European Journal of Business and Management Research
www.ejbmr.org

Measuring Liquidity Risk and Its Determinants in Commercial Banks of Bangladesh: An Empirical Investigation

Md Shah Naoaj

ABSTRACT

This study analyzes the determinants of liquidity risk in the banking sector using panel data from 28 banks and three different models: Pooled, Fixed Effect, and Random Effect. The results show that leverage has a consistently positive effect on liquidity risk, while the regulatory environment and bank size have a negative effect. Return on assets (ROA) and capital adequacy ratio (CAR) have varying impacts depending on individual bank characteristics. Real GDP has a consistently negative relationship with liquidity risk. These findings provide valuable insights for policymakers and bank managers on how to manage liquidity risk in the banking sector.

Keywords: Basel III, CAR, Determinants, Leverage, Liquidity Risk, Size.

Submitted: February 21, 2023

Published: April 09, 2023

ISSN: 2507-1076

DOI: 10.24018/ejbmr.2023.8.2.1889

M. S. Naoaj*
Graduate Student, Department of Economics, New York University, USA
(e-mail: mn3116@nyu.edu)

****Corresponding Author***

I. Introduction

Managing liquidity risk is a crucial and challenging task for financial intermediaries, particularly banks, who are responsible for providing liquidity in the financial system. Liquidity risk can arise when there is a mismatch between the demand and supply of funds, which can result from various factors such as customer withdrawals, credit facilities, and other expenses. To avoid liquidity risk, banks must carefully plan their net liquidity position and maintain a balance between holding sufficient liquidity and profitability. Holding too much liquidity can negatively affect profitability, while holding fewer liquidity holdings can create liquidity risk and hurt the bank's growth in the long run (Naceur, 2013). The Basel Committee of banking supervision formulated regulations to address the systematic risks of banks, including liquidity risk, after the global financial crisis of 2008. Liquidity risk can severely affect the performance of banks, and the intensity of this risk can vary based on factors such as industry size, ownership structure, and banking concentration.

II. Literature Review

Liquidity risk is a significant concern for banks, particularly in the aftermath of the 2008 financial crisis, which highlighted the importance of adequate liquidity management. Research has explored various aspects of liquidity risk in banks and identified several challenges and solutions. For example, Acharya and Viswanathan (2011) analyzed the relationship between leverage, moral hazard, and liquidity in banks. The authors argued that higher leverage can increase the probability of default, leading to a greater need for liquidity.

They also discussed the moral hazard problem in which banks may take on excessive risk if they believe they will be bailed out, further increasing liquidity risk.

Cihák and Nier (2009) examined the need for special resolution regimes for financial institutions, particularly in the context of liquidity risk. The authors argued that such regimes are necessary to prevent systemic risk and to ensure that banks have adequate liquidity during times of crisis. Blundell-Wignall and Atkinson (2010) discussed the Basel III regulations on capital and liquidity and argued that they may not be sufficient to address liquidity risk in banks. The authors suggested additional measures, such as contingent capital and restrictions on asset liquidity, to improve liquidity management.

Bhatt and Misra (2016) provided an overview of the different approaches to liquidity risk management in banks. The authors discussed the challenges of measuring liquidity risk, the importance of stress testing, and the role of central banks in providing liquidity during times of crisis. Tarazi and Vacca (2010) examined the liquidity risk faced by small and medium-sized enterprises in Tunisia. The authors found that such enterprises have limited access to credit, which increases their liquidity risk. The study suggested that policymakers should focus on improving the financial infrastructure for these enterprises to mitigate liquidity risk.

Liquidity risk is a major concern for banks, and understanding the determinants of this risk is crucial for effective risk management. Numerous studies have identified several factors that influence liquidity risk in banks. One of the primary determinants is asset quality, which affects a bank's ability to generate liquidity from its assets (Altunbas *et al.*, 2010). Low asset quality, such as high levels of non-performing loans, reduces the value of a bank's assets, making it more difficult to obtain funding through asset sales.

Another important factor is the size of a bank, as larger banks tend to have higher liquidity risk due to their complex operations and interconnectedness with the financial system (Brunnermeier & Pedersen, 2009). Larger banks may also have a higher probability of facing runs or systemic events, which can create liquidity pressures.

The funding structure of a bank is also a key determinant of liquidity risk. Banks that rely heavily on short-term funding sources, such as interbank borrowing or commercial paper, are more susceptible to liquidity risk (Holton & Rodriguez-Moreno, 2010). This is because these funding sources can quickly dry up during times of market stress, leaving the bank unable to meet its obligations.

The regulatory environment can also influence liquidity risk. The Basel III liquidity ratios, for instance, have been introduced to enhance the liquidity risk management practices of banks (Bangladesh Bank, 2014). The ratios require banks to maintain a certain level of high-quality liquid assets, which can help banks weather market disruptions.

In addition to the above factors, interest rate risk, macroeconomic conditions, and bank-specific factors such as management quality and corporate governance can also influence liquidity risk. For example, a rise in interest rates can cause a bank's funding costs to increase, reducing its ability to meet liquidity needs.

Even though Bangladesh has achieved impressive economic growth due to a fast-growing manufacturing sector, solid remittance inflows and sustained reforms, resulting in a 8.15% GDP growth rate in 2019 and a near 7% growth rate in the last decade (Naoaj *et al.*, 2021), liquidity risk is a critical issue in the banking sector of Bangladesh due to the high level of non-performing loans, the inadequacy of capital, and an underdeveloped interbank market. Several studies have investigated the determinants of liquidity risk in Bangladesh, highlighting various factors that influence the liquidity risk of banks in the country.

One of the primary determinants of liquidity risk in Bangladesh is asset quality. A study by Islam *et al.* (2015) found that non-performing loans significantly affect liquidity risk in Bangladeshi banks. Banks with higher levels of non-performing loans are likely to face higher liquidity risk due to the adverse effects on asset quality and the inability to generate liquidity from assets.

Another factor that contributes to liquidity risk in Bangladesh is the funding structure of banks. A study by Hoque and Zaman (2014) found that banks that rely heavily on short-term funding sources, such as interbank borrowing and deposits, are more susceptible to liquidity risk. In contrast, banks that have a more diversified funding base with a mix of long-term and short-term sources are better able to manage their liquidity risk. However, funding structure with capital increases crises of equity as Naoaj *et al.* (2023) estimate that a 10 percent increase in capital would reduce the cost of equity by 4.39 percent. The study conducted by Naoaj (2023) found that capital adequacy in commercial banks is significantly impacted by multiple independent variables. Specifically, the study revealed a negative relationship between capital adequacy and leverage, while liquidity risk had a positive association with capital adequacy.

The regulatory environment also plays a critical role in managing liquidity risk in Bangladesh. The central bank of Bangladesh, Bangladesh Bank, has implemented several measures to reduce liquidity risk in the banking sector. For example, the central bank has introduced the statutory liquidity ratio, which requires banks to hold a certain percentage of their deposits in the form of liquid assets (BB Basel III Policy, 2014; BB GCRM Policy, 2021). This measure helps to ensure that banks have sufficient liquidity to meet their obligations. However, policy communication can be further improved, including by strengthening the clarity of policy messages, their consistency with the policy framework (Ahokpossi *et al.*, 2020).

In addition to the above factors, the size of a bank, the profitability of a bank, and macroeconomic conditions can also influence liquidity risk in Bangladesh (Ahmed *et al.*, 2021). For example, smaller banks may have higher liquidity risk due to their limited access to funding sources. Sometimes economic crisis caused by natural disasters can also rise liquidity risk (Naoaj, 2019). Moreover, banks that are less profitable may have difficulty raising capital during times of stress, exacerbating liquidity risk.

Previous research has primarily examined bank-specific and macroeconomic factors to determine liquidity risk, but none have explored the effects of implementing Basel III liquidity ratios. To address this gap and examine other crucial variables, we utilized data from 2013 to 2019 for 28 private commercial banks in Bangladesh. Our study aims to determine whether the implementation of these ratios has improved the management of liquidity risk, and how monitored these factors and adopted appropriate risk management strategies can aid banks in preparing for potential liquidity shocks and reducing their exposure to liquidity risk.

III. Data and Methods

The analysis in this research is based on the data obtained from 28 commercial banks in Bangladesh, covering the period from 2013 to 2019, excluding the year 2020 due to the overshadowing effect of Covid-related uncertainty and strong fiscal and monetary measures on liquidity risk. The study gathered data from the banks' annual reports, the website of the Bangladesh Bank, and the World Bank. Liquidity risk was assessed using advances-to-depositosit ratio (ADR), which gauges a bank's maximum lending capacity relative to the deposits gathered. Higher ADR values imply fewer liquid funds are available to banks. In Bangladesh, the ADR stands at 85% and 90% for conventional and Islamic banks, respectively. However, due to the impact of Covid-19, the ADR increased to 87% and 92% for conventional and Islamic banks, respectively.

Table I shows the information on nine variables with 196 observations each: liquidity risk (liq_risk), leverage, basel liquidity dummy (basel), return on assets (ROA), return on equity (roe), capital adequacy ratio (car), bank total assets (size), real Gross Domestic Product (realgdp), and Gross Domestic Product deflator(gdpdeflator).

TABLE I: SUMMARY STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
liq risk	196	0.881	0.089	0.571	1.066
Leverage	196	0.662	0.065	0.472	0.837
basel	196	0.571	0.496	0	1
ROA	196	0.01	0.004	0	0.02
ROE	196	0.113	0.033	0	0.2
CAR	196	0.127	0.015	0.1	0.18
size	196	26151.69	14126.19	8941.17	114124
Real GDP	196	223.673	51.217	150	302.57
GDP Deflator	196	196.42	22.342	164.26	229.41

Fig. 1 shows the pairwise correlations between nine variables. The correlations range from -1 to 1, where a correlation of 1 indicates a perfect positive relationship, 0 indicates no relationship, and -1 indicates a perfect negative relationship. For example, the correlation between liq_risk and leverage are 0.7543, indicating a strong positive relationship between these two variables. The correlation between roa and car is 0.2463, indicating a weak positive relationship between these two variables. The diagonal of the matrix shows the correlations between each variable and itself, which are always 1. Overall, the matrix provides insight into the relationships between the variables in the dataset, which can be useful for understanding the data and for selecting variables to include in statistical models.

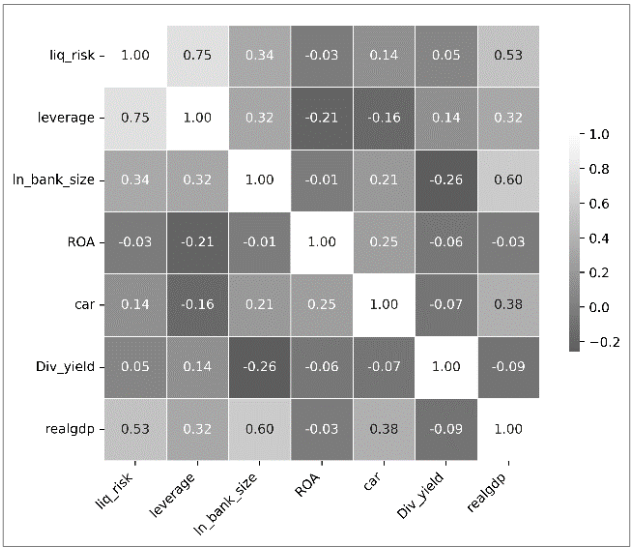

Fig. 1. Correlation Matrix.

The panel data estimations used in this study enable the control of observable and unobservable heterogeneity at the bank and time level. The empirical model is specified as (1).

$$liq\_risk_{it} = \propto + \beta 1 Leverage_{it} + \beta 2 basel_{it} + \beta 3 ROA_{it} + \beta 4 CAR_{it} + \beta 5 Bank\ Size_{it} + \beta 6 Real\ GDP_t + \beta 7 GDP\ Deflator_t + Ui + e_{it} \quad (1)$$

This is a panel data model with time and cross-sectional dimensions. It specifies the relationship between the dependent variable, liq_risk, and a set of explanatory variables that vary across both time and individual units.

The model includes individual-specific effects, Ui, which capture time-invariant unobserved heterogeneity across individual bank that may affect the outcome variable. There is also a stochastic error term, e_it, which accounts for random, idiosyncratic variation in the dependent variable that is not explained by the independent variables.

Overall, this model can be used to estimate the effects of various factors on liq_risk over time and across different individuals. By controlling for individual-specific effects and including time-varying covariates, this model provides a more accurate representation of the relationship between the variables than a simple cross-sectional regression model. The definitions of each of the variable are given in Table III.

TABLE IIII: DEFINITION OF VARIABLES

Symbol	Variable	Proxies	Relation
liq_risk	Liquidity risk	Loans to Deposit ratio Loans/advances to Deposit ratio	-
Leverage	Loan to Assets	Loans/advances to assets ratio	Positive/negative
basel	Basel dummy	Dummy equals 1 if the year the regulator imposes Basel liquidity (LCR) requirement	Positive
ROA	Return on Assets	Net profit after tax to equity ratio	Positive
CAR	Capital Adequacy Ration	(Tier 1 capital + Tier 2 capital)/Risk weighted assets	Positive
Bank Size	Bank size	Total Assets of Banks	Negative
Real GDP	Real GDP	Real Gross Domestic Product	Negative
GDP Deflator	GDP Deflator	Gross Domestic Product Deflator	Positive/negative

According to previous studies, various methods can be used for analyzing panel data, including Pooled Ordinary Least Square (POLS), fixed-effect model, random effect model, among others (Greene, 2012). When the number of independent variables is fixed and all variables are expressed in ratios, the fixed-effect model is generally preferred for regression and variance analysis (Wooldridge, 2002). In the current study, although the number of independent variables is fixed, not all terms are represented in ratios. Thus, the Hausman test is conducted to determine whether the Random Effect Model is more appropriate for this dataset (Hausman, 1978). Additionally, for robustness check, the Pooled Ordinary Least Square (POLS) method has been used in the study.

IV. RESULT

Table IV shows the results of a study on the determinants of liquidity risk in the banking sector, using panel data from 28 banks. The researchers employed three different models: Pooled, Fixed Effect, and Random Effect, and tested the effects of several independent variables on liquidity risk. The results indicate that all three models show consistent and significant positive effects of Leverage on liquidity risk.

However, the effect is strongest in the Fixed Effect model, suggesting that the individual characteristics of each bank have an impact on liquidity risk. The finding is consistent with other empirical findings that the relationship between bank liquidity risk and leverage is generally considered positive, meaning that higher leverage increases liquidity risk for banks. For example, a paper by Sufian and Habibullah (2012) titled "Bank liquidity risk and performance in Malaysia" found that leverage had a positive effect on liquidity risk.

Similarly, a study by Bhat and Sahoo (2015) titled "Bank Capital and Liquidity Risk: Evidence from India" found that bank leverage was positively related to liquidity risk.

The dummy variable Basel shows a negative relationship with liquidity risk in the Fixed Effect and Random Effect models, but not in the Pooled model, indicating that the regulatory environment has a significant impact on liquidity risk.

ROA shows a positive relationship with liquidity risk in the Pooled model, but not in the Fixed Effect or Random Effect models. This suggests that the relationship between ROA and liquidity risk is not consistent across all banks and can vary based on individual bank characteristics. Research studies have shown mixed results in the relationship between bank liquidity risk and return on assets (ROA). Some studies, such as Bofondi and Gobbi (2014), found a negative relationship between liquidity risk and ROA while others, such as Barua *et al.* (2017), found a positive relationship. The specific relationship may depend on various factors such as regulation, bank size, and country-specific factors.

CAR has a positive effect on liquidity risk in the Pooled and Random Effect models, but not in the Fixed Effect model, indicating that the capital adequacy ratio has a varying impact on liquidity risk depending on the bank's individual characteristics. The study found a negative relationship between bank size and liquidity risk, indicating that larger banks tend to have a higher liquidity position, resulting in lower liquidity risks. This finding was confirmed by the POLS results, where asset size was statistically insignificant in both cases. The relationship between bank size and liquidity position is consistent with the findings of Isshaq and Bokpin (2013), and Lucchetta (2015), but contrasts with Rauch *et al.* (2015), who found no significant effect.

TABLE IV: DETERMINANTS OF LIQUIDITY RISK

VARIABLES	(1) Pooled	(2) fixed effect	(3) Random effect
Leverage	1.008***	1.161***	1.092***
	(0.0717)	(0.0675)	(0.0640)
basel1	-0.0297	-0.0231**	-0.0246***
	(0.0196)	(0.00891)	(0.00939)
ROA	2.427**	0.0171	0.516
	(1.093)	(0.598)	(0.586)
CAR	0.917***	0.457	0.547*
	(0.278)	(0.314)	(0.306)
Bank_Size	-9.16e-07***	-1.21e-06	-1.10e-06***
	(1.64e-07)	(7.20e-07)	(2.92e-07)
Real GDP	-0.00875***	-0.00731***	-0.00776***
	(0.00231)	(0.00119)	(0.00132)
GDP Deflator	0.0218***	0.0185***	0.0195***
	(0.00558)	(0.00282)	(0.00316)
Constant	-2.216***	-1.891***	-1.973***
	(0.559)	(0.296)	(0.311)
Observations	196	196	196
R-squared	0.727	0.811	-
Number of bank	-	28	28

Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Real GDP has a negative relationship with liquidity risk in all three models, suggesting that economic conditions have an impact on liquidity risk. Similar findings were reported by Sopan and Dutta (2016), Waemustafa and Sukri (2015), and Jedidia and Hamza (2017), while Wójcik-Mazur and Szajt (2017) found a negative relationship between GDP and liquidity risk.

Overall, the study shows that different models can yield different results, and the individual characteristics of banks can have a significant impact on liquidity risk. The study provides valuable insights for policymakers and bank managers on how to manage liquidity risk in the banking sector.

V. CONCLUSION

The study on the determinants of liquidity risk in the banking sector using panel data from 28 banks has identified several significant factors that affect liquidity risk. The study confirms that bank leverage is positively related to liquidity risk, while the regulatory environment, as represented by the dummy variable Basel, has a negative relationship with liquidity risk. Additionally, the study found that the impact of ROA, CAR, and bank size on liquidity risk varies depending on the individual characteristics of each bank. The study also indicates that economic conditions, as measured by Real GDP, have a negative relationship with liquidity risk.

The study's findings suggest that policymakers and bank managers need to take into account the individual characteristics of banks when managing liquidity risk, including the size, capital adequacy ratio, and regulatory environment. The study's insights can help banks and policymakers to better understand and manage liquidity risk in the banking sector. Overall, the study highlights the importance of understanding the various factors that contribute to liquidity risk and the need for a nuanced approach to managing liquidity risk in the banking sector.

REFERENCES

Admati, A. R., DeMarzo, P. M., Hellwig, M. F., & Pfleiderer, P. (2014). Fallacies and irrelevant facts in the discussion on capital regulation. In *Central Banking at a Crossroads.* (pp. 33-41).

Acharya, V. V., & Viswanathan, S. (2011). Leverage, moral hazard, and liquidity. *Journal of Finance, 66*(1), 99-138. doi: 10.1111/j.1540-6261.2010.01613.

Admati, A. R., & Hellwig, M. F. (2013). *The Bankers' New Clothes: The Case for More Bank Equity.*

Admati, A. R., DeMarzo, P. M., Hellwig, M. F., & Pfleiderer, P. (2010). *Fallacies, irrelevant facts, and myths in the discussion of capital regulation: Why bank equity is not expensive?* Max Planck Institute for Research on Collective Goods.

Ahmed, M. R., Hoque, A., & Hossain, M. S. (2021). Liquidity risk management of banks in Bangladesh: A study on some selected banks. *Academy of Accounting and Financial Studies Journal, 25*(1), 1-12.

Ahokpossi, C., Isnawangsih, A., Naoaj, M., & Yan, T. (2020). The Impact of Monetary Policy Communication in an Emerging Economy: The Case of Indonesia. IMF Working Papers, 20/182.

Ahamed, F. (2021). Determinants of Liquidity Risk in the Commercial Banks in Bangladesh. *European Journal of Business and Management Research, 6*(1), 164-169.

Altunbas, Y., Gambacorta, L., & Marqués-Ibáñez, D. (2010). Bank risk and monetary policy. Journal of Financial Stability, *6*(3), 121-129. doi: 10.1016/j.jfs.2009.11.002.

Bangladesh Bank (BB). (2014). *Guidelines on Risk Based Capital Adequacy.* Dhaka, December 2014.

Baker, M., & Wurgler, J. (2013). *Do strict capital requirements raise the cost of capital? Banking regulation and the low-risk anomaly (No. w19018).* National Bureau of Economic Research.

Baker, M. P., & Wurgler, J. (2013). *Would stricter capital requirements raise the cost of capital? Bank capital regulation and the low-risk anomaly.* National Bureau of Economic Research.

Belkhir, M., Naceur, S. B., Chami, R., & Samet, A. (2019). Bank Capital and the Cost of Equity. *Social Science Research Network.* https://doi.org/10.2139/ssrn.3488908.

Belkhir, M. (2013). Do subordinated debt holders discipline bank risk-taking? Evidence from risk management decisions. *Journal of Financial Stability, 9*(4), 705-719. https://doi.org/10.1016/j.jfs.2013.06.002.

Belkhir, M., Saad, M., & Samet, A. (2020). Stock extreme illiquidity and the cost of capital. *Journal of Banking & Finance, 112*, 105281.

Barua, S., Kumari, J., & Kumar, S. (2017). Liquidity risk and profitability relationship: Evidence from Indian banks. *Borsa Istanbul Review, 17*(1), 25-37.

Besanko, D., & Kanatas, G. (1996). The regulation of bank capital: Do capital standards promote bank safety? *Journal of Financial Intermediation, 5*(2), 160-183.

Blundell-Wignall, A., & Atkinson, P. (2010). Thinking beyond Basel III: Necessary solutions for liquidity, transparency and supervision. *OECD Journal: Financial Market Trends, 2010*(2), 1-22.

Brunnermeier, M. K., & Pedersen, L. H. (2009). Market liquidity and funding liquidity. *Review of Financial Studies, 22*(6), 2201-2238.

Bhatt, V., & Misra, T. (2016). Liquidity Risk Management in Banks: A Review. *RBI Occasional Papers, 37*(2), 27-50.

Bhat, M. Y., & Sahoo, P. (2015). Bank capital and liquidity risk: Evidence from India. *Journal of Financial Economic Policy, 7*(4), 390-405.

Bofondi, M., & Gobbi, G. (2014). Information structure and the lending channel of monetary policy. *Journal of Banking & Finance, 49,* 286-298.

Campbell, J. Y. (1996). Understanding risk and return. *Journal of Political Economy, 104*(2), 298-345.

Cihák, M., & Nier, E. (2009). The need for special resolution regimes for financial institutions—The case of the European Union. *IMF Staff Papers, 56*(1), 1-26. doi: 10.1057/imfsp.2008.29.

Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics, 80*, 549-560.

Gardner, J. C., & Trzcinka, C. A. (1992). All-equity firms and the balancing theory of capital structure. *Journal of Financial Research, 15*(1), 77-90.

Gebhardt, W. R., Lee, C. M., & Swaminathan, B. (2001). Toward an implied cost of capital. *Journal of Accounting Research, 39*(1), 135-176.

Greene, W. H. (2012). *Econometric analysis* (7th ed.). Pearson Education.

Hail, L., & Leuz, C. (2006). International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of Accounting Research, 44*(3), 485-531.

Hail, L., & Leuz, C. (2009). Cost of capital effects and changes in growth expectations around US cross-listings. *Journal of Financial Economics, 93*(3), 428-454.

Hail, L., & Leuz, C. (2006). International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of Accounting Research, 44*(3), 485-531.

Hazra, D. R., Naoaj, M., Alam, M. M., & Kader, A. (2023). Cost of Implementation of Basel III reforms in Bangladesh-A Panel data analysis. *arXiv preprint arXiv:2303.11414.*

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica, 46*(6), 1251-1271. doi: 10.2307/1913827.

Holton, S., & Rodriguez-Moreno, M. (2010). Understanding the dynamics of bank liquidity: A Bayesian approach. *Journal of Banking & Finance, 34*(12).

Hoque, A., & Zaman, M. (2014). Liquidity risk management of commercial banks in Bangladesh. *Journal of Business and Technology (Dhaka), 9*(1), 63-86.

Islam, M. A., Rashid, A., & Rahman, M. (2015). Liquidity risk management of banks in Bangladesh: A study on some selected banks. *Journal of Applied Business and Economics, 17*(6), 29-4.

Isshaq, Z., & Bokpin, G. A. (2013). The effect of bank specific, industry specific and macroeconomic determinants of liquidity: Empirical evidence from Ghana. *International Journal of Financial Research, 4*(2), 33-46.

Jedidia, K. B., & Hamza, T. K. (2017). The impact of macroeconomic variables on liquidity risk: Evidence from Jordan. *International Journal of Economics and Finance, 9*(6), 46-59.

Kashyap, A. K., Stein, J. C., & Hanson, S. (2010). *An analysis of the impact of 'substantially heightened' capital requirements on large financial institutions. Booth School of Business, University of Chicago, mimeo, 2, 1-47.*

Lucchetta, M. (2015). Determinants of liquidity holdings in emerging markets: The role of bank market power. *Review of Development Finance, 5(2), 121-131.*

Myers, S. C. (1984). Capital structure puzzle (No. w1393). *National Bureau of Economic Research.*

Myers, S. C. (2001). Capital structure. *Journal of Economic Perspectives, 15*(2), 81-102.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review, 48*(3), 261-297.

Naceur, S. B. (2013). The determinants of banks' liquidity buffers in Central and Eastern Europe: New evidence from a crisis and non-crisis period. *Journal of Financial Stability, 9*(4), 438-449

Naoaj, M. S., Khan, A., & Ahsan, N. (2021). The Emerging Asia Pacific Capital Markets: Bangladesh. *Social Science Research Network*. https://doi.org/10.2139/ssrn.3807438.

Naoaj, M. S. (2023). Exploring the Determinants of Capital Adequacy in Commercial Banks: A Study of Bangladesh's Banking Sector. *European Journal of Business and Management Research, 8*(2), 108-112.

Naoaj, M. S., & Hosen, M. M. M. (2023). Assessing the Relationship between Enhanced Capital Requirements and Banks' Cost of Equity: Evidence from Publicly Listed Banks in Bangladesh. *European Journal of Business and Management Research, 8*(2), 149-153.

Rauch, J., Steffen, S., & Wang, J. (2015). Bank liquidity provision across the firm size distribution. *Journal of Banking & Finance, 61*(Suppl. 1), S1-S14.

Siddiqui, M. S., Naoaj, M. S., & Hosen, M. M. (2021). *Guidelines on Country Risk Management (GCRM) for Banks*. Bangladesh Bank, April 2021.

Sopan, M. A. M., & Dutta, A. (2016). Liquidity risk management and financial performance in emerging markets: Empirical evidence from India. *Vision, 20*(3), 215-228.

Sufian, F., & Habibullah, M. (2012). Bank liquidity risk and performance in Malaysia. *Journal of Asia-Pacific Business, 13*(2), 147-168.

Tarazi, A., & Vacca, V. (2010). Financial constraints and the risk-return trade-off in the Tunisian banking industry. *Journal of Banking & Finance, 34*(11), 2760-2769.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data.* MIT press.

Wójcik-Mazur, A., & Szajt, M. (2017). The liquidity risk determinants in the banking sector in Poland. *Journal of International Studies, 10*(4), 119-133.

Waemustafa, W., & Sukri, S. (2015). Bank-specific and macroeconomic indicators of profitability: Empirical evidence from the Islamic banking sector in Malaysia. *International Journal of Economics, Management and Accounting, 23*(2), 145-174.

Wu, X., & Wang, Z. (2005). Equity financing in a Myers-Majluf framework with private benefits of control. *Journal of Corporate Finance, 11*(5), 915-945.