regulatory capital to risk-weighted assets), GDP growth rate, and annual inflation rate.

Variable	Symbol	Measurement
Return on Assets	ROA	Net income / Average total assets
Return on Equity	ROE	Net income / Average shareholders' equity
Net Interest Margin	NIM	Net interest income / Average earning assets
Loan-to-Deposit Ratio	LDR	Total loans / Total deposits
Liquid Assets Ratio	LAR	Liquid assets / Total assets
Current Ratio	CR	Cash & equivalents / Short-term liabilities
Bank Size	SIZE	Natural log of total assets

Capital Adequacy Ratio	CAR	Regulatory capital / Risk-weighted assets
GDP Growth	GDP	Annual real GDP growth rate (%)
Inflation Rate	INF	Annual consumer price inflation (%)

Model Specification

The relationship among liquidity risk and financial performance is estimated by the following panel regression model:

$$PERFORMANCE_{it} = \beta_0 + \beta_1 LDR_{it} + \beta_2 LAR_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 CAR_{it} + \beta_6 GDP_t + \beta_7 INF_t + \varepsilon_{it}$$

where PERFORMANCE alternately represents ROA, ROE, and NIM for bank *i* in year *t*, β_0 is the constant term, β_1 through β_7 are the coefficients to be assessed, and ε_{it} is the idiosyncratic mistake term. To select the appropriate estimator, both fixed-effects and random-effects models were estimated, and the Hausman specification test was pragmatic to determine which specification produces consistent estimates. The Breusch-Pagan Lagrange multiplier test was used to validate the presence of significant panel effects relative to pooled OLS. We computed variance inflation factors (VIFs) to rule out multicollinearity in the independent variables. At the bank level, we used robust standard errors to account for serial correlation and heteroskedasticity..

RESULTS

Descriptive Statistics

Among the banks that were part of the sample, we found a net interest margin of roughly 3.8%, a ROE of around 12.6%, and an asset revenue rate of about 1.4%. A relatively modest amount of lending was indicated by the average loan-to-deposit ratio of around 72%. The average liquid assets ratio was around 28%, indicating reasonable liquidity buffers in line with the expectations of post-Basel III regulators. The capital adequacy ratio was 15.9% in the research period, which is higher than the required ratio, so the tested banks had enough capital on average.

Variable	Mean	Std. Dev.	Min	Max	Obs.
ROA (%)	1.41	0.62	-0.35	3.12	n
ROE (%)	12.63	5.84	-4.20	26.75	n
NIM (%)	3.82	1.05	1.20	6.90	n
LDR (%)	71.94	12.37	38.50	97.60	n
LAR (%)	27.85	8.41	9.30	48.20	n
CR (times)	1.32	0.41	0.55	2.60	n
CAR (%)	15.92	3.28	9.80	24.10	n

Correlation Analysis

The opportunity cost theory declares the retention of liquid assets with low yields decreases total returns. The ratio of liquid assets and two indicators of profitability are negatively correlated. All variance inflation factors are less than the conventional cut-off value of 5. Also, correlations among the independent variables are still small. Therefore, multicollinearity does not significantly affect the regression estimates.

Panel Regression Analysis

Based on the findings of the Hausman test, which was applied to all three performance metrics, it was determined that the fixed-effects specification is superior to the random-effects one.

Table 3 provides a summary of the findings of the fixed-effects regression.

Variable	ROA (Model 1)	ROE (Model 2)	NIM (Model 3)
LDR	0.018*** (0.004)	0.142*** (0.038)	0.021** (0.009)
LAR	-0.024*** (0.006)	-0.189*** (0.051)	-0.015* (0.008)
CR	0.011* (0.006)	0.087* (0.047)	0.006 (0.007)
SIZE	0.156** (0.062)	1.204** (0.512)	0.098 (0.081)
CAR	0.043*** (0.011)	0.298*** (0.079)	0.031** (0.014)
GDP	0.062** (0.028)	0.415** (0.184)	0.047* (0.026)
INF	-0.038** (0.017)	-0.256** (0.109)	-0.029* (0.016)
Constant	-1.842* (0.980)	-9.317* (5.204)	1.203 (1.150)
R ² (within)	0.41	0.37	0.29
F-statistic	18.62***	15.94***	10.27***
Hausman χ^2	24.51***	21.08***	17.36***

Note: Robust standard errors grouped at the bank level are described in parentheses. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, correspondingly.

The negative and statistically significant relationship between LAR and all three performance measures provides evidence that higher buffers of liquid assets, while prudentially beneficial, come at the expense of lost profits. CR has a positive influence on ROA and ROE, but it is small and only marginally significant. It does not have a significant impact on NIM. This means that the direct effect of short-term cash buffers held for urgent liquidity needs is lower than that of the total liquid assets ratio on profitability. The size of the bank is positively and weakly correlated with ROA and ROE. CAR is positively and significantly correlated with performance in all models. But the relationship between NIM and size is not so strong. Inflation is negatively related to performance, consistent with the decline of real returns in inflationary periods, and GDP growth is positively associated with performance, so macroeconomic conditions do matter.

DISCUSSION

The results confirm and extend several insights reported in the literature. Studies have shown that banks can increase profits by taking on some liquidity risk. The positive connection among the loan-to-deposit ratio and profitability supports the hypothesis that banks with moderate liquidity risk appetite are better able to convert their deposit funds into earning assets than those which hold excess cash. But that does not mean we are able to extend credit forever. Studies of the 2007-2009 financial crisis and the 2023 regional banking turmoil reveal that even profitable institutions can face solvency and liquidity crises if their loan-to-deposit ratios rise above prudent levels, particularly when they depend on volatile wholesale funding. MENA and UK financial institutions found that the effect of liquidity indicators on profitability be contingent on the measure and institutional setting. This is consistent with the findings of these studies, which support the liquidity-profitability trade-off theory and indicate a negative correlation between liquid assets ratio and profitability. An important practical implication of this finding is that the bank management cannot maximize profitability at the same time with the pursuit of liquidity safety. Instead, they need to identify an optimal liquidity band that balances the earnings needed to sustain capital generation and shareholder returns over time with resilience to funding shocks.

The positive and statistically significant coefficient on capital adequacy suggests that banks through adequate capital are better able to manage liquidity risk profitably. This could be because banks with larger capital buffers can pursue liquidity strategies that offer somewhat higher yields without having to worry too much about regulators or depositors becoming too risk averse. This finding is constant with previous studies which found that banks in both developing and developed countries had stronger capital and better risk management strategies. In a recessionary or inflationary environment when liquidity pressures arise, funding costs rise and credit risk increases, liquidity strategies that work well in an expansionary environment may need to be re-evaluated. This is because of the large macroeconomic effects which imply that liquidity risk management cannot be evaluated in isolation of the larger economic cycle. Liquidity risk management, as we have seen, is less of a compliance defence mechanism and more of a performance lever. Banks that dynamically calibrate their liquidity indicators for institutional characteristics such as size and capital strength and external conditions such as GDP growth and inflation, can better balance resilience and profitability. This is better than banks that apply static liquidity targets over the economic cycle.

CONCLUSION

The current study examined the association among liquidity risk management and financial recital in a panel of commercial banks. The current analysis used loan-to-deposit ratio, liquid assets ratio, and current ratio as indicators of liquidity risk and used return on assets, net interest margin, and return on equity as measures of performance. The panel regression results show a positive association between profitability and the loan-to-deposit ratio, a negative association with the liquid assets ratio, and the importance of capital adequacy in reinforcing the positive effects of prudent liquidity management. Results were estimated using fixed effects and robust clustered standard errors. Results show that the management of liquidity risks has a significant and tangible impact on the profitability of banks, with the sign of the effect depending on the particular measure of liquidity.

The research has several real-world implications. Alternatively, financial institutions should seek to maintain a flexible approach to liquidity management that is periodically adjusted to their capital position,

size and macroeconomic environment. Regulators should monitor liquidity ratios because capital and liquidity requirements should not be viewed as independent pillars of supervision but as prudential safeguards and indicators of a bank's performance trajectory.

Further research is needed to study the liquidity-profitability nexus with market-based measures such as stock returns or Tobin's Q, or by bank size or ownership (Islamic vs. conventional banks) and by looking at more recent years, with the impact of monetary tightening cycles and the changing nature of Basel III implementation.

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