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The Effect of Liquidity Risk on Financial Performance of Commercial Banks in Ethiopia

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Abstract

In the banking industry, retaining enough liquidity to meet customer obligations is crucial. This study examines the effect of liquidity risk on financial risk in Ethiopian commercial Banks spanning 2012 to 2021 for a sample of ten commercial banks operating in Ethiopia. The researcher employed descriptive and inferential statistics using secondary data (audited financial statements) from sampled commercial banks. Loan to deposit ratio (LTDR), liquid assets to deposit ratio (LATD), and liquid assets to total assets (LATA) were proxies for liquidity risk, and financial performance was measured by return on equity (ROE). The study's findings show that liquidity risk, as proxied by the loan-to-deposit ratio (LTDR) and liquid assets-to-deposit ratio (LATD), has an economically significant effect on financial performance, as measured by return on equity. In contrast, liquid assets to total assets (LATA) positively impact return on equity, but this is statistically insignificant.

1. Introduction

1.1. Background of the Study

A bank is a financial intermediary whose primary function is to obtain deposits from savers to pay borrowers. Banks route funds from a saver to a borrower, enhancing economic efficiency by encouraging better resource allocation. They achieve this by collecting surplus funds from a saver and allocating them to individuals and businesses with a funding shortage (borrower). However, because of their basic role in the maturity transition of short-term deposits into long-term loans, banks are intrinsically subject to liquidity risk, which can damage individual institutions and the entire market.

Rudhani & Balaj (2019) studied the impact of liquidity risk on the performance of banks in Kosovo for six years. Liquidity risk indicators refer to the ability of the bank to absorb the liquidity shocks, L2 - is the ability of the bank to cope with a high liquidity demand in the short term, and L3 - is the ability of the bank to face liquidity risk in the presence of non-liquid assets, while Return on assets ROA and return on equity ROE are the determinants of performance. The results show that there is a positive and significant relation between liquidity risk and performance of the banks and concluded that commercial banks in Kosovo could raise the level of performance by improving their ability to cope with the liquidity shocks risk, the short-term liquidity risk and the risk from the presence of large non-liquid assets.

Alta'ani & Dali (2020) investigated the association between liquidity risk management indicators and the financial performance of listed banks in Jordan from 2013 to 2017 for a sample of 15 listed Jordanian banks. The study's findings revealed a significant and positive relationship between liquidity ratio (LR), LTA, and ROA, while a significant and negative relationship between CTD and ROA. Meanwhile, there is a significant and positive association between CR, LTA, LR, and ROE and a significant and negative association between LTD, CTD, and ROE. Also, a positive and significant correlation exists between CR, CTD, LR, and TQ, while a negative relationship exists between GDP and TQ.

Muriithi & Waweru (2017) examined the effect of liquidity risk on financial performance of commercial banks in Kenya spanning 2005 to 2014 for a sample of 43 commercial banks in

Ethiopia. Liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) were proxies for liquidity risk, while return on equity (ROE) was a measure of financial performance. Panel data techniques of random effects estimation and generalized method of moments (GMM) were used. The study's findings revealed that the net stable funding ratio (NSFR) is negatively associated with bank profitability both in the long run and short run. In contrast, the liquidity coverage ratio (LCR) does not significantly influence the financial performance of commercial banks in Kenya in the long and short run.

Kalimashi et al. (2022) "investigated the relationship between liquidity risk management and the performance of commercial banks in the Western Balkans spanning from 2015 to 2020". Return on equity and net interest margin were proxies for financial performance. The quick ratio, current ratio, loan-to-deposits ratio, loan-to-assets ratio, cash and investment-to-deposit ratio, capital adequacy, and interest coverage ratio measured liquidity risk. The researcher employed the Ordinary Least Squares model using secondary data obtained from financial statements. The findings of the study found that the current ratio, quick ratio, and interest coverage ratio have a negative relationship with return on equity, but return on equity has a positive relationship with loans-to-total deposits, cash plus investments-to-total deposits, and capital adequacy ratio, current ratio, and loans-to-total assets. Net interest margin is negatively related to loans-to-total deposits, capital adequacy interest coverage ratio, and positively associated with loans-to-total assets.

However, the impact of liquidity risk on Ethiopian commercial banks' financial performance is still unstudied. Hence this study aims to investigate the effect of liquidity risk on financial performance of Ethiopian commercial banks.

1.2. Statement of the Problem

Any firm needs liquidity, but the banking industry needs it more than any other since banks need enough cash or other liquid assets to pay their obligations when they become due. Banks must be ready to meet certain commitments whenever they become due, even though the actual inflow and outflow of cash may not always mirror contractual maturities. Therefore, this liquidity mismatch experiences the bank, making its liquidity policies and risk management key to its business strategy.

Liquidity risk is considered one of the concerns and challenges for the modern banking industry. To this end, the researchers sought to evaluate the effect of liquidity risk on the financial performance of selected deposit money banks in Nigeria from 2009 to 2014. The researcher used the ex-post facto in this study. The net operating profit margin was a proxy for financial performance, and Deposits, Cash, Liquidity-Gap, Non-performing loans (NPLs), and Leverage ratio (LEV) were proxies for liquidity risk. The study's findings show that deposits, cash and non-performing loans have a positive relationship with net operating profit margin (NOPM). In contrast, liquidity-gap and leverage ratios negatively affect selected deposit money banks' net operating profit margin (NOPM) (Enekwe et al., 2017).

Hakimi & Zaghdoudi (2017) studied the relationship between liquidity risk and bank performance from 1090 to 2013 for 10 Tunisian banks. The researcher employed panel data regression. The findings of the study revealed that liquidity risk decreases significantly in Tunisian bank performance. Also, results indicate that international financial crisis and inflation act negatively and significantly on bank performance.

The issue related to the effect of liquidity risk on financial performance in commercial banks was studied by different researchers in Ethiopia and the rest of the world. However they limit the study on private commercial banks in Ethiopia, but this study includes both private and public commercial banks operating in Ethiopia.

1.3.Objectives of the study

This study determines the impact of liquidity risk on financial performance of Ethiopian commercial banks.
Specifically, this study addresses the following specific objectives;

- ✓ To examine the effect of loan-to-deposit ratio on financial performance of commercial banks.
- ✓ To investigate the effect of liquid assets to deposit ratio on financial performance of commercial banks.
- ✓ To gauge the impact of liquid assets to total assets ratio on financial performance of commercial banks.

1.4. Research Hypotheses

The researcher develops the following null hypotheses in line with the study's specific objectives.

Ho1: Loan to deposit ratio has no a negative and significant effect on financial performance of commercial banks in Ethiopia.

Ho2: Liquid asset to deposit ratio has no a negative and significant effect on financial performance of commercial banks in Ethiopia.

Ho3: liquid assets to total assets ratio has no a negative and significant effect on financial performanceof commercial banks in Ethiopia.

2. Material and Methods

2.1. Research Design

Research design is a plan outlining how information is to be gathered for an assessment or evaluation that includes identifying the data gathering method(s), the instruments to be used, how the instruments would be administered, and how the information would be organized and analyzed. A quantitative research design was used to meet the study's overall objective and test hypotheses.

2.2. Population of the Study

The study populations are all government and privately owned commercial banks in Ethiopia. According to NBE (2021) report, there are 18 commercial banks. Therefore, all those commercial banks are considered to be the study's target population.

2.3.Sample Size and Sampling Procedure

As of June 2021, there were 19 commercial banks; however, the researcher utilized a sample of ten commercial banks operating in Ethiopia. The researcher used purposive sampling techniques to select a sample from the population. The sample banks were; Commercial Bank of Ethiopia (CBE), Awash International Bank (AIB), Wegagen Bank (WB), Bankof Abyssinia (BOA), United Bank (UB), Dashen Bank (DB), Nib International Bank (NIB), Cooperative Bank of Oromia (CBO), Lion International Bank (LIB) and Oromia International Bank (OIB). All banks that released audited financial statements for 2012 to 2021 are included in the sample.

2.4. Source and Method of Data Collection

The secondary data source is the national bank of Ethiopia and sampled individual commercial bank websites. This secondary data includes audited financial statements (i.e., statement of financial position, statement of net income, statement of cash flow, and statement of change in capital) from 2012 to 2021. The selected period is based on the reason for providing recent time observation.

2.5. Method of Data Analysis

The data from the audited financial statements were analysed using descriptive and inferential statistics. Descriptive statistics were used to evaluate whether the data had a significant difference. The study also used correlation analysis to examine the degree of variation and the direction of the link between variables. The hypotheses were tested using inferential statistics.

2.6. Model Specification

The study used a panel data model. According to Gujarati & Porter (2010), panel data refers to the same cross-sectional unit surveyed over time.

The panel data model of the study is expressed as follows;

$$y_{it} = \alpha + \beta X_{it} + u_{it} \qquad i = 1,\ldots\ldots\ldots,N; \quad t = 1, \ldots\ldots\ldots\ldots,T \tag{1}$$

Where; i represents cross-sectional units being observed, t denotes the time-series dimension. α is the model intercept, β is the coefficient of the explanatory variable, and X_{it} is the it^{th} observation on K explanatory variables.

From the above equation (1), the disturbance term, $\mathbf{u_{it}}$ decomposed into an individual specific effect, $\boldsymbol{\mu_i}$**,** and the 'remainder disturbance', $\mathbf{v_{it}}$ that varies over time and entities.

$$u_{it} = \mu_i + v_{it} \tag{2}$$

where;

μ_i = Represents the unobservable individual-specific effect and

v_{it} = Represents the remainder disturbance

Baltagi (2005) claims that the fixed effect model presumes that the individual effect (μ_i), which is unobservable, is fixed. The model only applies if we want to assess the impact of factors that vary with time.

The specification for the fixed effect model shows below;

$$y_{it} = \alpha + \beta x_{it} + \mu_i + v_{it} \tag{3}$$

Under the random effects model, the intercepts for each cross-sectional unit are assumed to arise from a common intercept α (the same for all cross-sectional units and over time), plus a random variable ε_i that varies cross-sectionally but is constant over time (Brooks, 2014).

The specification for the random effect model is expressed as follows;

$$y_{it} = \alpha + \beta x_{it} + \mu_i + \varepsilon_{it} \tag{4}$$

Where: $\mu_i + \varepsilon_{it}$ represent the within and between effects, respectively.

According to Brooks (2014), the Hausman test is conducted to select a specific panel regression model (i.e., Fixed effect and Random Model). The hypothesis for the model selection test was formulated as follows;

Ho: Random effects model is appropriate.
Ha: Fixed effects model is appropriate.

Based on the p-value, either a fixed effect or random effect model is selected. If the p-value of the test is greater than 0.05, accept the null (***Ho***), which means the random effect is consistent. If the p-value of the test is less than 0.05, reject the null (***Ho***) hypothesis, which means that the fixed effect is appropriate.

This was to determine whether liquidity risks influenced the financial performance of Ethiopian commercial banks as measured by return on equity. The researchers assumed that a broad multiplicative function related to our investigation's independent and dependent variables.

$$ROE = f\ (LTDR, LATD, LATA) \tag{5}$$

The model was expressed as follows;

$$ROE_{i,t} = \beta_0+\beta_1 LTDR_{i,t}+ \beta_2 LATD_{i,t} + \beta_3 LATA_{i,t} + \varepsilon_{i,} \quad (6)$$

Where

i = 1,2……10

t = 1,2……10

$ROE_{i,t,}$ represents the return on equity; $\beta_{0,}$ represents model constant or intercept; βi is coefficients of the independent variables; $LTDR_{i,t}$ represents oan to deposit ratio; $LATD_{i,t}$ stands for liquid assets to deposit ratio; $LATA_{i,t}$ is liquid assets to total assets ratio and $\varepsilon_{i\ t}$ is error term assumed to have a normal distribution.

Table 1: Summary of Measurement of Study Variables

Variables	**Name of Variable**	**Operationalization**	**Measurement**	**Expected Result**
Dependent Variable	Financial Performance	ROE	NI ÷ Common Equity	NA
Independent Variables	Liquidity Risk	Loan to Deposit Ratio	Loan and Advance ÷ Total Deposit	Negative and Significant
		Liquid Assets to Deposit Ratio	Liquid Assets ÷ Total Deposit	Negative and Significant
		Liquid Assets to Total Assets	Liquid Assets ÷ Total Assets	Negative and Significant

Source: Authors' Computation, 2023

3. Result and Discussion

3.1. Descriptive Statistics of the Study

The descriptive statistics shows the number of observations, mean, standard deviation, and minimum and maximum value of study variables. Financial performance was the study's dependent variable, which is proxied by return on equity (ROE). Liquidity risk was the independent variable of the study which is measured by the loan-to-deposit ratio (LTDR), liquid assets-to-deposit ratio (LATD), and liquid assets to total assets (LATA).

Table 2. Descriptive Statistics of the Study Variable

Variable	Obs	Mean	Std. Dev.	Min	Max
ROE	100	.2220422	.0621095	.09	.342
LTDR	100	.882537	.4091141	.211357	.674418
LATD	100	.2587708	.0778693	.1103697	.4492262
LATA	100	.2091781	.0814267	.082315	.4589943

ROE represents return on equity, LTDR is a loan-to-deposit ratio, LATD stands for liquid assets to deposit ratio, and LATA represents liquid assets to total assets.

Source: Authors' Computation, 2023

The mean value of ROE was 22.20 percent, which means that for every one birr in equity, commercial banks in Ethiopia generate, on average, 22.22 cents in return on equity. The standard deviation value was 6.2 percent, showing moderate ROE dispersion between Ethiopia commercial banks. The maximum and minimum value of return on equity (ROE) was 9 percent and 34.2 percent, respectively.

The mean value of Loan to Deposit (LTD), which measures the ability of banks to bear stress by increasing loans, was 88.25 percent. This indicates that, on average, the commercial banks in Ethiopia had a higher amount of volatile deposits tied up with illiquid loans. There was moderate loan to deposit (LTD) dispersion towards its mean value among banks, shown by the standard deviation of 40.91 percent. The minimum and maximum value of the loan to deposit was 21.13 percent and 67.44 percent, respectively.

The mean value of the liquid assets to deposit ratio was 25.88 percent, with a standard deviation of 7.78 percent. The minimum and maximum values were 11.03 percent and 44.92 percent, respectively. The mean value of liquid assets to total assets was 20.91 percent, with a standard deviation of 8.14 percent. The minimum and maximum value was 8.23 percent and 45.89 percent, respectively.

3.2. Correlation Coefficient

Table 3. Pairwise Correlations of Liquidity Risk Indicators and Return on Equity.

	ROE	LTDR	LATD	LATA
ROE	1.0000			
LTDR	-0.5446*	1.0000		
	(0.0000)			
LATD	-0.4608*	0.4490*	1.0000	
	(0.0000)	(0.0000)		
LATA	0.0977	-0.4305*	-0.0614	1.0000
	(0.3337)	(0.0000)	(0.5440)	

Note: * and ** indicates significant level at 1 % and 5 %, respectively.

ROE refers to return on equity, LTDR represents loan-to-deposit ratio, LATD stands for liquid assets to deposit ratio, and LATA represents liquid assets to total assets ratio.

Source: Authors' Computation, 2023

As shown in Table 3, return on equity (ROE) negatively correlates with the loan-to-deposit ratio and liquid assets-to-deposit ratio. However, ROE positively correlated liquid assets to total assets. Therefore, in the regression analysis, all liquidity risk-measuring variable coefficients are expected to be negative except for the liquid assets to total assets. However, from correlation analysis, the study could not tell whether or not the coefficients of independent variables are significant.

The correlation coefficient of the loan-to-deposit ratio was (LTDR) ($\beta = -0.5446$, $p < 0.01$), an economically significantly negative correlation with financial performance measured by return on equity. The beta coefficient of liquid assets to deposit ratio (LATDR) was ($\beta = -.4608$, $p < 0.01$) economically negatively correlated with return on equity (ROE). The beta coefficient of liquid assets to total assets was 0.0977, and the p-value was 0.3337, which is a statistically insignificant positive association with return on equity (ROE)

3.3. Diagnostic Tests

Tests for Normality

The researcher developed the Normality test as a standard test that may be used before or after model estimation. Table 4 displays the normality test results for a component of the error term for the model.

Table 4. Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
Residuals	100	0.3679	0.5000	1.29	0.5236

Source: Authors' Computation, 2023

The chi statistics for the component of the error term in models have a matching p-value greater than 0.05, which is consistent with the overall normality test. As a result, at a 5% significance level, the chi statistics are fewer than the critical levels. As a result, the null hypothesis that each component is normally distributed is not rejected at a 5% significance level in the models. As a result, the model's error components follow a normal distribution.

Tests for Heteroskedasticity

The assumption of a regression model was tested using the heteroscedasticity method. The Breusch-Pagan or Cook-Weisberg test was used in this study to determine whether heteroskedasticity existed, and the results show that the chi2 value is 1.35. The prob > chi2 value is 0.2456, which is negligible at more significant than a 5% significance level. This demonstrates that heteroskedasticity's effects are absent.

Table 5. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Test Statistics	chi2(1)	prob>chi2
	1.35	0.2456

Source: Authors' Computation, 2023

Tests for Multicollinearity

Table 5. Test for multicollinearity

Variable	VIF	1/VIF
LTDR	1.57	0.635455
LATD	1.29	0.777064
LATA	1.26	0.792897
Mean VIF	1.37	

Source: Authors' Computation, 2023

According to the researcher tests, multicollinearity is not a severe concern of the model because the variance inflation factor values range from 1.26 to 1.57, which are well below the threshold of 10 (Field, 2005).

3.4. Regression Result

The results of multiple linear regression analysis are presented in this section concerning the effect of liquidity risk on financial performance as measured by return on equity (ROE) and regressed against each liquidity risk component. A Hausman test was used to decide whether to employ the fixed or random effects models to achieve the study's goals.

Table 6: Hausman Test Result

Test Statistics	chi2	P- Value
	0.58	0.9001

Source: Authors' Computation, 2023

As shown in Table 2 above, the Hausman test result shows that a chi2 with three degree of freedom random effect model was reasonable because the p-value is 0.9001, which is greater than 0.05. Therefore, in this study, the result of random effect was interpreted.

3.4.1. Regression of Return on Equity on Liquidity Risk Components

Table 7. Random Effect Estimations

Dependent Variable: ROE

ROE	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
LTDR	-.0760559	.0129076	-5.89	0.000*	-.1013543	-.050757
LATD	-.2642994	.0724556	-3.65	0.000*	-.4063098	-.122289
LATA	-.1064063	.0622094	-1.71	0.087	-.2283344	.0155219
_cons	.4558712	.0344505	13.23	0.000*	.3883493	.523393

Post Diagnostics Estimations

R-sq:			
	Within	=	0.5038
	Between	=	0.1079
	Overall	=	0.3661
	Rho		0.47235077
	Wald chi2(3)	=	90.11*
	LM Test chi2	=	0.0000*

In this table, * and ** represent a significant level at 1% and 5%, respectively; ROE represents return on equity, LTDR stands for loan to deposit ratio, LATD refers to liquid assets to deposit ratio, and LATA refers to liquid assets to total assets.

Source: Authors' Computation, 2023

4. Discussion of Findings

After reviewing empirical literature, the researcher developed three null hypotheses. To test the hypothesis, the researcher begins with the loan-to-deposit ratio hypothesis.

Ho_1: Loan to deposit ratio has no a negative and significant effect on financial performance of commercial banks in Ethiopia

As we have from Table 7 above, the beta coefficient of liquidity risk, measured by loan-to-deposit ratio, was -0.0760559 with a p-value of 0.000 economically significant adverse effect on financial performance as measured by return on equity (ROE). This implies that increasing the loan-to-deposit ratio by 1 percent leads to a 7.6 percent decreased financial performance.

The finding of this study is consistence with the findings of Chen et al. (2018), Otwoko & Maina (2021), Hacini et al. (2021), Simamora & Oswari (2019) state that liquidity risk, as proxied by loan-to-deposit ratio has an economically significant adverse effect on financial performance. Other findings contradict the study's findings, for instance, Kalimashi et al. (2022), Ebenezer et al. (2019) state that liquidity risk, as measured by loan to deposit ratio has a positive impact on financial performance. Therefore, the researcher accepts the alternative hypothesis.

Ho_2: Liquid asset to deposit ratio has no a negative and significant effect on financial performanceof commercial banks in Ethiopia.

The beta coefficient of liquidity risk, as proxied by liquid assets to deposit ratio (β =-0.2642994, $p < 0.05$), has an economically significant adverse effect on financial performance of commercial banks. This means that a 1 percent increase in liquid assets to deposit ratio leads to a 26.43 percent decrease in financial performance as measured by return on equity (ROE).

The finding of this result was similar to that of Sathyamoorthi et al. (2020) and Ebenezer et al. (2019), stating that liquidity risk, as proxied by liquid assets to deposit ratio has a statistically negative influence on financial performance. Other scholars in similar research found contradicting results where liquid assets to deposit ratio significantly positively affected financial performance Barat (2013) and Mandvekar & Potdar (2020) state that there is a significant positive effect on financial performance. Therefore, the researcher accepts the alternative hypothesis.

Ho_3: liquid assets to total assets ratio has no a negative and significant effect on financial performanceof commercial banks in Ethiopia.

As shown in Table 7, the beta coefficient of liquid assets to total assets (β = -0.1064063, $p > 0.05$) negatively affects commercial banks' financial performance in Ethiopia, which is economically insignificant.

The result's finding of this study was similar to that of Sathyamoorthi et al. (2020), Adesina et al. (2020) say there is a positive and economically insignificant impact on financial performance of commercial banks in Ethiopia. Therefore, the researcher accepts the null hypothesis and rejects the alternative one.

5. Conclusion and Recommendations

This study concluded that liquidity risk Management affects the financial performance of commercial banks in Ethiopia. The panel regression result revealed that liquidity risk, as proxied by the loan-to-deposit ratio (LTDR), has an economically significant adverse effect on return on equity (ROE), which implies that as there is an increase in loan-to-deposit ratio leads to a decrease in financial performance, as proxied by return on equity (ROE).

Liquid asset to deposit (LATD) statistically negatively affects return on equity (ROE). This means that increasing the ratio of liquid assets to deposits will decrease return on equity (ROE). Liquid assets to total assets (LATA) positively affect commercial banks' financial performance in Ethiopia, which is statistically insignificant.

The researcher provided the following recommendations;

- Liquid assets must be managed so idle funds, which do not bring profit, are avoided.
- Banks' liquidity policy tools must be scrutinized, followed up on, or monitored, and erring banks must be sanctioned appropriately if necessary.
- The National Bank of Ethiopia (NBE) must constantly assess the efficacy and efficiency of liquidity management tools, such as open market operations, cash reserve requirements, liquidity ratios, and the monetary policy rate.
- Credit management should be effective and efficient by ensuring that a sound and good credit policy is in place, which will reduce the amount of non-performing credit that generates no income for banks

COMPETING INTERESTS

The author has no competing interests to declare.

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