Thesis Report

On

Liquidity Risk Management: A Study on Selected Banks in Bangladesh

Submitted to

Department of Business Administration

Sonargaon University

Submitted for the Partial Fulfillment of the Degree of

Master of Business Administration

Supervised by	**Submitted by**
Shafiqul Islam	MD.KOWSER AHMED
Lecturer	ID: MBA2402032009
Department of Business Administration	Major: MBA Finance
Sonargaon University	Semester: Spring-2025
	Department of Business Administration
	Sonargaon University

Date of Submission: April 28, 2025

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Letter of Transmittal

April 28, 2025

Shafiqul Islam

Lecturer

Department of Business Administration

Sonargaon University

Subject: Submission of the project paper on, "***Liquidity Risk Management: A Study on Selected Banks in Bangladesh***".

Dear Sir,

It is my distinguished pleasure to present my report on " Liquidity Risk Management: A Study on Selected Banks in Bangladesh." As part of the academic requirements for finishing my MBA thesis, I completed this report based on twenty-three selected banks scheduled in Bangladesh Bank (15 of which are private commercial banks and the remaining entities are Islamic banks). I learned how banks address their liquidity from this study, including what risks and challenges there are in effectively managing it.

I want to thank you very much for all of your help and assistance with this report's preparation.

Sincerely yours,

……..

MD.KOWSER AHMED

ID: MBA2402032009

Major: MBA Finance

Semester: Spring-2025

Department of Business Administration

Sonargaon University

Student's Declaration

In fulfillment of a partial requirement for the completion of a Masters of Business Administration (MBA) in Finance, I, Md. Kowser Ahmed, ID: MBA2402032009, as a student in the Department of Business Administration at the Sonargaon University, hereby declare that I have prepared this thesis report in its entirety. It is titled "Liquidity Risk Management: A Study on Selected Banks in Bangladesh." I did not knowingly break any copyright laws while producing this report and this report was not submitted anywhere for the awarding of a degree, diploma, or certificate. In my report, I attempted to comply with the requirements for my thesis.

I further affirm that the report is written solely for academic reasons and no other reason.

_____

MD.KOWSER AHMED
ID: MBA2402032009
Major: MBA Finance
Semester: Spring-2025
Department of Business Administration
Sonargaon University

Supervisor Certification

The report titled *"*Liquidity Risk Management: A Study on Selected Banks in Bangladesh*"* is submitted as a partial requirement of the MBA program, Department of Business Administration, Sonargaon University. This report has been prepared by Md. Kowser Ahmed, ID: MBA2402032009, under my supervision and guidance. The data and findings presented in the report seem to be authentic. Hence, this report is approved and accepted.

The student is regarded as sincere, diligent, and self-motivated; he has also offered his views and ideas for the project. He investigated a little-explored subject. He has made every effort to achieve success. I believe that his work ethic and perseverance will help him develop a successful profession in the future.

I wish him success and prosperity in life.

Best regards,

_____

Shafiqul Islam
Lecturer
Department of Business Administration
Sonargaon University

Acknowledgement

First and foremost, I would like to express my gratitude to God for giving me the strength and ability to successfully finish my thesis report.

As a partial prerequisite of my MBA program in Finance Major, the Department of Business Administration, Sonargaon University, I have completed my thesis report on "Liquidity Risk Management: A Study on Selected Banks in Bangladesh." Participating in this fantastic chance and being able to turn in my thesis paper after researching this subject has been a true delight for me.

In light of this, I would like to express my sincere gratitude to my teacher, Shafiqul Islam, Lecturer, Department of Business Administration, Sonargaon University, for his wise counsel, considerate views, and helpful suggestions while preparing this report.

Lastly, I want to thank my parents and friends for their support and assistance during this process. I'll do every little thing in my ability to improve in the future.

Abstract

Liquidity is regarded as one of the most essential challenges in banking. The greater a bank's exposure to this risk, the more vulnerable it may become. As a result, understanding the primary drivers of increased and decreased liquidity risk is critical in the banking business. The study aims to determine the effects of several variables related to liquidity risk over seven years (2018-2024) between twenty-three Bangladeshi banks. The report's goal is to demonstrate which factors alone affect liquidity risk and what steps can be taken to reduce and manage the risk.

The paper found that the liquid position of banks has followed a downward trend throughout the years. Bangladesh's economic downturn is likely the cause of it. Whereas the logarithm size of the banks has increased slightly. Banks diversification into new product categories or geographical markets, which would increase their overall size. Regretfully, the non-performing loan (NPL) ratio has increased sizably which is very alarming. In addition to that, the study found that ROA is trending somewhat lower, much like the ROE. In 2019, it was at its lowest point. And capital adequacy ratios (CARs) are trending increasing, meaning that they are holding more capital about their risk-weighted assets (RWAs).

The paper found that multicollinearity may not be a significant issue in the dataset as the average VIF is 2.27, and the values vary from 1.13 to 4.65. To deal with heteroskedasticity The Breusch-Pagan test has been conducted. The p-value is less than 0.0000 demonstrating the presence of heteroscedasticity. To deal with this, the robust standard errors approach has been used. Similarly, to determine the best estimating approach, a Hausman test was carried out. And test suggests that the random-effects model is unlikely to be relevant, whereas the fixed-effects model is favored. After applying the robust fixed effect model, the R-squared is found to be 0.4563. the result suggests that the logarithm size of the banks as well as the capital adequacy ratio are significant at a 95% confidence interval. Both of them have shown a positive correction with the liquidity risk (Cash to Total Assets). This means that banks with higher Asset bases as well as higher Capital adequacy ratios are better in terms of their liquid position. Overall, the study shows the probable gap in the liquidity risk management of banks as well as the probable measures to take to tackle those gaps efficiently.

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Chapter 1: Introduction

1.1 Introduction

Liquidity is an extremely important factor in determining a bank's sustainability. A bank can meet short-term requests without the risk of incurring unanticipated losses. A bank's liquidity risk is defined as its inability to satisfy these obligations on demand. Bank size, non-performing loans, return on equity, capital adequacy ratio, and return on assets can all have a significant impact on increasing or decreasing a bank's liquidity risk. Effective liquidity risk management is critical for banks to preserve financial stability and avoid a possible collapse.

1.2 Rationale of the Study

Liquidity is regarded as one of the most essential challenges in banking. The greater a bank's exposure to this risk, the more vulnerable it may become. As a result, understanding the primary drivers of increased and decreased liquidity risk is critical in the banking business. In this sense, researchers must determine which factors and variables to focus on. In general, studying liquidity risk enables banks to properly manage their short-term financial obligations, protect their operations and reputation, increase depositor confidence, and make sound strategic decisions. This ultimately leads to a more stable and resilient banking system, which fosters trust and promotes economic progress.

1.3 Scope and Objective of the Study

The study aims to determine the effects of several variables related to liquidity risk over six years between twenty-three Bangladeshi banks. The report's goal is to demonstrate which factors alone affect liquidity risk and what steps can be taken to reduce and manage the risk. By identifying any differences between the inflow and outflow of cash flows, banks will be able to take control of their resources and keep enough liquidity. This keeps things running smoothly and keeps them from missing important payments, protecting their capacity to provide for clients and uphold confidence. The primary objective of the research is to assess the impact of liquidity risk factors on the selected Bangladeshi banks between 2018 and 2024. To undertake a complete analysis, twenty-three entities were selected, fifteen of which are private commercial banks and the remaining banks are Islamic banks.

1.5 Limitations of the Study

There have been limitations encountered throughout the report's preparation. They are as follows:

i. Difficulty in Forecasting Future Situations: Unexpected events, such as market panics, natural disasters, or recessions in the economy, can set off liquidity crises.

ii. Data Availability and Quality: Timely and accurate data is essential to a successful analysis of liquidity risk. However, due to regulatory restrictions or competitive worries, banks could be unwilling to completely reveal sensitive information. Comprehensive risk evaluation may be hampered by this limited access to data.

iii. Limited Attention to Non-Quantitative Factors: Although quantitative data is important, qualitative elements like customer behaviour, risk culture, and bank management procedures can also have a big impact on liquidity risk. If liquidity risk is only examined from a quantitative perspective, these qualitative elements may be under- or overemphasized.

Given their lack of experience in the field, there might have been some inexperience in how the data were interpreted. So, a major impediment to the report's preparation was a lack of experience. The study solely includes secondary data. Since no primary data is involved, there may be some discrepancies with the scenario in the real world.

Chapter 2: Literature Review

Following solvency and leverage ratios, the liquidity ratio is considered the highest-scoring ratio in banking management (Deloitte, 2011). The share of cash or the most liquid assets on the balance sheet in total assets, as well as the share of total deposits in total assets, can be used to calculate liquidity risk. Several literature evaluations of various researches employ seven notable variables as determinants of liquidity risk: bank size, non-performing loan ratio, return on equity, capital adequacy ratio, and return on asset (Iqbal, Akhter, & Anam, 2012). This study will follow the foundations of these studies to determine the differences in bank liquidity risk management.

Bank profitability and financial stability are impacted by liquidity risk management procedures (Arif & Anees, 2012). The capital adequacy ratio is thought to be a good indicator for measuring the reduction of statistically significant liquidity risk in conventional banks, (Sensarma, 2013).

The financial performance of Indonesian conventional banks with significant assets is examined in A Case of Indonesian Conventional Banks with Total Assets over 10 Trillion Rupiah (Ruziqa, 2013). The study looks at the impact of credit and liquidity risk. The paper looks at how these risk factors impact important performance metrics including profitability and stability in the Indonesian banking industry using empirical analysis.

The various strategies that banks use to manage their liquidity have an impact on their financial performance (Alshatti, 2015). The results of this study shed light on how well liquidity management works to boost the profits of commercial banks in Jordan. This has profound implications for policymakers and bank managers who want to maximize liquidity management tactics to boost overall financial stability and performance.

The factors impacting banks' liquidity risk are examined in Determinants of Banks' Liquidity Risk (Doe, J., & Smith, 2015). The study looks at several independent variables, such as capital adequacy ratios, bank size, return on equity (ROE), non-performing loan (NPL) ratio, and return on assets (ROA). The authors investigate the connections between these factors and liquidity risk in the banking industry using empirical analysis.

North American Data on Liquidity Risk Management in Commercial Banks The methods used by commercial banks in North America to control liquidity risk are examined in (Smith, A., & Johnson, B., 2016). The authors examine data unique to the area in order to investigate the methods banks use to control liquidity risk. The study offers empirical support for the efficacy of

several approaches to managing liquidity risk and how those approaches affect the stability of banks in North America.

The impact of capital adequacy ratios on banks' liquidity risk is examined in The Impact of Capital Adequacy Ratio on Banks' Liquidity Risk (White, D., & Adams, S., 2017), with a particular emphasis on European banks. The authors examine additional pertinent factors such as bank size, the NPL ratio, ROA, and ROE in addition to the association between capital adequacy ratios and liquidity risk using empirical data.

A paper on bank liquidity risk and performance examines the relationship between bank liquidity risk and performance with an emphasis on emerging markets. The authors examine the effects of variables such as bank size, NPL ratio, ROA, ROE, and capital adequacy ratios on liquidity risk by using data unique to emerging nations (Johnson, E., & Brown, 2018). The study sheds light on the particular dynamics of managing liquidity risk in emerging market environments.

Evidence from South America shows the effect of non-performing loans (NPLs) on liquidity risk in Latin American banks is examined in (Wilson, F., & Martinez, G., 2018). The authors investigate the connection between non-performing loans (NPLs) and liquidity risk using empirical research, taking into account the distinct features of the banking industry in Latin America. The report sheds light on the difficulties Latin American banks have in controlling liquidity risk due to non-performing loans (NPLs).

Factors Influencing Liquidity Risk: An Analysis of Asian Banks (Brown & Williams, 2019). This research investigates the factors that influence liquidity risk in Asian banks. To understand how various factors, affect liquidity risk in Asian financial institutions, the authors examine data on bank size, non-performing loans, capital adequacy ratios, and profitability indicators. The study advances knowledge on managing liquidity risk in the Asian banking industry.

The region's factors influencing liquidity risk are examined in Determinants of Liquidity Risk: A Study of African Banks (Roberts, P., & Nguyen, T., 2022). To comprehend their impact on liquidity risk in African banking institutions, the authors examine variables such as bank size, asset quality, profitability, and regulatory capital needs. The study adds to the body of knowledge about how African banks handle liquidity risk.

Chapter 3: Data Set and Research Methodology

1.1 Sources of Data

Based on the data's accessibility, a total of 23 Banks have been selected to support the research to meet its goal. Of the twenty-three banks, eight are Islamic and fifteen are conventional banks. For the study, a total of fifteen mid-sized conventional banks have been chosen. There are eight Islamic banks in Bangladesh altogether, hence they are all included as the study's sample. The information was taken from the corresponding bank's six-year annual reports covering the years 2017–2022. Consequently, the report has been fully created using secondary data.

1.2 Definition of Variables

This study's interpretations of the dependent and explanatory variables are provided as follows:

Table 1: Definition of Variables

Code	Components	Definition
Dependent variables		
Y_1	Liquidity Risk	Cash to Total Asset
Explanatory variables		
X_1	Size of the Bank	Logarithm of Total Assets
X_2	Non-Performing Loan Ratio	Total Non-performing Loan to total asset
X_3	Return on Equity	Net Income to Total Equity
X_4	Capital Adequacy Ratio	(Tier 1 capital + Tier 2 capital) / risk weighted asset
X_5	Return on Asset	Net Income to Total Asset
X_6	Islamic.D	Conventional bank is equivalent to 1 and Islamic bank for 0

€	Error Term	

Econometric Model Specification:

The following equation is evolved for conducting the study's multi-variant regression analysis:

$$\textit{Liquidity Risk}_{it} = \beta 0 + \beta 1 * \textit{Size of Bank (X1)}_{it} + \beta 2 * \textit{NPL ratio (X2)}_{it} + \beta 3 * \textit{ROE (X3)}_{it} + \beta 4 * \textit{CAR (X4)}_{it} + \beta 5 * \textit{ROA (X5)}_{it} + \beta 6 * \textit{Islamic.D } (X_{6})_{it} + \varepsilon it$$

Where,

- β0 indicates the intercept,
- β1 to β5 represent respective terms of coefficient,
- i (number of commercial banks),
- t (time-interval) = 1, 2...,5; and
- εit represents an error term.

1.3 Development of hypothesis

H0: There is no significant relationship between liquidity risk and the independent variables of selected banks.

H1: There is a significant relationship between liquidity risk and the independent variables of selected banks.

The detailed alternate hypotheses that are to be tested are stated below:

1. There is a significant relationship between liquidity risk and the size of the bank.
2. There is a significant relationship between liquidity risk and non-performing loan ratio.
3. There is a significant relationship between liquidity risk and return on equity.
4. There is a significant relationship between liquidity risk and capital adequacy ratio.
5. There is a significant relationship between liquidity risk and return on assets.

Chapter 4: Review of Industry

Bangladesh's banking sector has grown significantly since the nation gained its independence. It was common in earlier times to place commercial banks under official supervision. Later on, however, the government decided to liberalize and de-regulate the banking industry. This liberalization agenda was propelled by the IMF and World Bank's market-based economic approach. Problems with operational inefficiency and underutilization of bank capacity were brought about by state ownership. Bangladesh experienced the full force of South Asia's 1990 Financial Sector Reformation Program wave. The regulatory authority that oversees the banking industry prohibited foreign and private entrepreneurs from opening banks in any capacity in order to maintain intense competition and high levels of operational efficiency.

The deregulation of the banking sector has brought about the establishment of multiple non-bank financial companies and enhanced the financial market in Bangladesh. The primary monetary authority, the Bangladesh Bank, is in charge of managing, overseeing, and keeping an eye on a number of financial institutions. To ensure adequate supervision, the banks are divided into two groups:

- Scheduled Banks
- Non-scheduled banks

As of the fiscal year 2023, there are sixty-one scheduled banks in Bangladesh. The Banking Company Act of 1991 created rules that all of these banks must follow. The scheduled banks are comprised of nine foreign banks, eight Islamic banks, six SCBs, three specialized banks, and forty-three private commercial banks. The second set consists of seven unscheduled banks. There are now 35 active non-bank financial institutions in Bangladesh. NBFIs are governed by the Financial Institutions Act of 1993.

Bangladesh's banking industry makes a significant economic contribution because banks are essential to the majority of our economic sectors for their financial needs. However this dependence has caused a lot of issues for depositors and the banking industry. Small-term loans are what commercial banks are meant to offer. Numerous borrowers can be attracted by small loans, which aid the bank in building a portfolio that is well-diversified. Short-term loans boost revenue by increasing turnover. However, our banks operate inside the law in the exact opposite way. For instance, if a bank is allowed to lend up to 25% of its capital to finance projects in the

power sector, then only four of these borrowers might borrow the whole capital of the bank. The bank could become insolvent if these borrowers fail to make their repayments.

Bangladeshi banks have a comparatively low capital basis compared to banks in other Asian countries. This is attributable in part to our high proportion of non-performing loans (NPLs) and insufficient profit reinvestment. Banks must maintain profit-based contingencies against these NPLs. High NPLs have a direct influence on bank profitability. After making provisions, profit is separated into two parts: dividends and retained earnings. Bank shareholders prefer to receive profits as dividends rather than reinvest them as retained earnings, even if the latter can contribute barely to the building of a capital base.

The repeated changes in loan classification rules have also provided excessive benefits to Bangladeshi banks. To combat the unstoppable growth of NPLs, the loan classification rule was modified, deviating from the international standard. In addition to loan rescheduling (term extension, interest waiver, and additional borrowing), a group of large debtors with loans of Tk 500 crore or more were eligible for loan restructuring advantages with a minimum down payment on the outstanding loans. And despite obtaining such leniency, many borrowers failed to regularize their loans. Ultimately, NPLs skyrocketed, breaking all records. To reduce NPLs, rather than loosening associated policies, effective measures must be applied before and after loan approval. Loan rescheduling and restructuring must be entirely economic. These will boost the general health of the banking industry.

Additionally, there is a constant capital flight from rural to urban regions. According to data from Bangladesh Bank, while rural areas accounted for 12.93 % of deposits in 2010, they only received 8.04 % of advances. Although rural residents' deposit supply increased significantly to 21.57 % in 2022, they only received 10.33 % of advances, resulting in an 11.24 % point capital flight to metropolitan regions. For rural depositors, the danger posed by deliberate defaulters from urban regions misusing their loans is disproportionate. More opportunities for loan use in rural regions should be established to combat this.

Strength: A Growth Story Powered by Diverse Forces

The banking sector in Bangladesh has a remarkable story of expansion. The industry has seen a notable increase in its portfolio of assets, deposit engagement, and branch network since the 1990s. This expansion is explained by several important factors:

• Enhanced Competition: When the financial sector was liberalized in the 1980s, private banks entered the market, promoting healthy competition. New financial products and services were developed, customer service was enhanced, and innovation was sparked by this rivalry.

• Financial Inclusion measures: The government and financial institutions led important measures in recognition of the financial requirements of a sizable unbanked population. These included the advent of agent banking, mobile banking, and microfinance, which reached previously unreached populations, especially in rural areas.

• Economic Expansion: A strong demand for financial services has been generated by Bangladesh's remarkable economic growth, which has averaged over 6% yearly over the last ten years. This demand is felt by people, companies, and other economic sectors, which supports the expansion of the banking sector.

Accepting Technology: Making Use of Innovation

The banking sector in Bangladesh has actively adopted technology developments to improve service delivery, efficiency, and security. Among the significant advancements are:

- **• Mobile banking:** This has become a game-changer, providing millions of people, especially in rural areas, with easy and affordable financial options. With mobile banking, users may do a number of tasks from their phones, such as making payments, moving money, and checking account balances.
- **• Online banking:** This service gives users more freedom and control over how they handle their money. It enables applications for different banking services and products to be submitted, online transactions to be completed, and safe access to account information.

- • **Automation:** Streamlining procedures, boosting productivity, and cutting expenses are some of the ways banks are integrating automation into their operations. This covers back-office operations, customer service interactions, and loan processing.

Challenges: Things to Work on and Keep Watching

The following issues still need to be addressed, even with the industry's current trajectory:

- • **Non-Performing Loans (NPLs):** Eroding the industry's profitability and stability financially, NPLs present a serious threat. It is imperative to put into practice efficient NPL management techniques, such as more stringent loan assessment protocols, enhanced credit recovery systems, and encouraging borrower financial literacy.
- • **Cybersecurity Threats:** As industry dependence on technology grows, so does its susceptibility to hackers. Strong cybersecurity measures, such as purchasing cutting-edge security equipment, embracing frequent vulnerability assessments, and putting in place extensive staff training programs on cyber hygiene procedures, must be banks' top priorities.
- **Financial Inclusion Gap:** Despite amazing advancements, a sizable portion of the populace still does not have access to official financial services, especially in rural and underprivileged areas. It will take ongoing efforts to expand the reach of financial services by utilizing digital and mobile technologies, expanding branch networks, and agent banking models.
- **Financial Literacy:** People with low financial literacy may find it more difficult to decide on financial services and products. This may result in excessive debt, trouble handling money, and little involvement in the financial system. It is crucial to promote financial literacy through educational initiatives, public awareness campaigns, and partnerships with diverse stakeholders.

The Bangladeshi banking industry has undergone a remarkable transformation in recent decades, evolving from a state-dominated system to a more diversified and competitive landscape. This transformation has been driven by a combination of factors, including economic growth, liberalization policies, technological advancements, and financial inclusion initiatives. Today,

the industry stands tall as a crucial pillar of the country's economic development. However, despite its progress, the industry still faces challenges that require continued focus and strategic solutions.

SWOT Analysis of Banking Sector in Bangladesh

A SWOT analysis is a technique used to identify strengths, weaknesses, opportunities and threats of a business or even a specific project. SWOT Analysis is a strategic planning tool used to identify and analyze the Strengths, Weaknesses, Opportunities, and Threats related to a business, organization, or project. It's commonly used in business strategy, marketing, product development, and personal career planning.

Strengths (Internal Positive Factors)

1. **Expanding Financial Network:** The banking sector in Bangladesh has a wide and growing network across both urban and rural areas, enhancing access to financial services.
2. **Digitalization and Technological Advancements:** Adoption of digital banking, mobile banking apps (e.g., bKash, Nagad, Rocket), and real-time online services has improved customer convenience and efficiency.
3. **Supportive Regulatory Framework:** Bangladesh Bank provides regulatory oversight and has introduced various financial inclusion policies, such as agent banking and SME loan schemes.
4. **Diverse Product Offerings:** Banks in Bangladesh offer a range of products—from savings, remittances, and credit cards to Islamic banking and rural micro-loans.

Weaknesses (Internal Negative Factors)

1. **High Non-Performing Loans (NPLs):** A major concern is the persistent issue of bad loans, especially in state-owned banks, which weakens financial stability.
2. **Limited Risk Management Practices:** Many banks lack robust internal control systems and credit risk management strategies, leading to financial inefficiencies.

3. **Poor Governance and Political Influence:** Some banks suffer from mismanagement, corruption, and undue political influence in lending decisions, harming public trust.
4. **Low Financial Literacy Among Masses:** Despite increased access, a significant portion of the population lacks awareness of banking services and their benefits.

Opportunities (External Positive Factors)

1. **Rising Demand for Digital Financial Services:** The growing use of smartphones and internet access is opening up new markets for mobile banking and fintech partnerships.
2. **Large Remittance Inflows:** With a large number of Bangladeshis working abroad, there is a steady inflow of remittances, providing significant revenue for banks.
3. **Untapped Rural and SME Markets:** Rural populations and small businesses remain underserved, presenting growth potential through microfinance and SME lending.
4. **Government Infrastructure Projects:** Major projects under the government's Vision 2041 and Delta Plan can drive demand for project financing and banking services.

Threats (External Negative Factors)

1. **Economic Uncertainty and Inflation:** High inflation, trade imbalances, and external debt pressures can weaken consumer purchasing power and affect loan repayment.
2. **Global Financial Instability:** Changes in global markets (like US dollar rate fluctuations or global interest rate hikes) can impact foreign reserves and currency stability.
3. **Cybersecurity Risks:** With rising digital banking usage, the sector is increasingly exposed to cyber threats, data breaches, and financial fraud.
4. **Stiff Competition:** The entry of non-banking financial institutions (NBFIs), mobile financial services, and fintech startups adds pressure on traditional banks to innovate.

Factors Influencing Banks' Risk of Liquidity

The ability of a bank to satisfy short-term demands by maintaining sufficient amounts of cash and its equivalents without running the risk of an unforeseen loss is known as liquidity. Conversely, a bank's liquidity risk is the result of failing to fulfil this commitment, which poses a serious threat to the bank's capacity to continue operating financially. This risk may result from an unanticipated significant payment or cash outflow from the bank due to an unanticipated shift in the economy's market. Banks create various strategies and mitigating tactics to satisfy the demand for liquidity using their available capital.

Banks must strike a healthy balance between using their funds to create income through loans and investments and having enough cash on hand (liquidity). The bank's liquidity is influenced by several internal and external factors that are both under its control:

Internal Factors:

1. **Adequacy of Capital:** A robust capital foundation serves as a safety net, enabling the bank to absorb losses and carry on with business as usual during difficult times. Additionally, it fosters confidence among investors and depositors, which facilitates the bank's ability to obtain more capital if necessary. The Capital Adequacy Ratio (CAR), a regulatory indicator of a bank's capital strength, is kept up to date.
2. **Quality of Assets:** The bank's resources are strained by a large volume of non-performing, or bad, loans that are unlikely to be repaid. Because these loans are still recorded, there are fewer resources available to pay for ongoing commitments. In order to reduce non-performing loans (NPLs), banks use risk management techniques to evaluate borrower creditworthiness, track loan performance, and promptly handle delinquencies.
3. **Deposit Base:** A sizable, steady, and diverse deposit base offers the bank a dependable source of capital. Nevertheless, during times of unexpected withdrawals, banks with a larger percentage of demand deposits—funds that are easily withdrawn—are more vulnerable to liquidity problems. In order to draw in and keep a wide variety of depositors, banks provide a choice of deposit products with varying characteristics and interest rates, attempting to strike a balance between stability and liquidity.

4. **Loan Portfolio Management:** It's critical to strike a balance between lending and keeping enough liquidity. While lending too little can restrict the bank's ability to generate income, lending too much can exhaust its readily accessible capital. To diversify their loan portfolio across borrowers, sectors, and loan kinds, banks employ loan portfolio management strategies. To make sure they have adequate liquid assets to cover future withdrawals, they also impose restrictions on loan-to-deposit ratios.
5. **Liability Management:** By managing the bank's borrowings' maturity structure adequately, or its liabilities, it may make sure it has the money on hand to pay its debts when they become due. Liquidity issues may arise from mismatched maturities, which occur when long-term assets are financed by short-term loans. Banks employ a variety of strategies, such as the issuance of diverse debt instruments with variable maturities, to balance their assets and liabilities and guarantee that they will have the money on hand to fulfil their commitments.

External Factors:

1. **Economic Growth:** When the economy is doing well, there is usually a greater demand for loans and other banking services, which raises deposits and may help banks' liquidity. On the other hand, a recession may result in a drop in the demand for loans and a rise in bad loans, which would make it harder for banks to fulfil their commitments. The bank can monitor economic trends and modify its strategy accordingly, such as tightening lending requirements during economic downturns, even though it cannot directly affect the economy.
2. **Interest Rates:** Bank borrowing costs may increase in response to rising interest rates, which could cause liquidity problems. On the other hand, declining interest rates may reduce the cost of borrowing, relieving the strain on liquidity. Although banks have little control over interest rates, they can somewhat modify them for deposits and loans in order to control their overall cost of funds and profitability while taking the state of the market into account.
3. **Government Regulations:** To guarantee the stability of the banking system, governments impose regulations, such as capital adequacy ratios and liquidity ratios. Fulfilling these standards may have an effect on the way banks handle their liabilities and

assets, which may have an effect on their liquidity position. In addition to trying to maximize their liquidity management within the permitted framework, banks must adhere to rules.

4. **Market Conditions:** Banks may find it more difficult to borrow money or sell assets to raise cash if there is a general shortage of liquidity in the financial markets. This could exacerbate already-existing liquidity problems. Banks can lessen the effects of market illiquidity by maintaining a diverse funding mix, which includes access to facilities provided by the central bank and other funding sources, even if they have little control over the state of the market.

Banks can sustain a healthy level of liquidity and make sure they have enough money to pay their creditors and continue operating by comprehending and controlling these internal as well as external variables.

Chapter 5: Analysis and Findings

Graphical Analysis

The analysis below has been done to demonstrate the relationship between the variables. Using historical data from Bangladeshi banks covering the years 2016–2022, several ratios have been computed to assess liquidity risk and its drivers. The banks' average ratio analysis is shown visually as follows:

Liquidity Position of Banks

By dividing each bank's total assets by its cash and equivalents of cash assets, the liquidity risk of each bank has been determined. A rise in the ratio is interpreted as greater liquidity for the bank.

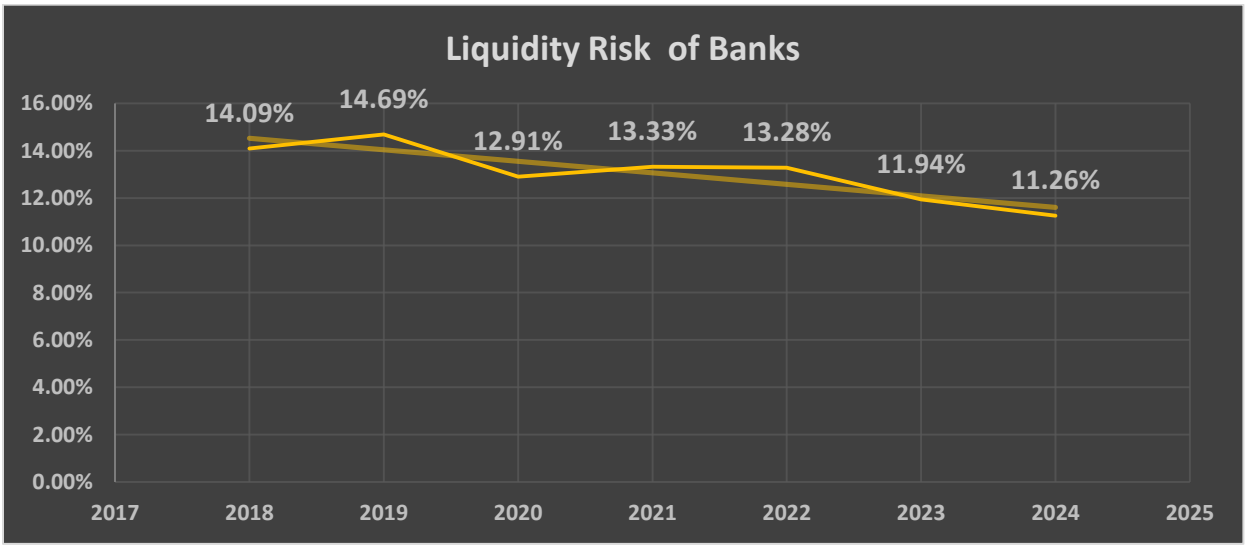


Figure 1: Liquidity position of banks

The graph displays a declining tendency during the tenure's seven years. The year 2017 had the highest percentage of liquidity. It thereafter saw a decline. Bangladesh's economic downturn is likely the cause. And the lowest proportion, 11.26%, was recorded in the most recent year. Banks may find it simpler to borrow money if interest rates decline, which could lessen the requirement for them to maintain sizable liquidity reserves. Furthermore, modifications to banking laws implemented by the Bangladeshi government may also have an impact on liquidity reserves. Banks may need to keep larger reserves of liquidity to handle changes in the short-term deposit market, which could make them more susceptible to unforeseen withdrawals. Short-term deposits include checking accounts and fixed deposits.

Size of Banks

The bank's total asset size is calculated using the logarithm of its total assets. The natural log of a bank's total assets determines the value of all assets managed by the banks.

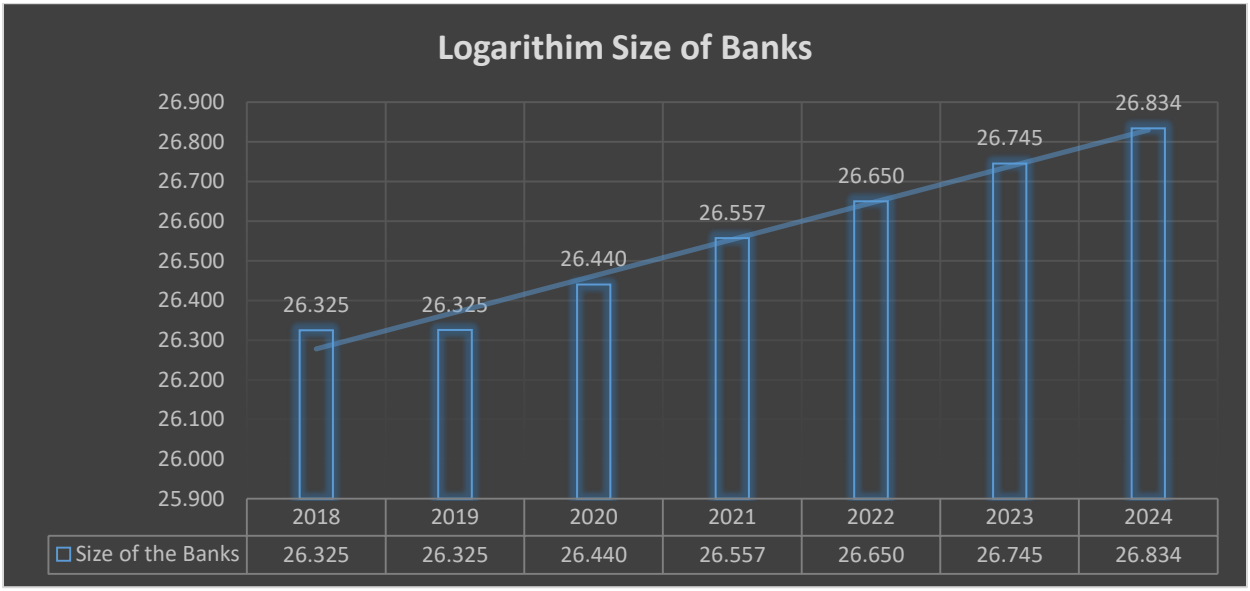


Figure 2: Logarithm Size of Banks

The graph displays the seven-year increase trend. the largest size for 2022 and the lowest size for 2017. Organic growth could be the likely cause. By expanding their lending activity, banks can expand in size. Growth in the economy may contribute to this. Strong economies usually result in more demand for loans from both individuals and companies, which enables banks to grow their loan portfolios. Furthermore, banks may diversify into new product categories or geographical markets, which would increase their overall size. Organic growth in deposits and other sources of funding can be facilitated by a larger customer base gained through luring in new clients and keeping hold of current ones. Fintech innovations can also have a big impact on bank size. Banks can increase efficiency, draw in new business, and even expand by providing modern products and services, using data analytics to make well-informed decisions, and optimizing operations. Here, the need for specialized services may also be quite important. Banks may choose to enter niche markets or provide specialized financial products that target particular customer segments, such as small and medium-sized businesses or particular industries, as their requirements and preferences change. This may result in focused expansion in particular regions and enhance the total size.

Non-performing loan ratio:

The non-performing loan ratio of a bank is calculated by dividing its total loans for the year by the number of non-performing loans. An increased ratio typically translates into a higher percentage of non-performing loans, a sign of a banking institution's inefficiency.

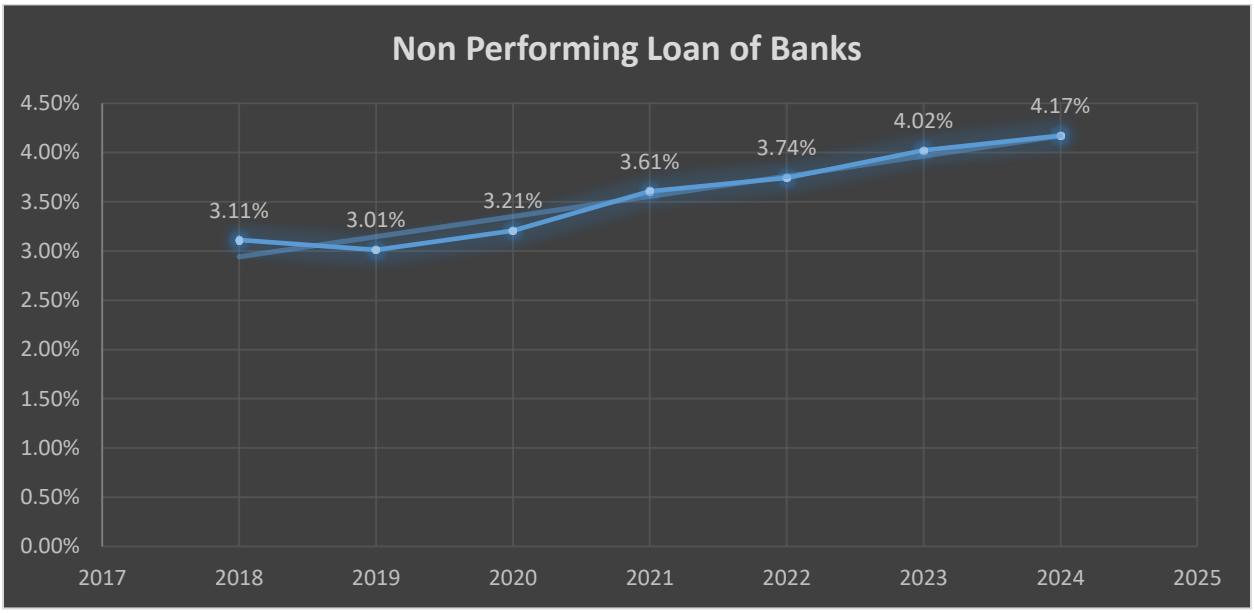


Figure 3: Non-performing loan ratio

Regretfully, there are a number of contributing factors to Bangladesh's high non-performing loan (NPL) ratio, making it a continuous problem throughout the years. A greater chance of defaults might result from weak governance and risk management practices, such as inadequate creditworthiness assessments before loan issuance. Loans may become non-performing and problems may worsen if loan performance is not monitored and delinquencies are not promptly addressed. In a similar vein, external pressure to approve loans without conducting adequate due diligence may raise the possibility of default. NPLs rise as a result of enterprises and individuals finding it difficult to repay loans during recessions due to lower incomes or job losses. Sectoral imbalances, such as a heavy emphasis on lending to troubled sectors, can have a disproportionate impact on banks' non-performing loan (NPL) levels. This is partly due to an inadequate legal environment for loan recovery. Inaction on the part of banks due to the difficulty and slowness of the legal processes for recovering bad loans can result in the accumulation of non-performing loans (NPLs). Likewise, insufficient bankruptcy laws may make it difficult for businesses to

depart the market or restructure debt, which could have an effect on loan repayment and increase the number of non-performing loans (NPLs).

Return on equity

Return on equity shows how profitably a bank may use its assets over a specified period. The ratio of net income to shareholder equity is known as return on equity. A banking organization is more efficient the higher its return on equity (ROE).

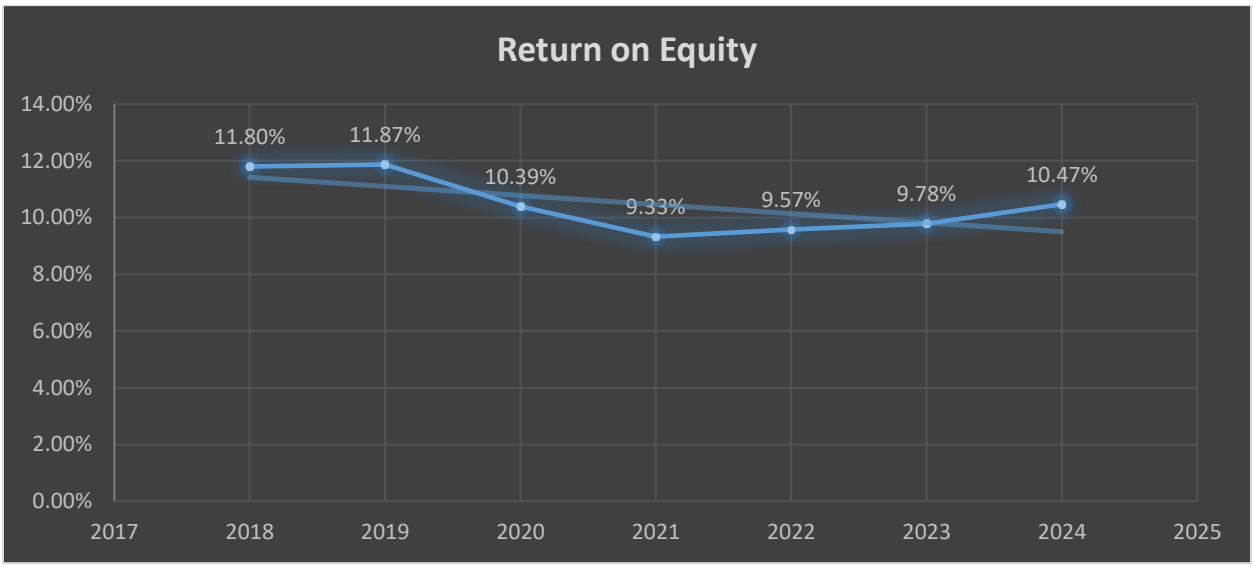


Figure 4: Return on equity

To a certain extent, the banks' ROE rates were stable between 2016 and 2022. Even yet, there is a modest declining tendency. In 2019, it was at its lowest. Then it gradually began to climb. Bangladeshi banks' declining Return on Equity (ROE) trends suggest that they are making less money in comparison to the amount of capital invested by shareholders. A high NPL ratio may be the cause of this, as it ties up bank capital in non-income-producing loans. In order to handle NPLs, banks might need to devote more resources, which would increase costs. Bad debt loan loss provisions immediately lower net income, which lowers ROE. In this case, economic conditions may also be important. Recessions and slowdowns in the economy can have a variety of effects on banks, including weaker business and consumer confidence, a decline in loan demand, an impact on interest revenue, an increase in defaults, which raises provisioning and lowers profitability, and a reduction in ROE.

Capital Adequacy ratio

A way to determine a bank's total capital is to use the CAR ratio. The computation involves splitting a bank's entire Tier-1 and Tier-2 capital by its risk-weighted assets. Banks safeguard depositors' financial activity by upholding this ratio.

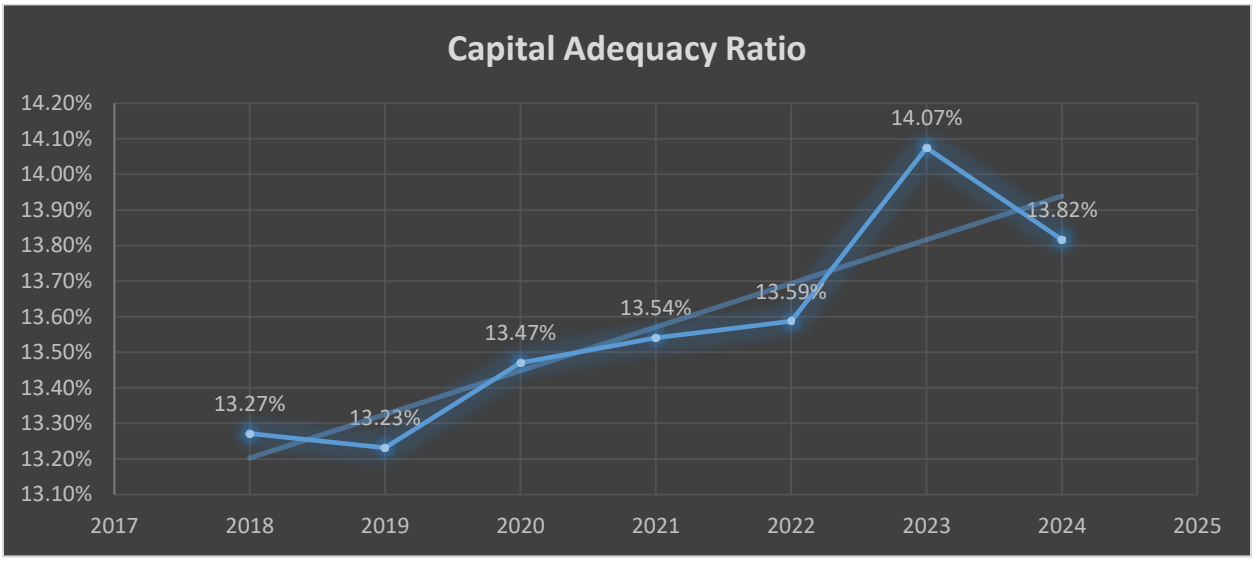


Figure 5: Capital Adequacy ratio

Bangladeshi banks' capital adequacy ratios (CARs) are trending increasing, meaning that they are holding more capital in relation to their risk-weighted assets (RWAs). It's possible that the Bangladesh Bank raised the minimum CAR requirements in order to ensure that banks have adequate reserves to withstand losses and to bolster the stability of the banking sector. But in the year 2022, the ratio has fallen slightly. However, banks may decide not to distribute their profits to shareholders in the form of dividends, instead holding onto a bigger amount of their earnings. As a result, their capital base grows and their CAR gets better. A greater CAR could result from banks issuing new bonds or shares to raise additional capital. Bangladeshi banks' capital adequacy ratios (CARs) are trending increasing, meaning that they are holding more capital in relation to their risk-weighted assets (RWAs). It's possible that the Bangladesh Bank raised the minimum CAR requirements in order to ensure that banks have adequate reserves to withstand losses and to bolster the stability of the banking sector. Furthermore, banks may decide not to distribute their profits to shareholders in the form of dividends, instead holding onto a bigger amount of their earnings. As a result, their capital base grows and their CAR gets better. A greater CAR could result from banks issuing new bonds or shares to raise additional capital.

Return on Assets

Return on asset is a measure of how well banks use their employed resources to generate revenue. Because it is based on the percentage of assets a bank has compared to its annual earned profits, this ratio varies greatly throughout institutions.

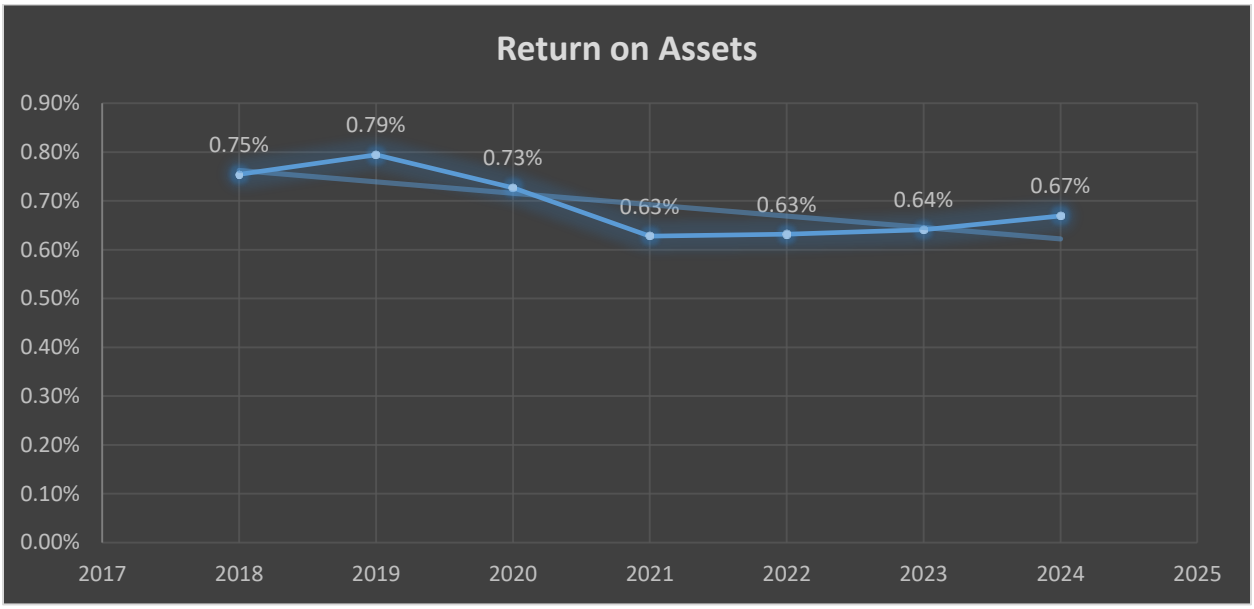


Figure 6: Return on Assets

The graph above illustrates how the ROA is trending somewhat lower, much like the ROE. In 2019, it was at its lowest point. Then it sprung back to climb once more. However, operational inefficiencies, such as excessive administrative costs, which can reduce banks' profitability, are likely the cause of this modest slowdown. Older procedures or legacy technological systems may impede cost optimization. Ineffective operational risk management can lead to losses, which lowers ROE. In this context, adjustments to the income structure may also be relevant. In the near run, ROE may be impacted by a move away from traditional interest-based revenue and toward fee-based services, particularly if banks don't handle the change efficiently.

Statistical Analysis

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Liquidity Risk (Y)	138	0.129	0.042	0.064	0.302
Size of Bank (X1)	138	26.592	0.416	25.600	28.240
NPL ratio (X2)	138	0.036	0.023	0.010	0.140
ROE (X3)	138	0.102	0.040	0.002	0.261
CAR (X4)	138	0.136	0.017	0.100	0.190
ROA (X5)	138	0.007	0.003	0.000	0.019
Dummy	138	0.652	0.478	0.000	1.000

Table 2: Descriptive Statistics

The table presents the descriptive findings of significant variables (controllable variables and outcome) for 23 commercial banks in Bangladesh that are listed and for whom financial data is accessible from 2016 to 2022. The summary statistics for six variables are displayed in the above table sequentially, with one dummy variable at the end. The statistics for the variable Liquidity Risk are displayed in the first row here. With 138 observations with a mean of 0.1290 and a standard deviation of 0.0420, the liquidity risk variable shows that most values fall between 0.087 and 0.171. This variable has a minimum value of 0.0638 and a maximum value of 0.3016 The bank's size reveals massive descriptive statistics values. This was the outcome of it being transformed into a logarithm variable. The values that the NPL ratio appears to indicate range from 0.0100 to 0.1400. The majority of Bangladeshi banks have NPL ratios below 0.06, as indicated by the mean of 0.0361 and the standard deviation of 0.0229. Analogously, the ROE values span from 0.0020 to 0.2610. The standard deviation is 0.0403 and the mean is 0.1024. According to this, most banks have a return on equity (ROE) of 0.06 to 0.14. The CAR data indicates that most banks have CAR values that are relatively close to the average, with a mean of 0.1362 and a standard deviation of 0.0170. In contrast, the ROE has a mean of 0.0068 with a standard deviation of 0.0031. Suggesting that most of the banks have an ROA below 0.01.

Correlation Matrix

The strength and direction of the relationship between two variables are measured by the correlation matrix. If there is a significant positive connection, then the variables appear to measure the same characteristic. The items may assess different qualities or be insufficiently detailed if they are not significantly related. The multicollinearity problem is thought to not arise if the correlation coefficient is less than 0.70.

	Liquidity Risk (Y)	**Size of Bank (X1)**	**NPL ratio (X2)**	**ROE (X3)**	**CAR (X4)**	**ROA (X5)**	**Islamic.D**
Liquidity Risk (Y)	1						
Size of Bank (X1)	0.1815*	1					
NPL ratio (X2)	0.040	-0.089	1				
ROE (X3)	0.149	-0.066	-0.2890*	1			
CAR (X4)	-0.082	0.142	-0.140	0.2510*	1		
ROA (X5)	0.047	-0.161	-0.3086*	0.8255*	0.3560*	1	
Islamic.D	-0.2882*	-0.116	-0.2322*	0.007	0.1882*	0.2957*	1

Table 3: Correlation Matrix

The correlation coefficient between the two variables in the appropriate row and column is shown in each cell of the table in this instance. A perfect positive correlation is represented by a value of 1, a perfect negative correlation by a value of -1, and no correlation is shown by a value of 0. The correlation coefficient can have values between -1 and 1.

The size of the bank and liquidity risk have a weak positive association (0.1815) a weak negative correlation (-0.082) and ROA (-0.047). It suggests that banks with greater capital adequacy ratios and return on assets have slightly lower liquidity risk, whereas larger banks are likely to have slightly higher liquidity risk. The NPL ratio exhibits a marginally negative association with both ROE and ROA. This suggests that banks tend to have lower returns on equity and return on assets when their non-performing loan ratios are greater. Banks with greater capital adequacy ratios typically have better returns on assets, as indicated by the moderately positive correlation found between CAR and ROA.

Test of Multicollinearity

By analyzing the independent variables included in the study, it was possible to ascertain whether there was an inter-correlation between them. A crucial test for enhancing the reliability of data gathered is the multicollinearity test; if multicollinearity is found, the data are deemed unreliable. In the event that the tolerance value is 0.10 or higher and the Variance Inflation Factor (VIF) value is 10.0 or below, multicollinearity is absent from the data.

Explanatory Variables	VIF	1/VIF
ROA (X5)	4.65	0.215187
ROE (X3)	4.02	0.248449
Islamic.D	1.43	0.699487
CAR (X4)	1.22	0.818049
NPL ratio (X2)	1.18	0.844131
Size of Bank (X1)	1.13	0.888767
Mean VIF	**2.27**	

Table 4: Test of Multicollinearity

The average VIF is 2.27, and the values vary from 1.13 to 4.65. VIF values larger than 5 or 10 are often seen as suggestive of multicollinearity issues. This table shows that while several values are around 5, none are greater than 5, indicating that multicollinearity may not be a significant issue in this instance. For confirmation, it's crucial to take into account additional variables and carry out additional research. Nevertheless, the maximum VIF of 4.65, which is nearly at the 5-mark, is recorded. To look into any potential multicollinearity problems, it could be worthwhile to look into this variable further. In contrast, the VIF values of the variables car, npl, and size are all within 2.5, suggesting that multicollinearity is not as much of an issue for these variables. All things considered, the VIF values imply that multicollinearity may not be a major problem in this dataset.

Test of Heteroskedasticity

To deal with heteroskedasticity The Breusch-Pagan test is a well-accepted and very dependable technique. It is a statistical technique that assesses whether the variance of the error terms or residuals, in a regression model is consistent across a range of values for the model's independent variables. Furthermore, it verifies if the residuals' distribution stays consistent across the dataset, a crucial premise for the majority of regression models.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Null Hypothesis (Ho): Constant variance (homoscedasticity). Alternative Hypothesis (Ha): Non-constant variance (heteroscedasticity).
Variables: fitted values of Liquidity risk
Test Statistic: chi2(1) = 34.35
p-value: Prob > chi2 = 0.0000

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

The p-value, or the probability of observing such a test statistic if the null hypothesis were true, is extremely small, less than 0.0000. This indicates that we should reject the null hypothesis of constant variance. In other words, the model demonstrates statistically substantial heteroscedasticity.

The presence of heteroscedasticity suggests that the error variance is not constant across the dataset. This can result in incorrect standard errors and significance tests in your regression model, which may have an impact on the study's overall validity. The Robust standard errors approach is one possible answer to this problem. The method it investigated is less sensitive to heteroscedasticity, resulting in more trustworthy estimations of coefficient uncertainty.

Hausman test

To determine the best estimating approach, a Hausman test was carried out. It compares the coefficients derived by applying the two models, assuming that the random-effects model is appropriate. If the difference between the coefficients is statistically significant, it indicates that the random-effects assumption has been violated and that the fixed-effects model is preferable.

Hausman (1978) specification test

	Coef.
Chi-square test value	19.26
P-value	0.0017

Table 6: Hausman (1978) specification test

The fixed-effects model addresses unobserved individual-specific factors that may have an impact on the dependent variable. It accomplishes this by creating a dummy variable for each person or organization in the panel. In contrast, the Random-effects model accounts for individual-specific effects that are random and uncorrelated with the independent variables. It is generally more efficient than the fixed-effects model, but this advantage may come at the expense of potentially biased results if the assumption of random effects is violated

- **Null hypothesis (Ho):** The random-effects model is appropriate (efficient and consistent).
- **Alternative hypothesis (Ha):** The fixed-effects model is more appropriate (consistent, but potentially less efficient).

Interpretation of the results:

The test statistic chi2(5) is 19.26, with a p-value of 0. 0017. The p-value is less than 0.05, hence the null hypothesis is rejected. This suggests that the random-effects model is unlikely to be relevant, whereas the fixed-effects model is favoured.

Model Testing

The R-squared value is 0.4563, indicating that the model accounts for about 45.63% of the variance in the dependent variable. This is not a very good fit, implying that other factors not included in the model could be relevant predictors of the dependent variable. The F-statistic is 3.95, and the p-value is 0.00052, indicating that the whole model is statistically significant at the 5% level. However, individual coefficients in the model may not be significant.

Number of obs	138
R-squared	0.4563
F (5,22)	4.56
Prob >F	0.00052

Table 7: Model specifications

Overall Model Fit

Independent variable: Liquidity risk

Explanatory variables: (Constants), Size of Bank, Non-Performing Loan ratio, return on Equity, Capital adequacy ratio, return on asset and Dummy variable.

The following model predicts the liquidity risk of banks in Bangladesh:

Liquidity risk= 1.426801+Size of Bank (X1) *0.0492115+NPL ratio (X2) *0.0406919 +ROE (X3) *-0.1828517+CAR (X4) *0.0253421+ROA (X5) *2.9431+Dummy*-0.024187+εit

Robust Fixed Effect Model

Liquidity Risk	Cof.	Robust SE	t stat	p-value	95% lower	95% higher
Size of Bank (X1)	0.0492	0.0147	3.35	0.003	-0.080	-0.019
NPL ratio (X2)	0.0407	0.3350	0.12	0.904	-0.654	0.735
ROE (X3)	-0.1829	0.1166	-1.57	0.131	-0.425	0.059
CAR (X4)	0.0253	0.0072	3.51	0.001	-0.040	-0.011
ROA (X5)	2.9431	2.2862	1.29	0.211	-1.798	7.684
Islamic.D	-0.0242	0.0085	-2.85	0.205	-0.041	-0.007
_cons	1.4268	0.4135	3.45	0.002	0.569	2.284

Table 8: Robust Fixed Effect Model

Model discussion:

The table shows the coefficients for each independent variable, along with their robust standard errors, p-values, and 95% confidence intervals.

Findings

Size of the banks and liquidity risk: The impact of extreme outliers on the regression model is lessened because the magnitude of the bank values was turned into logarithms to compress the scale of huge values. More reliable estimates result from this. It is possible to interpret the coefficients as roughly percentage changes. A 1% increase in bank size is linked to a 0.0492% increase in the liquidity risk variable, according to the coefficient of 0.0492 on a log-transformed bank size variable. The value of "r" is 0.0492, indicating that the model found a positive association between the size of the banks and liquidity risk. Furthermore, given that the "p" value is 0.003, the suggested hypothesis was determined to be significant at a 5% confidence level. Thus, the theory that was put out is verified.

NPL ratio and liquidity risk: The results show that the NPL ratio and liquidity risk are positively correlated, and the "r" and "p" values of 0.0407 and 0.904, respectively, show that the hypothesis was not significant at the 5% level. The idea isn't confirmed by the present inquiry. Therefore, there is insufficient evidence to support this hypothesis.

ROE and liquidity risk: The results show a negative correlation between ROE and liquidity risk, and as "r" and "p" have corresponding values of -0.1829 and 0.131, it was determined that the hypothesis was not insignificant at the 5% level. The idea is not supported by this investigation. Therefore, there is not enough data to support this theory.

Capital adequacy ratio and liquidity risk: The capital adequacy ratio and liquidity risk are positively correlated, according to the study, and the hypothesis was proven to be significant at the 5% level. Given that the values of "r" and "p" are, respectively, 0.0253 and 0.001. Therefore, the evidence available to us supports this theory.

ROA and liquidity risk: The results show that there is a positive correlation between banks' liquidity risk and ROA. Furthermore, at the 5% level, the suggested theory was deemed to be insignificant. "r" and "p" have values of 2.9431 and 0.002, respectively. Therefore, there is insufficient evidence to support this hypothesis.

Islamic.D and Liquidity risk: The results show that the Dummy as a variable has a negative correlation with the liquidity risk, and the "r" and "p" values of -0.0242 and 0.205, respectively, show that the hypothesis was not significant at the 5% level. The idea isn't confirmed by the present inquiry. Therefore, there is insufficient evidence to support this hypothesis.

Chapter 6: Conclusion and Recommendations

Conclusion

For banks, controlling liquidity risk is a major concern. A bank is more susceptible to financial problems the more risk it is exposed to. The significance of comprehending the variables that affect a bank's liquidity risk is emphasized by this study. To determine the major factors influencing a bank's capacity to fulfil its short-term financial obligations, this study examines data from 23 banks.

According to the report, Bangladeshi banks' overall liquidity position has declined, which is an alarming pattern. The recent economic slowdown in Bangladesh could be the cause of this fall in liquidity. Remarkably, the study discovered a positive association between capital adequacy ratio (CAR) and liquidity risk (cash to total assets) in relation to bank size (as determined by the logarithm of total assets). Larger banks are more likely to gain from diversification, having access to a wider range of funding sources, and having more liquid assets, which lowers the risk of illiquidity. Greater capital adequacy ratios promote stability and confidence among depositors and investors by guaranteeing adherence to regulatory liquidity requirements. On the other hand, the study discovered a negative association between liquidity risk and variables such as profitability (as determined by Return on Equity - ROE and Return on Assets - ROA) and loan quality (as determined by Non-Performing Loan - NPL ratio).

According to the study's findings overall, Bangladeshi banks should carefully consider their risk profiles and business plans in relation to their liquidity status. To reduce these risks and maintain the banks' financial stability, it will be essential to put in place efficient liquidity risk management procedures.

Recommendations

Boosting Forecasting and Monitoring of Liquidity:

- **More Effective Liquidity Indicators:** To evaluate their risk profile, banks should use advanced liquidity indicators in addition to the conventional Liquidity Coverage Ratio (LCR). Metrics for assessing longer-term liquidity, such as the Net Stable Funding Ratio (NSFR), may be included.
- **Stress Testing:** To model possible liquidity problems and evaluate the bank's resilience, regularly run stress test scenarios.

Enhancing the Sources and Uses of Liquidity:

- **Liability Structure Administration:** To lessen reliance on unreliable short-term funding, maintain a wide range of deposit base with an emphasis on steady, long-term deposits.
- **Asset Liability Management (ALM):** Put in place a robust ALM framework to guarantee that the maturities of assets and liabilities are appropriately matched.

Improving Contingency Planning:

- **Contingency Liquidity Plans:** Create concise, thoroughly recorded plans that specify what should be done in the event of a liquidity shortfall. This can entail taking out a loan through interbank markets or Bangladesh Bank.
- **Regularly Review and Update:** Make sure that backup plans are updated to take into account shifts in the market and the bank's risk profile.

A Framework for Effective Risk Management

- **Management and Board Oversight:** Make sure top management and the board are well-versed in liquidity risk and actively involved in monitoring the bank's liquidity risk management system.

- **Clearly defined rules and Procedures:** Create comprehensive, well-defined rules and procedures for managing liquidity risk, including risk assessment, measurement, oversight, and reporting. Leveraging Technology.
- **Liquidity Management Systems:** To automate processes, enhance data analysis, and make stress testing easier, invest in reliable liquidity management systems.

Regulatory Synchronization:

- **Bangladesh Bank instructions:** Banks should adhere strictly to the instructions that the Bangladesh Bank has released regarding risk management and liquidity risk.

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Appendix

1. **Hausman (1978) specification test**

	Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_bV_B))
	fixed effect	random effect	Difference	S.E.
Size of Bank (X1)	-0.0492115	-0.0028176	-0.0463939	0.0126304
NPL ratio (X2)	0.0406919	-0.0538811	0.094573	0.1646071
ROE (X3)	-0.1828517	-0.0662671	-0.1165846	0.1323942
CAR (X4)	0.0593431	-0.2239147	0.2832578	0.23781
ROA (X5)	2.9431	2.606494	0.336606	2.264652
Test: Ho: random effect				
chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 19.26				
Prob>chi2 = 0.0017				

2. Liquidity Risk Ratios

Year	Bank	LR	Size	Npl	Roe	Car	Roa
2019	AB Bank	0.106419	26.48248	0.018	0.001701	0.1063	0.000129
2019	Al-Arafah Islami Bank Limited	0.249123	26.48926	0.0479	0.140738	0.1228	0.009928
2019	Bank Asia	0.123275	26.3964	0.021	0.100894	0.1757	0.007259
2019	BRAC Bank	0.125809	26.3964	0.021	0.261151	0.1782	0.018898
2019	City Bank	0.171089	26.35113	0.011	0.132116	0.137	0.012438
2019	DBBL	0.196087	26.46597	0.0112	0.183198	0.1528	0.007872
2019	Dhaka Bank	0.11857	26.16494	0.026	0.101641	0.1576	0.006969
2019	Eastern Bank	0.111884	26.26845	0.0239	0.111001	0.1339	0.009485
2019	EXIM Bank Limited	0.20092	26.53409	0.0057	0.119291	0.1239	0.009879
2019	First Security Islami Bank Limited	0.148886	26.54692	0.0156	0.114766	0.1179	0.00411
2019	IFIC Bank	0.140618	26.02284	0.032	0.113668	0.1213	0.007903
2019	Islami Bank Bangladesh Limited	0.185854	27.52522	0.0379	0.097122	0.1091	0.00547
2019	Mercantile Bank	0.11998	26.28929	0.0142	0.171149	0.13	0.011553

2019	Mutual Trust Bank	0.129634	26.03031	0.038	0.168366	0.1486	0.009816
2019	One Bank	0.140893	26.14827	0.0531	0.1848	0.119	0.011596
2019	Prime Bank	0.128286	26.36657	0.0545	0.048988	0.1304	0.004304
2019	Shahjalal Islami Bank Limited	0.125018	26.07511	0.0503	0.098597	0.1427	0.006479
2019	Social Islami Bank Limited	0.172441	26.34472	0.0467	0.103254	0.12755	0.005301
2019	Southeast Bank	0.123666	26.55012	0.0599	0.045237	0.1084	0.003444
2019	Standard Bank Limited	0.111057	25.89204	0.0355	0.092352	0.1138	0.007049
2019	Union Bank Limited	0.170978	25.60362	0.0345	0.128951	0.1138	0.00676
2019	United Commercial Bank	0.130964	26.62373	0.0142	0.101305	0.1324	0.007454
2019	Uttara Bank	0.14788	25.90984	0.0207	0.110137	0.1401	0.008576
2020	AB Bank	0.10585	26.50139	0.0207	0.001846	0.1187	0.000134
2020	Al-Arafah Islami Bank Limited	0.151987	26.54769	0.0482	0.10462	0.1438	0.007259
2020	Bank Asia	0.100643	26.45702	0.021	0.096343	0.1747	0.007225
2020	BRAC Bank	0.125107	26.60381	0.021	0.135972	0.1777	0.015838
2020	City Bank	0.118923	26.51304	0.0115	0.089284	0.1372	0.006805
2020	DBBL	0.288418	26.57106	0.013	0.181993	0.142	0.012126
2020	Dhaka Bank	0.112213	26.34148	0.0296	0.081722	0.1549	0.005119
2020	Eastern Bank	0.114454	26.37751	0.0235	0.133079	0.1349	0.010896
2020	EXIM Bank Limited	0.162888	26.64084	0.0097	0.082666	0.1284	0.006278
2020	First Security Islami Bank Limited	0.104885	26.64265	0.0152	0.116363	0.1224	0.004285
2020	IFIC Bank	0.120658	26.27125	0.0305	0.108426	0.1205	0.009336
2020	Islami Bank Bangladesh Limited	0.135204	27.62898	0.0412	0.113768	0.1197	0.006323
2020	Mercantile Bank	0.106599	26.40257	0.0158	0.156587	0.1271	0.009985
2020	Mutual Trust Bank	0.110589	26.12803	0.0421	0.130145	0.1474	0.007797
2020	One Bank	0.141551	26.3074	0.0705	0.096908	0.1193	0.005296
2020	Prime Bank	0.119114	26.41607	0.0616	0.081147	0.1339	0.00766
2020	Shahjalal Islami Bank Limited	0.109553	26.23162	0.0684	0.082731	0.145	0.00506
2020	Social Islami Bank Limited	0.169681	26.45142	0.0305	0.101442	0.12755	0.00521
2020	Southeast Bank	0.112771	26.66758	0.0587	0.087931	0.1238	0.006482
2020	Standard Bank Limited	0.098249	26.00722	0.0362	0.08474	0.1105	0.006369
2020	Union Bank Limited	0.103979	25.72441	0.0319	0.12139	0.1192	0.006418
2020	United Commercial Bank	0.112649	26.72625	0.0134	0.087512	0.1324	0.006574
2020	Uttara Bank	0.142795	25.97002	0.0235	0.113354	0.1372	0.00879
2021	AB Bank	0.108237	26.63155	0.0232	0.005127	0.1182	0.000335
2021	Al-Arafah Islami Bank Limited	0.161493	26.6662	0.038	0.100531	0.1388	0.006371
2021	Bank Asia	0.134862	26.59741	0.022	0.079629	0.1649	0.005504
2021	BRAC Bank	0.111191	26.7512	0.022	0.098205	0.1723	0.011046
2021	City Bank	0.145188	26.60087	0.0123	0.107385	0.1347	0.007382
2021	DBBL	0.214775	26.69008	0.0162	0.158195	0.1417	0.011124
2021	Dhaka Bank	0.123158	26.38078	0.0327	0.090723	0.1539	0.005668
2021	Eastern Bank	0.116441	26.54691	0.0212	0.153703	0.1338	0.011799

2021	EXIM Bank Limited	0.148616	26.79405	0.0619	0.081612	0.1218	0.005501
2021	First Security Islami Bank Limited	0.140505	26.80468	0.0138	0.134913	0.1319	0.00478
2021	IFIC Bank	0.111826	26.3811	0.0264	0.069665	0.1216	0.005757
2021	Islami Bank Bangladesh Limited	0.132822	27.76396	0.0382	0.092307	0.1295	0.004798
2021	Mercantile Bank	0.105682	26.48445	0.0165	0.106141	0.1251	0.006995
2021	Mutual Trust Bank	0.113318	26.272	0.048	0.082123	0.1394	0.005207
2021	One Bank	0.163572	26.42051	0.0924	0.099621	0.128	0.005399
2021	Prime Bank	0.120494	26.50731	0.0466	0.047526	0.1325	0.004084
2021	Shahjalal Islami Bank Limited	0.132161	26.31644	0.0491	0.099027	0.1558	0.006175
2021	Social Islami Bank Limited	0.18482	26.56735	0.0405	0.088128	0.1255	0.00442
2021	Southeast Bank	0.106887	26.76901	0.0487	0.082222	0.1152	0.00594
2021	Standard Bank Limited	0.115427	26.12545	0.0871	0.092593	0.1368	0.00678
2021	Union Bank Limited	0.098205	25.91681	0.0364	0.070346	0.1264	0.003301
2021	United Commercial Bank	0.117476	26.83143	0.0139	0.085656	0.1339	0.006358
2021	Uttara Bank	0.158057	25.98636	0.0227	0.119757	0.1327	0.009709
2022	AB Bank	0.107643	26.68657	0.0225	0.014993	0.1207	0.000988
2022	Al-Arafah Islami Bank Limited	0.150893	26.75946	0.0481	0.10103	0.1507	0.006148
2022	Bank Asia	0.087103	26.74199	0.032	0.074407	0.1653	0.004925
2022	BRAC Bank	0.08764	26.84605	0.032	0.075177	0.1574	0.00886
2022	City Bank	0.115058	26.6858	0.0134	0.147923	0.1324	0.011231
2022	DBBL	0.171848	26.881	0.019	0.170479	0.1374	0.011641
2022	Dhaka Bank	0.117252	26.41651	0.0422	0.102292	0.1488	0.006697
2022	Eastern Bank	0.09248	26.55076	0.0241	0.141953	0.135	0.012313
2022	EXIM Bank Limited	0.152419	26.90711	0.0818	0.070496	0.1329	0.004448
2022	First Security Islami Bank Limited	0.133905	26.93236	0.0125	0.152617	0.1374	0.005616
2022	IFIC Bank	0.112583	26.49394	0.0225	0.106534	0.1247	0.008816
2022	Islami Bank Bangladesh Limited	0.30161	27.98	0.0341	0.076594	0.1355	0.003383
2022	Mercantile Bank	0.093277	26.5298	0.018	0.100291	0.1318	0.006712
2022	Mutual Trust Bank	0.087507	26.31898	0.0539	0.057044	0.1367	0.003604
2022	One Bank	0.194534	26.4392	0.086	0.079264	0.1302	0.004593
2022	Prime Bank	0.100379	26.57631	0.0346	0.064199	0.1284	0.005248
2022	Shahjalal Islami Bank Limited	0.102483	26.41352	0.0457	0.105179	0.1443	0.006467
2022	Social Islami Bank Limited	0.173277	26.67705	0.0605	0.08004	0.1265	0.00376
2022	Southeast Bank	0.092119	26.86593	0.031	0.103751	0.1435	0.004619
2022	Standard Bank Limited	0.281213	26.11358	0.0823	0.064542	0.1138	0.004935
2022	Union Bank Limited	0.063761	26.07052	0.0253	0.107957	0.1214	0.004706
2022	United Commercial Bank	0.100075	26.93503	0.0148	0.082512	0.1333	0.005915
2022	Uttara Bank	0.134551	26.12827	0.0245	0.122919	0.137	0.009647
2023	AB Bank	0.110661	26.74249	0.018	0.028023	0.1119	0.001743
2023	Al-Arafah Islami Bank Limited	0.102396	26.86032	0.0541	0.082101	0.1546	0.004596
2023	Bank Asia	0.151307	26.81237	0.038	0.10029	0.1714	0.006186

2023	BRAC Bank	0.088876	26.9922	0.038	0.060464	0.1937	0.008813
2023	City Bank	0.142267	26.77515	0.0145	0.167824	0.129	0.01293
2023	DBBL	0.137893	26.96627	0.0135	0.161818	0.164	0.010811
2023	Dhaka Bank	0.117886	26.54207	0.0557	0.101901	0.155	0.006348
2023	Eastern Bank	0.095201	26.69501	0.037	0.151719	0.137	0.01224
2023	EXIM Bank Limited	0.203635	27.01791	0.0715	0.068593	0.1466	0.003981
2023	First Security Islami Bank Limited	0.125089	27.02368	0.011	0.162435	0.1361	0.006177
2023	IFIC Bank	0.102451	26.61236	0.0217	0.040748	0.1325	0.003138
2023	Islami Bank Bangladesh Limited	0.30081	28.12368	0.0331	0.073145	0.1354	0.002937
2023	Mercantile Bank	0.080934	26.613	0.0215	0.144874	0.1409	0.009906
2023	Mutual Trust Bank	0.096673	26.44849	0.046	0.15127	0.1313	0.0097
2023	One Bank	0.116602	26.46189	0.1155	0.047628	0.1203	0.002721
2023	Prime Bank	0.080995	26.69421	0.0483	0.109285	0.1136	0.008292
2023	Shahjalal Islami Bank Limited	0.088648	26.48077	0.0442	0.130242	0.1504	0.008252
2023	Social Islami Bank Limited	0.114991	26.73599	0.0508	0.090229	0.1277	0.004283
2023	Southeast Bank	0.066225	26.92952	0.0481	0.059481	0.1386	0.003599
2023	Standard Bank Limited	0.13329	26.13974	0.081	0.045889	0.1396	0.003517
2023	Union Bank Limited	0.070611	26.18966	0.0253	0.087145	0.1327	0.003687
2023	United Commercial Bank	0.088989	27.06965	0.0171	0.065573	0.1347	0.004298
2023	Uttara Bank	0.130511	26.20405	0.021	0.119743	0.1402	0.009248
2024	AB Bank	0.09976	26.74562	0.0176	0.027717	0.1207	0.001732
2024	Al-Arafah Islami Bank Limited	0.118316	27.00508	0.0645	0.189857	0.1417	0.009202
2024	Bank Asia	0.109607	26.87753	0.039	0.107235	0.177	0.006484
2024	BRAC Bank	0.097179	27.20933	0.039	0.075553	0.1805	0.009333
2024	City Bank	0.12439	26.96726	0.0157	0.141147	0.1307	0.009286
2024	DBBL	0.172341	27.04309	0.0102	0.135971	0.1555	0.010193
2024	Dhaka Bank	0.077199	26.57459	0.0508	0.077775	0.1464	0.004812
2024	Eastern Bank	0.092007	26.85421	0.0278	0.143187	0.1461	0.011135
2024	EXIM Bank Limited	0.115651	27.01559	0.058	0.116775	0.149	0.006886
2024	First Security Islami Bank Limited	0.120933	27.14725	0.0102	0.130688	0.149	0.004804
2024	IFIC Bank	0.12215	26.74041	0.0251	0.084045	0.1309	0.006192
2024	Islami Bank Bangladesh Limited	0.134339	28.24008	0.037	0.088643	0.1254	0.003354
2024	Mercantile Bank	0.086217	26.67515	0.0228	0.091508	0.1435	0.006122
2024	Mutual Trust Bank	0.108559	26.59156	0.0498	0.111065	0.1363	0.006699
2024	One Bank	0.126193	26.47613	0.1397	0.082825	0.1177	0.004947
2024	Prime Bank	0.080224	26.79967	0.0342	0.124654	0.1169	0.009174
2024	Shahjalal Islami Bank Limited	0.101091	26.5602	0.0478	0.161608	0.1438	0.010461
2024	Social Islami Bank Limited	0.122278	26.81085	0.048	0.117847	0.1305	0.00559
2024	Southeast Bank	0.082349	26.92396	0.0654	0.056959	0.1275	0.003554
2024	Standard Bank Limited	0.134713	26.17827	0.081	0.029554	0.0997	0.002237
2024	Union Bank Limited	0.124503	26.3324	0.0349	0.099049	0.1407	0.005546

2024	United Commercial Bank	0.097708	27.17422	0.019	0.082101	0.1279	0.005209
2024	Uttara Bank	0.141265	26.2292	0.0223	0.132244	0.1405	0.010995