Measuring the Relationship between Liquidity Risk and Credit Risk in Banks: Case of Pakistan

Presented by

Usama Shafique

121-SE/MSEF/F13

Supervised by

Dr. Abdul Rashid

Associate Professor

International Institute of Islamic Economics (IIIE),
International Islamic University (IIU), Islamabad, Pakistan

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APPROVAL SHEET

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BY:

USAMA SHAFIQUE
REG NO: 121-SE/MSEF/F13

Accepted by International Institute of Islamic Economics, International Islamic University, Islamabad, as a partial fulfilment of the requirenments for award of MS Economics & Finance Degree.

Supervisor — Dr. Abdul Rashid
Associate Professor, IIIE, IIUI

Internal Examiner — Mr. Ghulam Mustafa Sajid
Assistant Professor, IIIE, IIUI

External Examiner — Dr. Muhammad Mazhar Iqbal
Associate Professor, QAU, Islamabad

Head School of Economics
International Institute of Islamic Economics
International Islamic University, Islamabad

Director
International Institute of Islamic Economics
International Islamic University, Islamabad

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Dedication

I dedicate this project to my beloved parents, brothers,

teachers and to all those who supported me and prayed for

my success

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ABSTRACT

This study examine the relationship between the two major sources of bank default risk: liquidity risk and credit risk. We use a sample of virtually 15 banks of Pakistan during the period 2002–2015 to analyze the relationship between these two risk sources on the bank institutional-level and how this relationship influences banks' stability. Our results show that both risk categories have an economically meaningful reciprocal contemporaneous or time-lagged relationship. They also do influence banks 'stability. This effect is twofold: whereas both risks separately increase the stability of bank, the influence of their interaction depends on the overall level of bank risk and can either aggravate or mitigate default risk. These results provide new insights into the understanding of bank risk and serve as an underneath for monitoring efforts aimed at strengthening banks (joint) risk management of liquidity and credit risks.

Keywords: Liquidity risk, Credit risk, Bank risk, Banks' stability

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CHAPTER 1

INTRODUCTION

1.1 Background

The role of banking sector is very essential in the economic and financial development of a country. This sector institutes one of the most fundamental parts of any country's economy. Financial performance of a bank shows its ability to make new resources, from day-to-day operation over a given period and it assessed by net income and cash flow from operations. Banking activities are different from other economic activities due to their assortment in products and services. Therefore, assessing the performance of banking institutions is a vital process and necessary for the persistence of banks' activities, to meet the changes and continuing challenges.

Bankruptcy of financial institutions is a serious threat to the entire economic system, which is associated to all types of financial risks. Risk can be explained as a possibility of undetermined future events, which are unavoidable, or a missed opportunity, which affects the probability of damage or profit in business (Owojori, Akintoye & Adidu, 2011). No doubt banking sector is also facing the different types of risks like financials and non-financials in the current changeable and risky environment. These risks may possible make threats for continued existence and achievement of the banks. In this regards, management of risk prevalent in investment options is becoming an emerging issue not only for the academicians but also for the experts. In the modern era, the financial institution can take the competitive edge only with the efficient management of risk. It will not only increase the return but also provide strong strength to survive in the competitive market.

In principle, there are two formal types of risk in the financial market. The first one is systematic risk and the other one is the unsystematic risk. The systematic risk has a positive correlation with the market and cannot be avoid through diversification. Unsystematic risk cannot move with the market and can be managed through effective risk management techniques. Among these risks, the liquidity and credit risk are very important factors, which are potential areas of risk management. Therefore, it is imperative that the liquidity risk, and credit risk in banking sector be managed in order to ensure a positive performance of the complete financial system. The liquidity situation of an individual bank is a function of confidence; the term confidence shows the relationship between counterparties and depositors in the institution and its perceived solvency or capital adequacy. **Liquidity risk** is the chance of loss due to banks' incapability to fund their short-term financial demands. This usually occurs due to the inability of a financial institution to convert a security or asset to cash without a loss of capital or income in the process.

The management, i.e. board of directors of banks, should create an efficient organizational makeup to constantly observed banks 'liquidity. **Credit risk** is the probability of incurring losses resulting from non-payment of loans or other forms of credit by debtors and mostly come across in the financial sector particularly by banks. The biggest credit risk faced by banking and financial intermediaries is the risk of customers or counter party default. Liquidity risk and credit risk are closely associated according to classical microeconomic theories of banking. Industrial organization models of banking, such as the Monti-Kelin framework (1971) and the financial intermediation perspective in Bryant (1980), Diamond and Dybig (1983) setting, suggest that banks' asset and liability structures are connected with each other especially with regard to borrower defaults and fund withdrawals.

This does not only hold true for banks' balance sheet business but also for the lending and funding business conducted through off-balance sheet items, as shown by Holmstrom and Tirole (1998) and Kashyap et al. (2002). Building on these models, a body of literature has recently evolved focusing on the interaction of liquidity and credit risk and their implications for bank stability. Some examples of these studies are Acharya et al. (2010), Acharya and Viswanathan (2011), Gorton and Metrick (2011), He and Xiong (2012), and Acharya and Mora (2013). Apparently, the bank did not differentiate between liquid and illiquid assets and the respective term funding thereby also disregarded the credit risk of the assets. Therefore, it might be a sign that the joint occurrence of liquidity and credit risks plays a tremendous role for banks' stability and that banks do not account for this joint occurrence in their risk management systems.

1.2 Research Gap

To the extent of our understanding, at international level, Imbierowicz *et al* (2014) investigate the relationship between credit risk and liquidity risk for U.S. commercial banks. However, no study has investigated the relationship between liquidity risk and credit risk empirically for banks of Pakistan. There are few studies that try to explore the relationship between multiple risks[1] faced by banks of Pakistan. However, they have not captured the relationship between liquidity and credit risk explicitly for banks operating in Pakistan. A few empirical studies, for example, Abdullah *et al.* (2012) find the relationship of debt to equity ratio with liquidity risk is negative and significant both in domestic and foreign banks of Pakistan. Another study by Ahmad *et al.* (2011) studied the Islamic banks of Pakistan.

[1] Like credit risk, liquidity risk, foreign exchange risk, operational risk and interest rate risk.

The findings of the study suggest that size of bank has directly associated with credit and liquidity risk, while its association with operational risk is also found to be negative and statistically irrelevant. The above mention studies analyze liquidity risk and credit risk separately yet, these studies did not capture the combined relationship of these two types of risk. Therefore, this study examines the forenamed relationship directly for banks of Pakistan.

1.3 Objectives of the Study

This study is carry out to accomplish the following objectives

- To investigate the relationship between the liquidity risk and credit risk for banks operating in Pakistan
- To analyze the relationship between the liquidity risk and credit risk with respect to bank size
- To examine whether these two types of risk jointly affect the stability of banks

1.4 Significance of the Study

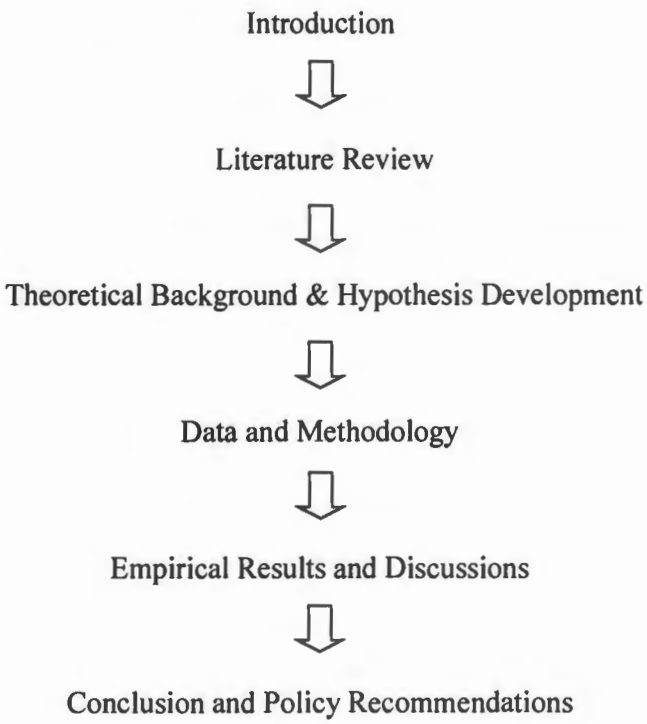
In today's business world, risk management recognized as an integral part of good management drill. In its broadest sense, it entails the systematic application of management policies, procedures and practices to the tasks of identifying, analyzing, assessing, treating and monitoring risk. It is also very likely that different types of risk faced by banks are inter-linked with each other. Therefore, it would be worthwhile to examine the relationship between these two types of risk. In this regard, this study enhance our understanding about the association of two major types of risk, namely as credit and liquidity risk that banks face in their operations.

Moreover, this study test the impact of liquidity and credit risk on the stability of banks. In essence, finding from study assist banking management to enhance the operative capabilities of banks while controlling the potential risk of liquidity and credit. Further, it will support regulatory authorities in ensuring a safe banking since development of country's economy is tied to performance of financial institutions of every country.

1.5 Organization of the Study

The organization of study is as follows. Chapter 2 describes the literature review. Chapter 3 consists of theoretical background and hypothesis development. Chapter 4 describes the data and methodology. Chapter 5 consists of results and discussions, and chapter 6 includes conclusion and policy implications.

Figure 1: Organization of the Study



CHAPTER 2

LITERATURE REVIEW

2.1 Theoretical Foundations

Banking sector considers as a key source of financing for the business segment. Financial institutions, specifically commercial banks play an important intermediate role in an economy. The significant risk has been faced by banks on daily basis while performing their regular operation (Pukeliene & Deksnyte, 2010). The issue of risk-taking has been a central focus of the banking sector. Financial risk can be narrowed down into credit risk, and liquidity risk. Once the amount of risk within each of these financial risk parameters has been assessed, the overall financial performance of a bank can be determined.

The nature of banking business contains an environment of high risk and it is the only business where proportion of borrowed funds is far higher than the owners' equity (Owojori, Akintoye & Adidu, 2011). However, there are number of dimensions in the way banks effectively manage their risk. In simple words, there are well-known risk management approaches that are used in this process to manage liquidity and credit risk. The purpose of research studies on banking sector is mostly two folds. On the one hand, they are focusing on the operational performance and risk (Jemison, 1987; Iannotta, Nocera, & Sironi, 2007; Beccalli, 2007), while on the other hand, they are linking the risk with financial performance.

From this viewpoint, there are some studies on financial performance of commercial banks and some on financial risks for markets. Like Iran, Japan (Sawada, 2010), Pakistan (Akhtar 2007; Arif & Anees, 2012), Nepal (Poudel, 2012), Zimbabwe (Mugomba et al., 2013), Kenya (Maaka, 2013), Malaysia (Sohaimi, 2013), Iran (Tabari, Ahmadi & Emami, 2013), Nigeria (Ogboi & Unuafe, 2013; Owojori, Akintoye & Adidu, 2011) and Serbia (Marinković & Radović, 2014). The key findings of these research studies indicate that the financial capital and equity are negatively influenced by the financial risk in banking sector (Sohaimi, 2013). The evidence from literature explained that NPL has been utilized as the proxy for credit risk measurement, which also has also negative relation with financial earnings, and capital of banks (Arif & Anees, 2012).

2.2 Liquidity Risk

In context of banking sectors, liquidity risk is an important dimension of financial risk, which is the risk of not having borrowing capability or enough cash to meet the day-to-day needs of loan demands or deposit withdrawals by customers. In this case, commercial banks have to borrow emergency funds from outside at excessive cost to meet its obligation (Angbazo, 1997). This risk badly affects a bank's financials i.e. capital and earnings. Therefore, guarantee of the availability of adequate funds is essential for a commercial bank's management to meet future demands of customers, at reasonable costs. Furthermore, the risk of being unable to settle an obligation appropriately at a reasonable cost is known as liquidity risk (Muranaga & Ohsawa, 2002). In the banking business, the majority of the assets are funded with deposits, and most of the times the current deposits are use, which may be called at any time by depositor. A bank, which has liquidity problems, may have trouble in meeting the demands of depositors (Arif & Anees, 2012).

The problem of liquidity risk may arise because of the maturity mismatch between assets and liabilities, which creates the liquidity gap. Liquidity gap is the main reason of liquidity risk in banks, which can negatively affect the bank profits because the liabilities exceeds the assets and bank have to pay more cost of money. However, this liquidity risk may be mitigated by decreasing the liquidity gap (Plochan, 2007). Higher liquidity gap will create liquidity risk, which may adversely effect on financial performance (Arif & Anees, 2012; Mugomba et al , 2013). The commercial banks are not able to increase its liabilities and they try to fund its assets by giving more advances. Therefore, the banks become illiquid which means they are not able to attain adequate funds by increasing their liabilities or changing their assets into money to meet the demand of depositors (Tabari et al, 2013).

The liquidity risk can be dangerous for both the capital and the profitability of the commercial bank. Therefore, it is the top priority of commercial banks to manage the liquidity risk in order to maintain sufficient level of funds, which can be used to meet the depositor's demands at reasonable costs (Maaka, 2013). If the commercial banks do not solve the liquidity problems, these problems may adversely affect the financial performance that can result in the collapse of a solvent bank. In the advanced financial system, liquidity risk in commercial banks has been managed by using the money market operations; which suggests many options to maintain liquidity. The banks can also manage the liquidity risk by addressing the major issue of maturity mismatches between assets and liabilities. Most of the commercial banks are unwilling to extend their deposit tenor that also limits their capacity of long term lending, and this is negatively influencing the net earnings of banks (Akhtar, 2007).

Some studies done previously state that liquidity risk has a positive effect on financial performance (Molyneux & Thornton, 1992; Barth et al, 2003), whereas a few studies found that it has a negative impact on financial performance (Bourke, 1989; Pasiouras & Kosmidou, 2007). Some studies (e.g: Sawada, 2010; Akhtar et al., 2009; Arif & Anees, 2012) also explained the diverse effect of liquidity risk according to its measures. It is determined through two different methods. As per first method, liquidity risk is measured by adjusted asset size which comprises on the liquidity ratios such as, cash to total asset (Barth et al., 2003; Arif &Anees, 2012), cash to total deposit (Shen et al., 2009; Mugomba, 2013). In case of second method, it is measured by the adjusted loan size, which involves the net loans to total asset and non-performing loans to total asset (Maaka, 2013). According to Ennis and Keister (2006), it is stated that commercial banks are holding more liquid assets when they are operating more, which recommends cash in hand as liquid assets and a decrease in the liquidity risk in banks.

As per first method, higher liquidity ratio shows the higher level of liquidity in commercial banks, therefore in this situation a bank is less vulnerable against threat of insolvency. Consequently, in second method higher values of loan ratio show that banks are facing more threat because there is an increase in liquidity risk (Tabari et al., 2013). In the financial system, the commercial banks have diversified roles as financial intermediaries, financial organizer and supporter in financial system. Akhtar, Ali, and Sadaqat (2009) conducted a research study to observe the liquidity risk related to the solvency of the commercial banks and analyzed liquidity risk management by using comparative analysis method between Islamic and conventional banks of Pakistan.

The factors were considered the significance size of the firms as the logarithm of total assets, return on equity, and return on assets, networking capital, and the capital adequacy ratio. The findings showed that the size of bank and net working capital to net assets have positive but insignificant relationship with liquidity risk. Moreover, ROA in Islamic banks and CAR in conventional banks is found to be positive and have a significant relationship with liquidity risk. It explains that long-term financing projects are more likely to be considered by conventional banks in Pakistan. Arif and Anees (2012) analyzed the effect of liquidity risk on financial performance of Pakistani banking industry and identified the problem of liquidity gap in commercial banks. In this research study, the profitability was used as the only measure of financial performance, while other economic factors were ignored. The result suggested that risk has a significant effect on performance. The bank profitability depends on the increase in deposits, which has positive effects. The commercial banks should have enough liquidity and not rely on State Bank of Pakistan to meet their obligations and demands of other depositors. The increase in non-performing loans and liquidity gap have the negative effects and it reduces the profitability of the commercial banks.

In most of the developing countries, the banking sector is ill equipped to face the temporary liquidity shocks and manage the risk effectively. Mugomba et al. (2013) to discuss the interdependency of liquidity risk and bank solvency in Zimbabwean banking industry examining 12 commercial banks conducted a research study. Bank solvency considered as independent variable and measured as loan to deposit ratio and the determinants of bank solvency in the regression model are liquidity risk, profitability of banks, credit risk, liquidity gap, inflation and GDP.

The results of Mugomba et al. (2013) show that a less significant effect of liquidity risk on bank solvency of the banking system exists because mitigation of liquidity risk is possible by raising customer deposit, having adequate cash reserves, decreasing the non-performing loans and liquidity gap. Recent crisis in banking industry raised the issue of the liquidity risk of financial assets and its role in financial institutions. Sohaimi (2013) discovered that there is a significant effect of liquidity risk on banks' capital and reserve, and the liquidity risk is getting worse because of high non-performing loan (NPLs). Thus, when there is a rapid increase in non-performing loans, liquidity crisis become unavoidable. The capital and reserve were found to have a negative relationship with customer deposit, cash reserve and liquidity gap. Tabari et al. (2013) analyzed the impact liquidity risk on the financial performance of banks. Two different types of variables are used to determine the performance of banking sector, which are macroeconomic variables, and bank related variables. The findings of this study indicated that some bank specific variables, bank asset and bank size, have positive effects. Similarly, macrocosmic variables like inflation and gross domestic product also have positive effects. Furthermore, the results of liquidity risk and credit risk indicates that they have negative impact on commercial bank performance, it explains the fact the financial risks weaken the financial performance and more financial organizations are exposed to these risks.

It is a requirement of central bank to keep specific amount as cash reserve to maintain liquidity. Central bank regulation sets the minimum fraction of customer deposits as reserve that each commercial bank must hold rather than lend out (Sohaimi, 2013). Every bank tries to keep up sufficient funds to fulfill the requirement and meet the unexpected demands from depositors. The liquidity risk can be mitigated by maintaining sufficient cash reserves but maintaining the cash is extremely

expensive because it decreases the level of short-term investments that the firm can make (Maaka, 2013).

2.3 Credit Risk

The credit risk in the commercial banks arises when the borrower is either reluctant to perform his obligation or his capability to perform this obligation is decreased. This situation results in the default of loans from the borrower, which causes the economic loss for commercial banks as a result (Khan & Khan, 2010). The credit failure in commercial banks is not new or a rare occurrence, the major reason behind the credit failure is the poor risk management. It can affect the liquidity position as well as cash flows and profitability of commercial banks. Therefore, the credit risk is considered as one of the biggest threats to financial performance and a major reason of bank failures (Greuning & Bratanovic, 2009). The credit operations are an important source of earning for the commercial banks. A large amount of credit money is supported by the strong economic activity in the country. According to Akhtar (2007), the development of the credit operations is based on the growing business activities in the country along with regular improvement in internal credit reviews. It is observed that the default rate in commercial banks has decreased over the last few years, which indicates the effective management of credit risk. Credit risk arises in the banks as the advances are considered uncertain and the bank does not predict exactly what percentage of its advances will perform and how much they have to pay for non-performing loans (Wong, 1997). Once a bank fails to receive principle amount and interest on loans and non-treasury securities, it leads to credit risk.

Credit risk also arises when promises are made by bank on the behalf of its customers without their consideration (Sinkey, 2006). There are different on-balance sheet tactics like increase in loan losses provisions, which are used for dealing with credit risk. Although, the profitability of a bank is decreased by providing higher provisions and these provisions show high percentage of total assets that are used by bank as an effort to control credit risk. Thus, loan loss provisions as part of total assets can be helpful in managing credit risk (Kashyap, Rajan & Stein, 2002). Miller and Noulas (1997) observed that there lies a negative relationship between these variables, represented by the higher risk for loan loss and non-performing loans which is negatively affecting the bank's ability to maximize its profits. The profitability of commercial banks is negatively influenced by the non-performing loans, which decreases the interest income. The high level of risky loans leads to the higher probability of non-performing loans and customer defaults, which can lead to a bigger failure. Understanding the impact of risks on banks performance can help to improve performance of financial institutions.

Poudel (2012) conducted a study to explore various parameters of credit risk like cost of per loan asset (CLA), default rate (DR), the capital adequacy ratio (CAR) and its effects on bank performance, which is proxied by the profitability ratio (ROA). The results of this study suggested that credit risk has a significant impact that predicts financial performance of bank; therefore, success of commercial bank depends on its management. The management of credit risk is an essential part of the advancing and financing activities in the banking sector. Ogboi and Unuafe, (2013) examine a positive relation of capital adequacy and credit risk management with bank's financial performance which indicates that improved capital requirement and better management of credit risk can positively support banks profitability.

A research study conducted by Adeusi *et al.* (2014) has focused on the relationship of credit risk management practices and financial performance of commercial banks in Nigeria. Profitability as a measure of financial performance is calculated as return on equity (ROE) and return on asset (ROA). The risks considered are credit, liquidity and capital risks, which are measured as managed funds, the equity-total asset ratio, the equity-loan ratio and the debit-equity ratio. The study concludes that a significant relationship exists between risk management and banks financial performance. Thus, better risk management techniques in terms of managed fund, reduction in cost of bad and doubtful loans and the debt equity ratio leads towards better bank performance. The largest source of credit risk in the commercial banks is the loans and advances because it is most important instrument of the commercial bank's asset (Fredrick, 2012). The loans and advances is also a biggest threat to the bank solvency because of the poor risk management and recovery of loans and advances within the specified time. These funds are given by using the deposit money of customers, when the customers start withdraws a lot their money because of some bad situation such as losing confidence in bank, the bank needs money from other sources to manage its loans and advances. The circumstances will lead banks towards the central bank to get money on higher interest rate, which will cost more and damage reputation of commercial banks. It is important for bank to manage an effective ratio of loans and advances to avoid such mishap (Ogboi & Unuafe, 2013).

2.4 Interdependence, amid Liquidity Risk and Credit Risk

There is an enormous account of literature that deliberates on the liquidity and credit risks of commercial banks. Elucidations for the banking operations and the inherent risk and returns can be classified into two strands of research.

The first one is the classic financial intermediation theory, as explained by Bryant (1980) that also discusses the microeconomics of banking. The other one is the model proposed by Diamond and Dybig (1983) that assume a rather industrial organization approach. The financial intermediation models perceive banks as liquidity pools that facilitate depositors as well as borrowers with the readily available cash, thus improving economic wellbeing and assuming economic liquidity risk.

However, the industrial organization approach views banks as profit-maximizing, price takers in oligopolistic lending market, that encounters an ascending demand for deposits and a descending demand for advances in response to an increase in interest rates. However, these bipolar models at least theoretically agree upon the existence of a relationship between liquidity and credit risk. To date, literature is unclear on the nature of this relationship. The Monti-Klein framework and its augmentations (Prisman, Slovin & Sushka, 1986) allow for borrower defaults besides unexpected deposit withdrawals, as both are expected to lower a bank's profitability. Since equity, debt besides marketable securities are assumed to be readily available, banks make the most of their profits by capitalizing on the margin spread between borrowing and lending rates, assuming an exogenous main refinancing rate in addition to stochastic debtor defaults above and beyond deposit withdrawals. Liquidity risk is perceived as a cost that lowers profits. However, a loan default intensifies this, risk consequently; of the decreased inflow of cash besides the depreciations it initiates (Dermine, 1986). Hence, the association amid liquidity and credit risks appears to be undoubtedly established, when viewed from a theoretic standpoint. The academic inferences founding Krasa and Villamil (1992) observe the factors that can affect size of a bank.

They emphasis on the benefits that are realized from larger size as equated with the costs that are incurred to monitor the quality of a bank's operations. They also demonstrate how the credit and liquidity risk warrants to optimize bank size (from owner's perspective). It hinges on the environment that controls projected loan defaults, provisions for loan loss, and risks on other assets of the banks.

De Nicolo (2001) studied the association among charter value, size and banks' insolvency risk in an assortment of countries and found that charter values when gauged by Tobin's Q decreases whereas insolvency risk when estimated by Z-scores increases which is in line with the analysis done by Merton (1977). De Nicolo (2001) proposed that risk-taking counterbalances any size economies of scale generated by size that provide diversification gains. Thus, large banks' returns on assets in addition to volatilities in these returns grow in size, signifying that large banks take on more risk than is optimum. As indicated earlier, the hypothesis of the presence of reciprocal relationship amid liquidity risk and credit risks is reinforced by the theoretic financial intermediation research. The models proposed by Bryant (1980) and Diamond & Dybvig (1983) verify the inverse relationship between the two risks. Extended versions of their models confirm riskier assets in conjunction with uncertain liquidity of the economy stimulates banks runs created by pure loss (Samartin, 2003; Iyer and Puri, 2012).

The crux of the above studies is that the liquidity and credit risk should assume a positive relationship and should jointly affect bank stability. This notion is reinforced by recent literature as well that emphasizes on the financial downfall of 2008. It is also explained by Acharya and Viswanathan (2011), Diamond and Rajan (2005), Gorton and Metrick (2012) and He and Xiong (2012).

The model proposed by Diamond and Rajan (2005) was grounded on the belief that banks get money from inexpert depositors, that is then utilized in lending operations. Issues arise when too many economic ventures sponsored with advances yield inadequate funds and consequently bank fails to satisfy demands of its depositors. Owing to such deterioration in assets, gradually all the depositors demand their money back. As a result, banks call in all of their loans and in so doing diminish total liquidity in the financial markets. Hence, higher credit risk is accompanied by higher liquidity risk due to depositors' claim. Acharya and Viswanathan (2011) demonstrated that increased debt/loan in the banking system produces higher risk of a "bank run". Thus, in a crisis, as soon as asset prices start to decline, banks face difficulty to "roll over debt", thus realizing the liquidity risk.

However, Gorton and Metrick (2012) extended a different standpoint on the association amid liquidity risk and credit risk. Their observations suggested that in the financial crisis of 2007, perceived credit risk in the shape of subprime loans stimulated refinancing rates as well as funding cuts in the interbank market to increase significantly. Wagner (2007) also illustrated that increase in liquidity of banks can heighten the risk of instability in the banking system. He argued that even though banks are benefited from more liquidity in assets with reference to stability, distresses turn out to be less expensive for banks, therefore they more likely not to avert them from happening.

Gatev, Schuermann, and Strahan (2009) extended the model of Kashyap, Rajan and Stein (2002) by arguing that transaction deposits are advantageous to a bank in order to hedge against defaulted loan commitments. Acharya, Shin, and Yorulmazer (2010) empirically concluded that the cash holdings of a bank rises harling the times of financial distress.

They developed a model wherein liquid assets become an ex-ante strategic decision of dynamic bank management with the purpose of purchasing other banks' assets at shockingly low prices during a financial crisis. Cai and Thakor (2008) suggested that interbank competition with higher credit risk can diminish liquidity risk. As in a competitive scenario, price of a risky asset that has higher returns will be high owing to competition and thus such assets can be liquidated easily, thus decreasing their liquidity risk. Lastly, according to Acharya and Naqvi (2012) during a severe macroeconomics stress or a financial crisis, household besides corporate depositors assume a "flight for quality" and start depositing their funds with banks at low rates. This causes increased funds in bank that consequently deteriorates that "quality" and makes it difficult to monitor new besides existing borrowers. Cole and White (2012) and Berger & Bouwman (2013) focused on bank defaults in the course of financial distress. In general, they observed unwarranted investment banking activities, unfavorable microeconomic environments surrounding a bank, low levels of equity, and significant investment in real estate loans considerably increases a banks' probability of default. Thought-provokingly, all of these researches offer clear inference that credit risk has a significant role in determining the overall stability for any bank. Nonetheless, they have mainly overlooked the importance of liquidity risk in this paradigm.

Hence, based on the evidence enlisted above it may be assumed that joint occurrence of liquidity and credit risks may have been a causal factor for bank defaults specifically in the times of a financial crisis. There are several studies such as (Jemison, 1987; Iannotta, Nocera, & Sironi, 2007; Beccalli, 2007) have examined the financial risks, which are credit risk, and liquidity risk related to the earnings response of commercial banks and its effects on the stock returns.

There are also a few number of studies about analyzing liquidity risk (Akhter et al., 2011; Arif & Anees, 2012; Tabari et al., 2013) and credit risk (Miller & Noulas, 1997; Poudle, 2012; Ogboi & Unuafe, 2013), with respect to financial performance of banks. We find no study that examines the effects of these risks jointly on financial performance of banks, specifically in case of Pakistan. In this research study, we evaluate the financial performance of Pakistani banking sector, which has developed rapidly in last two decades. The financial risk measured and analyzed as one of the determinants of banks' profitability. It has been identified based on existing studies that financial different types of risk and an increased level of total risk have negatively influenced performance of commercial banks may lead towards the banking crises (Maaka, 2012). Bank size also plays a significant role in determining the exposure of these risks for banks (Aggarwal & Jacques, 2001; Jacques & Nigro, 1997; Shrieves & Dahl, 1992; Stolz, Heid, & Porath, 2003; Van Roy, 2003).

Banking sector faces serious consequences when the different type of financial risks such as liquidity risk, and credit risk are not properly managed. The current vile of knowledge lacks research on the joint effects of liquidity and credit on the bank stability and performance while taking into account the size of bank, this study aims to fulfill this gap by testing the association of these risks with the financial performance of commercial banks in context of Pakistan.

CHAPTER 3

THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

3.1 The Reciprocal Relationship between Liquidity Risk and Credit Risk

Over the past years, a tremendous amount of literature has dealt with banks' liquidity and credit risks. Explanations for the way banks work and their major risk and return sources are given by two major research strands regarding the microeconomics of banking: (I) the classic financial intermediation theory, most prominently represented by Bryant (1980), and (II) Diamond & Dybvig (1983) presented the industrial organization approach. The financial intermediation models view banks as pools of liquidity that provide both depositors and borrowers with the ready availability of cash, thereby enhancing economic welfare and internalizing economic liquidity risk. The industrial organization approach models suggest the banks are profit-maximizing price takers in oligopolistic loan and deposit markets, facing an upward sloping demand for deposits and a downward sloping demand for loans with respect to increasing interest rates.

On the asset side, banks generate returns through loan interest rates; on the liabilities side, banks face costs through deposit interest rates. The models of both strands of literature suggest that at least theoretically, there is relationship between liquidity and credit risk. So far, empirical evidence is ambiguous about the question of whether the relationship is positive or negative.

The Monti-Klein framework and its extensions (Prisman, Slovin, and Sushka, 1986) take borrower default sand sudden fund withdrawals in to account, both assumed to be lowering a bank's profit. Equity, other than debt funding and marketable securities are seen as given. Banks maximize their profits by maximizing the spread between deposit and loan rates. It gives an exogenous main rate of refinancing as well as stochastic borrower defaults and fund withdrawals. From a theoretical perspective, the relationship between liquidity risk and credit risk therefore seems to be clearly established. The theoretical suggestions underlying by Krasa and Villamil (1992) look at the factors affecting bank size. They focus on the gains from size as compared to the costs of monitoring the quality of a bank's book. They show these two factors liquidity and credit risk ensure that optimal bank size (from the perspective of the equity owner) is determinate.

De Nicolo (2001) measured the relationship between size, charter value and insolvency risk for banks in a range of countries. He finds that charter values (measured by Tobin's q) decrease in size while insolvency risk (measured by Z-score method) rises in size, which is consistent with the Merton (1977) analysis set above. It shows that taking more risk offsets any size related scale economies of diversification benefits. Indeed, large banks' returns on assets and return volatilities increase in size, suggesting large banks choose higher risk than its optimal. Based on assumptions and outcomes of the microeconomic models discussed above, our hypothesis for the relationship between liquidity and credit risk are:

H_1: There is no relationship between liquidity risk and credit risk in banks.

H_2: Bank size has a significant impact on the relationship between liquidity and credit risk.

3.2 Bank Size, Credit Risk and Liquidity Risk

The larger size of the organization results in economies of scale, which is beneficial to decrease the operational cost and increase the profitability (Mugomba et al. 2013). The size of commercials bank is measured based on the total assets they have. Since large banks have an easier access to equity capital markets and are thus expected to have lower capital to assets ratios than smaller banks. Lindquist (2004) has argued that large banks facing capital regulation will have lower degree of pressure as they are *too big to fail*. Therefore, large banks are expected to have lower degree of capital requirement (Aggarwal & Jacques, 2001; Jacques & Nigro, 1997; Shrieves & Dahl, 1992; Stolz, Heid, & Porath, 2003; Van Roy, 2003). In addition, large banks carry out a wider range of activities, which is expected to increase their ability to diversify their portfolio hence to decrease their credit risk. The ***"too big to fail"*** argument suggests that large banks feel less pressure to increase their capital ratios and invest in riskier ventures. Yet, most of the big banks maintain higher CAR and low risk taking positions (Aggarwal & Jacques, 2001; Jacques & Nigro, 1997; Shrieves & Dahl, 1992; Stolz et al., 2003). Bank size is an important determinant of lending behavior of banks because of its relationship to bank ownership characteristics and access to equity capital; it can reduce its liquidity risk.

Nonetheless, the lager the bank size, the greater the credit risk is. Thus, there is a positive and statistically significant relationship between bank lending and size of bank (Cole, Goldberg, & White, 2004; Salas & Saurina, 2002). Large banks have higher degree of loans and product diversification than small and medium sized banks. Therefore, they have the advantage of providing a larger menu of financial services to their customers and there by mobilize more funds (Dietrich & Wanzenried, 2011; Hassan & Bashir, 2003).

3.3 The Influence of Liquidity Risk and Credit Risk on Bank Stability

From a theoretical perspective, the relationship between liquidity risk and credit risk seems to be clearly established. Now the question arises that how are banks affected by this relationship in their overall risk structure? Studies such as Meyer and Pfifer (1970), Espahbodi (1991), Thomson (1991), Cole and Fenn (1995) and Shin and Caputo (2002) show that a bank's default risk is mainly driven by low earning over-exposure to certain categories of loans, and excessive loan defaults. Generally, they find that excessive investment banking activities, bad macroeconomic conditions in the banks' immediate vicinity, low equity, and heavy concentrations in commercial real estate loans substantially increased banks' probability of default. Interestingly, all these studies provide clear evidence that credit risk plays a vital part for the overall stability condition of a bank, but largely ignore liquidity risk.

A more direct channel of how liquidity and credit risk can jointly cause default is theoretically shown by He and Xiong (2012b). They analyze the relationship between liquidity and credit risk from a company's wholesale funding perspective. The channel they identify which connects liquidity risk to credit risk and ultimately with default risk is debt rollover risk. The results of the study show that investors demand higher illiquidity premia for corporate bonds due to liquidity risk in the market of those bonds. Therefore, it might be possible that credit risk and liquidity risk may be a posed a serious threat for bank stability. It will lead us to the following hypothesis:

H3: Liquidity risk and credit risk jointly affect the banks' stability.

CHAPTER 4

DATA AND METHODOLOGY

This chapter describes the data, the regression framework and the econometric techniques for the estimation of the model in order to achieve the objectives of the study.

4.1 Data and sample selection

To analyze the relationship between liquidity and credit risk, the sample for this study will be 11 commercial banks and 4 public banks of Pakistan. The selected sample of 15 banks is based on large capitalization. These are renowned commercial banks of Pakistan. The year pattern, which has considered in the study for the evaluation of liquidity risk factor and credit risk on the operation of banks in Pakistan, are covering the period from 2002 through 2015.

In this regard information has been also reserved by the reports and statistics presented by the commanding body of Pakistan like State Bank of Pakistan and Pakistan Bureau of statistics to provide the assessment sample data for the study. Data obtained from various editions of the publication Money and Banking Statistics issued by State Bank of Pakistan[2], which contains annual information of the balance sheets, income statements and off-balance sheet items for all banks operating in Pakistan. The sources for macroeconomic data[3] such as GDP, saving ratio, and interest rate collected from IFS, WDI and Pakistan Bureau of statistics (Akhtar, Ali & Sadaqat, 2009).

[2] http://www.sbp.org.pk/stats/stat-bal-sheet.htm.
[3] http://data.worldbank.org/country/pakistan.

. In this study, a dedication for the work has been made on annual reports of the profit and loss account, balance sheets and off-balance sheets to consider the assumed hypothesis on the relationship of the liquidity risk and credit risk operation of commercial and public banks in Pakistan. Beside this, the subdivision of the sample data has been made to examine the credibility of the objectivity of proxy variables of the liquidity risk and credit risk for the selected banks Pakistan. The extracted data has been bifurcated into small and large banks on basis of assets. The nature of the data is panel as it contain repeated observations of the same unit. This panel data is the cross-sectional time series data. This data refers to multi-dimensional data that generally involves measurements over same period of time. Sample has been constructed under organized measures by deeply reviewing the information of the repost of State Bank of Pakistan and relationship of variables has been generalized to evaluate the impact and relation of liquidity risk and credit risk.

4.2 Methodology

There are two main variables to measure the risk: First measure is the liquidity risk, and second one is the credit risk. For the purposes of this study, we call the liquidity proxy variable liquidity risk (LR) for credit risk; we observe the credit risk (CR) variable shown in Table 4.1. The liquidity risk (LR) variable calculated by subtracting the volume of all assets, which the bank can quickly, and at low cost turn into cash at fair market value. To cover possible short-term withdrawals from the volume of liabilities this can be withdrawn from the bank on short notice. While credit risk (CR) variable will calculated by dividing the average net loan losses (loan charge-offs minus loan recoveries) in the current year by the average loan loss allowance recorded in the previous year.

Table 4.1: Bank liquidity risk and credit risk proxy variables

Proxy	*Calculation*	*Values*
Liquidity Risk (LR)	*[(Demand Deposits + Transaction Deposit + Brokered Deposits + Unused Loan Commitments)-(Cash+ Currency& Coin+ Trading Commercial Paper Securities available for Sale) ± Net Inter-Bank Lending Position ± Net Inter–Bank Acceptances / Total Assets*	Values above Zero imply that the bank is not able to endure a sudden bank run.
Credit Risk (CR)	$\frac{Loan\ Charge - Offs_t - Loan\ Recoveries_t}{Loan\ Loss\ Allowance_{t-1}}$ $Offs_t$ = *written off as uncollected by bank*	Values above 1 indicate unexpected losses.

4.3 Estimation Technique

We first observe the relationship between liquidity and credit risk using our proxy variables LR (liquidity risk) and CR (credit Risk). To account for possible reciprocal or lagged relationship between the variables this study employed a structural equations approach where systems of equations estimated via generalized least squares. The equations estimated simultaneously directing for the possible endogeneity of the respective independent risk variable in a three stages least square approach.

$$CR_{i,t} = \sum_{\tau=0}^{MAXm} LR_{i,t-\tau} + \sum_{\tau=1}^{MAXn} CR_{i,t-\tau} + Control\ Variables_{i,t} + \epsilon_{i,t} \quad (4.1)$$

$$LR_{i,t} = \sum_{\tau=0}^{MAXm} CR_{i,t-\tau} + \sum_{\tau=1}^{MAXn} LR_{i,t-\tau} + Control\ Variables_{i,t} + \epsilon_{i,t} \quad (4.2)$$

$\boldsymbol{Endogenous\ Varibles} = CR_{i,t}, LR_{i,t}$

$\boldsymbol{Exogenous\ Varibles} = CR_{i,t-\tau}, LR_{i,t-\tau}$

According to the above illustrated simultaneous equation model, the variables are of two categories such as dependent and independent. The values of the dependent variables are determined within the model and the values of independent variables are determined outside the model. The dependent variables are stochastic whereas independent variables are non-stochastic. Moreover, the independent variables are classified into two categories: predetermined (lagged as well as current) and lagged endogenous. The system of simultaneous equations is said to be complete if the number of simultaneous equations (let say three) is equal to the number of dependent variables (let say three). Structural models consist of complete system of equations. In the study three stage least square (3SLS) technique has been utilized, which is introduced by Zellner & Theil (1962), introduced. It can be seen as a special case of multi-equation where the set of instrumental variables is common to all equations. In the above set of simultaneous equations, when $\tau = 0$ then t-τ represents the contemporaneous effect. When $\tau = 1$, $t - \tau$ depicts a possible time-lagged effect of the independent variable to observe comprehensively its influence on the dependent variable. In addition, control variables accounting for the bank's general health structure, and interest rate environment are included. These are the log of total assets, the ratio of short-term to long-term deposits, the ratio of trading assets to total assets, commercial loan to total loans, log of GDP, the saving ratio. Furthermore, we are able to address a possible autocorrelation of the dependent variables with regard to possible lagged relationship. The appropriateness of a maximum lag length would be confirmed by employing the Schwert (1989) and Ng-Perron (2000) criteria.

To calculate the total effect of the independent risk variable on the respective dependent risk variable we sum up the coefficients and divide this by the within-bank standard deviation of the dependent variable.

We are thereby able to investigate the average change in the number of standard deviations of the dependent variable when the independent variable changes by one percentage point. We also include correlation analyses for the contemporaneous relationship between liquidity risk and credit risk within a bank. We incorporate the same control variables as in our simultaneous equations approach accounting again for the bank's general health, structure, and interest rate environment. The Z-score is used as a measure of overall bank risk. The Z-score measures the number of standard deviation of bank's return on assets has decrease from its expected value before the bank is insolvent because equity is depleted Roy (1952). The Z-score as the ratio of the sum of the return on assets (ROA) and the capital ratio, divided by the standard deviation of the return on assets is the proxy for bank stability.

$$Bank\ Stability_{i,t} = \ln\left(\frac{ROA_{i,t} + CR_{i,t}}{(SD(ROA_{i,t}))}\right)$$

$ROA_{i,t}$= Return on Assets

$CR_{i,t}$ = Capital Ratio

$SD(ROA)_{i,t}$= Standard Dev. Return on Assets

The capital ratio is calculated as the ratio of total equity.to total assets. Moreover, do both risks jointly have an impact on banks' stability? The lack of an economically meaningful relationship between the two risk types might be an indication of a lack of joint management of these risks in banks. If it seems true, we should find a joint (unmanaged) increase in liquidity risk and credit risk contributes strongly to banks' stability.

As we stated in our hypothesis, to test this in an empirical setting and to obtain a deeper understanding of the inner workings of liquidity risk and credit risk in banks. We run multivariate logistic regression model using this sample of banks of irrespective of default and non-default banks. Therefore, we developed our multivariate regression model as follow

$$Bank\ Stability_{i,t} = \beta_0 + \beta_1 CR_{i,t} + \beta_2 LR_{i,t} + Control\ Variables_{i,t} + \epsilon_{i,t} \quad (4.3)$$

A multivariable model can be thought of as a model in which multiple variables are found on the right side of the model equation. This type of statistical model can be used to attempt to assess the relationship between a numbers of variables; one can assess independent relationships while adjusting for potential confounders. A simple linear regression model has a continuous outcome and one predictor, whereas a multiple or multivariable linear regression model has a continuous outcome and multiple predictors (continuous or categorical).

In the regressions we control for bank characteristics and include the log of total assets, the capital ratio, the return on assets, the standard deviation of the (ROA), the efficiency ratio, bank loan growth, commercial to total loans and individual to total loans. The control variables are based on e.g. Cole and Gunther (1995, 1998), Cole and White (2012), Beltratti and Stulz (2012).

Table 4.2: Description of Variables

Variable Name	Unit	Description
Ratio Trading Assets/Total Assets	%	Amount of assets held for trading purposes as reported on balance sheet divided by the amount of total assets as recorded on balance sheet.
Total Assets	PKR	Total assets as reported on balance sheet.
Capital Ratio	%	Total (Tier 1 and Tier 2) equity divided by total assets as reported on balance sheet.
Return on Assets	%	Net income as reported on income statement divided by Total assets as reported on income statement
Nominal GDP	PKR	Gross domestic product of the Pakistan
Gross Private Saving		Gross private saving of all Pakistani household
Saving Ratio	%	Ratio of Gross Private Saving to GDP
Interest Rate	%	Inter-Bank Rate

CHAPTER 5

EMPIRICAL RESULTS AND DISCUSSION

This section includes the results and their interpretations. The division of this section is as follows. Section 5.1 describes the descriptive analysis of data and correlation. Section 5.2 includes the relationship between the liquidity risk and credit risk for banks operating in Pakistan its interpretations with other control variables. Section 5.3 explains the whether these two types of risk jointly affect the stability of banks.

5.1 Descriptive Statistics

We started by presenting the descriptive statistics of the variables. The table below show the descriptive statistic of 15 banks, which includes 4 government banks and 11 commercial banks, from the year 2002 to 2015. The descriptive statistic is presenting the mean, medium, standard deviation, maximum and minimum statistics of the small, large and all banks. Table 5.1 defines the descriptive statistics of variables, which are as follows: Liquidity Risk (LR), Credit Risk (CR), Z-score, Total Assets, Capital Ratio, Return on Assets (ROA), Standard deviation (ROA), Trading-Ratio, Gross Domestic Product and Saving Ratio (SR). The liquidity risk is when an individual or an institution is incapable to meet its obligation specifically short-term obligation. For this study the mean value of the liquidity risk for small-scale banks is 0.59 and it range from 0.06 to 0.93, for large-scale bank mean value is 0.61 with its range from 0.06 to 0.98, whereas for all banks the mean value is 0.6 with a range of 0.12 to 1.91. The liquidity risk for small banks is 0.59 whereas, for large banks, it is 0.61. It means the large banks are more susceptible to liquidity risk by an average of 0.02%.

Table 5.1: Descriptive Statistic

Variables	Mean			Median			Std. Dev.			Maximum			Minimum		
Banks	Small Banks	Large Banks	All Banks	Small Banks	Large Banks	All Banks	Small Banks	Large Banks	All Banks	Small Banks	Large Banks	All Banks	Small Banks	Large Banks	All Banks
Liquidity Risk (LR)	0.59	0.61	0.6	0.56	0.56	1.12	0.19	0.18	0.37	0.93	0.98	1.91	0.06	0.06	0.12
Credit Risk (CR)	0.51	0.51	0.51	0.49	0.51	1	0.17	0.18	0.35	0.90	1.10	2	0.20	0.10	0.3
Z-score	1.69	2.85	2.27	1.19	2.82	4.01	1.47	1.85	3.32	6.10	8.25	14.35	0.04	0.03	0.07
Total Assets	18.54	19.86	19.2	18.86	19.91	38.77	0.96	0.72	1.68	15.99	21.35	37.34	19.86	17.94	37.8
Capital Ratio	0.14	0.14	0.14	0.12	0.13	0.25	0.07	0.03	0.1	0.39	0.22	0.61	0.01	0.07	0.08
Return on Assets (ROA)	0.01	0.02	0.015	0.00	0.02	0.02	0.02	0.03	0.05	0.10	0.19	0.29	-0.12	0.00	-0.12
Standard deviation (ROA)	0.03	0.03	0.03	0.02	0.02	0.04	0.01	0.01	0.02	0.05	0.05	0.1	0.01	0.01	0.02
Trading-Ratio	0.05	0.02	0.035	0.03	0.00	0.03	0.07	0.05	0.12	0.21	0.25	0.46	-0.17	-0.00	-0.17
Gross Domestic Product	9.45	9.45	9.45	9.49	9.49	18.98	0.51	0.51	1.02	10.25	10.25	20.5	8.64	8.64	17.28
Saving Ratio (SR)	10.67	10.61	10.64	9.97	9.97	19.91	3.20	3.20	6.39	17.61	17.62	35.23	6.99	6.99	13.98

Credit risk also known as "risk of default", credit risk is the risk when borrower is unable to repay the amount of loan or we can say that credit risk for institution is the risk when lander (banks) lost its principle and interest amount. The mean value of credit risk for small-scale banks is 0.51 with its maximum value 0.90 and minimum value 0.20 whereas the mean value for large-scale banks is 0.51 with its maximum value 1.10 and minimum value 1.10 and the mean value of credit risk for all banks is 0.51 with its maximum value 2 and minimum value 0.3. Credit risk for large and small scale banks is same, which means that all type of banks are exposed to the same level of credit risk or it can be say that credit risk is indifferent with the size of bank. The standard deviation of the credit risk for small-scale banks is 0.17, for large-scale 0.18 and for all banks is 0.35.

For Z-score, the words "standard score" is also used. The mean value of Z-score for small-scale banks is 1.69 and it ranges from 0.04 to 6.10, however the mean value for large-scale banks is 2.85 and it ranges from 0.03 to 8.25 and the mean value of Z-score for all banks is 2.27 and it ranges from 0.07 to 14.35. However, the standard deviation of Z-score for small-scale banks is 1.19, for large-scale bank is 2.82 and for all banks is 4.0. Values indicated that large banks have more variations in their value of standard deviations than small-scale banks.

Total assets is the "total amount of assets", which is owned by a person, entity or an institution. For this study the average value of total asset for small-scale banks is 18.54 with its maximum value 19.86, minimum value 15.99, the average value for large-scale banks is 19.86 with its maximum value 21.35 and minimum value 17.94, and the average value of total asset for all banks is 19.86 with its maximum value

37.34 and minimum value 37.8. The average value of total assets for large-scale bank is greater than small-scale bank it is understandable that the size of bank is associated with the number of total asset. The value of standard deviation of total assets for small-scale banks 0.96, for large-scale bank is 0.72 and for all banks is 1.68.

Capital ratio is calculated or measure in term of "core equity capital of bank" which is compared with its "total risk-weighted assets". The capital ratio used to measure the financial strength of banks. The mean value of capital ratio for small-scale banks is 0.14 and its range is from 0.01 to 0.39, the mean value of capital ratio for large-scale banks is 0.14 and its range is from 0.07 to 0.22 and the mean value of capital ratio for all banks is 0.14 and its range is from 0.08 to 0.61. It is grasp that the average of the total assets for small-scale banks and for large-scale banks are equal which means that the financial strength of bank is unconcerned with the size of bank. The value of standard deviation for capital ratio is for small-scale banks is 0.07, for large-scale bank is 0.03 and for all banks is 0.1.

Return on assets (ROA) measure the profitability of company (banks) in term of its assets. The mean value of return on assets (ROA) for small-scale banks is 0.01 and its maximum value is 0.10 and minimum value is -0.12. Although, the mean value for large-scale banks is 0.02, its maximum value is 0.19 and minimum value is 0.00, the mean value for all banks is 0.02, and its maximum value is 0.29 while the minimum value is -0.12. For small scale banks the average of ROA is less than average of ROA for large scale banks, it means the profitability is directly related to the size of banks i.e. large banks are more profitable than small scale banks. The standard deviation of return on asset for small-scale banks is 0.02, for large-scale bank is 0.03 and for all banks calculated as 0.05.

Standard deviation in term of ROA measure the variation in the values of ROA for all banks. The mean value of Standard deviation in term of ROA for small scale banks is 0.03 and it ranges from0.01 to 0.05, however the mean value for large scale banks is 0.03 and it ranges from 0.01 to 0.05 and he mean value for all banks is 0.03 and it ranges from 0.02 to 0.1. The variation in profitability (Standard deviation in term of ROA) is indifferent with the size of bank i.e. the average for small scale bank and large scale bank for S.D (ROA) is same, there might be some other factors which effects the variations in profitability. The value of risk calculated for standard deviation in term of ROA for small-scale banks is 0.01, for large-scale bank is 0.01 whereas for all banks is 0.02. The trading ratio also known as "Profit/loss ratio". It measures the ability of an institution for generating profits over losses. The mean value of trading ratio for small scale banks is 0.05, the maximum value of trading ratio for small-scale banks is calculated as 0.21 while its minimum value is calculated as -0.17. However, the mean value for large-scale banks of trading ratio is 0.02 the maximum value of trading ratio for large-scale bank is calculated as 0.25 while its minimum value is calculated as 0.00. The mean value of trading ratio for all banks is 0.02.

The maximum value of trading ratio for all banks is calculated as 0.45 while its minimum value is calculated as -0.17. Comparing the average value of large and small-scale banks, we came to know that small-scale banks have more capability to generate profit over losses than large-scale banks. Whereas the value of standard deviation for trading ratio for small-scale banks is 0.07, for large-scale bank is 0.05 and for all banks calculated as 0.12.

The gross domestic product is the value, in monetary form, of all the goods and services performed in country or institution (banks) over the specific period. The average value of Gross domestic product for small-scale banks is 9.45 and it ranges from 8.64 to 10.25, the average value for large-scale banks is 9.45 and it ranges from 8.64 to 10.25 and the average value for all banks is 9.45 and it ranges from 17.28 to 20.25. The averages of gross domestic product for small-scale banks and for large-scale banks are same, it identifies that the goods and services produced in banks are not associated with the size of bank. However, the variation in the value of Gross domestic product for small-scale banks is 0.51, for large-scale bank is 0.51 and for all banks calculated as 1.02.

Saving ratio also known as "Average propensity to save (APS)". The saving ratio is the percentage of total income, which is save by individual or institution (bank). The mean value of saving ratio for small-scale banks is 10.67. The maximum value of saving ratio is 17.61 while the minimum value of this ratio calculated as 6.99. The mean value of saving ratio for large-scale banks is 10.61. The maximum value of saving ratio for large-scale banks is 17.62 while the minimum value of this ratio calculated as 6.99. The mean value of saving ratio for all banks is 10.61. The maximum value of saving ratio for all banks is 35.23 while the minimum value of this ratio calculated as 13.98. The small scale banks have 0.06% more saving ratio than large scale banks, although it is not a big difference but it indicate that small scale banks has more tendency to save money than large scale banks. The variation in the value of saving ratio for small-scale banks is 3.20, for large-scale bank is 3.19 and for all banks calculated as 6.39.

5.2 Correlation

In this section, we explain the correlation among the variables.

Table: 5.2 Correlation Matrix

Variables	Lr	Cr	TA	CAR	ROA	Sd. ROA	TR	SR	GDP
Liquidity Risk (LR)	1.000								
Credit Risk (CR)	0.86	1.000							
Total Assets	0.334	0.233	1.000						
Capital Ratio	0.165	0.381	0.062	1.000					
Return on Assets (ROA)	0.189	0.067	0.043	0.055	1.000				
Standard deviation (ROA)	0.006	0.212	0.288	0.011	0.074	1.000			
Trading-Ratio	0.118	0.116	0.176	0.092	0.257	0.110	1.000		
Saving Ratio (SR)	0.013	0.090	0.378	0.080	0.018	0.520	0.026	1.000	
Gross Domestic Product	0.023	0.368	0.454	0.076	0.087	0.661	0.157	0.800	1.000

The coefficient of correlation used to measure the direction of relationship and strength between two variables. Table 5.2 shows the strength and direction between given variable. Its shows that there is a positive but not too strong relationship exist between credit risk and liquidity risk (0.86). Similarly, Imbierowicz & Rauch (2014) also found in their study that there exist a relationship between liquidity risk and credit risk. Shubiri (2013) has also indicated the inverse and statistical insignificant relationship between liquidity risk and credit risk in commercial banks. The liquidity risk has somehow less strong and positive association with capital ratio (0.165), return on asset (0.189) and trading ratio (0.118).

However, the liquidity ratio has a positive and weak relationship with Saving Ratio (0.013) and Gross Domestic Product (0.023). It has shown in the table that credit risk has a less strong and positive association with total asset (0.233), capital ratio (0.381) and Gross Domestic Product (0.368), however credit risk has a weak and positive relation with Return on Assets (ROA) (0.067), Trading-Ratio (0.116) and Saving Ratio (SR) (0.090).

5.3 Interdependency of liquidity risk and credit risk in banks

This section investigates the interdependencies of liquidity risk and credit risk of banks with other control variables like Total Assets, Capital Ratio, Return on Assets (ROA), Standard deviation (ROA), Trading-Ratio, Saving Ratio (SR) and Gross Domestic Product. The below mentioned simultaneous equation estimated by three stage least square method under three different models and models are providing the different effects of the variables on the theory.

$$CR_{i,t} = \sum_{\tau=0}^{MAX2} LR_{i,t-\tau} + \sum_{\tau=1}^{MAX1} CR_{i,t-\tau} + Control\,Variables_{i,t} + \epsilon_{i,t} \quad (5.1)$$

$$LR_{i,t} = \sum_{\tau=0}^{MAX2} CR_{i,t-\tau} + \sum_{\tau=1}^{MAX1} LR_{i,t-\tau} + Control\,Variables_{i,t} + \epsilon_{i,t} \quad (5.2)$$

"Three stage least square (3SLS) method" used to check the interdependencies of liquidity risk and credit risk of banks. Table 5.3 is providing the different scenarios considering the different lag length of the variables and coefficient of the variables in which two general scenarios has analyzed. It is indicating that the highest statistic of 0.3171 is observed under the head of Model 2 with one lag as a total effect of the liquidity risk on overall banks and coefficient with credit risk which is maximum to proven the strength and significance of the assumption.

Table: 5.3 Relationship of liquidity risk and credit risk for all banks (Dependent variable: Liquidity Risk)

LR-ALL BANKS	Model 1	Model 2	Model 3
CR(t)	0.029**	0.768**	0.197*
	(0.013)	(0.344)	(0.114)
CR(t-1)	_	-0.451*	-0.199**
		(0.250)	(0.099)
CR(t-2)	_	_	0.204**
			(0.102)
Total Effect	0.029	0.317	0.208
Return on Assets	1.052**	1.314**	1.006**
	(0.429)	(0.489)	(0.459)
Total Assets	-9.850**	-4.900*	-9.570***
	(4.061)	(2.593)	(0.00)
Ln GDP	-0.2185*	0.013*	-0.092*
	(0.116)	(0.007)	(0.046)
Trading Ratio	-0.132*	-0.121*	0.044**
	(0.069)	(0.063)	(0.020)
Saving Ratio	-0.025**	-0.016*	-0.028*
	(0.011)	(0.008)	(0.013)
Observations	195	195	180

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

The second highest total effect observed under the head of Model 3 with two lags and the absolute value is 0.208 that is also a promising statistic to judge the assumption made in the study. The least value of total effect observed under the head of Model 1 and the absolute value is 0.029, considered as a least promising situation to judge the assumption. However, assessing the strength of the credit risk's association with liquidity risk and controlling variables, the results indicating high significant with each other as per the total effects of coefficient. Based on this result our first hypothesis "*there is no relationship between liquidity risk and credit risk for banks operating in Pakistan*" has rejected. Our study is consistent with Nikomaram et al. (2013) and Imane (2015) which shows that there is a positive and significant relationship between credit and liquidity risks. Similarly, Imbierowicz & Rauch (2014) also found in their study that there exist a significant relationship between liquidity risk and credit risk.

However, Berríos, (2013), conducted a study to see the interdependencies of liquidity risk and credit risk and their effect on the operation of banks. They found that there exist a weak coordination between the liquidity risk and credit risk.

Table: 5.4 Relationship of liquidity risk and credit risk for all banks (Dependent variable: Credit Risk)

CR-ALL BANKS	Model 1	Model 2	Model 3
LR(t)	0.226**	0.570**	-0.097*
	(0.097)	(0.270)	(0.051)
LR(t-1)	_	-0.201*	0.042**
		(0.116)	(0.019)
LR(t-2)	_	_	0.096**
			(0.048)
Total Effect	0.2226	0.5675	0.0411
Return on Assets	-0.646**	-0.898**	-0.395**
	(0.323)	(0.420)	(0.181)
T. bills	0.020***	-0.012***	-0.008***
	(0.005)	(0.003)	(0.002)
Capital Ratio	-0.472**	-0.291**	-0.582***
	(0.186)	(0.117)	(0.161)
Ln GDP	-0.241**	-0.210***	-0.409***
	(0.053)	(0.058)	(0.048)
Observations	195	195	180

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

Considering the negative figures of ROA in table 5.4, it has concluded that there exist an inverse relationship between the profitability and the credit risk i.e. high credit risk lead to low profitability. Crumley (2008) and Leung and Horwitz (2010) also viewed the negative relationship between credit risk and profitability, in their work they recognized the strategy of bank stability by many variables as well and relationship between variables is also showing the significant relationship between the variables. In this research, main motive behind the study was to investigate the risk approaches and financial crisis in the banks by assessing the credit risk, profitability risk and liquidity risk with interlinked relationships.

In the given situation, operational performance of the bank has viewed as the main fact with credit risk associated with liquidity risk and other controlling variables that are showing strong convincing correlation with each other.

5.4. The relationship between the liquidity risk and credit risk with respect to bank size

This section analyzed the data, which has divided according to the size of banks. Similarly, Beltratti and Stulz (2012) divides the data according to the nature and size of banks i.e. small-scale banks and large-scale banks to investigate the impact of liquidity risk and credit risk. Table 5.5 and 5.6 observe liquidity risk and credit risk of the small banks in Pakistan.

Table: 5.5 Relationship of liquidity risk and credit risk for small-scale bank (Dependent variable: Liquidity Risk)

LR-SMALL BANKS	Model 1	Model 2	Model 3
CR(t)	-0.192*	0.443*	0.295*
	(0.098)	(0.001)	(0.157)
CR(t-1)	–	-0.433*	0.155**
		(0.231)	(0.070)
CR(t-2)	–	–	-0.392**
			(0.174)
Total Effect	-0.192	0.009	0.058
Return on Assets	0.594*	0.979**	1.100
	(0.330)	(0.433)	(0.486)
Total Assets	-3.22**	-3.221**	-4.541**
	(1.448)	(1.457)	(2.241)
Ln GDP	-0.024**	-0.139*	-0.104**
	(0.110)	(0.076)	(0.047)
Trading Ratio	-0.042*	-0.130**	0.238**
	(0.022)	(0.058)	(0.108)
Saving Ratio	-0.050***	-0.039**	-0.041**
	(0.017)	(0.018)	(0.020)
Observations	91	91	85

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

Table 5.5 indicated the impact of liquidity risk on credit risk controlling for other variables and their influence on the operational performance of the small banks in Pakistan. When we take the liquidity risk as dependent variable, the results show a significant but negative relation between LR and CR under Model 1 without lag for small banks. The coefficient of contemporaneous credit risk is -0.192, which shows that when CR decreases by one unit then LR increases by 0.192 units. The results do not change when we take the first lag of credit risk and regress it on contemporaneous liquidity risk under the head of Model 2 with one lag. The value of coefficient of the lagged credit risk is -0.433, which show significant but negative relationship between liquidity risk and credit risk. Our results even do not change when we take the second lag of credit risk and regress it on contemporaneous liquidity risk under the head of Model 3. The value of coefficient of the lagged credit risk is -0.392, which show significant but negative relationship between liquidity risk and credit risk. The highest statistic of -0.912, observed under the head of model 1 as a total effect of the liquidity risk on small banks and coefficient with credit risk, which proves the significance of the hypothesis. The second highest value of total effect observed under the head of model 3, which is -0.531, it has statistical significance to justify the assumption made in the study. The negative value of -0.877 of total effect, perceived under model 2 and it is least significant value to defend the hypothesis of the study. Our results are consistent with Abdullah and Khan (2012). All the values are defending the significance of association between variables and are indicating the minor statistics to justify the relation in variables as a meaningful economic bond of performance for small-scale banks in Pakistan.

Table: 5.6 Relationship of liquidity risk and credit risk for small-scale bank

(Dependent variable: Credit Risk)

CR-SMALL BANKS	Model 1	Model 2	Model 3
LR(t)	0.151*	0.366**	-0.0530*
	(0.080)	(0.165)	(0.028)
LR(t-1)	_	-0.148*	-0.012**
		(0.078)	(0.005)
LR(t-2)	_	_	0.170**
			(0.075)
Total Effect	0.151	0.218	0.104
Return on Assets	-0.740*	-0.819**	-0.644
	(0.391)	(0.364)	(0.293)
T-bills	-0.002**	-0.005**	-0.010**
	(0.001)	(0.002)	(0.004)
Capital Ratio	-0.375*	-0.362	-0.406**
	(0.196)	(0.192)*	(0.188)
Ln GDP	-0.080**	-0.067*	-0.116***
	(0.034)	(0.035)	(0.034)
Observations	91	91	85

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

Considering the results mentioned in table 5.6, again it has observed a significant relationship between dependent, independent and control variable and ensuring the strength of individual variable effect on the performance of banks. A study conducted by Nikomaram, Taghavi, & Khalili Diman (2013) also shows that there is significant relationship of bank size with liquidity risk and credit risk and they found that the bank's performance has a close association with size of bank. Size of the bank has become the preferable area for the discussion for many scholars and literature has verified that in many situations the size of bank is significant when the studied with different types of risk that institutions have to face.

Table: 5.7 Relationship of liquidity risk and credit risk for large-scale bank (Dependent variable: Liquidity Risk)

LR- LARGE BANKS	Model 1	Model 2	Model 3
CR(t)	-0.142**	0.273*	0.014**
	(0.064)	(0.145)	(0.006)
CR(t-1)	_	-0.239**	-0.281*
		(0.105)	(0.148)
CR(t-2)	_	_	0.231**
			(0.108)
Total Effect	-0.412	0.035	-0.0364
Return on Assets	0.960**	1.301**	0.731**
	(0.425)	(0.573)	(0.323)
Total Assets	-1.540***	-1.290**	-1.200**
	(5.610)	(5.450)	(5.270)
Ln GDP	-0.004**	0.041**	0.010**
	(0.002)	(0.018)	(0.004)
Trading Ratio	-0.006**	-0.080**	0.387***
	(0.002)	(0.035)	(0.134)
Saving Ratio	-0.009**	-0.006**	0.0035**
	(0.004)	(0.002)	(0.001)
Observations	104	104	95

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

The association of liquidity risk with credit risk in large-scale banks of Pakistan has observed in this section, having the background of extended research with the reference of financial market of banks in Pakistan. In table 5.7, the statistics provide the figures of coefficient that reveal the fact of total effects that the entire variable and control variable having an association with the context of bank size and have individual effects on the performance of the banks. Sohaimi (2013) has viewed the relationship between the banks in term of liquidity risk in the operations of the banking system of Malaysia. The study on banking system of Malaysia assert the correlation for the liquidity risk with other variables and scenario, his focus was to check the effect of the liquidity risk on the performance of the banks, he also found a strong influence of liquidity risk on the operation of the banks.

Table: 5.8 Relationship of liquidity risk and credit risk for large-scale bank ((Dependent variable: Credit Risk)

CR-LARGE BANKS	Model 1	Model 2	Model 3
LR(t)	0.222**	-0.006*	-0.388**
	(0.107)	(0.003)	(0.171)
LR(t-1)	_	-0.024**	0.229**
			(0.100)
LR(t-2)	_	(0.011)	0.209***
			(0.075)
Total Effect	0.2223	0.009	0.0503
Return on Assets	-0.836*	-0.875**	-0.353**
	(0.440)	(0.385)	(0.155)
T Bills	0.005**	0.004**	-0.006**
	(0.002)	(0.002)	(0.002)
Capital Ratio	-1.027**	-1.007**	-0.914***
	(0.435)	(0.467)	(0.344)
Ln GDP	-1.102***	-0.100***	-0.216***
	(0.030)	(0.031)	(0.028)
Observations	104	104	95

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

Considering the results indicating in Table 5.8, it is observing that the highest statistic of coefficient 0.2223 is under the head of Model 1 without the possibility of lag value as a total effect of the credit risk on large banks and coefficient with liquidity risk, which is maximum to prove the strength and significance of the assumption. The second highest absolute value of total effect is 0.0503, under the head of Model 3, which is involving the possibility of two lag, which is also a favorable statistic to justify the assumption made in this study. The least absolute value of correlation for total effect is 0.009, under the head of Model 2, which has two lags in the equation that is also substantial statistic to accept the hypothesis. The results indicate the **H2**: "*Bank size has a significant impact on the relationship of liquidity and credit risk*" has accepted. This acceptance of H2 indicate that the study done by using the data of Pakistanis banks endorsed the results presented in previous studies which shows that bank size has a significant impact in terms of performance.

Therefore, there is a meaningful relation between liquidity and credit risk in case of bank size. Nikomaram, Taghavi, Khalili and Diman (2013), has investigated the liquidity risk and credit risk with reference of banks in Iran; he assessed the relationship of liquidity risk and credit risk based on the size of banks. They found that the liquidity risk support the size of bank and influence the operational performance of the bank as per its size but credit risk do not get effect by the size of the bank and dose not influence the operation of the banks, the credit risk is of discrete nature. They find that the credit risk do not matter whether bank is small or large but liquidity risk has its impacts regarding the size of bank. However, in this study combine relationship of liquidity risk and credit risk is presenting the significant influence for the operations of the banks in Pakistan that means alternative hypothesis has rejected.

5.5. Liquidity risk and credit risk jointly effects on the stability of banks

This section is associated with the combine effect of liquidity risk and credit risk on the bank's stability and it is alien with the third hypothesis of this study. "Liquidity risk and credit risk jointly affect the banks' stability". For this purpose, the variables are being analyzed by using the multivariate logistic regression model. It has assumed that there is need to check the probability factors for the individual risk with reference to control variables. Tables 5.9 demonstrations the combine impact of liquidity risk and the credit risk on the stability of the bank with 95% confident interval. The value of coefficient in regression show that how much change occurs in dependent variable because of the one unit change in the independent variable. In table 5.10, the negative value of coefficient of liquidity risk indicates that there is a negative or inverse relationship between liquidity risk and banks stability.

Whereas the positive sign of the coefficient of credit risk show a direct and positive relation between bank's stability and credit risk. However, when we talks about the predictor value or p-value, the change in the p-value indicates the change in the retort variables.

Table: 5.9 Combine effect of Liquidity risk and credit risk on banks' stability

Bank Stability	Coef.	Std. Err.	T	P>t
Liquidity Risk (LR)	-0.036364	0.684693	-0.05	0.958
Credit Risk (CR)	1.432708	0.735543	1.95	0.053
Return on Assets	29.8921	4.001047	7.47	0.000
log Total Asset	-0.050711	0.123053	-0.41	0.681
S.d.RoA	-211.7659	9.953578	-21.3	0.000
Capital Ratio	53.55461	2.568029	20.85	0.000
Cons	4.9351	2.720512	1.81	0.072

The highest value of p (greater than 0.05) indicates that the change in the one variable (independent variable) is not associated with the change in the other variable (dependent variable).As the results of the regressions shows that the liquidity ratio have p-value 0.053, which means that credit, risk have no effect on the stability of the banks. Whereas the liquidity risk have p-value 0.958, which is almost equal to the limit of the predicted value, and it indicates that liquidity risk have a significant and positive impact on the stability of the banks. As demonstrated in the study of Imbierowicz & Rauch (2014), in which they estimated the default probability of the bank because of liquidity risk and credit risk between 10% to 30% and mitigation of risk is estimated with default probability of 70-90% in the conclusion of their

research work. Thus according to the results of regression analysis it is analyze that the third hypothesis **H3**: *"Liquidity risk and credit risk jointly affect the banks' stability"* has partially accepted. Besides this, study conducted by Ndifon Ejoh, Inah Okpa and Ebong Inyang (2014) analyzed the impact of liquidity risk and credit risk as a joint risk effecting the performance of the banks. They find that there exist a significant impact of joint effect of liquidity risk and credit risk on the stability of bank. Gatev and Strahan (2009) also find in their study that liquidity risk and credit risk has joint effect on the stability of the bank and have potential influence if they occur jointly, than individual influence these risk still have probability of their occurrence to cause the crisis in the bank. With the image of individual influence these risk still have probability of their occurrence to cause the crisis in the bank. Many scholars has also emphasized the period of financial crisis in their sample data and research work to provide the keen analysis. However, there was no major financial crisis on the banking level in the Pakistan in near past so in this study period of financial crisis has not been considered as a mandatory scenario and all the sample data has been investigated on smooth flowing financial statements over years and hypothesis has been tested according the stable conditions.

CHAPTER 6

CONCLUSION AND POLICY IMPLICATIONS

6.1 Conclusion

Many factors influence the survival of banks. In these factors, liquidity risk and credit risk are of significant nature. This study examine the relationship between the liquidity risk and credit risk analyzed on the performance of commercial and public banks in Pakistan. The assumption, which has designed to estimate the role of the liquidity risk and credit risk, evaluated by many variables. This study takes the data of 11 commercial banks and 4 public banks and subdivide these banks has been made in to three categories of small banks, large banks and overall banks. The time-period of the data is of 13 years from 2002 to 2015.

To consider the assumption in practical scenarios different hypothesis has been designed with structured objectivity from the period of 2002 to 2015. Research methodology has been assessed based on three famous models of Cole and Gunther (1995), Cole and White (2012), Beltratti and Stulz (2012) which are providing the roadmap for the execution of the survey conducted in the study. All the variables are individual nature they dose not effect each other at broader terms (no multi collinearity exist between the variables). The assumption has been investigated is divided into three different hypothesis to test the sample data and to investigate the significance of the research study. It has been witnessed that it does matter if banks are small, large and overall banks all the variables which has been employed are keeping the individual personalities and not affecting the bank by creating interlinked relation with each other.

Findings investigated that the values of the coefficient and negative competent shows the meaningful association between the factors of all variables' relation that can be avoid or can be measured into some usable solution for the banks operational performance in the Pakistan. During all the years that has been included in the sample data remained an association of variables and effect factors for each other on the operational performances of banks in Pakistan. Therefore, this hypothesis, which were assumed to indicate the relationship between variables and their effect on the operational performance of the bank, becomes valid after the findings, and hypothesis can be defended after the findings. Finding for the second hypothesis relayed on the absolute values of the coefficient and standard deviation calculated by sample data which has been employed in the study.

After the analyses of first two hypotheses, third hypothesis with its relevant objective has been addressed to overview the validity behind the presented assumption. The third hypothesis that has been designed is to examine whether these two types of risk jointly affect the stability of banks in Pakistan and it is also investigated what were the banks stability during the duration of 2002-2015. This third assumption of the study investigated the effect and probability of the failure of operational performance of the bank. To calculate the finding and to utilize the sample data multivariate logistic regression model has been considered and probability is calculated by considering the different directions. To avoid the hurricane of the microeconomics and macroeconomics unstable condition probability has been considered as the malfunction of banks operational performance by using the multivariate logistic regression model. The model has provided us with the coefficient of variables, standard errors of variables, time lag of variables, and probability with the impact of time of variables and interval confidence of variable.

To identify the interval confidence 95% ratio has been taken into account for the findings. By viewing the statistic, the lag odds, which have been obtained, indicated the high probability of default of banks because of the liquidity risk which is up to 95% where credit risk is indicating the probability of 5% to fail the bank in its performance. The credit risk is also playing its role in the statistics of coefficient. Where there is the probability of the liquidity irks is high, the standard error figure is also high with 0.684693 but standard deviation of the return on assets is concluding the highest standard deviation error in the finding. The interval confidence with 95% limit of lag odds has been at highest level of 58 as upper limit and 48 as lower limit in the findings. Return on assets is also indicating the high absolute value for the interval confidence 37 as upper limit and 21 as lower limit. Log of the total assets is also containing the high probability of occurrence up to the 68% in the statistical findings of the different variables after utilizing the multivariate logistic regression model.

All the finding that has been obtained by utilizing the technical models and theories on the gathered sample data has summarized the concept and presented by the study into three different evidences. In which the first evidence is that banks has impacts of different variables with their individual personalities, these variables have a interlink relation with each other. Second evidence that has been witnessed was that variables have an association with each other if the size of the bank is varying. This argue is judged by the empirical finding where the liquidity risk as assumed association with other variables in small banks has shown very low relational factors. Same implication has been investigated for the scenario of the large banks where liquidity risk indicated the additional association with the other banks.

On the other hand, credit risk has shown a direct association with other variables in the small banks and same implication has been witnessed when the sample data of large banks in Pakistan has been tested. It indicated very small or negative association with all other variables that is meaningful and vague to estimate the relations of variables and their impacts on the working of banks in Pakistan. Therefore, the size of bank does matter whether it is small, large and overall banks sample data the relation and association of the variables in the group with each other is forming the strong basis.

The last and third evidence, which has been witnessed by the empirical finding, is that liquidity risk has high chances of the occurrence to cause the default of banks in Pakistan. Whereas the credit risk is also having the association with the equity management and return on assets and can affect the operational factor regarding the performance of the banks in Pakistan as according to literature. However, the basic scenario is liquidity risk management that is associated with the assets quality and supply in the market and cause the effective effect pattern in the equity dealing. The study is providing three considerations to analyze that there should be mixed approach to mitigate or transfer the risk of bank failure in the banking markets of Pakistan.

6.2 Policy Implications

It has been analyzed by studying the distinguished factors influencing the banking market's behavior. Liquidity risk and credit risks are the distinctly important features for the performance of the banking sector in right direction and lots of keen analysis required to assess these factors to make the balance for the occurrence of these factors.

From the above stated results, this study comes up with the following policy implications:

1. We find that liquidity risk is an endogenous determinant of bank performance. Therefore, it has different effects on bank performance in different financial system.
2. The greater regulatory empowerment of private monitoring of banks will increase bank liquidity risk and credit risk in market-based financial system.
3. Banks should have contingency plans for any abnormal or worst case scenarios.

6.3 Future Research

There are few suggestions for the future work that needs eager consideration of the researchers few points regarding the recommendations are given below:

- There is need to identify the individual aspect and influence of liquidity risk and credit risk on the performance of bank.
- There is need to search the broader pattern of bank defaults.
- Mix banking market approach needed to be addressed to check the individual influence of international banking system.
- There should be study on the involvement of more scenarios other than liquidity risk and credit risk on performance of banks.

It has been suggested to assess the individual effects of the variables and control variables on the banks to make advance steps for the banking industry.

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Appendix

List of All Banks	
Sr. No	**Name of Bank**
01	National Bank of Pakistan
02	Allied Bank Ltd
03	Habib Bank Ltd
04	MCB Bank Ltd
05	United Bank Ltd
06	Askari Bank Ltd
07	Bank Alfalah Ltd
08	Bank of Khyber
09	Al Habib Bank Ltd
10	Faysal Bank Ltd
11	Habib Metropolitan Bank
12	NIB Bank Ltd
13	Bank of Punjab Ltd
14	Standard Chartered Bank Ltd
15	JS Bank Ltd

List of Large Banks	
Sr. No	**Name of Bank**
01	Habib Bank Ltd
02	National Bank of Pakistan
03	United Bank Ltd
04	MCB Bank Ltd
05	Allied Bank Ltd
06	Bank Alfalah Ltd
07	Standard Chartered Bank Ltd
08	Al Habib Bank Ltd
09	Askari Bank Ltd

List of Small Banks	
Sr. No	**Name of Bank**
01	Bank of Punjab Ltd
02	Habib Metropolitan Bank
03	Faysal Bank Ltd
04	NIB Bank Ltd
05	Bank of Khyber
06	JS Bank Ltd