# Measuring the Impact of Loan-to-Deposit Ratio (LDR) on Banks' Liquidity in Nepal

Ishwari Rana, Garima Paudel, Jyoti Chauhan and Jyoti Panta[*]

## Abstract

This study examines the effect of loan to deposit ratio on the liquidity of Nepalese commercial banks. Liquid deposit to total deposit and cash reserve ratio are selected as the dependent variables. The selected independent variables are loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size and interest rate. The study is based on secondary data of 10 Nepalese commercial banks with 100 observations for the period from 2014/15 to 2023/24. The data were collected from Banking and Financial Statistics published by Nepal Rastra Bank, and annual reports of the selected commercial banks. The correlation coefficients and regression models are estimated to test the significance and importance of loan to deposit ratio and other bank specific factors on the liquidity in Nepalese commercial banks.

The study showed that return on assets has a positive impact on liquid deposit to total deposit and cash reserve ratio. It indicates that increase in return on assets lead to increase in liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. However, interest rate has a negative impact on liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. It indicates that increase in interest rate leads to decrease in liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. In contrast, capital adequacy ratio has a positive impact on liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. It indicates that increase in capital adequacy ratio leads to increase in liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. However, loan-to-deposit ratio has a negative impact on liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. It indicates that increase in loan-to-deposit ratio leads to decrease in liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. In contrast, firm size has a positive impact on liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. It indicates that higher the firm size, higher would be the liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. However, non-performing loan has a negative impact on liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio. It indicates that increase in non-performing loan leads to decrease in liquid deposit to total deposit liquid deposit to total deposit and cash reserve ratio.

*Keywords:* liquidity ratio, loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size

## 1. Introduction

Liquidity management is a key function of lending institutions, as it ensures that banks maintain adequate cash and liquid assets to meet their short-term obligations, such as customer withdrawals and loan disbursements, without disrupting normal operations. Effective liquidity management is crucial not only for the stability and profitability of individual banks but also for the overall health of the financial system (Bianchi and Bigio, 2022). A well-managed liquidity position allows banks to operate efficiently, avoid liquidity crises, and capitalize on profitable lending and investment opportunities. Poor liquidity

---

* Mr. Rana, Ms. Paudel, Ms. Chauhan and Ms. Panta are Freelance Researchers, Kathmandu, Nepal.

management, on the other hand, can lead to increased borrowing costs, or even bank failures. Moreover, since banks play a central role in financial intermediation, their liquidity positions have broader implications for the macroeconomic, influencing credit availability, interest rates, and economic stability. Therefore, maintaining optimal liquidity levels is vital for sustaining public confidence, ensuring regulatory compliance, and supporting a resilient banking sector (Pape, 2020).

Liquidity represents the overall monetary environment and reflects the degree of imbalance between the demand for and supply of monetary resources. It is broadly understood as the availability of funds or the assurance that such funds will be accessible to meet all financial obligations, both on-balance sheet and off-balance sheet, as they become due. From a central banking standpoint, liquidity pertains to the central bank's liabilities, particularly currency in circulation and reserves held by the banking system, collectively known as the monetary base, of which the central bank is the exclusive provider (Edem, 2017). For deposit money banks, liquidity refers to their capacity to fulfill daily financial obligations, including ensuring cash availability on demand. This liquidity may take the form of physical cash, balances with other financial institutions and the central bank, or highly liquid short-term instruments such as government securities that can be readily traded with minimal transaction costs. Maintaining sufficient liquidity is essential for financial stability, as banks must be able to meet withdrawal demands and other obligations to prevent panic and potential bank runs. A critical lesson from the 2007–2008 Global Financial Crisis (GFC) was the realization that liquidity is just as important as capital adequacy. While capital provides a buffer against unexpected losses, liquidity ensures a bank's ability to meet immediate demands. A bank may be solvent, possessing assets greater than its liabilities, but still face failure if its assets are illiquid and cannot be quickly converted into cash when needed (Agu and Nnamani, 2017).

Banks must maintain a sufficient level of liquid assets to promptly meet customer demands at a rational cost, highlighting the critical importance of efficient liquidity management. Achieving and maintaining an optimal liquidity level is a core aspect of sound bank management, as the entire banking operation depends heavily on a bank's ability to preserve adequate liquidity (Mounira and Anas, 2008). A shortage in liquidity at one bank can have far-reaching consequences due to the bank contagion effect, which may disrupt the stability of the entire banking system and elevate systemic risk. Striving for optimal liquidity levels requires banks to consider several internal factors such as bank size, nature of operations, and involvement in complex financial activities. Effective liquidity risk management entails adopting a strict decision-making structure, developing an appropriate funding strategy, minimizing exposure to risk factors, and adhering to synchronized regulatory frameworks to ensure liquidity is available when needed (Van Greuning and Bratanovic, 2020). A clear and well-structured liquidity management policy is essential for managing a bank's assets and liabilities efficiently. In Bangladesh, the banking sector has undergone significant transformations in recent years due to the rise in the number of scheduled banks and the introduction of technological innovations, intensifying competition. These developments underscore the need for performance enhancement to remain competitive. One of the fundamental responsibilities of banks is to ensure adequate liquidity reserves to meet customer obligations and operational expenses, thereby supporting smooth banking functions and contributing to broader economic development. Consequently, strategic and proactive liquidity planning is imperative to uphold banks' reputation and maintain public confidence in the financial system (Edem, 2017).

Banks are primarily driven by the goal of profitability, yet they must also maintain sufficient liquidity to meet the demands of depositors and fulfill other financial obligations

(Bassey and Ekpo, 2018). Striking a balance between profitability and liquidity is a constant challenge, as banks face numerous threats, notably liquidity risk and credit risk. Liquidity risk refers to the possibility that a bank will be unable to meet its financial obligations as they become due, often triggered by unexpected large withdrawals, sudden loan disbursements, or volatile market conditions (Kumar and Yadav, 2013). On the other hand, credit risk arises from the likelihood that borrowers may default on their loan repayments, disrupting the inflow of funds and compounding liquidity challenges. The coexistence of both liquidity and credit risks significantly elevates a bank's default risk and can lead to broader systemic risk, thereby undermining financial system stability and potentially worsening macroeconomic conditions (Imbierowicz and Rauch, 2014). To monitor and assess the level of liquidity within the banking system, various indicators are utilized, including movements in interest rates, end-of-day balances maintained by banks, and the volume and value of transactions conducted through central bank lending facilities. These variables help regulators and financial institutions gauge liquidity pressure and respond proactively to mitigate potential disruptions. Adenuga *et al.* (2021) revealed a direct relationship between the loan-to-deposit ratio (ldr) and inflation, aligning with a priori expectations. This suggests that higher LDRs, which indicate increased lending activities by Deposit Money Banks (DMBs), can stimulate output in the economy and potentially lead to a rise in inflation. The underlying rationale is that a higher volume of credit made available to the real sector increases aggregate demand and investment, which can exert upward pressure on prices within the Nigerian economy. However, it is important to note that if these loans are productively utilized and generate sufficient returns within the loan tenor, the inflationary impact may be moderated and less significant than initially anticipated. Tasnova (2022) examined the influence of both bank-specific and macroeconomic determinants on the liquidity of 29 listed commercial banks in Bangladesh. The results indicated that business cycle fluctuations and monetary policy interest rates have a negative impact on bank liquidity, suggesting that during economic downturns or periods of tight monetary policy, banks tend to experience reduced liquidity. In contrast, profitability, non-performing loans (NPLs), capital adequacy, and interest rate spread are found to have a positive relationship with liquidity. Notably, capital adequacy and the business cycle emerged as significant factors affecting liquidity levels. These findings imply that well-capitalized banks are better positioned to manage their liquidity, while changes in the macroeconomic environment, particularly the business cycle, play a crucial role in shaping liquidity conditions within the banking sector.

In the context of Nepal, Sharma (2016) showed that there is positive relationship between return on assets, credit to deposit ratio and liquid assets to total assets ratio. It indicates that higher the return on assets, higher would be the liquid assets to total assets ratio. Similarly, increase in credit to deposit ratio leads to an increase in liquid assets to total assets ratio. The results also showed that there is negative relationship between bank size, net interest margin, total deposit to total assets ratio and liquid assets to total assets ratio which reveals that increase in bank size will lower the liquid assets to total assets ratio. Similarly, higher the net interest margin, lower will be the liquid assets to total assets ratio. Likewise, the result showed that total loan to total assets ratio is positively correlated with capital adequacy ratio and credit to deposit ratio which indicates that higher the capital adequacy ratio, higher would be the total loan to total assets ratio. Similarly, increase in credit to deposit ratio will lead to an increase in total loan to total assets ratio. Gautam (2016) revealed that bank size, capital adequacy, and the inflation rate have a positive impact on the liquidity of Nepalese commercial banks, suggesting that larger banks with stronger capital positions and higher inflation environments tend to maintain higher liquidity levels. In contrast, non-performing loans (NPLs), profitability, and GDP growth rate were found to have a negative impact on liquidity, indicating that higher levels of NPLs and profitability, as well as robust economic growth, are associated with lower liquidity holdings. Among these variables, capital

adequacy, non-performing loans, and profitability exhibited statistically significant effects on bank liquidity, highlighting their critical influence on liquidity management practices. On the other hand, bank size, GDP growth, and inflation rate were found to be statistically insignificant.

Similarly, Bista and Basnet (2020) revealed that deposit, capital adequacy, remittance, and bank size are the key determinants of bank liquidity in Nepalese commercial banks. Among these, deposit plays the most prominent role in enhancing liquidity in the short term, as a higher volume of customer deposits directly increases the availability of liquid funds. Conversely, capital adequacy tends to reduce liquidity in the short run, likely because banks with higher capital buffers may allocate more resources toward long-term investments or maintain lower risk profiles, thereby reducing the need for excessive liquidity. In the long term, however, capital adequacy, bank size, and government expenditure are positively associated with increased bank liquidity, indicating that well-capitalized and larger banks, supported by public sector spending, are better positioned to maintain liquidity over time. Interestingly, deposits, while beneficial in the short run, show a negative relationship with liquidity in the long term, possibly due to increased lending and investment activities that outpace deposit growth. These dynamics highlight the complex and time-sensitive nature of liquidity management in the banking sector.

The above discussion shows that empirical evidences vary greatly across the studies on the effect of loan to deposit ratio and other bank specific factors on bank liquidity. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such findings using more recent data exist in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The major objective of the study is to examine the effect of loan to deposit ratio and other bank specific factors on the liquidity of Nepalese commercial banks. Specifically, it examines the relationship of loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size and interest rate on liquid deposit to total deposit and cash reserve ratio of Nepalese commercial banks.

The remainder of this study is organized as follows: Section two describes the sample, data and methodology. Section three presents the empirical results and the final section draws the conclusion.

## 2. Methodological aspects

The study is based on the secondary data which were collected from 10 Nepalese commercial banks for the study period from 2014/15 to 2023/24, leading to a total of 100 observations. The main sources of data collected from the Bank Supervision Report published by Nepal Rastra Bank (NRB), and annual reports of the selected commercial banks. This study is based on descriptive as well as causal comparative research designs. Table 1 shows the list of commercial banks selected for the study along with the study period and number of observations.

Table 1

**List of commercial banks selected for the study along with study period and number of observations**

| S.N. | Name of Commercial Banks | Study Period | Observations |
|------|--------------------------|--------------|--------------|
| 1 | Global IME Bank Limited | 2014/15-2023/24 | 10 |
| 2 | NIC Asia Bank Limited | 2014/15-2023/24 | 10 |
| 3 | Kumari Bank Limited | 2014/15-2023/24 | 10 |
| 4 | Prabhu Bank Limited | 2014/15-2023/24 | 10 |
| 5 | Himalayan Bank Limited | 2014/15-2023/24 | 10 |
| 6 | Nepal Bank Limited | 2014/15-2023/24 | 10 |
| 7 | Agricultural Development Bank Limited | 2014/15-2023/24 | 10 |
| 8 | Siddhartha Bank Limited | 2014/15-2023/24 | 10 |
| 9 | Everest Bank Limited | 2014/15-2023/24 | 10 |
| 10 | NMB Bank Limited | 2014/15-2023/24 | 10 |
| **Total number of observations** | | | **100** |

Thus, the study is based on 100 observations.

*The model*

The model estimated in this study assumes that liquidity depends upon loan to deposit ratio and other bank specific factors. The selected dependent variables are liquid deposit to total deposit and cash reserve ratio. Similarly, the selected independent variables are loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size and interest rate. Therefore, the model takes the following from:

$$LDTD_{it} = \beta_0 + \beta_1 FS + \beta_2 ROA + \beta_3 IR + \beta_4 CAR + \beta_5 LDR + \beta_6 NPL + e_{it}$$

$$CRR_{it} = \beta_0 + \beta_1 FS + \beta_2 ROA + \beta_3 IR + \beta_4 CAR + \beta_5 LDR + \beta_6 NPL + e_{it}$$

Where,

LDTD = Liquid deposit to total deposit as measured by the ratio of total liquid deposit to total deposit, in percentage.

CRR = Cash reserve ratio as measured by the minimum percentage of a commercial bank's total deposits that it must maintain as reserves with the central bank, in percentage.

ROA = Return on assets as measured by the ratio of net income to total assets, in percentage.

IR = Interest rate as measured by the lending interest rate of the bank, in percentage.

CAR = Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage.

LDR = Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage.

FS = Firm size as measured by the total assets of bank, Rs. in billion.

NPL = Nonperforming loan ratio as measured by the ratio of total non-performing loans to total loans, in percentage.

The following section describes the independent variables used in this study along with the hypothesis formulation:

*Firm size*

Priharta and Gani (2024) examined the determinants of bank profitability in Republic of Indonesia state-owned banks. The study showed that bank size plays a significant role in enhancing profitability. Larger banks typically benefit from economies of scale, allowing them to spread costs more effectively across a larger asset base, which improves their overall cost efficiency. Assfaw (2019) examined the influence of firm-specific and macroeconomic variables on the liquidity position of private commercial banks in Ethiopia. The findings indicate that bank-specific factors, particularly bank size, loan growth, and deposit levels, are significant determinants of liquidity. Larger banks tend to have greater access to funding sources and diversified portfolios, which enhance their liquidity, while rapid loan growth may strain liquidity if not supported by proportional deposit inflows. Deposits, being a primary source of liquid funds, positively contribute to maintaining adequate liquidity levels. Additionally, bigger banks tend to have a more diversified portfolio of financial products and services, enhancing their ability to generate consistent revenue streams (Birhanu *et al.*, 2021). Based on it, this study develops the following hypothesis:

$H_1$: There is positive relationship between firm size and bank liquidity.

*Return on assets*

Al-Matari (2023) found that liquidity significantly impacts the profitability of GCC, with an inverse relationship between liquidity and Return on Equity (ROE). This suggests that as banks hold higher levels of liquidity, their ROE tends to decline, possibly due to the opportunity cost of maintaining idle or low-yield liquid assets instead of deploying them into more profitable investments. Al Nimer *et al.* (2015) examined the impact of liquidity on Jordanian banks profitability through return on assets. The study revealed a significant impact of quick ratio on Return on Assets, indicating that liquidity, as measured by the quick ratio, plays a crucial role in influencing the profitability of Jordanian banks. A higher quick ratio, which reflects the bank's ability to meet its short-term obligations using its most liquid assets, is positively associated with better performance in terms of ROA. Moreover, Ruziqa (2013) assessed the impact of credit and liquidity risk on bank financial performance in the context of Indonesian Conventional Bank with total asset above 10 trillion Rupiah. The study showed a positive association between bank profitability and liquidity ratio. Based on it, this study develops the following hypothesis:

$H_2$: There is positive relationship between return on assets and bank liquidity.

*Loan to deposit ratio*

Adenuga *et al.* (2021) found a positive impact of loan-to-deposit ratio (LDR) on banks' liquidity in Nigeria. Van den End (2016) revealed that a higher LDR typically results in lower liquidity, while a lower LDR provides greater liquidity but potentially lower profitability. Saeed (2014) revealed that higher loan-to-deposit ratio (LDR) indicates that a larger proportion of a bank's deposits are being used for lending rather than being held as

liquid assets. While this can increase profitability through interest income from loans, it also means the bank has less liquidity available to meet sudden withdrawals or other short-term obligations. Based on it, this study develops the following hypothesis:

$H_3$: There is a negative relationship between loan to deposit ratio and bank liquidity.

*Nonperforming loan*

Taiwo and Mike (2021) empirically analyzed the relationship between non-performing loans and liquidity of deposit money banks in Nigeria and revealed that an increase in NPLs tends to reduce bank liquidity. Additionally, high NPLs force banks to set aside more capital as loan loss provisions, thereby reducing the funds available for other liquid assets or lending activities (Alaoui Mdaghri, 2022). According to Umar and Sun (2016), the deterioration in asset quality due to NPLs also undermines depositor and investor confidence, which may lead to reduced funding availability or increased cost of capital. In the long run, persistently high NPLs can severely constrain a bank's operational flexibility, erode profitability, and elevate liquidity risk, threatening overall financial stability. Based on it, this study develops the following hypothesis:

$H_4$: There is negative relationship between non-performing loans and bank liquidity.

*Interest rate*

Zhang and Deng (2020) revealed that there is a nonlinear, inverted U-shaped relationship between interest rate liberalization and bank liquidity creation, meaning that as interest rate liberalization progresses, bank liquidity creation initially increases, reaches a peak, and then begins to decline. This implies that moderate liberalization can enhance liquidity creation by improving pricing efficiency and encouraging financial intermediation, while excessive liberalization may increase market volatility and risk, eventually dampening liquidity creation. Lucchetta (2007) found a negative relationship between bank liquidity creation and increase in interest rate. Vodova (2013) revealed that higher interest rates also increase the cost of holding liquid assets, which may discourage banks from maintaining large liquidity buffers, depending on market conditions. Based on it, this study develops the following hypothesis:

$H_5$: There is a negative relationship between interest rate and bank liquidity.

*Capital adequacy ratio*

Margono *et al.* (2020) examined the roles of capital adequacy and liquidity to improve banking performance. The results demonstrated a positive association between capital adequacy, liquidity, and improved banking performance, indicating that banks with stronger capital buffers and higher levels of liquid assets tend to perform better overall. Dao and Nguyen (2020) assessed the bank capital adequacy ratio and bank performance in Vietnam using a simultaneous equations framework. The study revealed that well-capitalized banks are generally viewed as more stable and less risky, which enhances their ability to attract deposits and access funding at favorable terms. According to Aspal and Nazneen (2014), higher capital adequacy ratios not only improve a bank's solvency but also support its capacity to meet short-term obligations, thereby enhancing overall liquidity and financial soundness. Based on it, this study develops the following hypothesis:

$H_6$: There is a positive relationship between capital adequacy ratio and bank liquidity.

## 3. Results and discussions

*Descriptive statistics*

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2014/15-2023/24.

Table 2

**Descriptive statistics**

This table shows the descriptive statistics of dependent and independent variables of 10 Nepalese commercial banks for the study period of 2014/15 to 2023/24. The dependent variables are LDTD (Liquid deposit to total deposit as measured by the ratio of total liquid deposit to total deposit, in percentage) and CRR (Cash reserve ratio as measured by the minimum percentage of a commercial bank's total deposits that it must maintain as reserves with the central bank, in percentage). The selected independent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage), IR (Interest rate as measured by the lending interest rate of the bank, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), LDR (Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage), FS (Firm size as measured by the total assets of bank, Rs. in billion) and NPL (Nonperforming loan ratio as measured by the ratio of total non-performing loans to total loans, in percentage).

| Variables | Minimum | Maximum | Mean | Std. Deviation |
|-----------|--------:|--------:|-----:|---------------:|
| LDTD | 46.31 | 74.65 | 66.18 | 6.60 |
| CRR | 3.00 | 4.50 | 3.75 | 1.06 |
| ROA | 0.04 | 2.58 | 1.43 | 0.48 |
| IR | 4.47 | 11.78 | 8.57 | 1.81 |
| CAR | 9.37 | 22.99 | 13.73 | 2.41 |
| LDR | 65.38 | 97.69 | 86.46 | 5.88 |
| FS | 37.37 | 589.78 | 199.57 | 114.29 |
| NPL | 0.01 | 8.83 | 2.36 | 1.66 |

Source: SPSS Output

*Correlation analysis*

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and results are presented in Table 3.

Table 3

**Pearson's correlation coefficients matrix**

This table shows the correlation coefficients of dependent and independent variables of 10 Nepalese commercial banks for the study period of 2014/15 to 2023/24. The dependent variables are LDTD (Liquid deposit to total deposit as measured by the ratio of total liquid deposit to total deposit, in percentage) and CRR (Cash reserve ratio as measured by the minimum percentage of a commercial bank's total deposits that it must maintain as reserves with the central bank, in percentage). The selected independent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage), IR (Interest rate as measured by the lending interest rate of the bank, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), LDR (Loan to deposit ratio as measured by the ratio of total loan to total deposit, in

percentage), FS (Firm size as measured by the total assets of bank, Rs. in billion) and NPL (Nonperforming loan ratio as measured by the ratio of total non-performing loans to total loans, in percentage).

| Variables | LDTD | CRR | ROA | IR | CAR | LDR | FS | NPL |
|---|---|---|---|---|---|---|---|---|
| LDTD | 1 | | | | | | | |
| CRR | 0.417** | 1 | | | | | | |
| ROA | 0.352** | 0.451** | 1 | | | | | |
| IR | -0.050 | -0.030 | 0.132 | 1 | | | | |
| CAR | 0.400** | 0.214* | -0.038 | -0.006 | 1 | | | |
| LDR | -0.206* | -0.041 | 0.163 | 0.075 | -0.250* | 1 | | |
| FS | 0.230* | 0.345** | 0.152 | 0.118 | 0.331** | -0.132 | 1 | |
| NPL | -0.180 | -0.011 | 0.004 | -0.365** | -0.255** | -0.241* | 0.020 | 1 |

Note: The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent levels respectively.

Table 3 shows that there is a positive relationship between return on assets and liquid deposit to total deposit. It indicates that increase in return on assets lead to increase in liquid deposit to total deposit. However, there is a negative relationship between interest rate and liquid deposit to total deposit. It indicates that increase in interest rate leads to decrease in liquid deposit to total deposit. In contrast, there is a positive relationship between capital adequacy ratio and liquid deposit to total deposit. It indicates that increase in capital adequacy ratio leads to increase in liquid deposit to total deposit. However, there is a negative relationship between loan-to-deposit ratio and liquid deposit to total deposit. It indicates that increase in loan-to-deposit ratio leads to decrease in liquid deposit to total deposit. In contrast, there is a positive relationship between firm size and liquid deposit to total deposit. It indicates that higher the firm size, higher would be the liquid deposit to total deposit. However, there is a negative relationship between non-performing loan and liquid deposit to total deposit. It indicates that increase in non-performing loan leads to decrease in liquid deposit to total deposit.

Similarly, there is a positive relationship between return on assets and cash reserve ratio. It indicates that increase in return on assets lead to increase in cash reserve ratio. However, there is a negative relationship between interest rate and cash reserve ratio. It indicates that increase in interest rate leads to decrease in cash reserve ratio. In contrast, there is a positive relationship between capital adequacy ratio and cash reserve ratio. It indicates that increase in capital adequacy ratio leads to increase in cash reserve ratio. However, there is a negative relationship between loan-to-deposit ratio and cash reserve ratio. It indicates that increase in loan-to-deposit ratio leads to decrease in cash reserve ratio. In contrast, there is a positive relationship between firm size and cash reserve ratio. It indicates that higher the firm size, higher would be the cash reserve ratio. However, there is a negative relationship between non-performing loan and cash reserve ratio. It indicates that increase in non-performing loan leads to decrease in cash reserve ratio.

*Regression analysis*

Having analyzed the Pearson's correlation coefficients, the regression analysis has been carried out and the results are presented in Table 4. More specifically, it presents the regression results of loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size and interest rate on liquid deposit to total deposit and cash reserve ratio of Nepalese commercial banks.

Table 4

**Estimated regression results of loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size and interest rate on liquid deposit to total deposit**

The results are based on panel data of 10 Nepalese commercial banks with 100 observations for the study period from 2014/15 to 2023/24 by using the linear regression model and the model is $LDTD_{it} = \beta_0 + \beta_1 FS + \beta_2 ROA + \beta_3 IR + \beta_4 CAR + \beta_5 LDR + \beta_6 NPL + e_{it}$ where, the dependent variable is LDTD (Liquid deposit to total deposit as measured by the ratio of total liquid deposit to total deposit, in percentage). The selected independent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage), IR (Interest rate as measured by the lending interest rate of the bank, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), LDR (Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage), FS (Firm size as measured by the total assets of bank, Rs. in billion) and NPL (Nonperforming loan ratio as measured by the ratio of total non-performing loans to total loans, in percentage).

| Model | Intercept | Regression coefficients of | | | | | | Adj. R_bar2 | SEE | F-value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROA | IR | CAR | LDR | FS | NPL | | | |
| 1 | 1.667 (22.068)** | 0.318 (3.815)** | | | | | | 0.115 | 0.453 | 14.550 |
| 2 | 1.701 (3.233)** | | -0.020 (0.510) | | | | | 0.007 | 0.483 | 0.260 |
| 3 | 0.772 (4.967)** | | | 0.216 (4.433)** | | | | 0.152 | 0.443 | 19.654 |
| 4 | 2.890 (4.226)** | | | | -0.017 (2.135)* | | | 0.033 | 0.473 | 4.557 |
| 5 | 1.606 (18.874)** | | | | | 0.010 (2.404)* | | 0.044 | 0.470 | 5.778 |
| 6 | 4.072 (2.859)** | | | | | | -0.237 (1.853) | 0.023 | 0.476 | 3.435 |
| 7 | 1.687 (3.404)** | 0.317 (3.757)** | -0.001 (0.040) | | | | | 0.107 | 0.455 | 7.206 |
| 8 | 1.035 (2.178)* | 0.304 (3.933)** | -0.001 (0.041) | 0.209 (4.567)** | | | | 0.252 | 0.416 | 12.690 |
| 9 | 1.455 (2.166)* | 0.296 (3.825)** | | 0.201 (4.269)** | -0.005 (0.671) | | | 0.255 | 0.415 | 12.896 |
| 10 | 1.703 (2.735)** | 0.238 (3.271)** | | 0.263 (5.748)** | -0.007 (1.086) | 0.015 (4.311)** | | 0.366 | 0.383 | 16.002 |
| 11 | 3.147 (1.933) | 0.236 (3.239)** | | 0.247 (5.054)** | -0.009 (1.337) | 0.015 (4.199)** | -0.109 (0.960) | 0.365 | 0.383 | 12.976 |

Notes:

i. Figures in parenthesis are t-value
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Liquid deposit to total deposit ratio is the dependent variable.

Table 4 shows that the beta coefficients for return on assets are positive with liquid deposit to total deposit. It indicates that return on assets has a positive impact on liquid deposit to total deposit. This finding is similar to the findings of Al-Matari (2023). However, the beta coefficients for interest rate are negative with liquid deposit to total deposit. It indicates that interest rate has a negative impact on liquid deposit to total deposit. This finding is consistent with the findings of Zhang and Deng (2020). In contrast, the beta coefficients for capital adequacy ratio are positive with liquid deposit to total deposit. It indicates that capital adequacy ratio has a positive impact on liquid deposit to total deposit. This finding is similar to the findings of Margono *et al.* (2020). However, the beta coefficients for loan-to-deposit ratio are negative with liquid deposit to total deposit. It indicates that loan-to-deposit ratio has a negative impact on liquid deposit to total deposit. This finding is consistent with the

findings of Adenuga *et al.* (2021). In contrast, the beta coefficients for firm size are positive with liquid deposit to total deposit. It indicates that firm size has a positive impact on liquid deposit to total deposit. This finding is similar to the findings of Priharta and Gani (2024). However, the beta coefficients for non-performing loan are negative with liquid deposit to total deposit. It indicates that non-performing loan has a negative impact on liquid deposit to total deposit. This finding is similar to the findings of Taiwo and Mike (2021).

Table 5 presents the regression results of loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size and interest rate on cash reserve ratio of Nepalese commercial banks.

Table 5

**Estimated regression results of loan to deposit ratio, capital adequacy ratio, return on assets, non-performing loans, firm size and interest rate on cash reserve ratio**

The results are based on panel data of 10 Nepalese commercial banks with 100 observations for the study period from 2014/15 to 2023/24 by using the linear regression model and the model is $CRR_{it} = \beta_0 + \beta_1 FS + \beta_2 ROA + \beta_3 IR + \beta_4 CAR + \beta_5 LDR + \beta_6 NPL + e_{it}$ where, the dependent variable is CRR (Cash reserve ratio as measured by the minimum percentage of a commercial bank's total deposits that it must maintain as reserves with the central bank, in percentage). The selected independent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage), IR (Interest rate as measured by the lending interest rate of the bank, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), LDR (Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage), FS (Firm size as measured by the total assets of bank, Rs. in billion) and NPL (Nonperforming loan ratio as measured by the ratio of total non-performing loans to total loans, in percentage).

| Model | Intercept | Regression coefficients of | | | | | | Adj. R_bar2 | SEE | F-value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROA | IR | CAR | LDR | FS | NPL | | | |
| 1 | 15.760 (19.634)** | 4.539 (5.130)** | | | | | | 0.196 | 4.807 | 26.322 |
| 2 | 14.212 (2.422)* | | -0.132 (0.307) | | | | | 0.009 | 5.384 | 0.094 |
| 3 | 16.365 (8.867)** | | | 1.287 (2.226)* | | | | 0.037 | 5.261 | 4.957 |
| 4 | 9.210 (1.184) | | | | -0.037 (0.413) | | | 0.008 | 5.382 | 0.171 |
| 5 | 15.289 (16.719)** | | | | | 0.161 (3.729)** | | 0.110 | 5.056 | 13.902 |
| 6 | 14.156 (0.878) | | | | | | -0.156 (0.108) | 0.010 | 5.386 | 0.012 |
| 7 | 14.010 (2.662)** | 4.579 (5.108)** | -0.131 (0.336) | | | | | 0.189 | 4.828 | 13.104 |
| 8 | 18.351 (3.428)** | 4.667 (5.631)** | -0.130 (0.345) | 1.391 (2.701)** | | | | 0.236 | 4.685 | 11.708 |
| 9 | 13.490 (1.514) | 4.758 (5.389)** | -0.116 (0.305) | 1.301 (2.442)* | -0.056 (0.683) | | | 0.232 | 4.698 | 8.851 |
| 10 | 13.956 (1.608) | 4.374 (5.012)** | -0.221 (0.595) | 0.862 (1.577) | -0.038 (0.468) | 0.108 (2.548)* | | 0.272 | 4.574 | 8.769 |
| 11 | 17.808 (0.763) | 4.362 (4.959)** | -0.192 (0.472) | 0.903 (1.518) | -0.033 (0.383) | 0.107 (2.480)* | -0.264 (0.178) | 0.265 | 4.596 | 7.241 |

Notes:

i. Figures in parenthesis are t-value
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Cash reserve ratio is the dependent variable.

Table 5 shows that the beta coefficients for return on assets are positive with cash reserve ratio. It indicates that return on assets has a positive impact on cash reserve ratio. This finding is similar to the findings of Al Nimer *et al.* (2015). However, the beta coefficients for interest rate are negative with cash reserve ratio. It indicates that interest rate has a negative impact on cash reserve ratio. This finding is consistent with the findings of Lucchetta (2007). In contrast, the beta coefficients for capital adequacy ratio are positive with cash reserve ratio. It indicates that capital adequacy ratio has a positive impact on cash reserve ratio. This finding is similar to the findings of Dao and Nguyen (2020). However, the beta coefficients for loan-to-deposit ratio are negative with cash reserve ratio. It indicates that loan-to-deposit ratio has a negative impact on cash reserve ratio. This finding is consistent with the findings of Van den End (2016). In contrast, the beta coefficients for firm size are positive with cash reserve ratio. It indicates that firm size has a positive impact on cash reserve ratio. This finding is similar to the findings of Assfaw (2019). However, the beta coefficients for non-performing loan are negative with cash reserve ratio. It indicates that non-performing loan has a negative impact on cash reserve ratio. This finding is similar to the findings of (Alaoui Mdaghri, 2022).

## 4. Summary and conclusion

A well-managed liquidity position is crucial for banks to operate efficiently and sustainably. It ensures that banks have sufficient cash or liquid assets available to meet short-term obligations, such as customer withdrawals, loan disbursements, and other financial commitments. This liquidity management helps avoid liquidity crises, where a bank may struggle to fulfill its obligations, potentially leading to insolvency or a loss of depositor confidence. Furthermore, maintaining an optimal liquidity position enables banks to capitalize on profitable lending and investment opportunities without compromising their financial stability. By balancing liquidity needs with investment and lending activities, banks can maximize profitability while mitigating the risks associated with liquidity shortages, ensuring long-term operational success and resilience.

This study attempts to examine the effect of loan to deposit ratio and other bank specific factors on the liquidity of Nepalese commercial banks. This study is based on the secondary data of 10 Nepalese commercial banks, leading to a total of 100 observations.

The major conclusion of this study is that return on assets, capital adequacy ratio and firm size have positive impact on liquid deposit to total deposit and cash reserve ratio. It indicates that higher the return on assets, capital adequacy ratio and firm size, higher would be the liquid deposit to total deposit and cash reserve ratio. However, interest rate, loan-to-deposit ratio and non-performing loan have negative impact on liquid deposit to total deposit and cash reserve ratio. It indicates that increase in interest rate, loan-to-deposit ratio and non-performing loan lead to decrease in liquid deposit to total deposit and cash reserve ratio. The study also concluded that capital adequacy ratio followed by return on assets is the most influencing factor that explains the changes in the liquid deposit to total deposit in the context of Nepalese commercial banks. Likewise, the study also concluded that return on assets followed by firm size is the most influencing factor that explains the changes in the cash reserve ratio in the context of Nepalese commercial banks.

## References

Adenuga, A. O., Mohammed, J. A., Laniyan, C. V., Akintola, A. A., and Asuzu, O. C. (2021). Measuring the impact of loan-to-deposit ratio (LDR) on Banks' liquidity in Nigeria. *Economic and Financial Review* 59(2), 43-59.

Agu, C. C., and E. Nnamani, 2017. Nigerian banking structure and performance: The banking system's contribution to economic development. *Research monographs in banking and Finance* 3(1), 840-849.

Al Nimer, M., L. Warrad, and R. Al Omari, 2015. The impact of liquidity on Jordanian banks profitability through return on assets. *European Journal of Business and Management* 7(7), 229-232.

Alaoui Mdaghri, A., 2022. How does bank liquidity creation affect non-performing loans in the MENA region? *International Journal of Emerging Markets 17*(7), 1635-1658.

Al-Matari, E. M. 2023. The determinants of bank profitability of GCC: The role of bank liquidity as moderating variable—further analysis. *International Journal of Finance and Economics 28*(2), 1423-1435.

Aspal, P. K., and A. Nazneen, 2014. An empirical analysis of capital adequacy in the Indian private sector banks. *American Journal of Research Communication 2*(11), 28-42.

Assfaw, A. M., 2019. Firm-specific and macroeconomic determinants of banks liquidity: empirical investigation from Ethiopian private commercial banks. *Journal of Accounting, Finance and Auditing Studies* 5(2), 123-145.

Bassey, G. E., and U. N. Ekpo, 2018. Liquidity management in Nigerian deposit money banks: Issues, challenges and prognosis. *International Journal of Economics, Commerce and Management* 6(5), 556-580.

Bianchi, J., and S. Bigio, 2022. Banks, liquidity management, and monetary policy. *Econometrica 90*(1), 391-454.

Birhanu, T., S. Bosho Deressa, H. Azadi, A. H. Viira, S. Van Passel, and F. Witlox, 2021. Determinants of commercial bank loan and advance disbursement: the case of private Ethiopian commercial banks. *International Journal of Bank Marketing 39*(7), 1227-1247.

Bista, R. B., and P. Basnet, 2020. Determinants of Bank Liquidity in Nepal. *Quantitative Economics and Management Studies 1*(6), 390-398.

Dao, B. T. T., and K. A. Nguyen, 2020. Bank capital adequacy ratio and bank performance in Vietnam: A simultaneous equations framework. *The Journal of Asian Finance, Economics and Business 7*(6), 39-46.

Edem, D. B., 2017. Liquidity management and performance of deposit money banks in Nigeria (1986–2011): An investigation. *International Journal of Economics, Finance and Management Sciences 5*(3), 146-161.

Gautam, R., 2016. The determinants of banks liquidity: Empirical evidence on Nepalese commercial banks. *Journal of Interdisciplinary Studies 2*(2), 69-78.

Imbierowicz, B., and C. Rauch, 2014. The relationship between liquidity risk and credit risk in banks. *Journal of Banking and Finance* 40(3), 242 – 256.

Kumar, M., and Yadav, G. C. (2013). Liquidity risk management in bank: a conceptual framework. *AIMA Journal of Management and Research*, 7(2/4), 974-997.

Lucchetta, M., 2007. What do data say about monetary policy, bank liquidity and bank risk taking? *Economic Notes 36*(2), 189-203.

Margono, H., M. K. Wardani, and J. Safitri, 2020. Roles of capital adequacy and liquidity to improve banking performance. *The Journal of Asian Finance, Economics and Business 7*(11), 75-81.

Mounira, B. A., and E. Anas, 2008. Managing risks and liquidity in an interest free banking framework: the case of the Islamic banks. *International Journal of Business and Management 3*(9), 80-95.

Pape, F., 2020. Rethinking liquidity: A critical macro-finance view. *Finance and Society 6*(1), 67-75.

Priharta, A., and N. A. Gani, 2024. Determinants of bank profitability: Empirical evidence from Republic of Indonesia state-owned banks. *Contaduría y Administración 69*(3), 49-65.

Ruziqa, A. 2013. The impact of credit and liquidity risk on bank financial performance: the case of Indonesian Conventional Bank with total asset above 10 trillion Rupiah. *International Journal of Economic Policy in Emerging Economies 6*(2), 93-106.

Saeed, M., 2014. Using loan-to-deposit ratio to Avert liquidity risk: a case of 2008 liquidity crisis. *Research Journal of Finance and Accounting 5*(3), 75-80.

Sharma, P., 2016. Determinants of commercial banks liquidity in Nepal. *Nepalese Journal of Business*, *3*(3), 126-138.

Taiwo, I., and M. E. E. Mike, 2021. Empirical Analysis of non-performing loans and liquidity of deposit money banks: Nigeria experience. *Journal of International Business and Management 4*(9), 1-14.

Tasnova, N., 2022. Impact of bank specific and macroeconomic determinants on banks liquidity: an empirical study on listed commercial banks in Bangladesh. *Finance and Economics Review 4*(1), 11-24.

Umar, M., and G. Sun, 2016. Non-performing loans (NPLs), liquidity creation, and moral hazard: Case of Chinese banks. *China Finance and Economic Review 5*(3), 51-75.

Van den End, J. W., 2016. A macroprudential approach to address liquidity risk with the loan-to-deposit ratio. *The European Journal of Finance 22*(3), 237-253.

Van Greuning, H., and S. B. Bratanovic, 2020. Analyzing Banking Risk (World Bank Publications, New York).

Vodova, P., 2013. Determinants of commercial bank liquidity in Hungary. *Finansowy Kwartalnik Internetowy e-Finanse 9*(4), 64-71.

Zhang, J., and X. Deng, 2020. Interest rate liberalization and bank liquidity creation: Evidence from China. *China Finance Review International 10*(4), 377-391.