The Nexus of Bank Liquidity and Profitability: Evidence from Commercial Banks in Ethiopia

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Abstract
The study attempted to examine the effect of liquidity on performance of commercial banks in Ethiopia for the period 2004-2016. Liquidity risk is considered as one of the serious concern and challenge for the modern era banks. A bank having good asset quality, strong earnings and sufficient capital may fail if it is not maintaining adequate liquidity. During the recent global financial crisis, several banks experienced some difficulties because they failed to manage liquidity in prudent manner. Thus, the unique feature of the study was inclusion of more liquidity measures and assessment six sampled banks. Both descriptive and explanatory research design is used. Secondary data mainly audited financial statements are used to observe the effect of bank liquidity measures over bank performance. Convenience sampling method is used to select banks in the study. Both descriptive and econometric data analysis tools are applied. The finding of the study reveals that LATD and TLTD were significant at 1% level of significance on bank performance—NIM. These variables have a negative effect on bank performance measure. Except the CR measurement, the remaining explanatory variables hypotheses are rejected on the ground. Based on the findings of the study, banks are advised to be very cautious while disbursing loan and mobilizing liquid assets.

1. INTRODUCTION
1.1 Background and Justification of the study
Profitability and liquidity are two important variables which give information about the performance of any business entity. Profits are the driving force for many business firms. Finance mangers mostly direct their efforts to this goal in order to grow the shareholders wealth and survival in the market. (Lukorito, Muturi, Nyang, & Nyamasege, 2014).

To generate profit a business need short-term funds to fulfill its day to day needs in operations and other requirements. So the liquidity tells the ability of a business firm to meet its liabilities in the short period of times, usually one year and profitability tells about the profit generated from the operations of business (Ahmad, 2016).

Liquidity risk is considered as one of the serious concern and challenge for the modern era banks. A bank having good asset quality, strong earnings and sufficient capital may fail if it is not maintaining adequate liquidity (Maaka, 2013)

Mohiuddin (2014) noticed liquidity management is one of the most important functions o f a bank. If funds collected are not properly utilized, the institution should suffer loss. Idle cash balance in hand has no yield. On the other hand if the bank does not keep balanced liquid cash in hand, it cannot be able to pay the demand withdrawal of depositors, as well as, installment of creditors and ultimately payment for other contingent liabilities. These will lead overtrading position to the institution and create problems to borrow funds at high rate. So proper balanced liquidity should be maintained by avoiding inadequate cash position, or excess cash position

During the recent global financial crisis several banks experienced some difficulties because they failed to manage liquidity in prudent manner(Marozva, 2015; Ly, 2015).

As banks dominate the financial sector in Ethiopia, ensuring the liquidity position of these institutions is likely going to ensure the health of the financial system of the country. However, Limited numbers of studies were done in relation to liquidity and bank performance. For instance, Nathenael(2013) on the study entitled "Determinants of liquidity and their impact on profitability of development bank of Ethiopia" noted real GDP growth rate and loan growth rate had positive impact on financial performance of Development bank of Ethiopia. Likewise, Sirak(2016) found that Liquidity ratio, NBE Bills and inflation rate had significant positive impact on profitability Nib International Bank. Albeit the above two studies tried to shows the relationship among liquidity measures and profitability of banks, both them were analyzed by taking a single bank as unit of analysis. In addition, most of the studies were focused on identifying the determinants of bank performance (Abebaw& Kapur, 2011; Teshale, 2011; Belayneh, 2011).

As to fill the knowledge gap, this study is aimed to examine the effect of bank liquidity on the performance of selected private banks. Six private banks have selected. Besides, relevant explanatory variables has used in relation to the study.

1.2 Objectives of the Study
The main objective of the study is to examine the effect of liquidity on performance of commercial banks in Ethiopia for the period 2004-2016.

1.3 Literature Driven Hypothesis

The following hypothesis is pointed out from literatures of (Sirak, 2016; Ahmed, 2016; Francis, 2006; Olweny & Shipho, 2011).

H1: All else equal, liquidity variables has no significant effect on bank performance as measured by NIM

- ➢ H1a: LATD has no significant effect on bank performance
- ➢ H1b: TLTD has no significant effect on bank performance
- ➢ H1c: CR has no significant effect on bank performance

1.4 Scope of the Study

It is much recommended to examine all aspects of commercial banks in Ethiopia as to make conclusion about their liquidity trends. However, due to unavailability of data, the study is bounded to investigate the relationship between liquidity and bank performance across six private commercial banks. From methodological perspective, this study has pursued both descriptive and regression data analysis.

1.5 Significance of the Study

The finding of study provides relevant information on the tradeoff between liquidity and profitability banks to policy makers' in the banking industry. On the other hand, it gives awareness about the current situations and performance of banks to the regulatory body, shareholders, investors and managers. Besides, it is used as a bench mark for further studies on the area.

2. LITERATURE REVIEW

Liquidity Ratio is expressed as a company's ability to repay its short-terms debts obligations. It is obtained from the division of the Liquidity Assets by the Total Assets of the company. A larger number of this ratio implies sufficient liquidity to meet unexpected customers need in cash, thus the more safety for going bankruptcy. Some authors like Bourke (1989) mentions in his study a positive relationship between liquidity and bank profitability. In contrast, Molyneux and Thorton (1992) point out a negative impact of liquidity on the profitability. However keeping a certain amount of liquidity will engender loses because of the time of money.

Insufficient liquidity is one of the major reasons of bank failures. However, holding liquid assets has an opportunity cost of higher returns. A positive significant link between bank liquidity and profitability were examined in the studies of (Bourke, 1989; Olweny & Shipho, 2011). However, in times of instability banks may choose to increase their cash holding to mitigate risk. On contrary, Molyneux & Thorton (1992) and Francis (2006) noted a negative correlation between liquidity and bank profitability.

Ahmed (2016) shows the relationship between bank profitability and liquidity of standard chartered bank Pakistan. The relation is measured by current ratio, quick ratio, and net-working capital. At the end, he found that the weak positive relation between liquidity and profitability.

Maaka (2013) noticed that profitability of the commercial bank in Kenya was negatively affected due to increase in the liquidity gap and leverage. With a significant liquidity gap, the banks may have to borrow from the repo market even at a higher rate thereby pushing up the cost of banks.

On other study Ly(2015) noted Liquidity risk has played an important role in most of the historical banking crisis. Recent events are not different. The International Monetary Fund (2011) highlighted that banks failed in the 2007 financial crisis due to poor liquidity management and over reliance on short-term wholesale funding, which accelerated the failure of a number of banks. Consideration of an array of regulation and supervision reveals that regulatory environment is likely to impact on banks' risk-taking behavior and bank performance. As in most cases, conflicting predictions about these regulations and supervision may raise concerns on how policymakers can effectively prevent banking crisis in the future. The belief that the recent turmoil has posed challenges to banks' liquidity risk management has attracted significant attention from the regulators, researchers and financial institutions across the globe.

2.1 Studies in Ethiopia

Ethiopian banking sectors has witnessed a remarkable growth in recent years as the number of banks and their branches are increased. The determinants of bank profitability are well studied.

However, Limited numbers of studies were done specifically in relation to liquidity and bank performance.

Nathenael(2013) on the study entitled "Determinants of liquidity and their impact on profitability of development bank of Ethiopia" found real GDP growth rate and loan growth rate had positive impact on financial performance of the bank.

On the other hand, Sirak(2016) noticed that Liquidity ratio, NBE Bills and inflation rate had significant positive impact on profitability of NIB bank. Albeit the above two studies tried to shows the relationship among liquidity measures and profitability of banks, both them were analyzed by taking single bank as unit of analysis. In general, most of the studies were focused on identifying the determinants of bank performance (Abebaw&

Kapur, 2011; Teshale, 2011; Belayneh, 2011).

This study shows the relationship of bank liquidity and profitability by considering six private banks. Besides, relevant explanatory variables are selected in relation to the study. Hence, this study is aimed to examine the effect of bank liquidity on the performance of selected private banks.

3. Research Methods
3.1 Research Design
Both descriptive and explanatory type of research design is applied to see the linkage between bank performance and liquidity.

3.2 Sources and Method of Data Collection
Since the study was conducted to examine the effect of liquidity on bank performance, which is highly dependent on the data from secondary sources. Those data have been collected from the published and audited annual report of the selected private commercial banks. Particularly, financial statements – Position statements, and profit and loss statements were used. In addition, to annual report, different documents and literatures records have been reviewed in order to realize the objective of the study.

3.3 Sampling Design
The population of interest in this study were 16 private commercial banks which was registered by NBE and operated between 2004 and 2016. Convenience sampling is used to select six banks based on the years of the establishment (i.e. banks started the operation before 2004) and easily accessibility to annual report.

3.4 Data Analysis
The collected data were analyzed using both descriptive and inferential statistics tools. Descriptive statistical tools like mean, percentage, and ratios are used. Besides, panel regression model is estimated to look the relationship among dependent and independent variables.

3.5 Model Specification
In this study a type of panel data, is a combination of time series and cross sectional units (banks) are used. Panel data regression, specifically fixed effect model is used.

$$NIM_{it} = B_{1i} + B_{2it}LATD + B_{3it}TLTD + B_{4it}CR + w_{it}$$

Where, B_{1i} shows the intercept term, $B_2 \dots B_4$ are coefficients of the explanatory variables; i indicates the cross sectional (sampled private banks) and t shows the time periods from 2004-2016; $w_{it} = \varepsilon_i + \mu_i$, consists of two components ε_i, which is the cross- section, and μ_i which is the combined time series and cross section error component. The following table shows variables, notation and measures used in the study.

Table 1: Variables Profile

Variable Name	Notations	Measurement	Definitions& Expected sign
Net Interest Margin	NIM	Net interest income / Total Assets	It shows how much net interest income generated for each birr total assets
Liquid Asset by Total Deposit	LATD	Liquid Assets / Total Deposit	It shows the ability of a bank to meet its financial obligations (-)
Total loan by Total Deposit	TLTD	Total Loan / Total Deposit	It shows the proportions loan created for each birr of deposits (+)
Current Ratio	CR	Total Assets / Liabilities	The ability of the firm in meeting liabilities (-)

Source: Own design

4. DATA ANALYSIS AND INTERPRETATION
The study has analyzed based on descriptive and econometric analysis. Accordingly, these analyses are explained as follows;

4.1 Descriptive Data Analysis
In this section the results from descriptive statistics are discussed. The data that were collected for this study are secondary in nature. The descriptive statistics are used in order to get insight about the relationship between liquidity and bank performance variables of sampled banks.

Table 2: Summary of the study Variables

Variable	Observation	Mean Std.	Dev.	Min	Max
NIM	78	.0327179	.0068594	.0164	.0473
ROE	78	.2225628	.0587033	.0396	.3567
LATD	78	.3999295	.1512711	.1455	.7434
TLTD	78	.6505551	.1207431	.4663	.9768
CR	78	1.145942	.0406281	1.0687	1.2379

Secondary Data (2014)

The above table shows the descriptive statistics of the study variables. Accordingly, sampled private banks accounted 3.27% and 22.26% average results from NIM and ROE, respectively. Similarly, sampled banks registered mean values of 40%, 65.05%, and 1.14% of liquidity measures – LATD, TLTD and CR, respectively. Overall, high standard deviations are shown on variables associated with ROE, LATD and TLTD.

The correlation matrix among variables is presented in table 2 below. Accordingly, no significant correlation is shown among variables and all values are below 80%. We can understand from the result that, no multicolinearity problem was existed among variables since the matrix indicates low correlation coefficients.

Table 3: Correlation Matrix Analysis

	NIM	LATD	TLTD	CR
NIM	1.0000			
LATD	-0.5582	1.0000		
TLTD	0.4348	-0.1937	1.0000	
CR	0.4561	-0.2099	-0.0194	1.0000

Source: (STATA output)

4.2 Econometric Analysis

In the study, inferential statistics explicitly- Fixed effect panel data regression, is used. The selection of fixed effect over random effect is made by estimating the Hausamn test (See Annex1). Moreover, in this study, prior to the estimation of econometrics model, the classic linear regression fitness tests are made. These are: Multi-colinearity, Hetroskedasticity, Normality of error term, Model Specification (Link Test), and Omitted Variable (See Annex 2)

The next table shows the regression analysis of the study. The findings of fixed effect model shows, LATD and TLTD were significant at 1% level of significance on bank performance - NIM. Their expected sign is similar as projected in table 1. Their coefficients have shown negative results—imply that the more these ratios have a negative effect on the level of bank performance. The results signal an important message to management to be very cautions while disbursing loan and mobilizing liquid assets. Except the CR measurement, the remaining explanatory variables hypotheses are rejected on the ground.

Table 4: Fixed effect regression using NIM as dependent variable

Variable Type	Variable Name	Robust Coef.	Std. Err.	t	P>t
Dependent	NIM				
Explanatory	LATD	-.0230967	.0039409	-5.86	0.001*
Explanatory	TLTD	.0220423	.0064745	3.40	0.011*
Explanatory	CR	.0083909	.0174634	0.48	0.646
	_cons	.0179997	.0249317	0.72	0.494
*=significant at 1%					
No of observations =78					
Overall R^2 =45.36%					
Prob > F = 0.0000					

5. CONCLUSION

The study attempted to examine the nexus of bank liquidity and performance of selected private banks in Ethiopia. Both descriptive and explanatory research design is used. Secondary data mainly audited financial statements are used to observe the effect of bank liquidity measures over bank performance. Specifically, Twelve years (2004 to 2016) data are used. Convenience sampling method is used to select banks in the study. Both descriptive and econometric data analysis tools are applied. The panel data estimation reveals that LATD and TLTD were significant at 1% level of significance on bank performance - NIM. These variables have a negative effect on bank performance measure. The results show an important signal to management to be very cautious while disbursing loan and mobilizing liquid assets. In general, most of the postulated hypothesis is rejected

except the CR one.

Based on the findings of the study, the sampled banks have to undertake prudent management policy in relation to the credit service. Similarly, in current dynamic and competitive business world, the sampled banks have to have effective data management system to provide relevant information and mitigate any potential liquidity risk.

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ANNEXES
Annex -1: Selection of Panel Model

As to the select the best estimates in panel data regression, hausman test was run. Since the P value is significant, the fixed effect model is selected

	---- Coefficients ----			
	(b)	**(B)**	**(b-B)**	**sqrt(diag(V_b-V_B))**
	FE	**RE**	**Difference**	**S.E.**
LATD	-.0230967	-.0210895	-.0020072	.
TLTD	.0220423	.0210248	.0010176	.0012365
CR	.0083909	.042107	-.0337161	.0116827
	b = consistent under Ho and Ha; obtained from xtreg			
B =	**inconsistent under Ha, efficient under Ho; obtained from xtreg**			
Test: Ho:	**difference in coefficients not systematic**			
	chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)			
	=	**148.51**		
	Prob>chi2 =	**0.0000**		
(V_b-V_B is not positive definite)				

Annex 2: CLRM Fitness Tests
1. Multi- colinearity

Variable	VIF	1/VIF
LATD	1.09	0.916786
CR	1.05	0.952183
TLTD	1.04	0.958691
LATD	1.09	0.916786
Mean VIF	**1.06**	

According to the VIF estimation there is no perfect correlation among the study variables. Since the mean VIF resulted below 10.

2. Hetroskedasticity

To check the problem of Hetrokedasticity , Cameron & Trivedi's decomposition of IM-test has been estimated. Accordingly, all the p values are insignificant means no hetroskedasticty problem was shown in the data set. Moreover, robust estimation will be made to abandon hetrokedasticity problem.

Source	Chi2	Df	p
Heteroskedasticity	7.06	9	0.6314
Skewness	0.91	3	0.8237
Kurtosis	1.16	1	0.2814
Total	9.12	13	0.7636

3. Normality of error term

Normality of the error term is measure by graphical method- Kernel density estimate. As we have seen from the graph the error term is normally distributed.

kernel = epanechnikov, bandwidth = 0.0019
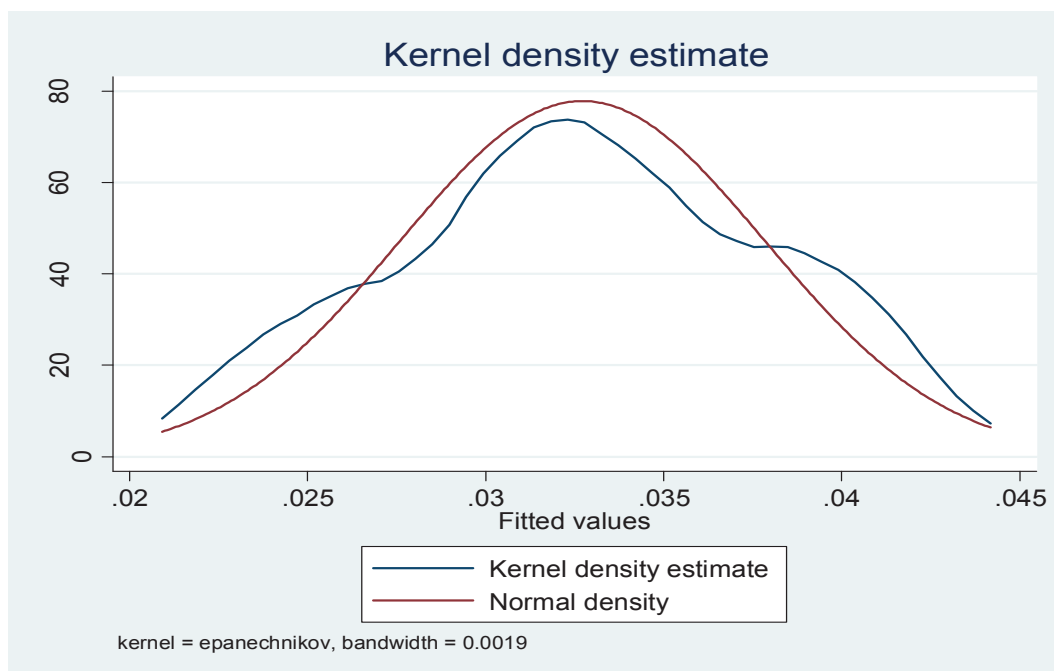
4. Omitted Variable

This test is made to verify whether omitted variables in model specification. Accordingly, OV test was done. Since the probability of F more than the null hypothesis i.e. 5%, it indicates that no omitted variables were in data set.

F(3, 71) =	1.19
Prob > F =	0.3203

5. Model Specification (Link Test)

NIM	COEF.	STD. ERR.	T	P>|T|	[95% CONF. INTERVAL]	
_HAT	2.543998	1.214502	2.09	0.040	.124585	4.963411
_HATSQ	-23.71856	18.59145	-1.28	0.206	-60.75463	13.31752
_CONS	-.0245117	.0195058	-1.26	0.213	-.0633692	.0143458

As indicated in the table above, the hatsq was more than 0.05; hence, the model was correctly specified.