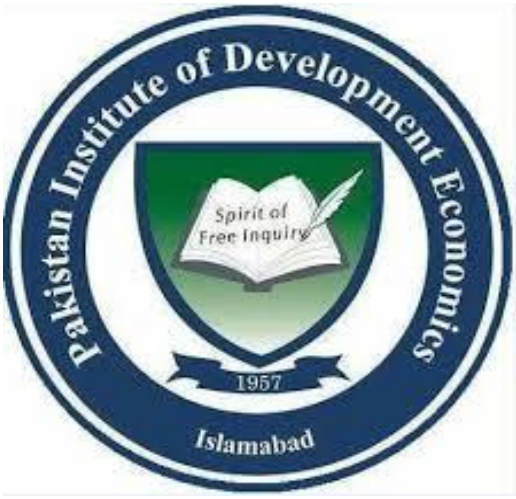
Determinants of Bank Liquidity: An Evidence from Pakistan



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I wholeheartedly dedicated this thesis to my respected parents and teachers whose categorical encouragement and unconditional support made it possible for me to finish the work

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May Allah bless them all

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Abbreviation

PSX	Pakistan Stock Exchange
SBP	State Bank of Pakistan
BS	Bank Size
CR	Credit risk
NIM	Net Interest Margin
ME	Management Efficiency
CAP	Capital adequacy
MQ	Management Quality
ROA	Profitability
MIR	Monetary Policy

ABSTRACT

Liquidity is a very important variable for all financial sectors, especially banks and the banking system components. So, it is interesting to show its determinants. Thus, this study empirically investigates the determinants of bank liquidity of listed banks of Pakistan by using a sample of 20 listed banks with stock exchange from a population of 37 commercial banks. This study has used an unbalanced annual panel data covering the period 2009-2018. The ratio approach method was used to measure bank liquidity (liquid assets / total assets). The results of the balance fixed-effect model showed that bank size and net interest margin have a statistically significant and negative relationship with bank liquidity, whereas credit risk has a negative but statistically insignificant relationship with bank liquidity. Management efficiency, capital adequacy has a positive and statistically significant relationship with bank liquidity, whereas Profitability and management quality has a positive but statistically insignificant relationship with bank liquidity. The result of this study also reports that the exchange rate has a positive and statistically significant relationship with bank liquidity, whereas monetary policy has a positive but statistically insignificant. The results of this study are important for credit manager, regulators, and academician, in the sense that they can facilitate commercial banks inefficient resource allocation

KEYWORDS: Bank liquidity, Capital Adequacy Ratio, Bank Size, Pakistan, Determinants of Liquidity, Profitability

Chapter 1

Introduction

The banking sector plays an important role in an economy by performing as an intermediary between surplus and deficit units, and funding liquidity is an important issue in the smooth functioning of a commercial bank. This issue has gained momentum after the crises of a subprime mortgage in 2007-08 crises, and it has been influenced by certain bank-specific and macroeconomic factors. Liquidity of commercial banks is a debatable topic of financial intermediation, and it can be defined as "The ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses" (Basel Committee 2008)[1]. Thus, a substantial number of studies investigated the determinants of bank liquidity. Moussa (2015) investigate the determinants of bank liquidity and reports that financial performance, Bank capital, the growth rate of GDP, inflation rate, and delayed Liquidity have a significant impact on bank liquidity.

The debate regarding liquidity literature can be categorized into two strands (market liquidity and funding liquidity). Market liquidity is referred to as banks are either able or unable to trade an asset on short notice at market price without incurring significant losses. At the same time, funding liquidity refers to settle bank positions or the ability of a bank to fund increases in assets and meet obligations without incurring unacceptable losses. Banks must have an adequate level of funding liquidity for better financial stability, but over the period level of funding liquidity of banks could not stable due to economic variation in the country. Therefore, funding liquidity should be monitor continuously because it has a great impact on the financial stability of banks, whereas this study only focuses on funding liquidity and its determinants in the context of Pakistan.

Several studies have been conducted to evaluate the determinants of funding liquidity in developed markets. Vodova (2011) finds that capital adequacy, capitalization, and size have a significant positive relationship with funding liquidity. The optimal level of Liquidity is extremely dependent on the effectiveness of banking operations (efficiency). If Liquidity is not adequately managed, it can lead to insolvency (in case of low Liquidity) and low Profitability (in the case of

[1] Principles for Sound Liquidity Risk Management and Supervision (https://www.bis.org/publ/bcbs144.htm)

high Liquidity) and finally destroyed shareholder's value and may be harmful to other banks because of the contagion effect (Malik & Rafique, 2013). The "too-big-to-fail" argument states that large banks hold fewer liquid assets because they depend on the lender of last resort, and they have access to capital markets as well as they can screen and monitor borrowers. Banks that hold more liquid assets benefit from a superior perception in funding markets, reducing their financing costs and increasing Profitability (Bordeleau & Graham, 2010).

Credit risk is defined by Brown and Moles (2014) as 'the potential that a contractual party will fail to meet its obligations in accordance with the agreed terms.' Therefore, it provides that credit risk will influence Liquidity negatively. The theory of financial fragility by Franklin Allen and Douglas Gale states that the financial crises may be created because of small liquidity shocks to a business. The informational friction theory implies that an increase in inflation rate reduces the Return on assets leading to the rationing of credit and, in turn, increases Bank's Liquidity. Several single-country studies showed that tightened monetary policies, interest rates, have a negative effect on Liquidity (Vodova, 2013). During the global financial crisis, many banks struggled to maintain adequate Liquidity because the financial crisis led to poor bank liquidity. The crisis showed that Liquidity is very important for the health of any financial system, and it is essential for banks to establish a level of Liquidity sufficient to survive any turmoil.

The Pakistan banking sector also became a victim of liquidity shortfalls because of credit demand from the public sector enterprises and enormous amounts of funds borrowed by the government of Pakistan. It becomes difficult for the State Bank of Pakistan (SBP) to manage Liquidity to meet all economic needs. The factors affecting Liquidity in Pakistani banks remain relatively unidentified owing to a scarcity of studies on the management of Liquidity in Pakistani banks. This study provides deep insights into the relationships that Liquidity shares with various macroeconomic and Bank specific factors. The findings of the study enable the managers of the Bank to formulate appropriate strategies to maintain adequate Liquidity while incurring minimum losses. In this direction, the objective of this study is to identify macroeconomic and microeconomic (bank-specific) factors, which affect the bank liquidity.

The present study seeks to fill this gap by empirically analyzing macroeconomic factors, e.g., monetary policy, exchange rate, financial crises, and bank-specific Profitability, bank size, capital adequacy ratio, efficiency, managerial quality, credit risk, and interest incurred factors

affecting Liquidity of Pakistani banks, thus making a significant contribution to the existing body of literature also, because the current study considered both macro and bank-specific factors to observe their effect on Liquidity. The study also makes a significant contribution with the help of reviewing the impact of more factors/ variables on funding liquidity as well as also; this study used the data of listed banks from 2009 to 2018.

1.1 Problem Statement

Liquidity management is considered as one of the top priorities in banks to ensure their ability to reach funds when needed to meet customer's demands and meet their obligations at the time. The mismanagement of bank liquidity may lead to bank insolvency, and the liquidity problem was traced in the banking sector during the global financial crisis (Vodova, 2013). (BCS, 2008)[2] clarify that if the banks could not fulfill the claim of depositors, then this will lead toward liquidity shocks, and ultimately will be bankrupt. The financial crisis has shown that the lack of liquidity in the banking system is the trigger of negative events. Keeping in mind these issues, the mismanagement of funding liquidity is crucial part and key issue in banking sector, it is essential to identify determinants of bank liquidity for a better understanding of the concept and for the appropriate positioning of liquidity risk in relation to other financial risks as well as for avoiding the future bad situation in the Bank such as bankruptcy.

1.2 Research Questions

The present study is intended to answer the following questions

- Whether Bank specific factors influence funding liquidity?
- Do macroeconomic factors have an impact on funding liquidity?

[2] Sound Practices for Managing Liquidity in Banking Organizations (https://www.bis.org/publ/bcbs69.htm)

1.3 Objectives of the study

The study has the following objectives.

- To investigate the bank-specific factors that affect the Bank's liquidity of Pakistan.
- To explore the macroeconomics factors that affect the Bank's liquidity of Pakistan.

1.4 Significance of the study

Banks performing a vital role in the financial system, and liquidity management is considered one of the top priorities in banks. The financial crisis underlined the importance of sound bank liquidity management. Liquidity importance can be recognized through the Basel committee (BCS), as BCS (2000) clarifies that bank liquidity is essential for Bank's day-to-day operations to pay the claim of their short-term depositor as well as short-term business obligations.

The current study provides empirical evidence on the determinants of Pakistani commercial Bank's liquidity. In addition, the study is also contributing significantly to the existing literature by adding four new bank-specific variables, i.e., managerial quality, credit risk, net interest margin, management efficiency, and two macroeconomic factors, i.e., monetary policy and exchange rate. This study is also contributing to the existing literature by using the latest data of Pakistani listed banks from 2009-2018. The findings of this study are very useful for all relevant stakeholders, such as the banking sector, the State Bank of Pakistan, and the economy. Identification of bank-specific and macroeconomic factors is helpful for the authorities to decrease the chances of bank run and bankruptcy situations.

Finally, the study is also useful for the management of banks to manage effectively their internal and external factors that contribute to boosting the Bank's performance. Bank regulators and policymakers can anticipate the performance to plan rules and strategies to improve the Profitability of banks.

1.5 Research Gap

There are limited studies that determine the Liquidity of commercial banks in Pakistan. There is notable literature focusing on bank liquidity creation, and most recent ones focused on measuring the amount of Liquidity created in the banking sector, while few studies shed light on determinants of funding liquidity (Melese, 2015). Under these circumstances, it is very crucial to study the Pakistani Bank's liquidity and explores its determinants to have a wider view on liquidity

issues and try to avoid risks related to it. Most of the studies investigated the determinants of Bank's liquidity and their relationship in developed countries. The effect of determinants on bank liquidity may be different from country to country due to their different financial system, rules and regulation, economic position, and market structures.

Determinants influencing Liquidity in Pakistani banks remain relatively unidentified because of the lack of studies on funding liquidity and its relationship with determinants in Pakistani banks. In the context of Pakistan, Ahmad and Rasool (2017) and Khan and Tahir (2018) investigated the determinants of Pakistani Bank's liquidity. However, the variables which they have used are bank size, capital adequacy ratio, cost of funds, deposits, Profitability, GDP, and unemployment. This study concerns managerial quality, non-performing loan, interest incurred, efficiency, monetary policy, and exchange rate, which contributes to existing literature. This study explains the impact of macroeconomic factors (monetary policy, exchange rate, and financial crises) on funding liquidity and examines the impact of bank-specific factors (Profitability, efficiency, bank size, managerial quality, NIM, capital adequacy, and credit risk) on funding liquidity.

1.6 Organizing of the study

This study is organized into five chapters. The first chapter provides the introduction. The general information included in this chapter is the problem statement, the objective of the study, research questions, significance of the study, and research gap of the study. The second chapter provides a detailed review of the literature regarding this study. The third chapter contains data and methodology. Chapter four provides results and their interpretations. The last chapter of this study is Chapter five provides a conclusion, policy recommendations, and future research direction.

Chapter 2

Literature Review

This chapter concisely discusses the review of the study and includes general perception about the study topic, methods of measuring Liquidity and potential variables that may affect banks liquidity position, as well as the statistical methods used in these studies.

2.1 Review of literature

Previous studies regarding bank liquidity determinants are divided into two strands; the first empirical studies investigated determinants of banks' Liquidity in a single country. Secondly, empirical studies that explored determinants of bank liquidity in a group of countries around the world.

The study of Diamond and Dybvig (1983) is the first to provide evidence on the importance of the role of the Bank in the creation of Liquidity. The findings of this study indicate that the optimal level of Liquidity is strongly linked to effective banking operations; if Liquidity is not created properly, it can lead to insolvency (in case of low Liquidity) and low Profitability (in the case of high Liquidity) and finally destroyed shareholders value and may be harmful to other banks and because of the contagion effect.

Shah, Khan, and Tahir (2018) investigate the determinants influencing the Liquidity of banks operating in Pakistan. They selected 23 banks for examining these determinants. 11 banks are skipped because of unavailability of data and merger and acquisitions in the banking sector for the period of 2007 to 2016. The study uses a panel data model. According to results, cost of funds, capital adequacy ratio, and bank size have a positive and significant impact on the Liquidity of banks operating in Pakistan. On the other hand, deposits are inversely linked with Liquidity in the present study. Simultaneously, the Profitability of banks has no significant impact on banks' Liquidity. Simultaneously, the Liquidity of banks in Pakistan is influenced very differently by GDP when the two measures of Liquidity are employed. Finally, unemployment, although statistically significant in the first specification and insignificant in the second specification.

Ahmad (2017) explores the determinants of bank liquidity of Pakistani commercial Banks by employing data of 37 commercial banks for the period of 2005 to 2014. The study employed

the fixed-effect model for examining determinants of Liquidity of Pakistani commercial banks. The results of this study suggest that there is a positive impact of bank capital on bank liquidity in Pakistan and this relationship is statistically significant. On the other hand, bank size is negatively affected by bank liquidity of Pakistani commercial banks, and the result is statistically significant. NPL and bank liquidity have a negative and statistically significant relationship. Bank liquidity is positively affected by Profitability, and this relationship is statistically significant. The result of this study is linked with the finding of Khidmat & Rehman (2014). Khidmat and Rehman (2014) conclude that the Profitability of a bank supports its solvency problem, but it does not help in the liquidity shortage problem of the commercial banks because Liquidity needs a day to day operation while Profitability is for a longer period. The result of this study shows a positive and significant relationship between GDP with Liquidity. The finding of this study is contrary to the findings of (Moussa, 2015). Moussa (2015) shows the negative impact of GDP on bank liquidity in the context of Tunisia. Inflation rate and bank liquidity have a positive but statistically insignificant relationship with bank liquidity.

Malik and Rafique (2013) examine the Bank specific and macroeconomic determinants of commercial Bank liquidity in Pakistan. The sample of the study consists of 26 Pakistani commercial banks for a period of 5 years. Bank's Liquidity is measured in two ways; one is cash and cash equivalents to total assets (L1), and the second is advances net of provisions to total assets (L2). Two models are estimated based on these measures of Liquidity. The results of model 1 (L1) indicate that the bank-specific fundamentals (NPL and TOA) and monetary policy interest rate positively determine the bank liquidity, whereas inflation has a negative impact. Bank liquidity measured by L1 is negatively and significantly affected by the financial crisis. The results of model 2 (L2) indicate that the bank size and monetary policy interest rate positively and significantly determine the bank liquidity. The study also reports that there is a positive and significant impact of the financial crisis on the Liquidity of commercial banks measured by L2.

Al-harbi (2017) explores the determinants of bank liquidity in developing/less-developing countries by using the Ordinary Least Square fixed effect model on an unbalanced panel data set of all conventional banks working in the Organization of Islamic Cooperation (OIC) countries over the period 1989-2008. The results suggest that capital ratio, foreign ownership, credit risk, inflation rate, monetary policy, efficiency, size, off-balance-sheet activities, market capitalization, and

concentration have a statistically significant relationship with bank liquidity. The study also reports that bank liquidity is negatively affected by bank capital. The relationship between banks Liquidity and foreign ownership is negative as suggested banks with foreign affiliation take more risk to increase their revenue because they depend on their foreign partners in times of distress. In the same way, credit risk also affects bank liquidity negatively and statistically significant. The relationship between Profitability and Liquidity is insignificant, and this indicates that there is a limit for holding liquid assets. When this limit is exceeded, a bank's Profitability will diminish. Similarly, size has a positive and significant impact on bank liquidity, and small banks hold more Liquidity to face liquidity shortages because they do not have access to the capital market. GDP growth rate negatively affected on bank liquidity and statistically significant, the same result, although insignificant, obtained when GDP lagged by one year. Significantly, Inflation has a positive link with banks' Liquidity.

Ahmed, Ahmed, and Naqvi (2011) investigate the firm's level determinants of liquidly risk of listed Islamic banks of Pakistan. The results indicate that leverage, tangibility, and age are important determinants to define the liquidity risk of Islamic banks of Pakistan, while liquidity risk has a statistically insignificant relationship with the Profitability and size of Islamic banks of Pakistan. Surprisingly, the results predict that explanatory variables size and Profitability are not powerful explanatory variables to define the liquidity risk of Islamic banks of Pakistan.

Abdullah and Khan (2011) explore the liquidity risk management by taking a comparative study between Domestic and Foreign banks in Pakistan. The study found that the relationship of bank size with liquidity risk is negative and significant in domestic banks and negative and insignificant in foreign banks. The relationship of debt to equity ratio with liquidity risk is negative and significant both in domestic and foreign banks. The relationship of investment to assets ratio with liquidity risk is negative and insignificant both in domestic and foreign banks. The relationship of Return on equity with liquidity risk is negative and insignificant both in domestic and foreign banks. The relationship of liquid assets with liquidity risk is negative and insignificant in domestic banks and positive and significant in foreign banks

Vodová (2011) examines the determinants of Liquidity of Slovak commercial banks for the period of 2001 to 2010 by using panel data of 16 banks. This study has four liquidity ratios to express banks Liquidity; the first one is liquid assets to total assets ratio, the second one is liquid

assets to deposits and short-term borrowing ratio, the third one loans to total assets ratio, while the fourth one loans to deposits and short- term funding ratio. The results indicate that the growth rate of GDP and Profitability has a significant and positive impact on bank liquidity, whereas bank capital adequacy and bank size have a significant and negative impact on bank liquidity. Vodová (2011) replicates his own study to explore the determinants of Liquidity of Czech commercial banks for the period of 2001 to 2009 by using panel data of 16 banks. This study has used four liquidity ratios to express banks Liquidity; the first one is liquid assets to total assets ratio, the second one is liquid assets to deposits and short-term borrowing ratio, and the third one loans to total assets, while the fourth one loans to deposits and short-term funding. The results indicate that capital adequacy, asset quality, lending rate, and the interest rate on the interbank transaction have a significant and positive impact on bank liquidity, whereas inflation rate, business cycle, and the financial crisis have a significant and negative impact on bank liquidity.

Moussa (2015) investigate the determinants of bank liquidity by employing the data of 18 banks of Tunisia for the period of 2000-2010. In this study, panel data estimation has been used for data analysis. The study uses two liquidity measures to estimate the Bank's liquidity as follows: liquid assets to total assets ratio and loans to deposits ratio. The results of this study indicate that financial performance, Bank capital, the growth rate of GDP, inflation rate, and delayed Liquidity have a significant impact on bank liquidity, whereas size, total liquid assets, financial costs/ total credits, total deposits have an insignificant impact on bank liquidity. This study supports the findings of Vodova (2013). Vodova, (2013) results in the case of Hungarian banks showed that the following factors had a significant positive impact on bank liquidity, which were capital adequacy, lending rate, and bank profitability, Whereas the bank size, interest rate on interbank transaction, monetary policy interest rate, and interest margin had a significant negative relationship with banks liquidity.

Furthermore, Vodová (2012) investigate the determinants of Liquidity of commercial banks of Poland by employing panel data regression analysis for the period of 2001 to 2010. This study used four liquidity ratios to express banks Liquidity. The first one is liquid assets to total assets, and the second one is liquid assets to deposits and short-term borrowing ratio, the third one is liquid assets to total deposits ratio, while the fourth is loans to deposits ratio. The results show that the firm factors have a significant positive impact on bank liquidity, which are capital

adequacy, the share of nonperforming loans, inflation, interest rates on loans, and interbank transaction. In contrast, the following factors have a significant negative impact on bank liquidity, which are interest rate margin, Profitability, and bank size. Moreover, Munteanu (2012) examine the determinants that influence bank liquidity in Romania and used two liquidity ratios to express Bank's liquidity, which are loans to total assets ratio and liquid assets to deposits and short-term funding ratio. The study uses the panel data regression method to analyze data of Romanian banks for the period from 2002 to 2010. The pre-crisis years were observed separately from the crisis period (2008-2010). An important indicator for bank stability, Z-score, has a significant influence over bank liquidity in the crisis years. Moreover, results indicate that Liquidity is a significant negative effect on capital adequacy, asset quality, and interbank funding, whereas it is positively related to cost to income ratio, funding cost, credit risk rate, and inflation.

Additionally, Al-Homaidi, Tabash, Farhan, and Almaqtar (2019) examine the determinants of Liquidity of Indian commercial banks. This study uses GMM and pooled model, employee data of 37 banks of India listed in Bombay stock exchange for the year 2008-2017. The finding of this study suggests that bank size, capital adequacy ratio, operation efficiency ratio, deposits ratio, and profitability ratio are found to have a significant and positive impact on bank liquidity, whereas assets quality ratio, assets management ratio, return on equity ratio, and net interest margin ratio are found to have a significant negative impact on Liquidity as well as, with respect to macroeconomic factors, the results indicate that interest rate and exchange rate are found to have a significant effect on Liquidity. There is a significant association between bank size and Liquidity. The findings are inconsistent with the findings of Moussa, (2015). The results of the study of Mousa indicate that financial performance, Bank capital, the growth rate of GDP, inflation rate, and delayed Liquidity have a significant impact on bank liquidity whereas size, total liquid assets, financial costs/ total credits, total deposits have an insignificant impact on bank liquidity in the term of macroeconomics determinants, the findings reveal that the only GDP has a significant effect on Liquidity. The inflation rate has a positive influence on Liquidity.

Vodova (2013) explore the determinants of the Liquidity of Hungarian commercial banks for the period of 2001 to 2010. The study uses panel data regression analysis to examine the determinants of bank liquidity. This study uses three liquidity ratios to express banks Liquidity. The first one is liquid assets to total assets, and the second one is liquid assets to deposits and short-

term borrowing, while the third is liquid assets to total deposits. The results show that the bank liquidity has a significant and positive relationship with capital adequacy, lending rate, and bank profitability, whereas the significant and negative relationship with bank size, interest rate on interbank transaction, monetary policy interest rate, and interest margin.

Mehdi and Abderrassoul (2014) examine the determinants of Moroccan Bank's Liquidity and analyzes the behavior of Moroccan Bank's Liquidity for the period of 2001 to 2012. Panel data regression is used for examining the determinants of Moroccan Bank's Liquidity. Results of this study highlight that financial crises have a negative impact on bank liquidity, but he also reports that the impact of financial crises is not the same for all banks. Furthermore, Liquidity is mainly determined by eleven 11 determinants; liquidity of the Moroccan banking industry is positively correlated with the Bank's size, the share of own Bank's capital of the Bank's total assets, external funding to total liabilities, monetary aggregate, foreign assets, foreign direct investment and negatively correlated with Return on assets, inflation rate, the growth rate of gross domestic product, public deficit, and financial crisis. Finally, Bank's Return on equity, equity to total assets, and the unemployment rate have no impact on Moroccan Bank's Liquidity. Additionaly, Chagwiza (2014) explores the determinants of Liquidity for the Zimbabwe commercial banks. The study analyzes data of 10 banks for the period of 2010 to 2011 using the panel data regression method to explore the relationship between study variables. The results indicate that bank liquidity is significant and positively influenced by total assets, bank rate, capital adequacy, and GDP; however, significant and negatively influenced by the business cycle, adoption of multi-currency, and inflation.

Roman and Sargu (2015) evaluate the liquidity risk with a view to presenting proposals for the financial stability of the banking system for CEE Countries. Therefore, the study analyzes the financial statements of the following country's banks (Bulgaria, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania) for the period from 2004 to 2011 using OLS regression analysis. The results of their research highlight the negative impact that the depreciation of the loan portfolio has on the overall Liquidity of the analyzed banks. Sheefeni and Nyambe (2016) investigate macroeconomic determinants of commercial banks Liquidity in Namibia by using the autoregressive distributive lag (ARDL) model on the quarterly data of Bank of Namibia for the period of 2001 to 2014. The results indicate that only economic activities appear to have a negative,

statistically significant impact on commercial banks' liquidity. This result is consistent with the findings of Mousa (2015). Mousa (2015) also report similar results for Tunisia, which indicate that financial performance, Bank capital, the growth rate of GDP, inflation rate, and delayed Liquidity have a significant impact on bank liquidity whereas size, total liquid assets, financial costs/ total credits, total deposits have an insignificant impact on bank liquidity.

Significantly Boadi, Li, and Lartey (2016) explore the principal determinants of Rural Community Banks' liquidity in Ghana by using the panel least square fixed-effect method on data of 114 rural and community bank-specific panel data from 2005 to 2013. The finding of this study suggests that capital adequacy, asset quality, management efficiency, and gross domestic product have a significant positive effect on Liquidity. Market jurisdiction of rural and community banks has a significant effect on their liquidity performance. The effect of macroeconomic variables on bank liquidity determinants indicated GDP has a positive impact, whereas inflation has a negative effect on bank liquidity.

Zaghdoudi and Hakimi (2017) investigate bank-specific factors and macroeconomic factors that determine the liquidity risk of Tunisian banks. The study examines both internal and external factors. Results show that banks' lending activity, financial crisis, capital adequacy, economic growth are positively affected the Bank's liquidity risk, while size and inflation are negatively affected the Bank's liquidity. The study also shows that Tunisian banks concentrate on granting loans, which evolved faster than collected deposits.

Islam and Nasreen (2018) examine macroeconomic and Bank specific determinants of the Liquidity of banks in Bangladesh. For this purpose, they took Panel data of 28 banks of Bangladesh for the period of five years (2012 to 2016), but the newly established conventional commercial banks have been excluded because of the unavailability of data of these banks. A panel regression is used for this purpose of finding factors that influencing the bank liquidity of banks of Bangladesh. The result of this paper indicates that bank size, off-balance sheet exposure of banks, and risk exposure have a significant relationship with the Liquidity of commercial banks of Bangladesh. Size has a negative relationship with Liquidity. As Deléchat, Henao, Muthoora, and Vtyurina (2012) explain, smaller banks are likely to maintain higher Liquidity because they have limited opportunity to raise fund from external sources as compared to large-sized banks that are likely to maintain less Liquidity because they have adequate opportunity to manage funds from

call money market and other alternative sources. The paper also shows that Banks with high engagement in off-balance-sheet activities maintain less Liquidity and vice versa. Risk-weighted assets, GDP, and capital adequacy are also negatively related to liquid assets. Profitability, deposits, and age of banks have a positive influence on liquid assets.

Similarly, El-Chaarani (2019) explores the determinants of bank liquidity in the Middle East region, and the study compares the liquidity level of banking sectors among Middle Eastern countries. By using Weighted regression analysis on data of 183 banks from eight different countries of Middle Eastern countries for the period of 3 years (2014, 2015 & 2016). The study found the significant impacts of economic growth, assets quality, capital level, and bank size on Liquidity in the banking sector. It finds that Lebanese banks have the highest level of Liquidity, whereas Omani banks have the lowest level of Liquidity, and his study also shows a decrease in bank liquidity during 2016 in Middle Eastern countries. The results also report that the size of banks has a significant negative impact on liquidity level because small banks have a buffer of liquid assets, whereas big banks depend on the inter-bank market and credit instruments. Bank liquidities have an inverse relation with economic growth. The high level of investment opportunities during the economic expansions compel banks to increase their profit margins and so to decrease their Liquidity by providing more loans.

Concluding the discussion regarding literature, this study has selected the seven bank-specific (Profitability, Management efficiency, Management quality, Credit risk, Capital Adequacy, Net interest margin) and two macroeconomic variables (Exchange rate and monetary policy) of funding liquidity Because the financial institution, especially banking sector depends on not only bank-specific factors but also macroeconomic indicators that directly or indirectly influence the performance of financial institutions. As from literature, this study deeply observed that most of the researcher stress on considered bank-related variables and there are limited studies in the context of the Pakistani banking sector; therefore, this study considered these Bank related and macroeconomic variables.

Chapter 3

Data description and methodology

This chapter comprises four sections, firstly describing the sample selection and data collection procedure. Secondly, briefly discuss all the variables used in this study. Thirdly discuss in detail model specification and finally describe the econometrics model used in this study.

3.1 Data Description

This study examines the impact of determinants on bank liquidity of those banks which are listed with Pakistan stock exchange (PSX). The study uses data from the banking sector of Pakistan for the period of 2008 to 2018. The population of the study is all commercial banks. The sample size of this study comprises 20 commercial banks. The data have been taken from the balance sheet and income statements of all banks, web site of the state bank of Pakistan, and from the business recorder.

3.2 Measurements of variables

This section discusses in detail the variables used in the study and their measurements. The dependent variable is bank liquidity, and the independent variables are Profitability, size, credit risk, efficiency, management quality, capital adequacy, net interest margin, monetary policy, financial crises, and exchange rate.

3.2.1 Measurements of the dependent variable

3.2.1.1 Bank liquidity

"Liquidity is the ability of a bank to increase funds in assets and meet obligations as they come due, without incurring unacceptable losses" (Basel Committee, 2008). There are different approaches for measuring Liquidity, e.g., liquidity gap, liquidity ratios, liquidity index, financing gap, etc. This study adopts the ratio approach because academic literature prefers it due to a more standardized method (Moore, 2010).

$$Bank\ Liquidity\ = \frac{Total\ liquid\ assets}{Total\ assets} \qquad 3.1$$

3.2.2 Measurements of independent variables

3.2.2.1 Capital adequacy ratio

The Capital Adequacy Ratio (CAR) assesses the capital requirement based on the risks faced by the banks. Capital of banks includes common stocks, surplus funds, undivided profit, reserve for contingencies, and other capital reserves (Melese, 2015). This study uses the ratio of equity to total assets as a proxy for measuring capital adequacy as used by (Moussa, 2015; Gorton and Winton, 2000; Berger and Bouwman, 2009). It is hypothesized that bank capital structure has a Negative relationship with bank liquidity.

$$Capital\ adequacy\ of\ banks\ = \frac{Equity}{Total\ Assets} \qquad 3.2$$

3.2.2.2 Profitability

Profitability is the measure of the financial performance of a Bank, and it is captured by using the proxy Return on asset as used by (Molyneux and Thornton, 1992, Moussa 2015, Naceur, 2003; Khrawish and Al-Sa'd, 2011). It is hypothesized that there is a negative relationship exist between Profitability and bank liquidity.

$$Profitability\ of\ bank\ = \frac{Net\ income}{Total\ assets} \qquad 3.3$$

3.2.2.3 Bank size

Poorman and Blake (2005) define bank size as a natural log of total assets. This study measures it by using the natural logarithm of total assets as used by (Al Khouri, 2012; Tseganesh, 2012; Vodová, 2013). It is hypothesized that the relationship between size and bank liquidity is positive.

Size of the Bank = ln (Total assets) 3.4

3.2.2.4 Net interest margin

Net interest margin ratio measures how efficiently a bank is investing its funds (interest earned) in comparison to its expenses (interest expense) on the same investments. Net interest margin indicates the efficiency of financial intermediation Hamadi and Awdeh (2012). The following proxy is used to measure the efficiency of financial intermediation as used by (Moussa, 2015). It is hypothesized that the net interest margin has a negative relationship with bank liquidity.

$$\text{NIM} = \frac{\text{Interest receivable} - \text{Interest incurred}}{\text{Total assets}} \quad 3.5$$

3.2.2.5 Management Efficiency

Rashid and Jabeen (2016) define management efficiency as the ratio of total expenditures to run a business operation to the total revenues obtained from the business. This ratio implies how a business can efficiently use its assets and revenues. It is captured by using a proxy of operating expense to total assets as used by (Lartey, Antwi1, and Kofi, 2013; Moussa, 2015). It is hypothesized that bank liquidity has a positive relationship with efficiency.

$$\text{Bank efficiency} = \frac{\text{Operating expense}}{\text{Total Assets}} \quad 3.6$$

3.2.2.6 Credit Risk

Brown and Moles (2011) defined credit risk as 'the potential that a contractual party Will fail to meet its obligations in accordance with the agreed terms. It is captured by using the proxy of Non-performing loans to Total assets as used by (Vodová 2011; Tseganesh 2012; Vodová, 2013). It is hypothesized that credit risk has a negative relationship with bank liquidity.

$$\text{Credit risk of Bank} = \frac{\text{Non-performing loan}}{\text{Total Loan}} \quad 3.7$$

3.2.2.7 Managerial quality

The managerial quality of bank measure indicates the asset quality of banks. It shows that whether banks invested their deposits properly or not. It is captured by using the proxy of advances to total deposits as used by (Lartey, Antwi1, and Kofi 2013). It is hypothesized that managerial quality has a positive relationship with bank liquidity.

$$\text{Managerial quality of Bank} = \frac{\text{Advances}}{\text{Total Deposits}} \quad 3.8$$

3.2.2.8 Exchange rate

The exchange rate is the price of one currency in terms of another currency. It is captured by using the proxy of exchange rate Average in a year as used by (Deléchat, Henao, Muthoora, and Vtyurina, 2012; Issah and Antwi, 2017; Al-Homaidi, Tabash, Farhan, and Almaqtar 2019). It is hypothesized that due to variation in exchange rate continuously, the exchange rate has a positive relationship with bank liquidity. This study has used Rupees in terms of dollar to capture the exchange rate.

$$\text{Exchange rate of bank} = \text{Average rate in a year (Rs/\$)} \quad 3.9$$

3.2.2.9 Monetary Policy

Monetary policy is a central bank's actions and communications that control the money supply. It is captured by using the interest rate of the 6-month rate as used by (Ongore and Kusa, 2013; Al-Homaidi, Tabash, Farhan, and Almaqtar, 2019). It is hypothesized that due to the variation of interest rate continuously, it has a positive influence on bank liquidity.

$$\text{Monetary policy} = \text{Interest rate} \quad 3.10$$

Table 1 List of variables

Variable	Formula	Reference
Liquidity	$\text{Bank Liquidity} = \frac{\text{Total liquid assets}}{\text{Total assets}}$	Moussa, (2015)
Size	$\text{Bank Size} = \ln(\text{total assets})$	Al Khouri, (2012)
Capital adequacy ratio	$\text{Capital adequacy of banks} = \frac{\text{Equity}}{\text{Total Assets}}$	Berger and Bouwman, (2009)
Profitability	$\text{The Profitability of Bank} = \frac{\text{Net income}}{\text{Total assets}}$	Khrawish, 2011
Net interest margin	$\text{NIM} = \frac{\text{interest receivable} - \text{interest incurred}}{\text{Total assets}}$	Moussa, (2015)
Credit risk	$\text{Credit risk of Bank} = \frac{\text{Non} - \text{performing loan}}{\text{Total Loan}}$	Tseganesh, (2012)
Managerial quality	$\text{Managerial quality of Bank} = \frac{\text{Advances}}{\text{Total Deposits}}$	Lartey, Antwi1, & Kofi, (2013)
Management efficiency	$\text{bank efficiency} = \frac{\text{Operating expense}}{\text{Total Assets}}$	Al-Homaidi, Tabash, Farhan, and Almaqtar; (2019)
Exchange rate	$\text{Exchange rate of Bank} = \text{Average rate in a year}$	Issah and Antwi, (2017)
Monetary policy	$\text{Monetary policy} = \text{interest rate}$	Almaqtari, (2018)

3.4 Model Specification

In this study, Panel data analysis has been used to investigate the impact of determinants on bank liquidity. Panel data have several advantages, such as increasing the degrees of freedom and reduces collinearity, improve the efficiency of estimates, and assisting in overcoming the inherent multicollinearity between the independent variables.

3.5 Method of Panel data analysis

For the estimation of the panel data, there are three widely used models in the literature, e.g., common constant, fixed effects, and random effects model procedures.

3.5.1 The common constant method

The common constant method, also called the pooled OLS method of estimation, presents results under the principle assumption that there are no differences among the data matrices of the cross-sectional dimension. In other words, the model estimates a common constant γ for all cross-sections

$$Y_{it} = \gamma + \theta X_{it} + \epsilon_{it} \qquad 3.12$$

3.5.2 Fixed effect method

The fixed effects estimator is also known as the least-squares dummy variables (LSDV) estimator. It explores the relationship between predictor and outcome variables within an entity. Each entity has its own individual characteristics that may or may not influence the predictor variables. Fixed effect modeling is appropriate if there is a serial correlation between the error term of the model and the independent variables. The equation for the fixed effects model is as follow:

$$Y_{it} = \gamma_i + \theta_1 X_{1it} + \theta_2 X_{2it} + \cdots + \theta_k X_{kit} + \epsilon_{it} \qquad 3.13$$

3.5.3 Random effects method

The variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. The random effect model handles the constants for each section not as fixed but as random parameters. Random effects modeling procedure is more suitable in the absence of serial correlation between the explanatory variables and the error term (Shah, Khan, and Tahir, 2018).

$$Y_{it} = \gamma_i + \theta_1 X_{1it} + \theta_2 X_{2it} + \cdots + \theta_k X_{kit} + \nu_i + \epsilon_{it} \quad 3.14$$

However, the decision regarding choosing between the random and fixed effects model is carried out by using the Hausman test. It basically tests whether unique errors are correlated with the regressors. (Toh, 2017).

3.7 Econometric models

The study estimates the following model to investigate the determinants of bank liquidity and then find the relationship of bank liquidity with macroeconomic factors (The exchange rate and monetary policy) and bank-specific factors (Profitability, bank size, efficiency, managerial quality, Net interest margin, capital adequacy ratio and Credit risk).

$$LIQ_{it} = \beta_{\circ} + \beta_1 ROA_{it} + \beta_2 NIM_{it} + \beta_3 CAP_{it} + \beta_4 Size_{it} + \beta_5 CR_{it} + \beta_6 MQ_{it} + \beta_7 ME_{it} + \beta_8 MIR_{it} + + \beta_9 EXCH_{it} + \varepsilon_{it} \quad 3.15$$

Where the dependent variable LIQ_{it} is the bank liquidity of bank i at time t, and Independent Variables are $ROA_{it}$is the Profitability of bank i at time t, NIM_{it} is the Net interest margin of bank i at time t, CAP_{it} is the Capital adequacy ratio of Bank i at time t $Size_{it}$ is the size of bank i at time t, CR_{it} is the Credit risk of bank i at time t, MQ_{it} is the Managerial quality of bank i at time t, ME_{it} is the Management efficiency of bank i at time t, MIR_{it} is the Interest rate of bank i at time t, $EXCH_{it}$ is the Exchange rate of Bank i at time t and ε_{it} is the error term.

Chapter 4

Results and Discussion

This chapter includes results and discussions. The result includes descriptive statistics, correlation matrix, and panel data analysis.

4.1 Descriptive Statistics

In this chapter, the collected data are presented, and important correlation and regression results are discussed accordingly; the descriptive statistics of dependent and independent variables are as follows. The results of the simple linear regression model are presented, and finally, the most important part is a detailed discussion of results, findings, and empirical literature.

It includes the Mean value that measures the central tendency of data. Standard deviation is reflected from the mean, and it provides dispersion and spread of data from the mean value. Skewness indicates the positive or negative spread of the data, and if skewness is zero, then data is symmetrical or normally distributed. Kurtoses depicts that whether the tails of given distribution contain extreme values. Hence, table 2 below presented the descriptive statistics values of the study variables, comprises of both dependent and independent variables for the study period, and all variables comprised 200 observations. This study has used the dependent variable, which measures the Liquidity of Pakistani banks, and nine independent variables, which included both Bank specific and macroeconomic variables. The bank-specific variable is capital adequacy, credit risk, bank size, Profitability, management quality, management efficiency and net interest margin whereas the remaining two variables; Exchange rate and monetary policy are macroeconomic variables of the study. The mean value shows the average value of all banks in each variable, whereas the minimum and maximum values of each variable from all banks show in the minimum and maximum statistics, respectively. Sample variation from the mean shows in the standard deviation statistics, which is the square root of the variance and normally good if it is low.

Table 2 Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
LIQ	200	.081	.026	.003	.183
ROA	200	.007	.013	-.054	.035
NI	200	.033	.02	-.016	.191
CA	200	.087	.044	.016	.298
Size	200	19.65	1.08	16.99	21.83
CR	200	.115	.079	0	.516
MQ	200	.006	.001	0	.01
ME	200	.309	.106	.145	.807
MIR	200	.099	.028	.062	.139
EXCH	200	.062	.078	-.041	.268

Note descriptive statistics are calculated for each variable from 2009 to 2018 LIQ is bank liquidity. ROA is Profitability. NI is Net interest margin. CA is capital adequacy. CR is credit risk. MQ is management quality. ME is management efficiency. MIR is monetary policy, and EXCH is the exchange rate.*

Table 2 present the mean value of Liquidity as 8.1. The maximum and minimum values of LIQ 18.3 and 0.3, respectively, with a standard deviation of 2.6. As a proxy for capital adequacy, the ratio of equity to total assets was used. Hence, the mean value of capital adequacy is 8.70. This indicated that from the total asset, only 8.70 is covered by equity shareholders, whereas the remaining 92.30 is financed by external funds. This implies that as there is a high dependency on external funds that arise from higher deposit mobilization. Also, the mean value of 8.70 is above the general standard for capital adequacy, i.e., 8 (Reporter, 13 March 2010) with the maximum and minimum values of 29.8 and 1.6, respectively.

The standard deviation for capital adequacy is 4.4 revealed that there is little dispersion towards the mean among commercial banks in Pakistan. In general, although the Bank with a minimum capital adequacy ratio of 1.6 would be exposed to liquidity risk, the capital adequacy of Pakistani commercial banks is in a good position since the mean capital ratio of 8.70 is more than

the State Bank of Pakistan. The asset size of the Bank was measured by the natural logarithm of the total asset (LnTA), which has a mean value of 19.64, and the standard deviation from the mean was 1.073, which revealed some variation from its mean. Since natural logarithm is used to reduce the variation of maximum and minimum value, the values are 21.83 and 16.98, respectively.

Return on asset (ROA) was used to proxy the Profitability of commercial banks, which is the ratio of net income after tax to the total asset. The mean value or average Return on assets of selected banks over a period between 2009 up to 2018 is 0.007. The minimum value of ROA is 0.007. The maximum and minimum values are .035 and -0.054, respectively. The standard deviation of .013 implies that there was little variation in Profitability among Pakistani commercial banks. Non-performing loan to total loan used to the proxy credit risk of commercial banks. The mean value of credit risk of selected banks over a period between 2009 up to 2018 is 0.115, and the standard deviation is .079, which reflects that a little dispersion of NPL among Commercial Banks of Pakistan from its mean value. The maximum and minimum values are 0 and 0.516, respectively. Bank Al-Habib have 0 value of credit risk in 2018, and standard chartered Bank limited have zero value of credit risk in 2016.

The interest margin represents 0.033 of total assets, and the standard deviation is low .02. Operating expenses represent 0.309 of the average total assets. So, there is efficiency in the banking sector, and there is a slight variation in management efficiency between banks. The minimum and maximum values are -0.276 and 0.807, respectively. The mean value of Management quality, Monetary policy, and exchange rate are 0.006, 0.099, and 0.062, respectively. The minimum value of management quality is 0, which is the value of Standard chartered bank limited in 2015, and the maximum value is .01.

4.2 Correlation

The correlation matrix is analyzed through both signs and values of the variable. If the value is 1, which shows a perfect relationship between variables, and the sign shows the direction of the relationship. The positive sign shows that increase in one variable results in an increase in another variable, whereas the negative sign explains that variables move against each other. Hair et al. (2006) argue that a correlation coefficient below 0.9 may not cause a serious multicollinearity problem. Malhotra (2007) stated that the multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75.

Kennedy (2008) suggests that any correlation coefficient above 0.7 could cause a serious multicollinearity problem leading to inefficient estimation and less reliable results. A correlation coefficient of positive one indicates that a perfect positive association between the two variables, whereas the correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero indicates that there is no linear relationship between the two variables. This indicates as there is no consistent argument on the level of correlation that causes multicollinearity.

Therefore, in this study, the correlation matrix for nine independent variables of the study is shown. Below is the table had been estimated. From the result of the following correlation matrix table, Liquidity is positively correlated with Profitability and with net interest margin with a correlation of 0.127. The correlation of bank liquidity with capital adequacy and size is also positive with the value of .036 and .239, respectively, but with the credit risk, the correlation is negative with the value of .077. The correlation between Liquidity and management quality, management efficiency is positive. Since there is no correlation value above 0.7, 0.75, and 0.9 according to Kennedy (2008), Malhotra (2007), and Hair et al. (2006) respectively, hence it is concluded that there is no multicollinearity problem in this study.

Table 3 Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) LIQ	1.000									
(2) ROA	0.127	1.000								
(3) NIM	0.127	0.054	1.000							
(4) CAP	0.036	0.060	0.185*	1.000						
(5) Size	0.239*	0.048	0.148*	-0.334*	1.000					
(6) CR	-0.077	-0.193*	-0.415*	-0.024	-0.231*	1.000				
(7) MQ	0.079	-0.288*	0.138	0.131	-0.180*	-0.068	1.000			
(8) ME	0.042	-0.044	-0.148*	0.234*	-0.320*	0.007	0.156*	1.000		
(9) MIR	0.217*	0.078	0.244*	0.234*	-0.385*	0.276*	0.132	-0.111	1.000	
(10) EXCH	0.022	0.017	-0.111	-0.135	0.131	-0.130	0.007	-0.027	-0.169*	1.000

* shows significance at the .05 level

The study further investigates the correlation between the independent variables by using the variance inflation factor (VIF). The findings of the VIF suggests that there is no multicollinearity problem among the independent variables. All values of the VIF are below six, which indicates that the multicollinearity problem between the independent variables is not present in this study.

Table 4 Variance inflation factor

	VIP	1/VIF
Size	1.736	.576
MI	1.728	.579
NI	1.709	.585
CR	1.652	.605
ME	1.47	.68
MQ	1.291	.774
ROA	1.288	.776
CAP	1.281	.781
EXCH	1.041	.961
Mean VIF	1.466	.

4.4 Likelihood Test

This test is applied to find out which model is an appropriate, common, or fixed-effect model. The null hypothesis (Ho) for the test is that all the cross-sections have a common intercept, and the alternative hypothesis is that intercept is different for each cross-section. The result is given in the following table

Effects Test	Statistic	d.f.	Prob.
Cross-section F	7.819	-19171.000	0.000
Cross-section Chi-square	125.052	19.000	0.000

From the above table, the probability of cross-section is significant, which means that the appropriate model is a fixed-effect model as compared to the common constant model.

4.5 Hausman Test

Hausman test is the most efficient way to select the best model between fixed effects and random effects.

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	9	0.0000

The result of the Houseman test shows that the p-value of chi-square is significant, which reflects that the fixed effect model is the more efficient model than the random effect model. Hence, this study is considering the fixed effect model as their final model to be analyzed.

4.6 Results of the regression analysis

In this section, the results of the fixed effect regression model are presented. The regression results have their own implications, and hence beta indicates each variable level of influence on the dependent variable, which may have a coefficient of negative or positive. P-value indicates at what percentage level of each variable is significant, and R2 values indicate the explanatory power of the model.

Table 5 Results

LIQ	Coef.	St. Err.	p-value	Sig
ROA	0.208	0.148	0.162	
NIM	-0.178	0.105	0.092	*
CAP	0.027	0.041	0.518	
Size	-0.014	0.002	0.000	***
CR	-0.046	0.026	0.081	*
MQ	2.366	1.343	0.080	*
ME	0.001	0.000	0.005	***
MIR	0.412	0.076	0.000	***
EXCH	0.138	0.042	0.001	***
Constant	-0.265	0.047	0.000	***
R – Squared	.4412		F- statistic	3.42
Adjusted R-Squared	.3281		Prob	0.0035

**P<0.1, weak significant, **P<0.05 Semi strong significant, ***P<0.01 strong significant*

There is a positive relationship between Profitability and Liquidity. If ROA increase by 1%, LIQ increase by 20.8%, and this relationship are statistically insignificant. The result of this finding is linked with a previous study of Khidmat and Rehman (2014) about BL and ROE and concluded that the Profitability of a bank supports its solvency problem, but it does not help in liquidity shortage problem of the commercial banks because Liquidity needs a day to day operation while Profitability is for a longer period. The same result is given by Olarewaju and Adeyemi (2015).

The findings are consistent with the study of Shah, Khan, and Tahir (2018) and Aspachs et al. (2005). Bank size has a statistically significant and negative relationship with bank liquidity. The coefficient value is -0.014, which means that BS rises by 1%, then BL decreases by 1.40%. The result is in line with the hypothesis "too big to fail" by Iannotta et al. (2007). Hence based on this hypothesis, large banks tend to hold fewer liquid assets and invest in riskier assets through implicit guarantee. Moreover, the result of this study about BS and BL are

also relevant with the empirical findings of Vodova, (2011); Hackethal et al., (2010); Rajan and stein, (2002); G. Alger and I. Alger, (1999) and Vento and Ganga, (2009) This is contrary to result found by Malik and Rafique (2013).

There is a negative relationship between net interest margin and bank liquidity (if NIM increases by 1%, bank liquidity decreases by 1.78%. This relationship is statistically significant. An increase in interest margins stimulates Bank to focus more on lending activity, and as a result, the share of liquid assets is decreasing (Vodova, 2013). The result is also consistent with the results of (Moussa, 2015). There is a positive relationship between Management efficiency and bank liquidity; if management efficiency increases by 1%, bank liquidity also increases by 0.1%. The increase in operating expenses has a positive impact on bank liquidity. This relationship is statistically significant. The findings are consistent with the results of (Malik & Rafique, 2013).

There is a positive relationship between management quality and bank liquidity; if management quality increase by 1%, bank liquidity also increases by 2.36. The increase in operating expenses has a positive impact on bank liquidity. This relationship is statistically insignificant. The findings are in line with the results of (Malik & Rafique, 2013). There is a negative relationship between Credit risk and bank liquidity. If non-performing loans increase by 1%, then bank liquidity will be decreased by 4.6%. The relationship is statistically significant. The results are consistent with the finding of (Melese, 2015) and contrary to the findings of (Malik & Rafique, 2013).

The positive influence of the share of capital on total assets is consistent with the assumption that Bank with sufficient capital adequacy should be liquid, too. The results are consistent with the findings of (Vodova 2012). Exchange rates have a statistically significant and positive effect on the Bank's liquidity. The results are consistent with the findings of (Al-Homaidi et al., 2019). Monetary policy has a statistically insignificant and positive effect on the Bank's liquidity. The results are consistent with the findings of (Malik & Rafique, 2013).

Keeping in view the objectives of the study, the estimated regression results of this study clearly shows that bank-specific variables, i.e., Net interest margin, Size, Credit risk, Management quality, Management efficiency have a significant relationship with funding liquidity. The second objective was also achieved as the results of this study depict that there is a significant relationship between macroeconomic variables (Monetary policy and exchange rate) with funding liquidity.

This indicates that the considered variables are significant determinants of the dependent variables. Hence, keeping in view the current study objectives, this study concluded that the given variables are the key determinants of funding liquidity. This study has also concluded that funding liquidity has a positive relationship with Profitability, capital adequacy, management quality, management efficiency, monetary policy, and exchange rate, whereas a negative relationship with the size, credit risk, and net interest margin.

Chapter 5

Conclusions and recommendations

The preceding chapter presented the analysis of the findings, while this chapter deals with the conclusions and recommendations based on the findings of the study. Accordingly, this chapter is organized into two sub-sections. Section 6.1 presents the conclusions, and section 6.2 presents the recommendations.

5.1 Conclusion

The main objective of the study was to identify the bank-specific and macro-economic factors that can affect Pakistani banks Liquidity and to what extent these determinants exert an impact on Pakistani banks Liquidity. In doing so, previous studies on bank liquidity have been reviewed

And it is summarized that the Liquidity of a Bank is usually expressed as a function of internal and external determinants.

According to the review on empirical literature of Liquidity and its determinants, the Current study chosen and investigated the impact of seven bank-specific and two macro-economic factors on the Liquidity of the Pakistani listed banks over the period of 2009 to 2018. The bank-specific factors include variables such as Profitability, credit risk, capital adequacy, bank size, management quality, management efficiency, and net interest margin. On the other hand, the macroeconomic variables employed in this study are monetary policy and exchange rate. The quantitative data were mainly obtained from the business recorder, State bank of Pakistan reports, and Stoch exchange website to identify and measure the determinants of banks liquidity.

The results showed that there is a positive relationship between Profitability and Liquidity. This relationship is statistically insignificant and concluded that the Profitability of a bank supports its solvency problem, but it does not help in the liquidity shortage problem of the commercial banks because Liquidity needs a day to day operation while Profitability is for a longer period. Bank size has a statistically significant and negative relationship with bank liquidity. The result is in line with the hypothesis, "too big to fail." Hence based on this hypothesis, large banks tend to hold fewer liquid assets and invest in riskier assets through implicit guarantee.

Besides this, there is a negative relationship between net interest margin and bank liquidity. This relationship is statistically significant. An increase in interest margins stimulates Bank to focus more on lending activity, and as a result, the share of liquid assets is decreasing. There is a positive relationship between Management efficiency and bank liquidity. The increase in operating expenses has a positive impact on bank liquidity. This relationship is statistically significant. There is a positive relationship between management quality and bank liquidity. The increase in operating expenses has a positive impact on bank liquidity. This relationship is statistically insignificant. There is a negative relationship between Credit risk and bank liquidity, but the relationship is statistically significant. The positive influence of the share of capital on total assets is consistent with the assumption that Bank with sufficient capital adequacy should be liquid, too. Exchange rate and Monetary policy have a positive effect on the Bank's liquidity. Exchange rates have a significant, whereas monetary policy has an insignificant relationship with bank liquidity. This study has concluded that funding liquidity has a positive relationship with Profitability, net interest margin, management efficiency, and exchange rate, whereas a negative relationship with capital adequacy, size, credit risk, and management quality.

5.2 Recommendations

Based on the major findings which were obtained from the results, the following recommendations were made. Some variables such as bank size, management quality, management efficiency, and credit risk are significant key drivers of the Liquidity of Pakistani banks. Focusing and reengineering the institutions, along with these factors, could improve the efficient management of the liquidity position of the listed banks in Pakistan. Among the external factors included in this study, exchange rate and monetary policy exist as significant key drivers of the Liquidity of Pakistani banks. This is a clear signal to all commercial banks in Pakistan that they cannot ignore the macroeconomic variables when strategizing to improve on their position of Liquidity.

Thus, banks in Pakistan should not only be concerned about internal structures and policies or procedures, but they must consider both the internal environment and the macroeconomic environment together in developing their strategies to efficiently manage their liquidity position. No doubt, capital is the most important safety buffer since it gives the resources to recover from substantial losses of any nature and save banks from liquidations. However, the main cause of a

bank's failure is usually a liquidity problem, and bank capital makes it possible to cover the shortfall of the liquidity problem. Therefore, the State Bank of Pakistan should periodically checkup the Capital strength of all commercial banks.

According to SBP (2013), Basel 111 regulatory framework the minimum bank capital requirement, i.e., 8% and the average value of bank capital during the tested period was 13.87%, but the minimum value of bank capital is low as per descriptive statics of this study is very low and this would-be liquidity risk problem for commercial banks of Pakistan. Hence, based on this strategy, banks can reduce the non-performing loan as well as maintain the liquidity level. In addition, the commercial Bank of Pakistan should develop a strict mechanism of recovery policy because the Maximum bank non-performing loan is 40%, as in the Descriptive statistics part of this study. The State Bank of Pakistan should use monetary policies such as open market operations, changing the discount rate, and changing in legal reserve requirement so these strategies would limit the requirement for loan application.

This study expects that the findings of the study would be indeed useful for all relevant stakeholders such as the banking sector itself, the SBP, and the aggregate economy. The management and authorities are suggested to monitor the identified internal factors that have a negative influence on Bank's liquidity to reduce the chances of a bank run and should study the banking sector to prevent further deterioration of banking liquidity, which, if not addressed timely, might translate into liquidity crunch and crisis.

5.3 Future Research Direction

This study investigates the microeconomic and macroeconomic determinants of funding liquidity of the commercial Bank of Pakistan. Since bank liquidity is very important to the existence of commercial banks, therefore, further research can be done by incorporating some other variables. Moreover, this study has suggested several research topics for future work. Future studies can be improved by the expansion of samples as they incorporate non-financial institutions.

This study has taken data of commercial banks of Pakistan listed with the stock exchange. It would be useful to carry the same study by incorporating, Development Finance institutions, Microfinance Banks, Investment Banks, Insurance Companies, Mutual fund companies, and Leasing Companies. Finally, the study investigated only limited internal and external variables by

using ten years of data; there are other variables like the interest rate on loans, total deposits, and efficient management of liquid assets from internal and government regulation, industry concentration, reserve requirements, and ownership structure from external variables which are not included in the study. Therefore, further investigation, which includes the above variables, might have a better role in identifying other factors contributing to the Liquidity of Pakistani banks.

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