

# Impacts of Bank Specific and Macroeconomic Determinants on Bank Liquidity: Empirical Evidence from Bangladesh

Md. Khaled Bin Amir<sup>1</sup>

**Abstract:** *This study endeavors to determine the determinants that have an influence on bank liquidity over the tenure from 2008 to 2018. To achieve this purpose, some internal and external factors are identified and divided into bank specific and macroeconomic determinants respectively. Bank liquidity is measured as a function of bank-specific and macroeconomic factors using prominent liquidity indicators such as current ratio. Using a multiple regression analysis, the results show that return on assets, non-performing loan, debt to assets ratio and capital adequacy ratio have a significant impact on bank liquidity. However, macroeconomic factors such as annual gross domestic product growth rate, annual inflation rate and annual unemployment rate have no significant impact separately on bank liquidity, but they have a unified impact on bank liquidity as they are non-diversified factors. So, the bank management body should concern mostly with internal determinants than external factors to maintain liquidity balance. Because internal factors are controllable but macroeconomic factors are equally influential for every banking institution and, they are non-diversifiable in nature. So, the results suggest that concern return on assets, non-performing loan, debt to asset ratio and capital adequacy ratio will help improve liquidity management.*

**Keywords:** *Bank Liquidity, Inflation, ROA, and GDP*

## 1.0 Introduction

Nowadays banking is considered an essential innovation for investment financing in Bangladesh, which routinely involves mobilization of funds from the surplus units to deficit units. Like in many developing countries banks play a vivacious role in Bangladeshi economy, treated as the dominant financier for the industrial and commercial activities. So banking is a diversifying aspect, correlated with diversified risks specifically liquidity risk is one of the significant risks.

Calculating the optimum level of liquidity is a really difficult task but essential for banks because liquidity crisis or excess liquidity can impact on banks' overall financial performance. So, maintaining sufficient liquidity is one of the important indicators of financial soundness (Vodová, 2013), deals with immediate cash needs of the depositors. A bank has supposed to have sufficient liquid fund to meet and honor the instantaneous demand from depositors otherwise there have chances to fall in liquidity crisis. One the other hand liquidity works opposite of profitability. The fundamental relationship between profitability and liquidity is a matter of tradeoff (Rose and Hudgins, 2004). If the bank holds more liquid funds for meeting immediate demand of the depositors that squeezes the chance to make investment for profit facing a huge opportunity cost. So, the liquidity manager forecasts future demand and tries to balance between liquidity and profitability. Additionally, managing liquidity is crucial for the

<sup>1</sup> Assistant Professor, Department of Banking and Insurance, University of Dhaka

survival and success of a bank, essential to compensate for expected and unexpected balance sheet fluctuations and provide funds for growth (Suliaman Alshatti, 2014). As a whole, liquidity management plays a significant role in Maintaining the stability and efficiency in the whole banking system in Bangladesh. Efficient liquidity management generally indicates the full utilization of reserves in the banks. Any mismatch in liquidity management forces banks to fall into huge difficulties, finally bankruptcy. So sufficient liquidity management is a must for the total banking industry. The inner meaning of banking business is trustworthiness both from investors and depositors.

Complying with the above discussions, the main objective of this study has been set to determine the impact of bank specific and macroeconomic factors on bank liquidity in Bangladesh. To achieve the main objective, this paper identifies return on assets (ROA), total debt to total assets ratio (DA), capital adequacy ratio (CAR) and nonperforming loans ratio (NPL) as bank specific indicators and annual growth rate of gross domestic product (GDP), inflation rate and unemployment rate (UNEM) as macroeconomic factors. Here, mainly empirical analysis of relevant ratios has been done to get the clear idea about the impact of bank specific and macroeconomics determinants on bank liquidity.

## **2.1 Literature Review**

Different research has been conducted to find out the determinants of bank liquidity and has revealed diverse types of banks specific and macroeconomic factors that have an impact on bank liquidity (LR). This research paper collects the following evidence.

Al-Harbi (2017) conducted his research to identify the factors that have an impact on bank's liquidity in both less developing and developing countries. He covered data from 686 banks (all conventional banks) operating in the Organization of Islamic Cooperation (OIC) countries for the period of 19 years (1989 to 2008) and found credit risk, capital ratio, inflation rate, foreign ownership, monetary policy and deposit insurance have a negative impact on banks' liquidity, but bank liquidity have a positive link with off-balance sheet activities, concentration, size, efficiency and market capitalization.

Another empirical study has been conducted by Umar and Sun (2016), covering all listed banks of BRICS (Brazil, Russia, India, China, South Africa) countries for the period of 2002 – 2014 to find out the determinant of liquidity creation, funding liquidity and stock liquidity. This research found bank size is not a determinant of different selected types of liquidity except funding liquidity. But profitability and riskiness of the bank are the determinant of funding liquidity. In addition, macroeconomic variables like inflation rate, effective interest rate and national savings rate are the determinant of funding liquidity. This research also found macroeconomic determinants like unemployment rate, stock market index and effective interest rate, and bank specific factors like leverage and profitability are the determinant of liquidity creation.

Singh & Sharma, (2016) used data of 59 banks in India from 2000 to 2013 and chose factors including profitability, bank size, capital adequacy, bank deposits, GDP growth rate, inflation rate, unemployment rate, etc. In their findings they found that bank deposits, profitability, capital adequacy and inflation rate effect on bank liquidity positively while bank size and GDP growth

rate were shown negatively significant but unemployment resulted in insignificant influence on bank liquidity.

Vodova (2011) discovered that capital adequacy and the share of nonperforming loans were positively related to bank liquidity in his study of Czech commercial banks' liquidity from 2001 to 2009, whereas inflation rate was negatively related to bank liquidity. Furthermore, Vodova (2011) discovered that higher capital adequacy and bank size reduce bank liquidity in another study on the determinants of liquidity of Slovak Commercial Banks from 2001 to 2010. Also, bank liquidity increases with the growth of GDP and decreases with higher unemployment, but the inflation rate and nonperforming loans have no statistically significant effect on bank liquidity.

On the other hand, Vodova (2013) in his another study on determinants of commercial banks liquidity in Hungary from the period 2001 to 2010 found that capital adequacy, profitability are positively effect on liquidity of banks while bank size negatively related with bank liquidity but share of nonperforming loans and unemployment rate results insignificant influence on bank liquidity and relation between GDP growth rate and bank liquidity was ambiguous.

Moussa (2015) studied on determinants of bank liquidity of 18 banks in Tunisia for 2000-2010 observed that deposits and bank size have no significant impact on liquidity of banks but GDP growth rate and inflation rate have significant impact on bank liquidity. Profitability was positively and significantly influenced on bank liquidity in the study of Bourke (1989); (Lartey, Antwi & Boadi, 2013) contrary to this, (Delechat, C.H., Muthoora & Vtyurina, 2012) indicates that profitability and bank size had negative significant relationship with bank liquidity. Simultaneously, (Aspachs, Nier & Tiesset, 2005) observed in their study that profitability and bank size were insignificant with bank liquidity and bank liquidity had an inverse relationship with GDP rate and vice-versa.

Dinger (2009) found in his study that bank size has a significant influence on bank liquidity but in a negative way. He observed that if deposit increases then the banks liquidity will decrease, that means rise in bank deposits results in the reduction of its liquidity. But (Bonner, Lelyveld & Zymek, 2013) found in their study that bank deposits had a positive influence on banks liquidity.

The study of (Bunda & Desquilbet, 2008) found a positive impact of GDP rate on liquidity of banks while Dinger (2009) established negative relationship between GDP growth rate and bank liquidity. In addition, the study of (Horvath, Seidler & Weill, 2014) showed that inflation rate had an insignificant impact on bank liquidity while unemployment rate had negative impact on bank liquidity and high rate of unemployment decrease demand for loans that influences bank liquidity.

Trenca, Petria & Corovei (2015) conducted a study where they analyzed the effect of macroeconomic factors on liquidity of 40 banks of six countries (Greece, Portugal, Spain, Italy, Croatia & Cyprus) from 2005-2011 and found that inflation rate had the highest significant impact on bank liquidity and GDP growth rate had the lowest impact on liquidity of banks.

Ferrouhi & Lehadiri (2014) made a study to identify the determinants of banks liquidity in Morocco from 2001-2012 and revealed that liquidity is positively related with bank size and negatively related with return on assets, inflation rate, GDP growth rate but unemployment rate has no effect on bank liquidity.

## **2.2 Variable Measurement**

### **Dependent Variables**

According to literatures banks liquidity is typically measured by liquidity ratio (LR). Here we have used ratio indicating liquidity namely current ratio defined as current assets divided by current liabilities. Liquidity indicates the availability of cash in hand at any point of time (Rose and Hudgins, 2004). Liquidity ratio measures how capable a financial institution to meet its short-term debt obligations and an important indicator of financial soundness. Maintaining Liquidity in banks is essential to carry out daily operations and facilitating the depositors on their immediate demand of withdrawal.

### **Bank Specific Independent Variables**

Internal policy makers and managerial body generally decided banks' specific determinants as denoted as internal factors such as return on asset, total debt to asset, capital adequacy ratio and loan performance indicator. This research study uses four types of banks 'specific factors as inner determinants of bank liquidity are as follows.

#### **Return on Assets (ROA)**

Profitability occurs when banks revenue exceeds its expenses. Robust profitability in banks ensures ability to support present and future operations and strengthen the capacity to deal with other financial tasks. But negative profitability reflects ineffective management and may be investors would be hesitant to invest in those banks. Return on Asset (ROA) is the most appropriate and widely used indicators of profitability which infers efficiency and capacity of banks by generating revenues from assets.

- H0<sub>1</sub>: There is no significant impact of ROA on LR

#### **Total Debt to Asset Ratio (DA)**

Total debt to assets ratio (DA) reflects the total amount of a company's liabilities divided by the total amount of the company's assets. Inefficient debt to total assets management may be one of the reasons to firm failure (Edmister, 1972). This ratio measures the degree of leverage used by any firm in its capital structure. Using more leverage is not good sign for any bank, reasons for financial risk. DA ratio is quite important and useful to be considered for measuring financial distress, is empirically proved (Shimerda, 1981).

- H0<sub>2</sub>: There is no significant impact of DA on LR

### **Capital Adequacy Ratio (CAR)**

Capital adequacy ratio (CAR) is for the protection of depositor's deposited money and stability in financial system expressed as capital to risk weighted asset ratio (CARR). Bank profitability (as measured by both ROA and ROE) is positively related with risk adjusted capital adequacy measure (i.e. tier 1 risk-based ratio and core capital ratio), (Mathuva, 2009). Along with this lack of maintaining defined capital adequacy also the reason of bank failure (Adeyemi, 2011). Exact capital requirement maintenance is must to avoid financial inefficiency and different risks. Excess or below amount of capital from defined capital requirement hampers efficiency as well as creates various financial indiscipline (Altunbas et al., 2007).

- $H_{03}$ : There is no significant impact of CAR on LR

### **Non-performing Loan Ratio (NPL)**

When borrower might not capable to repay the debt amount or fail to pay the schedule installments causes non-performing loan (NPL). Banks must concern on non-performing loan ratio because imbalance of NPL will create huge operational and liquidity risk. Higher percentage of NPL reduces the cost efficiency of banks (Karim, Chan and Hassan, 2010).

- $H_{04}$ : There is no significant impact of NPL on LR

### **Macroeconomic Independent Variables**

Bank liquidity is really sensitive to some of the other factors which are uncontrollable denoted as macroeconomic factors. Here we have used three macroeconomic variables: growth of annual gross domestic product (GDP), annual inflation rate and annual unemployment rate (UNEM).

### **Gross Domestic Product (GDP) Growth Rate**

GDP measures the monetary value of final goods and services, are bought by the final user, produced in a country in a given period of time (Callen, 2008). Gross domestic product is mainly used measuring social well-being and economic progress (England, 1998). GDP is used as wealth signatures of the country economical state (Ausloos and Lambiotte, 2007). On the other hand, bank lending rates has significant impact on output of in an economy (Obamuyi, Edun and Kayode, 2012).

- $H_{05}$ : There is no significant impact of GDP on LR

### **Inflation Rate**

Inflation is the situation when price of goods and services rise and purchasing power falls i.e. too much money chases too few goods (Campbell & Mishkin, 1986). In order to keep economy stable, government tries to keep inflation rate at expected and persistent level by introducing inflation targeting (Ball and Sheridan, 2004; Thomas, 1999). Central bank has significant role in this regard. Policy from an independent central bank always interconnected with public attitudes towards inflation that really creates an anti-inflationary culture and public consensus

on monetary stability in countries with low inflation rates (Hayo, 1998). General observation about inflation and bank liquidity is that purposeless bank loan creates inflationary pressure in the whole economy.

- H0<sub>6</sub>: There is no significant impact of IMF on LR

### Unemployment Rate (UNEM)

Unemployment is the situation of people actively looking for employment but not being employed, is calculated by dividing the number of unemployed people by all individuals currently in the labor force in a country. Higher unemployment rate effects on loan portfolio of banks in a country. Flexible market conditions accelerate the banking crises which has impact on unemployment rate. So rigid labor market is effective to lower down the unemployment rate (Furceri, Verdugo and Guillaume, 2015). Again, unemployment and wage rates have nonlinear relation, impact on overall economy (Phillips, 1958). Higher rate of unemployment affects the demand for loan by the customers and on the other hand, lower rate of unemployment may increase the loan demand of banks.

- H0<sub>7</sub>: There is no significant impact of UNEM on LR

To simply elucidate the dependent and independent variables following table is used which clarifies the variables notation and how the independent variables impact on dependent variables expressed by positive (+) or negative (-) signs .

**TABLE 1:** Definitions and Notation of the Variables

Dependent Variable	Variables	Measure	Notation
Dependent Variable	Bank Liquidity	Current Asset / Current Liabilities	LR
	Profitability	Net Profit / Total Assets	ROA
Bank Specific Independent Variables	Financial Leverage	Total debt / Total Asset	DA
	Effectiveness	NPL / Total Outstanding loan	NPL
	Efficiency	Capital / Risk weighted asset	CAR
	Economic Activity	Annual GDP growth rate	GDP
Macroeconomic Independent Variables	Inflation	Annual Inflation Rate	INF
	Unemployment Rate	Number of Unemployed Persons / Labor Force	UNEM

## **2.3 Research Gap**

Based on the above literature of various authors (Delechat, C.H., Muthooru & Vtyurina, 2012; Ferrouhi & Lehadiri, 2014; Karim, Chan and Hassan, 2010; Lartey, Antwi & Boadi, 2013; Moussa 2015; Singh & Sharma, 2016; Sulieman Alshatti, 2014; Umar and Sun, 2016 and Vodova, 2013) it can be said that a number of studies have been analyzed to find the effect of bank specific and macroeconomic factors on bank liquidity in various countries and different results were found from above studies. But very few researches have been conducted regarding this issue in Bangladesh. That's why this study desires to investigate the impact of selected bank specific and macroeconomic factors on bank liquidity operating in Bangladesh.

## **3.0 Methodology of the Study**

### **3.1 Research Sample**

The total banking industry in Bangladesh is the population of this research study. For the of convenience for data collection, six state-owned commercial banks (SCBs), three state-owned development financial institutions (DFIs) or specialized banks, thirty four conventional private commercial banks (PCBs) and nine foreign commercial banks (FCBs), are selected randomly as sample banks. Time series data have been collected over the period of ten years during 2008 to 2018.

### **3.2 Sources of Data**

This research study is mainly quantitative in nature, so sources are used to conduct the research. Relevant data published annual reports are the desired sources of this study. Also, different journals, research papers, Bangladesh Bank website, different economical websites, conference papers have taken in consideration for collecting data.

### **3.3 Research Design and Instrument**

This paper is constructed in the context of Bangladesh, tries to determine influence of bank specific and macroeconomic factors on the bank liquidity (LR) in the economy of Bangladesh. Return on assets (ROA), total debt to total assets (DA), capital adequacy ratio (CAR), non-performing loans ratio (NPL) and annual gross domestic product (GDP) growth rate, inflation rate (INF) and unemployment rate (UNEM) have taken as bank specific and macroeconomic factors respectively. Empirical analyses have been done through descriptive statistics, correlation analysis, ANOVA test and multiple regression analysis. Hypothesis test has been included to orchestrate the empirical analysis. The hypothesis has been tested through multiple linear regressions. To conduct the analyses we have used SPSS (Statistical Package for Social Sciences) version 20.

## **4.0 Empirical Results and Discussions**

### **4.1 Test of Hypothesis**

At 5% significance level bank specific determinants ROA, DA, CAR and NPL has significant impact on bank liquidity (LR) because value is less than the value of  $\alpha$  that's why null hypothesis

is rejected. On the other hand GDP, INF and UNEM have not significant impact on bank liquidity at 5% significance level because value is greater than  $\alpha$ .

**Table 2:** Test of Hypothesis (Coefficient Table)

Model		Unstandardized Coefficients		Standardized Coefficients Beta	T	Sig.
		B	Std. Error			
	(Constant)	-5.277	24.097		-.219	0.828
1	ROA	1.415	3.203	.147	.442	<b>0.042</b>
	DA	3.303	1.512	5.451	2.185	<b>0.037</b>
	CAR	1.025	.197	1.092	5.204	<b>0.000</b>
	NPL	.712	.334	.500	2.133	<b>0.041</b>
	GDP	4.001	2.194	.179	1.824	0.078
	INFLA	-.294	.665	-.040	-.442	0.662
	UNEM	-1.316	2.599	-.045	-.506	0.616

#### 4.2 Regression Model

$$Y_{LR} = \alpha + 0.147* ROA + 5.451* DA + 1.092* CAR + 0.500* NPL + 0.179*GDP + (-0.040) * NFLA + (-0.045) * UNEM + e$$

Where  $Y_{LR}$  is the dependent variable,  $\alpha$  is the constant and  $\beta_1$ = Coefficients of profitability,  $\beta_2$ = coefficients of financial leverage,  $\beta_3$ = coefficients of effectiveness,  $\beta_4$ = coefficients of efficiency,  $\beta_5$ = coefficient of economic activity,  $\beta_6$  = coefficients of inflation and  $\beta_7$ = coefficients of unemployment. Last of all e measure the standardized error. From the above research model it is clear by observing beta coefficients that debt to asset ratio has most influence on bank liquidity. Apart from this return on asset, capital adequacy ratio and non-performing loan have also positive impact on the dependent variable.

#### 4.3 F- Test

At 5% significance level  $H_0$  and  $H_1$  indicates the null and alternate hypothesis respectively where,  $H_0$ : No significant impact of mentioned bank specific and macroeconomic determinants on LR.  $H_1$ : significant impact of mentioned bank specific and macroeconomic determinants on LR.



**Table 3:** ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6424.107	8	803.013	14.597	0.001 <sup>b</sup>
	Residual	1705.409	31	55.013		
	Total	8129.516	39			

From the ANOVA output we have rejected the null hypothesis that the variances of both the factor groups are equal, since  $p < \alpha$  i.e.  $0.0\% < 0.05$ . Which indicates p value is less than alpha value. So, it is easier to say that overall mentioned macroeconomic factors and bank specific factors has significant impact on bank liquidity (LR).

#### 4.4 Measuring Fitness of Model:

**Table 4:** Model Summary Table

Model	R		Adjusted	Std. Error of the Estimate	Change Statistics				
					Square Change	F Change	df1	df2	Sig. F Change
1	0.89	.790	.736	7.41709	.790	14.597	8	31	0.000

The model summary shows that Coefficient of variation ( $R^2$ ) is around 80% indicates about 80 percentage of variation of bank liquidity explained by both the firm specific factors i.e. ROA, DA, CAR, NPL and macroeconomic factors i.e. GDP, INF and UNEM. The relation in between dependent and independent variables is strongly positive about 90 percent which is expressed by R. To conduct this study relevant variables are chosen because adjusted  $R^2$  is quite high about 75% and the table shows p value is 0% which is less than significance level ( $\alpha = 5\%$ ) at 95% confidence interval, clearly indicates the overall model is fit.

#### 5.0 Major Findings

Form the regression model it can be easily seen that DA and CAR have the coefficient value among all the independent variables means that they have more influence on bank liquidity. By using hypothesis testing specific variables have more significant impact on bank liquidity than chosen macroeconomic factors in this research study. Some of the chosen bank specific factors ROA, DA, CAR and NPL have statistically significant impact on bank liquidity [Table-2]. On the other hand three chosen macroeconomic variables have not statistically significant impact on bank liquidity [Table-2] because macro factors are non-diversifiable and non-controllable whose impact are equal for whole economy in Bangladesh this may be one of reason from vast area which is really matter for further scope of research. However the value of and adjusted clearly indicates correspondently strong relation between dependent and independent variables, more

variations are explained by independent variables and finally the chosen variables are relevant for this model and the model is fit [Table-4].

All in all considering the impact sign form table -2, bank liquidity will rise if ROA and DA tend to grow which means that banks have excess fund for lending. On the other hand, rising trend of NPL and CAR declines bank liquidity, expressed by negative (-) sign from table-2 which squeezes the overall investment.

## 6.0 Conclusions

Liquidity management is one of the most important issues for sound operations of the banks. This study had tried to investigate the mentioned bank specific and macroeconomic factors that have impact on liquidity of the banking industry in Bangladesh over the 2008 to 2018 years. After making the trend analysis, among the above mentioned four types of banks operating in Bangladesh, DFIs is found more vulnerable than the other types of banks. Liquidity ratio (LR), a return on asset (ROA), total debt to asset ratio (DA), capital adequacy ratio (CAR) is lower of DFIs during 2008 to 2017 June and non-performing loans ratio (NPL) is higher of DFIs. FCBs and PCBs show positive sign and SCBs also try to improve their performance over the research mentioned tenure.

According to empirical analysis of all bank specific determinants FCBs performs the best in maintaining higher percentage of LR, ROA, CAR and lowering the NPL and DA. SCBs also try to perform well but most of the bank scams was from state owned banks that created vulnerability in that banking zone, created financial indiscipline in the economy (The Daily Star, 2019) should be the topic of further research. According to bank specific factors, observing the trends of DFIs over 2008-2017, performs worse than others. They failed to maintain sound LR, ROA and CAR ratio on the other hand NPL ratio is higher than that of other types of banks, clearly indicates the vulnerability in financial condition of this sector in the economy of Bangladesh. PCBs perform a verge but their DA is showing highest percentage means suffering by excess liquidity problem. Also based on the empirical analysis, all the mentioned banks' specific factors have statistically significant impact on bank liquidity (LR) except ROA. On the other hand, all the macroeconomic factors have no statistical significance on bank liquidity means that they have indirect influence on bank liquidity.

## References

- Adeyemi, B. (2011). Bank failure in Nigeria: a consequence of capital inadequacy, lack of transparency and non-performing loans. *Bank And Bank System*, 6(1), 99-107.
- Al-Harbi, A. (2017). Determinants of banks liquidity: evidence from OIC countries. *Journal of Economic and Administrative Sciences*, 33(2), 164-177. doi.org/10.1108/JEAS-02-2017-0004
- Alper, D., & Hülya Talu, N. (2011). Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey. *International Journal*

- of *Economics and Financial Issues*, 7(2), 144-46. Retrieved 25 November 2020, from.
- El-Charani, H. (2020). Determinants of Bank Liquidity in the Middle East Region. *International Review of Management and Marketing*, 9(2), 68-71.
- Altunbas, Y., Carbo, S., Gardener, E., & Molyneux, P. (2007). Examining the Relationships between Capital, Risk and Efficiency in European Banking. *European Financial Management*, 13(1), 49-70. <https://doi.org/10.1111/j.1468-036x.2006.00285.x>
- Aspachs, O., Nier, E., & Tiesset, M. (2005). Liquidity, Banking Regulation and the Macroeconomy. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.673883>
- Ausloos, M., & Lambiotte, R. (2007). Clusters or networks of economies? A macroeconomy study through Gross Domestic Product. *Physica A: Statistical Mechanics and Its Applications*, 382(1), 16-21. <https://doi.org/10.1016/j.physa.2007.02.005>
- Bb.Org.Bd, 2019. <https://www.bb.org.bd/>.
- Bernal-Verdugo, L., Furceri, D., & Guillaume, D. (2015). A reply to “banking crises, labor reforms, and unemployment: A comment”. *Journal of Comparative Economics*, 43(4), 1142-1147. <https://doi.org/10.1016/j.jce.2015.11.001>
- Bernanke, Ben S, and Michael Woodford (2019). “The Inflation-Targeting Debate. In Does Inflation Targeting Matter?” 249-282. Reprint, Chicago: University of Chicago Press.
- Bonner, C., Lelyveld, I., & Zymek, R. (2013). Bankss Liquidity Buffers and the Role of Liquidity Regulation. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2327474>
- Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal Of Banking & Finance*, 13(1), 65-79. [https://doi.org/10.1016/0378-4266\(89\)90020-4](https://doi.org/10.1016/0378-4266(89)90020-4)
- Bunda, I., & Desquilbet, J. (2008). The bank liquidity smile across exchange rate regimes. *International Economic Journal*, 22(3), 361-386. <https://doi.org/10.1080/10168730802287952>
- Callen, Tim (2008). “What Is Gross Domestic Product”. *Finance & Development* 45, no. 4: 1-60.
- Campbell, T. S., & Mishkin, F. S. (1986). Money, Banking and Financial Markets. *The Journal of Finance*, 41(4), 992. <https://doi.org/10.2307/2328245>
- Deakin, E. (1976). Distributions of Financial Accounting Ratios: Some Empirical Evidence. *American Accounting Association*, 51(1), 90–96. <https://www.jstor.org/stable/pdf/245375.pdf>
- Delechat, C., Henao Arbelaez, C., Muthoora, P. S., & Vtyurina, S. (2012). The Determinants of Banks’ Liquidity Buffers in Central America. *IMF Working Papers*, 12(301), i. <https://doi.org/10.5089/9781616356675.001>
- Dinger, V. (2007). Do Foreign-Owned Banks Affect Banking System Liquidity Risk? *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.1008223>

- Edmister, R. O. (1972). An Empirical Test of Financial Ratio Analysis for Small Business Failure Prediction. *The Journal of Financial and Quantitative Analysis*, 7(2), 1477. <https://doi.org/10.2307/2329929>
- England, R. W. (1998). Measurement of social well-being: alternatives to gross domestic product. *Ecological Economics*, 25(1), 89–103. [https://doi.org/10.1016/s0921-8009\(97\)00098-0](https://doi.org/10.1016/s0921-8009(97)00098-0)
- Ferrouhi, E. M. (2014). Bank Liquidity and Financial Performance: Evidence from Moroccan Banking Industry. *Business: Theory and Practice*, 15(4), 351–361. <https://doi.org/10.3846/btp.2014.443>
- Hayo, B. (1998). Inflation Culture, Central Bank Independence and Price Stability. *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.56192>
- Horváth, R., Seidler, J., & Weill, L. (2013). Bank Capital and Liquidity Creation: Granger-Causality Evidence. *Journal of Financial Services Research*, 45(3), 341–361. <https://doi.org/10.1007/s10693-013-0164-4>
- Karim, M. Z. A., Chan, S.-G., & Hassan, S. (2010). Bank Efficiency and Non-Performing Loans: Evidence from Malaysia and Singapore. *Prague Economic Papers*, 19(2), 118–132. <https://doi.org/10.18267/j.pep.367>
- Kong, Y., Musah, M., & Antwi, S. K. (2019). Liquidity-Profitability Trade-Off: A Panel Study of Listed Non-Financial Firms in Ghana. *International Journal of Trend in Scientific Research and Development*, Volume-3(Issue-4), 1086–1099. <https://doi.org/10.31142/ijtsrd25068>
- Curtis Lartey, V., Antwi, S., & Kofi Boadi, E. (2013). The Relationship between Liquidity and Profitability of Listed Banks in Ghana. *International Journal of Business and Social Science*, 4(3), 48–56. [https://www.researchgate.net/publication/284428785\\_The\\_Relationship\\_between\\_Liquidity\\_and\\_Profitability\\_of\\_Listed\\_Banks\\_in\\_Ghana](https://www.researchgate.net/publication/284428785_The_Relationship_between_Liquidity_and_Profitability_of_Listed_Banks_in_Ghana)
- Mathuva, D. M. (2009). Capital Adequacy, Cost Income Ratio and the Performance of Commercial Banks: The Kenyan Scenario. *The International Journal of Applied Economics and Finance*, 3(2), 35–47. <https://doi.org/10.3923/ijaef.2009.35.47>
- Mishra, R. (2019). Relationship between Liquidity and Profitability of Commercial Banks in Nepal. *PatanPragya*, 5(1), 143–153. <https://doi.org/10.3126/pragya.v5i1.30454>
- Moussa, M. A. B., & Majouj, W. (2016). Determinants of Bank Net Interest Margin: Case of Tunisia. *International Journal of Finance & Banking Studies (2147-4486)*, 5(3), 103–116. <https://doi.org/10.20525/ijfbs.v5i3.252>
- Moyer, S. E. (1990). Capital adequacy ratio regulations and accounting choices in commercial banks. *Journal of Accounting and Economics*, 13(2), 123–154. [https://doi.org/10.1016/0165-4101\(90\)90027-2](https://doi.org/10.1016/0165-4101(90)90027-2)

- Marshal Obamuyi, T., T. Edun, A., & Femi Kayode, O. (2019). Bank lending, economic growth and the performance of the manufacturing sector in Nigeria. *European Scientific Journal*, 8(3), 19–38. <https://www.eujournal.org/index.php/esj/article/view/54>
- Phillips, A. W. (1958). The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-19571. *Economica*, 25(100), 283–299. <https://doi.org/10.1111/j.1468-0335.1958.tb00003.x>
- Rose, Peter S (1999). *Commercial Bank Management*. Reprint, New York: McGraw-Hill Book.
- Singh, A., & Sharma, A. K. (2016). An empirical analysis of macroeconomic and bank-specific factors affecting liquidity of Indian banks. *Future Business Journal*, 2(1), 40–53. <https://doi.org/10.1016/j.fbj.2016.01.001>
- Sulieman Alshatti, A. (2014). The Effect of the Liquidity Management on Profitability in the Jordanian Commercial Banks. *International Journal of Business and Management*, 23(27), 23–27. <https://doi.org/10.5539/ijbm.v10n1p62>
- The Daily Star (2019). “Banking Sector and Its Impact on Our Economy”.
- The Daily Star. “Defaulters Have the Last Laugh”, (2019). <https://www.thedailystar.net/business/banking/loan-scams-bangladesh-defaulters-have-the-last-laugh-1745554>
- Thomas, L. B. (1999). Survey Measures of Expected U.S. Inflation. *Journal of Economic Perspectives*, 13(4), 125–144. <https://doi.org/10.1257/jep.13.4.125>
- Trenca, I., Petria, N., & Corovei, E. A. (2015). Impact of Macroeconomic Variables upon the Banking System Liquidity. *Procedia Economics and Finance*, 32, 1170–1177. [https://doi.org/10.1016/s2212-5671\(15\)01583-x](https://doi.org/10.1016/s2212-5671(15)01583-x)
- Umar, M., & Sun, G. (2016). Determinants of different types of bank liquidity: evidence from BRICS countries. *China Finance Review International*, 6(4), 380–403. <https://doi.org/10.1108/cfri-07-2015-0113>
- Vodová, P. (2013). Determinants of commercial banks’ liquidity in hungary. *Acta Academica Karviniensia*, 13(1), 180–188. <https://doi.org/10.25142/aak.2013.016>
- Vodova, P. (2011). Liquidity of Czech Commercial Banks and its Determinants. *International journal of mathematical models and methods in applied sciences*, 5(6), 1060–1067. <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.418.2468&rep=rep1&type=pdf>