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Effect of Basel III Liquidity Ratio LCR and NSFR on the Profitability of Commercial Banks in Bangladesh

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Subrata Deb Nath[1], Munna Rani Biswas[2], Md. Abdul Maleque[3]
M.M Mohitur Islam[4]

Abstract:

Purpose: *Commercial banks play a crucial role in the sustainable economic development of any economy. They are dominating the banking sector of Bangladesh. Recently Commercial banks are facing a severe liquidity crisis, in spite of maintaining LCR and NSFR above the lowest supervisory regulation. Therefore, the aim of this research is to determine the effect of Basel III liquidity ratio LCR and NSFR on the profitability of commercial banks in Bangladesh.*

Design/Methodology/Approach: *This study alphabetically selects 14 commercial banks as sample for secondary panel data for 9 years' time span (2015-2023) and uses ROE, ROA as dependent variables and LCR, NSFR, NPL as independent variables for random effects regression analysis. Moreover, at the very beginning, panel unit root test is conducted to verify the stationary property of all study variables and then performed Hausman specification test to select appropriate regression model.*

Findings: *Study results show that LCR has statistically significant negative effect whereas NSFR has positive impact on the profitability state owned commercial banks in Bangladesh, i.e. if LCR increases in 1 unit, it decreases profitability by 0.067 unit, whereas if NSFR increases in 1 unit, it raises profitability by 0.5141 unit. Moreover, study also shows strong negative influence of NPL on the profitability of commercial banks.*

Practical Implications: *Management of respective banks, regulators like central bank, ministry of finance etc., academic researchers, journalists and other stake holders may utilize the outcome of this research for proper liquidity management, future research reference regarding liquidity management.*

Originality value: *Research study regarding the impact or effect of Basel III liquidity ratio on the profitability of commercial banks is hardly available in the context of Bangladesh. Hence, this is a pioneering effort to examine the effect of Basel III liquidity ratio LCR and NSFR on the profitability of commercial banks in Bangladesh.*

Keywords: *Basel III liquidity ratio, LCR, NSFR, profitability, SOCB.*

JEL Classification: *G21, G28, E44, E58, L25.*
Paper type: *Research article.*

[1]*Corresponding author, Senior Principal Officer, Janata Bank PLC, Bangladesh.*
subratadebnath81@gmail.com;
[2]*Senior Assistant Secretary, Ministry of Chittagong Hill Tracts Affairs, Bangladesh.*
[3]*DGM, Janata Bank PLC, Bangladesh.*
[4]*AGM, Janata Bank PLC, Bangladesh.*

1. Introduction

Commercial banks are essential to every economy, because they maintain equilibrium between the surplus and deficit fund flows. As a result, they are subject to strict national and international regulations, such as the Basel III Accord (Obadire and Obadire, 2023).

Liquidity is the creditworthiness of a bank and its capacity to covert assets to cash. It controls the smooth operation of a bank (Sekoni, 2015). It includes cash, gold, securities like Treasury bond, Treasury bill etc. Bank should have adequate liquidity to meet its all debt obligations due within a one-year time horizon (Mishra and Pradhan, 2019; Jędrzejowska-Schiffauer *et al.*, 2019; Thalassinos *et al.*, 2015).

In September 2010, Basel Committee on Banking Supervision recommended a set of modifications to reinforce international capital standards and introduce universal standards for liquidity. This set of modifications is known as Basel III (Financial stability and payment system report 2010). For funding and liquidity, BCBS has established two minimum standards, namely, LCR and NSFR.

The intention of development of LCR regulation is to stimulate the short term resilience liquidity risk profile of a bank by ensuring adequate high quality liquid asset to endure a substantial stress scenario lasting for 30 days. On the other hand, the aim of NSFR enlargement is to reduce funding risk for a longer (one year) time period (BCBS, 2014). The Basel Committee on Banking Supervision introduced liquidity coverage ratio on 1st January, 2015 according to the following schedule:

Table 1. *LCR fulfillment schedule*

	1st Jan, 2015	1st Jan, 2016	1st Jan, 2017	1st Jan, 2018	1st Jan, 2019
Minimum LCR	**60%**	**70%**	**80%**	**90%**	**100%**

The Basel Committee on Banking Supervision defined LCR as the value of high quality liquid asset relative to total net cash outflows over the next 30 calendar days. LCR should be greater than or equal to 100% (BCBS, 2013).

Similarly, NSFR is the amount of available stable funding comparative to the amount of requisite stable funding. Net stable funding Ratio should be greater than or equal to 100% on an on-going basis (BCBS, 2014; Amira and Thalassinos, 2023).

Banking sector of Bangladesh is enduring a severe liquidity crisis and some of them are finding it hard to repay the money to depositors (Mowla, 2024). Moreover, a number of banks are unable to maintain adequate cash reserve ratio and statutory liquidity reserve due to severe liquidity crisis. In addition, they are borrowing from central bank to maintain daily operations (Rahman, 2024).

However, customer deposits at banks are not meeting the expectations of the banks and depositors are not willing to renew their deposits because of the dominant inflation. However, the government's borrowing from banks is adding pressure, which in turn is creating a liquidity crisis (Saad, 2024). On the other hand, the banking industry of Bangladesh as a whole maintained LCR and NSFR above the lowest supervisory obligation, except the private Islamic commercial banks (Financial Stability Report, 2022).

The prime objective of this study is to examine the empirical effect of Basel III liquidity ratio LCR and NSFR on the profitability of commercial banks in Bangladesh.

This study is designed as follows: Introduction and Literature review are presented in section 2. Section 3 designates the methodology and Section 4 describes the results and discussion. Section 5 describes conclusion at last.

Research question: *How do LCR and NSFR affect the profitability of commercial banks in Bangladesh?*

Research Gap: It is proved from review of literature that a lot of national and international researchers together with Lalon *et al.* (2023), Rahman and Jannat (2023), Begum *et al.* (2022), Islam *et al.* (2022), Thinh *et al.* (2022), Talreja *et al.* (2021), Doana and Buia (2021), Akber and Dey (2020), Paul *et al.* (2020), Khati (2020), Mandvekar and Potdar (2020), Pandey and Budhathoki (2020), Moussa and Boubaker (2020), Mishra and Pradhan (2019), Parvin *et al.* (2019), Awulo *et al.* (2019), Alali (2019), Chaudhury (2018), Ibrahim (2017), Ashraf *et al.* (2017), Uddin *et al.* (2016), Pradhan and Shrestha (2016), Malik *et al.* (2016), Lukorito *et al.* (2014), Bordeleau and Graham (2010) etc. have examined the impact of liquidity on the profitability of banks across the world.

On the other hand, Rajdeep and Patra (2023), Sidhu *et al.* (2022), Altahtamouni and Alyousef (2021) and Mashamba (2018) have studied the impact Basel III liquidity ratio (LCR) on the profitability of banks, whereas Obadire and Obadire (2023), Ayub and Alhabshi (2023), Veeramoothoo and hammoudeh (2022), Nedorezova and Maraval (2019) and Said (2018) evaluated the impact Basel III liquidity ratio (LCR and NSFR) on the profitability of banks across the world.

However, there is hardly any research available regarding the effect of Basel III liquidity ratio (LCR and NSFR) on the profitability of state owned commercial banks in Bangladesh.

Hence, this research has carried out to show the empirical effect of Basel III liquidity ratio (LCR and NSFR) on the profitability of state owned commercial banks in Bangladesh.

2. Literature Review

Rajdeep and Patra (2023) examined the relationship between LCR and profitability of public sector banks in India for the period 2015 to 2022 using panel data technique and showed that liquidity coverage ratio has significant positive impact on the profitability of public sector banks in India (Rajdeep and Patra, 2023).

Mashamba (2018) conducted a study in emerging markets to find out the impact of Basel III LCR (liquidity coverage ratio) on bank's profitability over the period 2011 to 2016 using GMM system. The study results showed that LCR requirement increases profitability of banks in emerging markets (Mashamba, 2018).

Altahtamouni and Alyousef (2021) studied the effect of Liquidity Coverage Ratio on the profitability of Saudi Arabian banks for the period 2015 to 2018 utilizing pooled OLS, fixed effects and random effects model respectively and showed that LCR requirement increases profitability of banks in Saudi Arabia (Altahtamouni and Alyousef, 2021).

Sidhu, Rastogi, Gupte, and Bhimavarapu (2022) examined the impact of liquidity coverage ratio on the profitability of selected Indian banks for the period 2010-2019 employing dynamic panel data regression technique and showed that liquidity coverage ratio components have adverse impact on profitability (Sidhu *et al.*, 2022).

Obadire and Obadire (2023) determined the effect of Basel III bank guidelines on the profitability of selected banks in Africa for the period 2010-2019 using fixed effects and random effects regression models and found that liquidity and minimum capital requirement have detrimental impact on the financial performance of banks in Africa (Obadire and Obadire, 2023).

Veeramoothoo and Hammoudeh (2022) examined the impact of Basel III liquidity regulations on U.S. Bank performance developing simultaneous fixed effects quartile regression framework and found positive significant relation-ship between LCR and profitability and NSFR and profitability (Veeramoothoo and Hammoudeh 2022).

Said (2018) examined the impact of Basel III new liquidity framework NSFR on the profitability of Malaysian commercial banks for the period 2005 to 2011 and showed that net stable funding ratio positively influence profitability (Said, 2018).

Ayub and Alhabshi (2023) determined the impact of LCR and NSFR on the profitability of Islamic banks in Pakistan covering the time 2007 to 2021 applying panel ARDL model. Study results showed that LCR has positive significant impact whereas NSFR has adverse impact on the profitability of Islamic banks in Pakistan (Ayub and Alhabshi, 2023).

Nedorezova and Maraval (2019) carried out a quantitative study on the impact of the Basel III requirements on the banks' stock returns and showed that both LCR and NSFR have a significant adverse impact on profitability (Nedorezova and Maraval, 2019).

Lalon, Afroz, and Khan (2023) explored the association between liquidity and profitability to get important knowledge on the ways in which liquidity affects profitability using econometric model. They used return on asset (ROA) as dependent variable and bank specific variables (loan to deposit ratio, loan loss provision to total asset, equity to total asset, operational expense to total asset, bank size and NPL) and macroeconomic variables (GDP, Inflation, Interest rate and Unemployment rate) as independent variables and showed positive significant association between liquidity and profitability and adverse relation between NPL and profitability of state owned banks in Bangladesh (Lalon *et al.*, 2023).

Begum, Rashid, Haque, and Uddin (2022) examined the impact of liquidity on the profitability of Bangladeshi banks covering a period 2010-2020 using Hausman specification test. They used ROE, ROA and EPS as profitability indicators (dependent variables) whereas current ratio (CR), cash ratio (CASR), capital adequacy ratio (CADR), interest coverage ratio (ICR), GDP and inflation are used as independent variables. They showed that CR, ICR and CADR have statistically significant influence on the profitability of Bangladeshi banks (Begum *et al.*, 2022).

Islam, Ullah, Avi, and Ashanuzzaman (2022) assessed the impact of liquidity on the profitability of commercial banks in Bangladesh for the period 2011-2020 applying OLS regression model. They utilized ROA as profitability indicator (dependent variable) whereas loan to deposit ratio (LTD), deposit to asset ratio (DTA), cash to deposit ratio (CTD) are being used as independent variables. Study results showed that LTD, CTD and DTA have significant positive relation with profitability (Islam *et al.*, 2022).

Akber and Dey (2020) carried out a study regarding influence of liquidity on profitability of commercial banks in Bangladesh during 2012-2019. They applied ROE and ROA as profitability indicators (dependent variables) whereas loan to deposit ratio, deposit to asset ratio, loan to asset ratio and cash deposit ratio are used as independent variables and showed that liquidity has no statistically significant impact on profitability (Akber and Dey, 2020).

Paul, Bhowmik, and Famanna (2020) examined the effect of liquidity on profitability of commercial banks in Bangladesh during the period 2009-2018. They took return on equity (ROE) as proxy variable of profitability (dependent variable) and loan to deposit ratio, deposit to asset ratio, cash to deposit ratio, cash to current liabilities ratio, current ratio as liquidity indicator (independent variables) and showed positive significant effect of liquidity on profitability (Paul *et al.*, 2020).

Using descriptive as well as correlations analysis statistics, Parvin, Chowdhury, Siddiqua, and Ferdous (2019) showed that liquidity and bank size have statistically insignificant impact on profitability of commercial banks in Bangladesh. They used loan to asset ratio, deposit to asset ratio and bank size as independent variables and ROA as dependent variable (Parvin *et al.,* 2019).

Lukorito, Muturi, Nyang'au, and Nyamasege (2014) showed positive significant association between liquidity and profitability of commercial banks in Kenya (Lukorito *et al.,* 2014). However, Ibrahim (2017) revealed positive insignificant association between liquidity and profitability in banking sectors of Iraq. He used loan to deposit ratio, deposit to asset ratio and cash to asset ratio as independent variables and ROA as dependent variable (Ibrahim, 2017).

Khati (2020) conducted a Hausman test and Fixed effects regression model to explore the effect of liquidity on profitability of Nepalese commercial banks during 2013-2019. She used credit to deposit ratio, cash to deposit ratio and asset quality (NPL) as liquidity indicators and ROA, ROE as profitability indicators. Her study results showed that both credit to deposit ratio and cash to deposit ratio have statistically positive insignificant relation with ROA as well as ROE. On the other hand, asset quality showed statistically significant adverse relation with ROA but positive relation with ROE (Khati, 2020).

Pradhan and Shrestha (2016) analyzed the impact of liquidity on the financial performance of Nepalese commercial banks during the period 2005/06-2013/14. They chose ROA and ROE as dependent variables and capital to asset ratio, loan to deposit ratio, cash and cash equivalent to total asset (liquidity ratio), current asset to current liabilities (quick ratio) as independent variables and showed that liquidity ratio and quick ratio are inversely affect ROE and ROA (Pradhan and Shrestha, 2016).

Uddin, Reza, and Das (2016) revealed the association between liquidity risk and profitability during the period 2010-2015 emplying regression analysis technique. They used loan to deposit ratio, current ratio and liquid asset to total asset ratio as liquidity indicators (independent variables) and ROA, ROE as profitability indicators (dependent variables) and showed that loan to deposit ratio and liquid asset to total asset ratio have negative impact on profitability (Uddin *et al.,* 2016).

Awulo *et al.* (2019) conducted a study to explore the impact of liquidity on profitability of commercial bank in Ethiopia over the period 1986-2017 applying ARDL model. They employed ROA as dependent variable and current ratio, loan to deposit ratio, operating efficiency ratio and exchange rate policy as independent variables. Study results showed that loan to deposit ratio, operating efficiency ratio and exchange rate policy adversely affect profitability, whereas current ratio positively affect (Awulo *et al.,* 2019).

Chaudhury (2018) analyzed the impact of liquidity on banks' productivity in Bangladesh for the year 2007-2016. She took net asset value (NAV) as proxy variable of bank productivity (dependent variable) and CRR, SLR, loan to deposit ratio, loan to asset ratio, cash to deposit ratio as independent variables and concluded that liquidity and bank productivity are positively and significantly correlated (Chaudhury, 2018).

Rahman and Jannat (2023) wanted to review the influence of liquidity on the profitability of commercial banks in Afghanistan for the period 2016-2020 using OLS regression technique. They used ROA as dependent variable and current ratio (CR) and net working capital ratio (NWCR) as independent variables and showed that CR and NWCR are positively and significantly affect profitability, i.e. liquidity particularly influences commercial bank profitability in Afghanistan (Rahman and Jannat, 2023).

Mandvekar and Potdar (2020) analysed the impact of liquidity on the profitability of HDFC bank in India through regression analysis. They utilized ROE, ROA and NIM as profitability indicators (dependent variables), whereas credit-deposit ratio, cash-deposit ratio, loan-asset ratio, loan- deposit ratio, liquid asset- total asset ratio, liquid asset- deposit ratio etc. are used as liquidity variables (independent variables). Study result showed that credit-deposit ratio, cash-deposit ratio, liquid asset- total asset ratio etc. are negatively influence ROA, whereas loan-asset ratio and liquid asset-deposit ratio are positively influence ROA. But these ratios had no significant effect on ROE and NIM (Mandvekar and Potdar, 2020).

Mishra and Pradhan (2019) evaluated the effect of liquidity on the profitability of private sector banks in India for the period from 2013 to 2017 using ROA and ROE as dependent variables and cash to deposit ratio, ADR, investment to deposit ratio as independent variables. They showed that ADR and Investment to deposit ratio are adversely affect return on asset, whereas it is insignificant on return on equity (Mishra and Pradhan, 2019).

Pandey and Budhathoki (2020) conducted a study to find out the effect of liquidity on the profitability of Nepalese commercial banks for the period 2008/09-2017/18 using ROA as dependent variable and investment ratio, liquidity ratio and capital ratio as independent variables and their results showed that investment ratio and liquidity ratio have significant negative relation with profitability (Pandey and Budhathoki, 2020).

Talreja, Anwa, Shaikh, and Shah (2021) carried out a study regarding effect of liquidity management on the profitability of private commercial banks in Pakistan and showed that liquidity has significant adverse relation with ROA but it is insignificant on ROE (Talreja *et al.*, 2021). However, Malik, Awais, and Khurshed (2016) and Ashraf, Nabeel, and Hussain (2017) found significant positive relationship between liquidity and ROA.

Alali (2019) took ROA and ROE as profitability indicator (dependent variables) and liquidity ratio, legal liquidity ratio and employment ratio as independent variables to examine the impact of liquidity on profitability of commercial banks for 2013- 2017. Study results showed that liquidity ratio and legal liquidity ratio have statistically significant impact on return on asset (Alali, 2019).

Moussa and Boubaker (2020) carried out empirical research in Tunisia to explore the impact of liquidity on bank profitability covering a period 2000-2017. The used ROA and ROE as profitability indicator (dependent variables) and liquid asset to total asset ratio, total credit to total deposit ratio, current asset to current liabilities ratio as independent variables. Study results showed that liquid asset to total asset ratio, total credit to total deposit ratio has positive significant effect on ROA but in case of ROE, these ratios have insignificant impact (Moussa and Boubaker, 2020).

Doana and Buia (2021) analyzed the effect of liquidity on the profitability bank in Vietnam covering the period 2013-2018 applying GMM estimation technique. The used ROA as profitability indicator (dependent variable) and LATA (liquid asset to total asset), TLTD (total loan to total deposit), economic growth and inflation as independent variables. Study results showed that LATA negatively influenced profitability but TLTD positively influenced.

Moreover, economic growth and inflation also positively affect profitability of bank in Vietnam (Doana and Buia, 2021). On the the hand, Thinh, Thuy, and Tuan (2022) investigated the association between liquidity and profitability of banks listed in Vietnam for the period of 2011-2019 through OLS regression method and showed that liquidity has positive association with profitability (Thinh *et al.*, 2022).

Bordeleau and Graham (2010) examined association between liquid asset holdings and profitability over the period 1997-2009 on various banks of Canada and USA and showed that profitability is improved for banks that hold some liquid assets. However, there is a point beyond which holding further liquid assets diminishes a bank's profitability (Bordeleau and Graham, 2010).

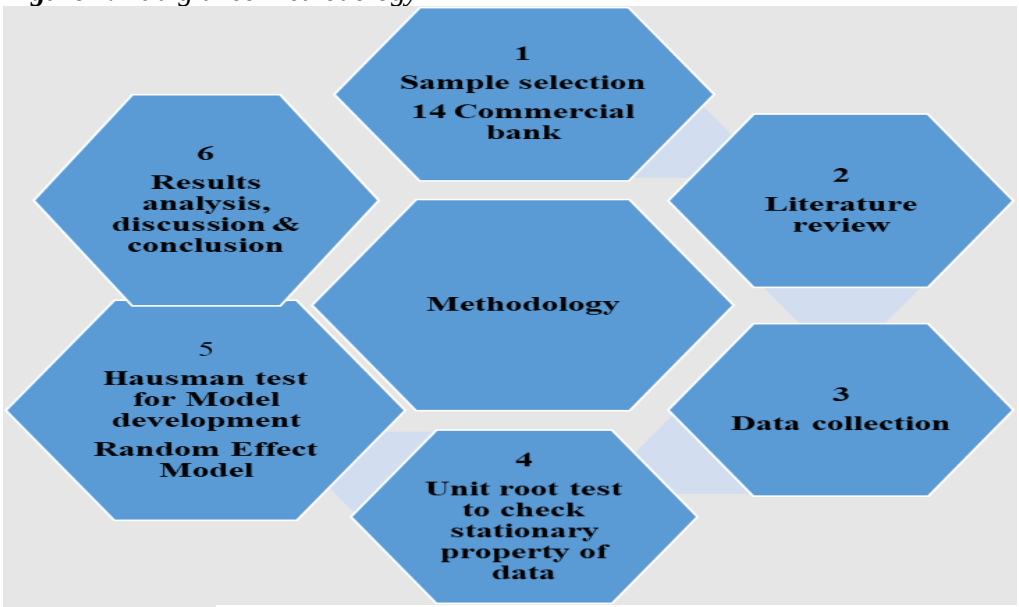
3. Researcch Methodology

Sample, Population and Data Source:
According to the Financial Stability Report (2022) 61 scheduled banks are running in Bangladesh. Among these 61 scheduled banks, there are 6 SOCBs (state owned commercial banks) 43 PCBs (private commercial banks) and 9 FCBs (foreign commercial banks) (Financial Stability Report, 2022).

This study used above 61 scheduled banks as study population and 14 commercial banks are alphabetically selected as sample of the study. AB Bank PLC, Agrani Bank PLC, Basic Bank PLC, Brac Bank PLC, The Citi Bank PLC, Dhaka Bank PLC, Dutch Bangla Bank PLC, Eastern Bank PLC, Janata Bank PLC, Pubali Bank

PLC, Rupali Bank PLC, Sonali Bank PLC, South East Bank PLC and Uttara Bank PLC are the sample of this study. This econometric research is carried out based on secondary panel data covering a period of 2015 to 2023 and all data are collected from each sample bank's own website. Research methodology as in Figure 1.

Figure 1. *At a glance Methodology*



Source: *Own study.*

Variables of the Study:

This study takes return on equity (ROE) as profitability indicators (dependent variables) and LCR, NSFR, NPL as liquidity indicators (independent variables). Details of dependent and independent variables are shown in Table 2.

Table 2. *Description of study variables*

Indicators	**Variable**	**Measurement description**	**Symbol**
Profitability (dependent variable)	Return on equity	(Net profit/Average total equity) x100	**ROE**
Liquidity (independent variables)	Liquidity coverage ratio	(Value of high quality liquid asset/Total net cash outflows over the next 30 calendar days) x 100. LCR should be ≥100%.	**LCR**
	Net stable funding ratio	(Amount of available stable funding/ Amount of required stable funding) x100. NSFR should be ≥100%.	**NSFR**
	Non-performing loan	Classified loan and advances/ Total loan and advances	**NPL**

Source: *Own study.*

Panel Unit Root Test:
Non stationary panel data provide spurious regression result. Hence, this study uses Eviews 12 student version software to conduct unit root test. Following hypothesis are developed for unit root test analysis:

H_0: LCR series is non-stationary; H_0: NSFR series is non-stationary; H_0: NPL series is non- stationary.
If the p-value is less than 0.05 at 95% confidence interval then accept the null hypothesis (H_0), otherwise reject the alternative hypothesis (H_1).

Hausman Test Specification:
The Hausman test is a statistical test for selection of appropriate model in panel data analysis. This test can help the researchers to choose between fixed effects model or a random effects model. Therefore, this research applies Eviews 12 student version software to carry out Hausman test.

H_0: Random effects model is appropriate model; H_1: Fixed effects model is appropriate model.
If the p-value is less than 0.05 at 95% confidence interval then reject null hypothesis (H_0), otherwise accept the alternative hypothesis (H_1).

Models Development:
Based on Hausman test result, this study takes Random effects model for determining the effect of Basel III liquidity ratios on the profitability of state owned commercial banks in Bangladesh. The following econometric model is shown:

$$ROE_t = \mu + \beta_1 LCR_t + \beta_2 NSFR_t + \beta_3 NPL_t + \varepsilon_t \quad \text{(Model 1)}$$

Where, ROE = Return on Equity; LCR = Liquidity Coverage Ratio; NSFR = Net Stable Funding Ratio; t = Time period; μ = regression equation constant; ε_t = standard error and $\beta_{1\text{----}}\ \beta_3$ = Coefficient of independent variables.

4. Research Results

Panel Unit Root test:
This research chooses Augmented Dicky Fuller test by applying EVIEWS 12 student version software to examine the stationary property of panel data (ROE, LCR, NSFR and NPL).

The details of Augmented Dicky Fuller test results are shown in Table 3. Table 3 shows that except non-perming loan, return on asset, return on equity, liquidity coverage ratio and net stable funding ratio etc. are stationary at level, because p-value of these variables are less than 0.05. However, non-perming loan is stationary at first difference.

Table 3. *ADF test results.*

Variable	Level				First Difference				Remarks
	C	P-value	CandT	P-value	C	P-value	CandT	P-value	
ROE	-147.03	0.0000	-142.19	0.0000	-85.51	0.000	-37.02	0.000	Stationary
LCR	-5.163	0.0000	-36.73	0.0000	-39.54	0.000	-27.72	0.000	Stationary
NSFR	-5.876	0.0000	-16.03	0.0000	-2.75	0.000	-26.65	0.000	Stationary
NPL	-3.192	0.0007	-2.48	0.0015	-5.61	0.000	-21.38	0.000	Stationary at I(1)

Source: *Own study.*

Descriptive Statistic of Commercial Banks:

Descriptive statistic of study variables is illustrated in Table 4. The minimum and maximum value of return on equity is (258.0) and 22.16. Due to large difference between minimum and maximum values, standard deviation of ROE is high. Independent variables (LCR, NSFR and NPL) also show same scenario.

Table 4. *Descriptive Statistics.*

Variable	Mean	Maximum	Minimum	Std. Deviation	Skewness	Kurtosis	Observation
ROE	3.01	22.16	-258.0	28.46	-6.69	58.29	126
LCR	216.87	792.99	82.21	133.48	1.78	6.54	126
NSFR	106.21	136.21	80.54	7.08	0.48	5.91	126
NPL	13.96	63.35	2.22	14.30	1.80	5.81	126

Source: *Own study.*

Correlation Analysis:

The correlation among the variables ROE, LCR, NSFR and NPL are presented in the Table 5. ROE has strong negative relation with NPL and LCR but positive relation with NSFR. However, NPL has robust negative affiliation with ROE but weak adverse relation with LCR and NSFR.

Table 5. *Correlation analysis result*

	ROE	LCR	NSFR	NPL
ROE	1	-0.469	0.285	-0.523
LCR	-0.469	1	-0.126	-0.382
NSFR	0.285	-0.126	1	-0.326
NPL	-0.523	0.382	-0.326	1

Source: *Own study.*

Hausman Test Results:

Hausman test results are presented in Table 6. The Chi-square statistic of Hausman test is 1.36 and 3.45 and p-value is 0.714 and 0.324 for Model 1 and Model 2 respectively. As the p-value is greater than 0.05 for Model 1 and Model 2, therefore Random effect model is appropriate model.

Table 6. *Hausman Test Summary.*

Test name	Models	Chi-square statistic	P-value	Decision
Hausman Test	Model 1	4.695	0.1955	As p-value > 0.05, so Random effects model is appropriate

Source: *Own study.*

As p-value is greater than 0.05 at 95% confidence interval, so Random effect model is appropriate.

Random Effects Model Results:

This study used return on equity (profitability indicator) as dependent variable and liquidity coverage ratio (LCR), net stable funding ratio (NSFR) and non-performing loan (NPL) as independent variable in Random effect regression model. Random effect regression analysis results are presented in Table 7.

Table 7. *Random Effects regression results.*

Variables	Model 1		
	Coefficients	t-stat.	P-value
Constant	-26.987	-0.814	0.41
LCR	-0.067***	-4.086	0.0001
NSFR	0.5141*	1.695	0.0925
NPL	-0.7181***	-4.442	0.0000
Regression Statistics			
R-squared		0.3720	
F-statistic		24.0142	
Probability (F-statistic)		0.0000	
Durbin-Watson stat		2.1320	
Dependent Variable		ROE	

Notes: **, **, *** indicate significant at 10%, 5% and 1% level of significance respectively.*
Source: *Own study.*

Table 7 shows that the value of R-squared is 37.20% which indicates that independent variables- LCR, NSFR and NPL are collectively responsible for 37.20% variation of commercial banks profitability. The coefficient and p-value of LCR is -0.067 and 0.0001 respectively, which specify that LCR has statistically significant negative effect on return on equity.

On the other hand, coefficient and p-value of NSFR is 0.5141 and 0.0925 respectively. It also states that NSFR positively affects profitability of banks. However, NPL has strong adverse effect on return on equity of commercial banks.

5. Results Discussion

The Basel committee on Banking Supervision has developed two minimum standards for LCR and NSFR to stimulate the short term resilience liquidity risk profile of a bank by confirming sufficient high quality liquid asset to endure a substantial stress scenario lasting for 30 days and to reduce funding risk for a longer (one year) time period respectively.

Minimum value of LCR and NSFR should be greater than or equal to 100%. Study results show that LCR has statistically significant negative effect on profitability of banks which is similar to the findings of Obadire and Obadire (2023) and Sidhu et al. (2022) but contrast to Rajdeep and Patra (2023), Ayub and Alhabshi (2023), Veeramoothoo and Hammoudeh (2022), Altahtamouni and Alyousef (2021), Nedorezova and Maraval, (2019) and Mashamba (2018).

On the other hand, NSFR shows positive relation with profitability of banks. This result is in line with the study results of Veeramoothoo and hammoudeh (2022) and Said (2018) but contrast to Obadire and Obadire (2023), Ayub and Alhabshi (2023) and Nedorezova and Maraval, (2019). However, NPL has statistically significant negative effect on profitability of banks which is also similar with the study results of Lalon *et al.* (2023) and Khati (2020).

6. Conclusions

As a financial intermediary, banks collect customer deposits and lend these deposits to borrowers as loan. Banks are bound to back the customers deposit on their demand. If a bank is unable to repay the money to depositors, it is called liquidity crisis of that bank. Recently banking sector of Bangladesh is enduring a severe liquidity crisis.

On the other hand, another report published that banking industry of Bangladesh as a whole maintained liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) above the lowest supervisory regulation. Therefore, this study aims to find out the effect of Basel III liquidity ratios (LCR and NSFR) on the profitability of commercial banks in Bangladesh.

This study is done based on panel secondary data for the period 2015-2023 and used random effect regression model which is selected by Hausman specification test through EVIEWS 12 student version software. Study results show that LCR has statistically significant negative effect whereas NSFR has positive impact on the profitability commercial banks in Bangladesh.

However, study also shows strong negative influence of NPL on the profitability of commercial banks.

Recommendations:

- **Non-performing loans has detrimental effect on the profitability of banks.** Therefore, management should take necessary action to keep NPL as low as possible.

- **Liquidity coverage ratio also adversely affects the profitability of banks.** Hence, management should try to maintain the minimum regulatory standard prescribed by Basel Committee of Banking Supervision as well as central bank.

Authors Contribution:

All authors are equally contributed in this research.

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Conflict of Interest:

Authors declare that there is no any conflict of interest.

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References:

Akber, S.M., Dey, A. 2020. Influence of liquidity on profitability of commercial banks in Bangladesh. Research Journal of Finance and Accounting, Vol. 11(14), 87-93.

Alali, S.M. 2019. The impact of bank liquidity on the profitability of commercial banks: An applied study on Jordanian commercial banks for the period 2013-2017. International Journal of Economics and Finance Issues, Vol. 9(5), 24-28.

Altahtamouni, F., Alyousef, S. 2021. The effect of liquidity according to the requirements of the Basel III Committee on the profitability of banks: Evidence from Saudi banks. International Journal of Economics and Business Administration Vol. 9(2), 439-463.

Amira, H., Thalassinos, E. 2023. The Global Business Cycle within the New Commodities and the Financial Cycle: An Empirical Evidence Based on a Multivariate Unobserved Components Model (UCM). IntechOpen.

Ashraf, M., Nabeel, M., Hussain, S.M. 2017. Liquidity management and its impact on banks profitability: A perspective of Pakistan. International Journal of Business and Management Invention, Vol. 6(5), 19-27.

Ayub, R., Alhabshi, S.M. 2023. Managing liquidity and profitability: A study of the impact of Basel III regulations on Islamic banks in Pakistan. International Journal of Islamic Economics and Finance Research (IJIEFER), Vol. 6(2), 69-84.

Awulo, T., Alemu, A., Chala, B.W. 2019. Impact of liquidity on profitability of bank: A case of commercial bank of Ethiopia. Research Journal of Finance and Accounting, Vol. 10(1), 26-34.

Begum, H., Rashid, M.M., Haque, M.H., Uddin, M.M. 2022. Effect of liquidity on profitability of banks using revisited panel data analysis: Does ownership structure matter? International Journal of Asian Social Science, Vol. 12(6), 205-216.

Bordeleau, E., Graham, C. 2010. The impact of liquidity on bank profitability. Bank of Canada Working Paper 2010-38, 1-22. Available at: https://www.bankofcanada.ca/wp-content/uploads/2010/12/wp10-38.pdf.

Chaudhury, N.J. 2018. Impact of liquidity on banks' productivity: A study on selected commercial bank in Bangladesh. IIUC studies, Vol. 15, 59-71.

Doana, T.T.T., Buia, T.N. 2021. How does liquidity influence bank profitability? A panel data approach. Accounting, Vol. 7(1), 59-64. https://www.*g*rowingscience.com/ac/Vol7/ac_2020_156.pdf.

Financial Stability Report. 2022. Financial Stability Dept., Bangladesh Bank. Issue 13. Available online: https://www.bb.org.bd//pub/annual/fsr/financial_stability_ report_2022_en.pdf.

Financial stability and payment system report. 2010. Bank Negara Malaysia. Available at: https://www.bnm.gov.my/documents/20124/856389/cp03_001_whitebox.Pdf.

Ibrahim, S.S. 2017. The impact of liquidity on profitability in banking sectors of Iraq: A case of Iraqi commercial banks. Journal of Finance and Banking Studies, Vol. 6(1), 113-121.

Islam, M.A., Ullah, A.K.M.M., Avi, M.A.R., Ashannuzzaman, M. 2022. Assessing the impact of liquidity on profitability: Specific to the banking industry of Bangladesh. Journal of Business Studies, Pabna University of Science and Technology, Vol. 3(1), 257-269.

Jędrzejowska-Schiffauer, I., Schiffauer, P., Thalassinos, I.E. 2019. EU Regulatory Measures Following the Crises: What Impact on Corporate Governance of Financial Institutions. European Research Studies Journal, 22(3), 432-456.

Khati, P. 2020. Impact of liquidity on profitability of Nepalese commercial banks. IOSR Journal of Economics and Finance (IOSR-JEF), Vol. 11(5), 26-33.

Lalon, R.M., Afroz, A., Khan, T. 2023. Impact of bank liquidity and macroeconomic determinants on profitability of commercial banks in Bangladesh. International Journal of Economics and Financial Issues. Vol. 13(6), 177-186.

Lukorito, S.N., Muturi, W., Nyang'au, A.S., Nyamasege, D. 2014. Assessing the effect of liquidity on profitability of commercial banks in Kenya. Research Journal of Finance and Accounting, Vol. 5(19), 145-152.

Malik, M.S., Awais, M., Khurshed, A. 2016. Impact of liquidity on profitability: A comparative case of Pakistan's private banking sector. International Journal of Economics and Finance, Vol. 8(3), 69-74.

Mandvekar, A., Potdar, R. 2020. Impact of liquidity on the banks' profitability: A study on HDFC Bank. International Journal of Business and Management Invention (IJBMI), Vol. 9(8), 45-54.

Mashamba. T. 2018. The effect of Basel III liquidity regulations on bank's profitability. Journal of Governance and Regulation, Vol. 7(2), 34-48. https://doi.org/10.22495/jgr_v7_i2_p4.

Mishra, S., Pradhan, B.B. 2019. Impact of liquidity management on profitability: An empirical analysis in private sector banks on India. Revista Espacios, Vol. 40. Available at: file:///E:/New%20Research%20Liquidity/3.0India.pdf.

Moussa, Phd. M.A.B., Boubaker, A. 2020. The impact of liquidity on bank profitability: Case of Tunisia. European Journal of Accounting, Auditing and Finance Research, Vol. 8(2), 20-37.

Moussa, Phd. M.A.B., Boubaker, A. 2020. The impact of liquidity on bank profitability: Case of Tunisia. European Journal of Accounting, Auditing and Finance Research, Vol. 8(2), 20-37.

Mowla, G. 2024. How severe is the banking sector liquidity crisis? Dhaka Tribune, Bangladesh. Available at: https://www.dhakatribune.com/bangladesh/349844/how-severe-is-the-banking-sector-liquidity-crisis.

Nedorezova, E., Maraval, C. 2019. A quantitative study on the impact of the Basel III requirements on the banks' stock returns (Master's Thesis in Business administration, Umea University). Available online: http://www.diva-portal.se/smash/get/diva2:1333774 /FULLTEXT01.pdf.

Obadire, A.M., Obadire, K. 2023. The impact of bank regulation on bank performance: A novel analysis of pre-Covid era with cross country evidence. American Journal of Industrial and Business Management, Vol. 13(3), 118-139. Available online: https://doi.org/10.4236/ajibm.2023.133009.

Pandey, C., Budhathoki, R.K. 2020. Impact of liquidity on the profitability of Nepalese commercial banks. Pravaha, Nepal Journals Online, Vol. 26(1), 39- 40. Available at: https://www.nepjol.info/index.php/pravaha/issue/view/2590.

Parvin, S., Chowdhury, A.N.M.M.H., Siddiqua, A., Ferdous, J. 2019. Effect of liquidity and bank size on the profitability of commercial banks in Bangladesh. Asian Business Review, Vol. 9(1), 7-10.

Paul, S.C., Bhowmik, P.K., Famanna, M.N. 2020. Impact of liquidity on profitability: A study on commercial banks in Bangladesh. Advances in Management and Applied Economics, Vol. 11(1), 73-90.

Pradhan, R.S., Shrestha, D. 2016. Impact of liquidity on bank profitability in Nepalese commercial banks. Available at SSRN: http://ssrn.com/abstract=2793458.

Rahman, M.U., Jannat, Z. 2023. The effect of liquidity on the banks' profitability: Empirical evidence from the commercial banks of Afghanistan. Liberal Arts and Social Sciences International Journal (LASSIJ), Vol. 7(1), 172-186.

Rahman, M. 2024. Banks' liquidity crisis puts Bangladesh's economy I red. The New Age: Bangladesh. https://www.newagebd.net/post/banking/239139/banks-liquidity-crisis-puts-economy-in-red-.

Rajdeep, S., Patra, B. 2023. Does Basel III- Liquidity Coverage Ratio affect the profitability of Indian public sector banks? Millennial Asia, SAFE publication of India. https://journals.sagepub.com/doi/pdf/10.1177/09763996231192027? download=true.

Saad, A.S.M. 2024. Govt. bank borrowing triggers liquidity crunch. The Business Post: Bangladesh. https://businesspostbd.com/economy/banking/govt-bank-borrowing-triggers-liquidity-crunch.

Said, R.M. 2018. Basel III new liquidity framework and Malaysian commercial banks profitability. Jurnal Pengurusan, Vol. 52, 111-120. https://www.ukm.my/jurnalpengurusan/wp-content/uploads/2022/10 /jp_52-9.pdf.

Sekoni, A. 2015. The basic concepts and features of bank liquidity and its risk. MPRA Paper No. 67389. Available online: https://mpra.ub.uni-muenchen.de/67389/.

Sidhu, A.V., Rastogi, S., Gupte, R., Bhimavarapu, V.M. 2022. Impact of liquidity coverage ratio on performance of select Indian banks. Journal of Risk and Financial Management, Vol. 15(5), 1-17. https:// doi.org/10.3390/jrfm15050226.

Talreja, V., Anwa, N., Shaikh, G.M., Shah, S. 2021. Effect of liquidity management on bank's profitability (A study on private commercial banks in Pakistan). International Journal of Advanced Research in Engineering and Technology (IJARET), Vol. 12(4), 345-362. Available at: https://iaeme.com/Home/issue/IJARET?Volume=12andIssue=4.

Thalassinos, I.E., Venediktova, B., Zampeta, V. 2015. Applications of M-GARCH Model for the Selection of Securities of Banks' Investment Portfolio. Applied Economics and Finance, 2(2), 1-13.

The Basel Committee of Banking Supervision. 2014. Basel III: The net stable funding ratio. Bank for International Settlement. Available at: https:// www.bis.org/bcbs/publ/d295.pdf

The Basel Committee on Banking Supervision. 2013. Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools. Bank for international Settlement. Available online: https://www.bis.org/publ/bcbs238.pdf.

Thinh, T.Q., Thuy, L.X., Tuan, D.A. 2022. The impact of liquidity on profitability- evidence from Vietnamese listed commercial banks. Banks and Banks Systems, Vol. 17(1), 94-103.

Veeramoothoo, S., Hammoudeh, S. 2022. Impact of Basel III liquidity regulations on U.S. Bank performance in different conditional profitability spectrums. The North American Journal of Economics and Finance, Vol. 63(C).

Uddin, M.R., Reza, S.M.A., Das, S. 2016. Liquidity risk and performance: A study on the banking sector of Bangladesh. Business Review - A Journal of Business Administration Discipline, Khulna University, Vol. 11, 35-42.