

Major: FIN
S.No. F11

*Evaluating the influence of macroeconomic factors on financial risk: A perspective
from Pakistan's banking landscape*



By:

Faheem Asghar Jan

01-321222-063

Supervisor:

Dr. Nida Aman

Department of Business Studies

Bahria University Islamabad

Fall 2023

FINAL PROJECT/THESIS APPROVAL SHEET

Viva-Voce Examination

Viva Date 29/01/2024

Topic of Research: Evaluating the influence of macroeconomic factors on financial risk: A perspective from the Pakistan's banking landscape.

Name of Student(s): Faheem Asghar Jan

Enroll # 01-321222-063

Class: MBA Finance 1.5 years weekend

Approved by:

DR. Nida Aman

Supervisor

Shamsa Khalid

Examiner-I

Osman Bin Saif

Examiner-II

Dr. Syed Haider Ali Shah

Research Coordinator

Dr. Khalil Ur Rehman

Head of Department

Business Studies

Acknowledgement

All praises to ALLAH Almighty, the Most Gracious and Merciful, for giving me the power, direction, and blessings to finish my thesis. This was not an easy journey. I want to express my sincere gratitude to my teacher, Dr. Nida Aman for her continuous support and invaluable advice throughout the entire research process. Her confidence in my abilities has enabled me to work to the best of my ability and has taught me the correct research approaches.

I owe a special debt of gratitude to my family, whose unfailing encouragement, tolerance, and understanding have served as my rock throughout this process. Their support and devotion have given me the drive I need to get things done on time and conquer challenges.

I also want to thank everyone who helped me in this thesis, whether they were actively involved in it or not. Their support, suggestions, and resources have been crucial in determining how my thesis will turn out.

Table of Contents

Acknowledgement	3
List of Figures	6
ABSTRACT	7
Introduction	8
1.1 Background	8
1.2 Problem statement	12
1.3 Research Gap:	12
1.4 Research Questions	12
1.5 Research Objective	12
1.6 Significant of study	13
1.7 Scheme of Study	14
Chapter 1: Introduction	14
Chapter 2: Literature Review	14
Chapter 3: Research Methodology	14
Chapter 5: Recommendations and conclusions	14
Chapter 02	15
Literature review	15
2.1 Empirical Literature Review	15
2.1.1 Evidence of the Interdependence between Credit Risk and Macroeconomic Factors	16
2.1.2 Evidence of the Interdependence between Liquidity Risk and Macroeconomic Factors	20
2.2 Theoretical Framework	23
Chapter 03	28
Research Methodology	28
3.1 Research Design	28
3.2 Data and sample	28
3.3 Variable Measurement	28
3.4 Econometric Model	29
3.5 Panel data estimation Models	30
Results and Analysis	32
4.1 Descriptive Statistics	32
4.2 Correlation matrix	33
4.3 Regression Analysis	33
4.4 Discussion	37
4.5 Impact of Macro-Economic Variables on Liquidity Risk	40

Chapter 05	49
Conclusion and Recommendation	49
5.1 Conclusion	49
5.2 Recommendation	51
5.3 Limitation of the Study	53
5.3.1 Methodological limitations	53
5.3.2 Conceptual limitations	53
5.3.3 Future research directions	53
References	55

List of Figures

Figure 1: Theoretical Framework for Credit Risk.....	25
Figure 2: Theoretical Framework for Liquidity Risk.....	26

List of Tables

Table 1: Summary Statistics.....	34
Table 2: Correlation matrix.....	35
Table 3: Regression analysis: Credit risk and macro-economic variables.....	35
Table 4: Summar statistics.....	42
Table 4: Regression analysis: Liquidity risk and macroeconomic variables.....	43

ABSTRACT

In this the findings were how macroeconomic factors affect financial risk in the Pakistani banking sector, especially credit and liquidity risk. Proper evaluation has been done about the relationships between exchange, inflation, interest, and GDP growth. Panel data was used and a total of 23 banks were selected in Pakistan.

Our research offers a complicated view. GDP growth and credit risk are negatively related to credit risk, indicating that economic growth reduces the ability of people's ability to repay loans. Interest and inflation have positive impact on credit risk, emphasising the difficulties lending in high-interest rate or inflationary environments. Similarly exchange rates have a negative effects on credit risk.

Liquidity risk also shows some what similar results like credit risk. GDP growth shows a negative correlation. While, inflation and interest rates have a positive impact, showing that cash flow management is difficult when prices or borrowing costs increases. In the last to note that exchange rates have positive correlation with liquidity risk, suggesting that currency up and down may make liquidity issues worse.

This study increases our understanding of the dynamics of financial risk in the specific circumstances of the banking industry in Pakistan. Our research shows the complex connection between macroeconomic variables and credit and liquidity risk, providing important recommendations for risk management strategies and policy initiatives specific to the unique conditions of Pakistan's financial landscape.

Keywords: Gross Domestic Products (GDP), Risk, inflation rate, interest rate, credit risk, liquidity risk, exchange rate.

Chapter 01

Introduction

1.1 Background

In present day society, expansion of industries specifically the growth of banking industry is necessary and crucial for the success of any nation. Customers satisfaction and their need must be fulfilled by the banking sector in order to achieve sustainable development (Pakurár et al., 2019). To achieve this a stable financial environment is necessary. Around 2635 banks over 18 countries have been studied and the resultant was that the financial inclusion contributes greatly to banks stability (Ahamed et al., 2019). Financial inclusion is a system when there are equal opportunities for everyone to raise funds, to get a credit and to have to access to equal capital. However, there are various factors that not only influence the financial system but also bend it to the degree that it creates a risky environment for the institution to grow and flourish. These macroeconomic factors have not been understood properly till now. To understand these macroeconomic factors and their influence on the financial risk. A need to establish what is a financial risk is required. Risk is any situation or thing that create a hurdle in achievement of particular goal. A financial risk is the probability that an investment or any financial decision will result in loss of that investment or capital. Beside complete loss of capital, financial risk also includes the inconsistency of payments made to the lender or institution like bank. According to Lelgo et al., (2018) banking institution should review their credit rating policies in order to achieve the financial stability, crediting policy is again a part related to financial risk . Financial risk is among the most technical and difficult risks that create a challenge for those who are running and managing the company. This is even worse for the companies who are listed on the stock market as they are highly dependent on market conditions. Some of the risks that are common to all organizations are liquidity risk and credit risk (Ali & Oudat., 2020). Financial risk changes unexpectedly or in a way that is least expected. Financial risk is of many types, and these separately contribute adversely to financial performance of the company.

The financial risk is a term that is used broadly for the combination of other types of risk. Some of the most important one that we will consider in this study are credit risk and liquidity risk.

Credit risk also known as the default risk, is the risk that the lender or borrower of the capital may not fulfil their obligation of repayment. The reason for this is because when an individual or institution does not repay or fulfil his commitment it usually reflects his bankruptcy. Credit risk is an essential component of lending and investing. When institutions like banks or companies give credit to people or governments, they bear the risk of incurring a bad debt. When investors buy or purchases financial instruments such as bonds, securities etc they bear credit risk. The need to consider the credit risk from the perspective of commercial banks is necessary. Credit risk plays an important role in banks profitability as a large crunch of its revenue is accrued from lending's (loans) and from these loans interest is earned. So, it can be deducted that interest rate risk directly contributes to the credit risk. Credit risk and interest rate risk are co related to each other and are not separable. (Kolapo et al., 2012). Banks' efforts to accomplish their goals are hampered by the growing percentage of non-performing loans in their credit portfolio. The proportion of loan amounts that are not repaid after three months is known as non-performing loans. (Samuel, 2015).

Effective management of credit risk is necessary for the banks and other financial institutions because if not managed properly it would put them in risk of going concern.

Liquidity risk is the risk that individuals, companies and institutions or market participants faces difficulties in meeting their short-term obligations. This occurs due to the imbalance between its liquid assets and liabilities.

Over the past few decades, the management of the banks have paid very little attention to the liquidity risk but later it has obtained a significant attention from the financial institution such as banks. They have felt the need to give proper attention to liquidity risk besides other financial risk, the liquidity risk is as important as other risks. (Arif & Anees, 2012). Liquidity risk has been the assassin, and this claim has been developed due the failure and bankruptcy of banks in past (Shamas et al., 2017). Liquidity risk not only affect the performance and the survival of the banks, but it also put at risk the reputation of the banks. For any institution specially banks the goodwill is of outmost importance because if people do not trust a bank, they won't put money in that bank. (Maak, 2013). Beside reputation the poor liquidity also put the banks in a position where they may have to face the penalties of the regulators. Therefore, it is considered extremely important for the banks to have a sound liquidity management system. liquidity management has become a serious problem for the banks of modern era (Goodhart, 2008). High competition from the consumers and wide range of products and

services that they now offer and with the technological advancement in the capital market have change the overall view of funding and risk management processes (Davis, 1996).

1.1.1 Interdependence of Credit and Liquidity Risk in Financial Institutions

Classic theories of banking accept that there is a close relation between credit risk and liquidity risk i.e. a negative relationship (Hassan et al., 2019). Over the past few decades, many literatures have dealt with banks credit and liquidity risks. Explanation and justification for the way the banks works is given by two major research studies. The first is the classic financial intermediation theory which is represented by Bryant (1980) and by the industrial organization approach related to banking represented by Monti-Klein.

According to the financial intermediation concept, all the banks act as a pool of liquid resources that make sure that cash is available for borrowers and depositors, improving the economy and help in internalization of liquidity risk. Another approach called the industrial organization approach take banks as the taker of price that maximize the profits in loan markets. These takers of the price must contend with other for the demand of deposits and decreasing demand for loans because of rise in interest rates. Banks incur costs through the interests that are deposited, and this reduce demand for loans as rise occur in interest rates. Banks also incur expenses through interests that are deposited on the liabilities side and makes profits on the interest rates on asset sides. The positive relation between credit risk and liquidity risk is also supported by the literature which has focused on the crisis between 2007 and 2008, this model is based on the studies of several researcher such as Diamond and Ranjan's paper, the whole idea of their model was based on the idea that banks obtain deposits from unskilled people which is then used for lending purposes. However, if too many projects which are funded by these loans do not make the return than the banks will have insufficient funds and hence cannot meet the requirements and demands of depositors. As a result of this the word will spread and more people would demand the deposits that they have made with banks. To tackle this the banks will call for all the loans and hence this will reduce the liquidity in the market. (Diamond, 1997). Acharaya & Viswanathan (2011) explains that why making up of leverage in stable economic conditions leads to sudden asset shocks and disappearing of liquidity in conditions when economy is running slow. The main assumption they have put forward was that the debt raised by financial firms have to be rolled over continuously which is used to purchase assets.

They showed that higher the debts in banking financial system higher would be the bank run i.e. they will have liquidity problems. Based on the above models discussed it is concluded that there is a positive relation between liquidity and credit of the banks. Also, it proves their interdependency between liquidity risk and credit risk.

In Pakistan where banking sector is one of the major contributors to the economy, is also the sector that is affected highly by the financial risk. Commercial banks play a pivotal role in upboosting the economic performance of the country. This is mainly achieved through lending money and accepting deposits from individuals and other businesses. As mentioned earlier the banking sector despite helping the economy grow is also the one that is affected by the financial risk so, banks must take a careful approach to manage and tackle the effects of financial risk (Ahmed et al., 2021). To deal with the monetary crisis banking system should work on the soundness and effectiveness of the commercial banks especially in developing countries like Pakistan. To tackle these kinds of risks, there is an area which is called risk management and has made an important place in the world of corporate finance and accounting sector (Dechow et al, 2012).

According to state banks quarterly report of 2015, the asset quality of Pakistan's banking sector is declining. The non-performance loan increased by 1.6% during the month of June in 2015. The market's fierce competition and deregulation have resulted in high interest rate volatility, which can have a dynamic impact on costs and earnings and increase the risk associated with interest rate fluctuations. Liquidity risk is caused by mismatches in the maturities of assets and liabilities and inadequacies in the capital funds mix. These factors have a negative effect on banks' financial performance. The banks find themselves unable to promptly liquidate a position (Ahmed et al., 2021).

To sum up, in the continually evolving banking industry, it is vital to know about financial risk. The complicated issues and problems that banks come across demand a thorough examination of the macroeconomic variables that are essential in determining financial risk. four important macroeconomic indicators will be our focus as we get deeper into the analysis: GDP growth, inflation rate, exchange rates and interest rates. In combination, these elements create a basis of economic stability. They not only show the state of the economy as a whole, but they also have the ability to greatly affect the risk profile of financial institutions.

1.2 Problem statement

Managing financial risk and how to mitigate different policies into effect has always been a difficult task for the Pakistani banking sector. (Khan et al., 2023). Existing research on the links between macroeconomic factors and financial risk in the Pakistani banking industry is limited, providing only a basic overview or ignoring important variables and their interactions. Current risk management frameworks used by Pakistani banks may be inadequate to handle the complex relationships between multiple macroeconomic factors and their combined impact on financial risk. The most recent example of mismanagement of financial risk is the of Standard Chartered bank, although they have one of the best services but still they were not able to survive in Pakistani markets. They sold majority of their shares to HBL Pakistan (Kishwar & Ullah, 2019).

1.3 Research Gap:

Lack of in-depth analysis into the dynamics of credit and liquidity risk within the specific context of the Pakistani banking industry. Existing studies including ‘The impact of macroeconomic variables on the profitability of listed commercial banks in Pakistan’(Kanwal & Nadeem, 2013) focused on individual macroeconomic factors in isolation, failing to consider their combined effects on financial risk. This study takes the combined effect of macro economic factors (GDP, inflation rates, interest rates and exchange rates) on financial risk (credit risk and liquidity risk).

1.4 Research Questions

1. In the context of Pakistani banks, what are the changes in macroeconomic variables (interest rate, inflation rate, GDP growth and exchange rates) influencing credit risk?
2. In the context of Pakistani banks, what are the changes in macroeconomic variables (interest rate, inflation rate, GDP growth and exchange rates) influencing liquidity risk?

1.5 Research Objective

The main objective of this research is to examine the combined effects of inflation, GDP growth, interest rates, and exchange rates on credit risk and liquidity risk from a perspective of Pakistan's banking sector. The objective of this research are;

1. To what extent are the changes in the macroeconomic variables (interest rate, inflation rate, GDP growth and exchange rates) influence the credit risk?
2. To what extent are the changes in the macroeconomic variables (interest rate, inflation rate, GDP growth and exchange rates) influence the liquidity risk?

1.6 Significant of study

1.6.1 Government Policy Makers

The findings of this study will have a significant impact on the people who make policy. Prior to implementing and forming any economic policies, it is crucial to comprehend the relationship between the variables (inflation, interest rates, GDP growth, and exchange rate) and financial risk (credit risk and liquidity risk). This study will aid in risk management guidelines and provide policy makers with guidance on how to create and modify frameworks and policies, including fiscal and monetary policies. The government can create a more robust and stable banking sector in Pakistan by aligning policies with available market data, which will ultimately support economic growth.

1.6.2 Investors

Investors, both domestic and foreign, will gain insight into Pakistan's economic circumstances with the aid of this study. They will gain an understanding of what might occur as a result of these variables and how these will effect their businesses, which will help them not only make informed decisions but also grow their business. Since they will be able to manage their portfolio with greater accuracy and precision, it will also help with the risk assessment associated with their investment in Pakistani industries.

1.6.3 General Public

Stronger and more stable banks will benefit the general public's customers as well as those involved in the larger economy. An effective banking system protects savings, makes credit available, and promotes general financial well-being, all of which help to maintain economic stability. The public may gain from improved economic resilience, increased financial security, and increased trust in the banking system, among other things, as the study clarifies the unique opportunities and challenges facing the Pakistani banking industry.

Insights specific to the Pakistani banking sector are provided by this study, which closes a significant research gap. These insights can be used to inform decisions that will enhance the sector's stability and efficiency and, eventually, accelerate its overall economic growth.

1.7 Scheme of Study

Chapter 1: Introduction

This part will build a background for this study, the common definitions, the relation between variables and work done related to these.

Chapter 2: Literature Review

This chapter will put shed on the past studies and proof from the previous work that will validate this study. This section also contains Theoretical Framework and Hypotheses that guides the analysis of the impact of macroeconomic factors on financial risk. The framework will draw upon relevant theories and concepts from finance and risk management.

Chapter 3: Research Methodology

This section will point out the research methodology used in the study, including how data is collected, how it is analysed, the techniques used. The methodology will be tailored to the specific research questions and objectives.

Chapter 4: Results and Analysis

This chapter will focus on the result obtained from the regression that will be done and the interpretation of the results and also analysis will be written to confirm the hypothesis. After that a discussion will done and proof from previous research work will be collected and use as evidence.

Chapter 5: Recommendations and conclusions

This section will provide recommendations to the credit risk and liquidity risk all related to Pakistan's banking industry. The conclusions section will identify all the key findings of the study will be presented and their significance to banking industry. This chapter will also shed light on the limitations in this case study.

Chapter 02

Literature review

2.1 Empirical Literature Review

The foundation of any economy is the banking sector. It serves as an intermediary between various financial objectives. However, there are a variety of uncertainties and risks associated with this significant role that could jeopardise the stability of the entire financial system.

Etymology of the word 'risk' is 'Rescum' meaning risk at the sea or the factor that cuts deep. Financial risk, on the other hand is a multidimensional phenomenon, comprising of the potential for negative or adverse outcomes that results from changes in market, credit uncertainties, and liquidity problems within the industry, in this case the banking industry. Financial Risk are more severe and lengthy when banks fails to recapitalize from the losses that they incur. (Bigio & Avernas, 2019).

The financial system serves as a link between global markets and reacts to local policies across different sovereign states, as is already widely understood. The challenges, opportunities, and issues facing Pakistan's banks are growing more complex each passing day. (Sultan & Mohamed, 2023). Let's first talk about financial risk as it relates to banks before moving further with our research. Credit risk and liquidity risk are the two dependent variables we have chosen for this analysis. Furthermore, we have included certain independent variables like GDP growth, inflation, interest rates, and exchange rates. To advance our research, we have included two additional control variables: the leverage ratio and bank size.

Financial Risk Management is important, and the industry (banks) has accepted it in response to the risk available in them. (Finger et al., 2018). To make sure the stability and flexibility of financial institutions, a strategic and methodical approach to the identification of risk, its assessment and its mitigation is required. In addition to the interest of management, shareholders and other stakeholders including other banks, government and the whole environment effective risk management also helps to support the overall stability of the country.

Pakistan set an important and unique playground for the research and study of the financial risk in the sector of banks because of its important and unique economic state and other regulatory structure. This study helps to identify and resolve the issues by taking credit risk and market risk in the context of Pakistan, illustrating the direction in which macroeconomic variables influence and shape the risk profile of the banking industry of Pakistan.

2.1.1 Evidence of the Interdependence between Credit Risk and Macroeconomic Factors

Credit risk is the risk of the consumer, institution, and other financial organization to not able to repay and fulfil the obligation that they have made. Credit risk is one of the most crucial factors for banks and other institutions because it will put them in jeopardy if not properly handled. It has been studied that there is a relationship between credit risk of the banks and their profits (Ekinici & Poyraz, 2019). This credit risk has been affected by several factors each of them have either positive or negative co relation. Positive correlation means that one of these variable increases so will the credit risk and vice versa. Negative correlation shows that if one of the variables increases it will have adverse effect on the credit risk. It means credit risk will decrease.

It has been observed that interest rate has positive correlation with credit risk. (Ekinici & Poyraz, 2019). When interest in the country rises it put several types of effects on the borrower as well as banks. With higher interest rates the consumers would prefer to not take loans from banks. The reason is that on acquired loan they must pay a higher fixed interest premium. Fixed interest means that at a specified date they must have to pay a fixed amount to bank, if they don't then they have to pay additional fine which decreases the borrower purchasing power and hence in long run it will contribute to his bankruptcy. Most financial analyst agrees that banks are directly affected by the unexpected and unpredictable changes in the interest rates (Naser, 2019). Business with low profit margin is also affected by the rise in the interest rates. Since businesses need loan to run their businesses, in addition for capital development projects like major replacement and repairs they usually get bank loans. Also, for expansion again huge loans are usually acquired from the banks.(Bord et al., 2021). Now since they have small profit margin and on the acquired loans, they must pay fixed interest payments. In long run this put them and their business in jeopardy. The interest payments become so huge that they either are unable to pay, or they delay the payment as much as possible. Both factors increase the credit risk. According to Fabozzi et al, (2003), the US savings and loan crisis of 1980s is due to the

fact the manager and financial institution ignored the effects of interest rates on the credit risk. It was also government inadequacy that they allowed this financial institution to take high risk than normal as a result the real estate prices shoot up and creating a bubble, this bubble burst when more and more people started to take loans (not repaying them), as a result the market became saturated, and the bubble busted. This is the kind of loss from which America still hasn't recovered yet. Interest rate rises also have indirect impact on the economy. For example, to control inflation (we will discuss it later) the regulatory bodies usually raise interest rates, the purpose to increase interest rate is due to the fact that it makes people to spend less, the lower spending creates a vacuum of money in the system. This prohibits the institution to invest less in new ventures and hence this slows down the economy and less jobs will be available which again result an increase in the credit risk. Thirty-six banks have been considered and positive co-relation has been found, the finding of the study indicate that high capital adequacy requirement shows a positive co-relation with gross non-performing assets (Rizvi et al., 2018).

The inflation rate has highest positive influence on the credit risk (De Leon, 2020). Inflation is general increase in prices results in the lower spending power of the consumers. Inflation has direct impact on the credit risk. The higher the inflation the higher would be the cost of local products and services for the consumers, hence lower saving for the consumer. This directly have impact on the credit risk because if there is less or no saving that individual, corporations and institution will not be able to pay their interest on loan neither the repayment of principle repayment. The positive relation as discussed above has been confirmed by the study of Priyadi et al., (2021). As we have established earlier that interest rate has positive co-relation with credit risk, also it has been proved by the interest rate has direct impact on the inflation rate. Increase in interest rate will also increase the inflation (Kusomaningtyas et al., 2021). Higher inflation rate result in higher cost for the businesses which in turn result in lower profit and hence higher risk of non-repayment of debt and interests on debt. So, credit risk increases exponentially. Inflation also affects the GDP growth and if GDP growth become slow then again it will directly impact the purchasing power of the individuals (Adaramola & Dada, 2020). And as discussed if the individual has low purchasing power, they will not be able to afford the repayment and they in worst situation became bankrupt and this will increase the credit risk and in return would create a going concern for the banks.

The exchange rate fluctuations can significantly impact credit risk is well-supported by empirical evidence. It will no effect economy but also the financial channels. (Avidijev et al, 2019). A depreciation of the local currency can increase the burden of debt denominated in

foreign currency, leading to higher credit risk for borrowers (Paniza & Taddei, 2020). This is because depreciation makes it more expensive for borrowers to repay their debt obligations, as they need to convert more local currency to foreign currency to meet their payments.

The increased credit risk due to exchange rate changes can negatively impact banks stability and its profits (Xu et al., 2019). When lenders or borrowers face problems in repaying their foreign currency-denominated loans, as a result banks may experience an increased NPL (non-performing loans) and lessor loan recoveries from their creditors. This in the end will decrease the profitability of the bank and in long run it will affect the stability of the banks.

Bostanci & Yilmaz (2020) went on board on an empirical study to evaluate the complex relationship between exchange rate changes and credit risk, especially shedding light on the German firms. Their study reveals a close relationship between increased exchange rate and increased credit risk for those firms who bear foreign currency denominated loans obligations. Their study shed light on the sense of defencelessness of the firms to exchange rate fluctuations and the possible impacts for their credit worthiness.

A comprehensive meta-analysis has been conducted by Beckmann & Czudaj (2017), they reviewed and synthesized the outcome of numerous studies on the possible connection between the credit risk and the exchange rate in the sector of banks. Their analysis showed a definitive conclusion i.e. exchange rate risk has a determine impact on the credit risk of the banks. It was found that there is a positive corelation between exchange rate and credit risk. The above studies provide a collective and compelling proof to substantiate the study that exchange rate has a positive impact on credit risk. Movements in exchange rate can result in uncertainties that resonate through credit portfolio, affecting the will and the ability of the lenders to fulfil their financial obligations.

GDP growth and the credit risk are negatively co-related to each other. A rise in GDP indicates the three is favourable turn in the economy and when economic conditions get better the people purchasing power and the job opportunities increases as a result individuals in the economy can pay their financial debt easily and hence decrease the credit risk for the banks. This relation is also evident from the current condition of Pakistan. As the GDP growth is slow nowadays and inflation are high the purchasing power of the people have decreased and hence there is much higher credit risk than it was few years before. According to Vitor, (2013) credit risk decreases with increase in GDP growth and the share price and house indices increases. Because this decreases the unemployment and hence reduced default risks.

Commercial banks play an important role in the flow of money, it acts as the intermediary between the consumers and corporates. These banks also help the government to transfer and implement the policies such as the monetary and fiscal policies. Hence act as the helping for the regulatory authorities. In short banks need to be highly proactive and stable to fulfil their duty as the intermediary and the agent of the money flow in the economy (Masau & et al., 2018). In general, it is considered that there is a positive co-relation between the stock market and GDP of the country. As when the economy is performing well it usually results in higher profits for the corporate sectors and as a result this motivates the potential investors to buy further stock and hence this contributes to upward movements in the stock market. This upward movement has a direct impact on the banking industry. Because the upward movements show the growth in economy which in turn results in higher credit quality. In a thriving economy there is a reduced chance of loan default so in turn it improves the overall health of the banks. (Patatoukas, 2021). Patatoukas, (2021) also identifies that stability in GDP also results in the increased demand for loans since people instead of savings their investments prefer to use it on different startups and other profit-making projects. In contrast when GDP or the economy of the country slows down it increases the chances of loan default, reduces demands for loans which of course is highly unprofitable for banks and also it decreases the overall value of different assets held by the banks. GDP also has effects on interest rates. Interest rates are a big concern not only for institutions but also investors because changes in interest rates result in positive or negative fluctuations in fixed-income securities. In general, when GDP moves in a positive upward direction, banks in response will increase the interest rate that they charge for different products and services that they offer. However, this is restricted by the central banks as they can intervene if interest rates get higher than a required set limit. If they do not do this then it will result in instability in the economy. Nominal GDP, (GDP in which inflation factor is considered) is modified to account for inflation to represent real GDP. One of the main factors of GDP growth is the rate of interest, whose volatility is highly related with that of inflation rate. Its high or low rates also influence the GDP rise and grows to affect the rate of GDP growth. The evaluation and prediction of interest rate is crucial for understanding the credit risk in the banking industry. (Baur & Rudebusch, 2020).

According to Aaron & Muellbauer (2002), many people believe that a rise in the interest rate has a direct effect on the GDP, but according to him it takes several months before it shows its true effect in the economy. This is supported by the previous studies made on GDP. According to him when regulatory institutions like central banks raise the interest rates to handle the

inflation in the economy, then the impact is visible in few months rather than it appear abruptly in the economy. This whole thing is called monetary tightening. Also, during the time when economy slows down, the interest rates are decreased to put the stability in the economy. In the end the focus of this whole discussion is that whether it takes one month or few quarter or even few years the impact of GDP has negative impact on the credit risk that the bank faces. So, a stable economic growth is necessary for the reduction in credit risk.

2.1.2 Evidence of the Interdependence between Liquidity Risk and Macroeconomic Factors

Liquidity risk is the risk that banks are unable to manage their day-to-day expenses due to shortage of funds and other liquid current assets. Liquidity is an important factor for any organization. It makes sure that banks or any other corporation or institution have enough funds that they can at least survive for foreseeable future. Liquidity risk decrease the survivability of banks as seen in the banking industry of America (Chen et al., 2021). Foreseeable future means that at least they can manage their business activities for at last upcoming twelve months. Liquidity position also shows the overall health of the business, investors pay close attention to liquidity position before doing any business with the organization. The findings demonstrate that credit risk and capital requirements' strictness have a substantial detrimental effect on liquidity risk (Mohammad et al., 2020). Liquidity in banks is more important than any other financial institution, because banks are the places where people keep their money, and it is this money that bank uses for their business expansion and day to day activities so for banks the higher the liquid assets they have the more the banks is considered to have stability and people trust these kinds of banks.

In this study we will observe the liquidity risk and will also see the impact of macroeconomic factors such interest rate, inflation, exchange rates and GDP growth on banks liquidity.

The interest rates have positive co-relation on the liquidity risk of the banks. Banks with a wider income disparity make more money and reduce their lending more than other banks do when the Fed Funds rate rises. This result holds up well when known influences on how monetary policy is transmitted to bank lending are taken into account (Gomez et al., 2021). Volatility in the interest rates can put a constraint on the deposits of the banks. For example, the consumer would put their deposits in the banks saving accounts when interest rate in the

markets is low, so to save their investment and to get a premium on their interests they will keep the money in the banks. However, if they found out the interest rates have become high, they may start looking for other options such as investment in other financial instruments such as bonds, options, and other type of securities in the market which earn a high yield for them. So as result a sudden decrease in the bank deposit would put a constraint on the banks' ability to make return and to earn profits. The evidence of this positive co relation has been found from the study done by Sadiq et al, (2022). To achieve a more robust and long-lasting rise in shareholder wealth, decision-makers who oversee a company's risk and efficiency must place a greater emphasis on risk.

Interest rate changes can result in a negative impression on the market participants they become more cautious and risk averse, this will result in decline of trading and hence in liquidity management. Interest rate also have effects on price and accessibility to funds in the whole market because they have an impact on the country's stock market. (Sitiawan 2020).

Opposite to expectations, the interest rate control law has had the opposite impact. In particular, it has resulted in decreased financial intermediation, a decreasing loan book for small banks, and a collapse of credit to micro, small, and medium-sized businesses (Alper et al., 2020). As a result, not only, this will put a constraint on the borrowers and hence this will not only increase the credit risk but also in future the potential borrower will hesitate to acquire new loans from the banks as they might not be able to pay these high interests on the loan. So as result people will look for other options instead of taking loan from banks, when they do this, there will be a sharp decline in the bank loans. Since earning interest by providing loans are one of the main activities of banks or we can even say that it's the main earning source for banks.

Inflation rate and liquidity risk has direct relation with each other. A study by Madhi, (2021) indicate that the overall decline in foreign market activity and the public's mistrust of the banking system were obvious indirect impacts. Not only inflation decreases the purchasing power of the people, but it also has some harsh effects on other areas as well. For example, a high inflation forces the organization to reduce their production and limit their services, which ultimately results in the increase redundancy. When people lose jobs, this create uncertainty in the economy. People started to leave the home country and hence brain drain occur which in long run negatively affect the country. It is observed that some macroeconomic and specific factors have a substantial impact on bank liquidity. These include capital adequacy, non-

performing loans, deposit growth, GDP, unemployment rate, and marginal interest rate. Profitability and inflation, however, do not (Mazreku, 2019). Central bankers and other financial and economic experts see price stability as the main objective they think that inflation is costly for anyone and everyone. One of these costs is the rise in inflation rate which result in uncertainty. When there is a high rate of inflation, banks and other businesses perform poorly. (Le at el., 2023).

GDP growth and inflation has negative and positive impacts on the liquidity risk. This has been tested on different banks of India, including the State bank of India. (Sopan et al, 2018).

Strong GDP is concerned with the stable economic conditions (Svenfelt at el, 2019) When economy is growing businesses make stable profits and individual may have higher income potential. This economic stability contributes to overall wellness of the economy and hence reduces the risk of liquidity. GDP growth can also lead to increased economic activities and higher trading in the stock markets. Higher trading usually indicates more liquid market, this is due to increased numbers of sellers in the market and also the buyers. Higher GDP also take part in the stability of the banking system. Banks will face lower default problems and the financial position of the lenders may improve. A stable and growing market will help in stable banking system hence reducing the systemic liquidity risk.

Commercial banks play an important role in the circulation of money in the economy. They take money from the lenders and provide it to the user of this money. Due to this circulation of money banks are helping the regulatory authorities to implement proper fiscal and monetary policies. The majority of the cashflow that revolves in the economy is mainly comprised of banks deposits as a result this flow help in the economy to shift the cost of goods and the services in the economy. To fulfil this whole process of circulation banks needs to be stable and they must have enough liquid resources to carry out their process. (Masau & et al, 2018).

The stability in GDP also results in increased demand for long- and short-term loans since people instead of savings their investments prefer to use it on different startups and other profit making projects. In contrast when GDP or the economy of the country slows down it increases the chances of loan default, reduce demands for loan which of course is highly unprofitable for banks and also it decrease the overall value of different assets held by the banks (Patatoukas, 2021). Real GDP growth is main represented by the nominal GDP growth which account for the inflation in the economy. Behind the spread of macroeconomic the main force

that contribute to it is the interest rate and changes in it is closely related to the inflation. The rise or fall in economic growth are affected by the inflation in the. High inflation means slower growth while lower inflation means higher growth in GDP. Across a range of demographic groups, low interest rates cause a considerable increase in the proportion of risky assets held. (Lian et al., 2019).

A depreciating currency can result in increased liquidity risk, especially when the decrease in the value of currency is rapid. Investors will not be ready to take risk by investing the depreciating currency hence it will give rise to liquidity risk. Hence a positive correlation exist here. Also, if the bank hold asset in foreign currency in other country and the value of the currency depreciate this will create a problem of liquidity because they will be getting less cash than they actually desired to. There are methods to decrease liquidity risk such as hedging techniques, using forward or futures. Also currency option can decrease this risk but at the end the relation still remain positive if these techniques does not exist. Roman & Sargu, (2015) has worked and used OLS regression. Analysis. the data has been used is from 2004 to 2011, their result confirm this relation.

Study by Rafiq et al., (2019) stated that Pakistani banking industry is vulnerable to changes in the exchange rates and by interest. Since Pakistan is country who is highly dependent on imports, so a rapid change in exchange rate poses a significant threat to the industry as whole. The study shed light on the importance of comprehensive knowledge and showed that how important it is to have knowledge of the effect of GDP on the liquidity risk of the banks.

2.2 Theoretical Framework

The theoretical framework that evaluates the relation between Credit risk and its drivers which consists of interest rate, inflation rate, GDP growth and exchange rate. Credit risk represents the risk of companies to not pay their debts due uncertainties and variables that are beyond their control. Interest rate represents the overall interest or premium that has to be paid on different financial instruments such as loan, bonds etc. Inflation is the decrease in the purchasing power of the consumers in the economy. GDP growth represents the overall growth or the per capita income of individuals in the economy. Lastly the exchange rate represents the transaction risk that arise due to currency fluctuations in two countries. Examining these independent variables under the theoretical framework shows us the direction as how these influences the Credit risk from the perspective of the banking industry of Pakistan.

Dependent variables; Credit Risk and Liquidity risk

Independent variables; GDP growth , inflation rate , interest rate and exchange rate .

Control variables; Leverage ratio and bank size.

Understanding the complex correlation between macroeconomic variables and financial risk in the banking industry of Pakistan requires a theoretical framework based on established economic theories. The Agency Theory sheds light on how decisions about credit and liquidity risk may be in line with shareholder interests and helps to clarify possible conflicts of interest between stakeholders and bank management. When managing liquidity risk, banks in Pakistan may choose to prioritise internal funds over external sources. This decision may be influenced by the macroeconomic conditions that are currently in place. This can be examined by applying the Pecking Order Theory. Furthermore, the Trade-off Theory comes into play when trying to comprehend how financial institutions strike a careful balance between avoiding excessive debt, which could raise credit risk, and leveraging for higher returns. Understanding how exchange rate fluctuations, impacted by global economic factors, may be taken into account in credit and liquidity risk assessments is made easier by taking the Efficient Market Hypothesis into consideration. In the context of the Pakistani banking industry, the Mundell-Fleming Model aids in the analysis of the complex interactions between exchange rates, interest rates, and economic output. Finally, the Phillips Curve supports theories about how inflation affects credit risk and is useful for examining the possible effects of inflation on economic stability and borrower repayment capacity.

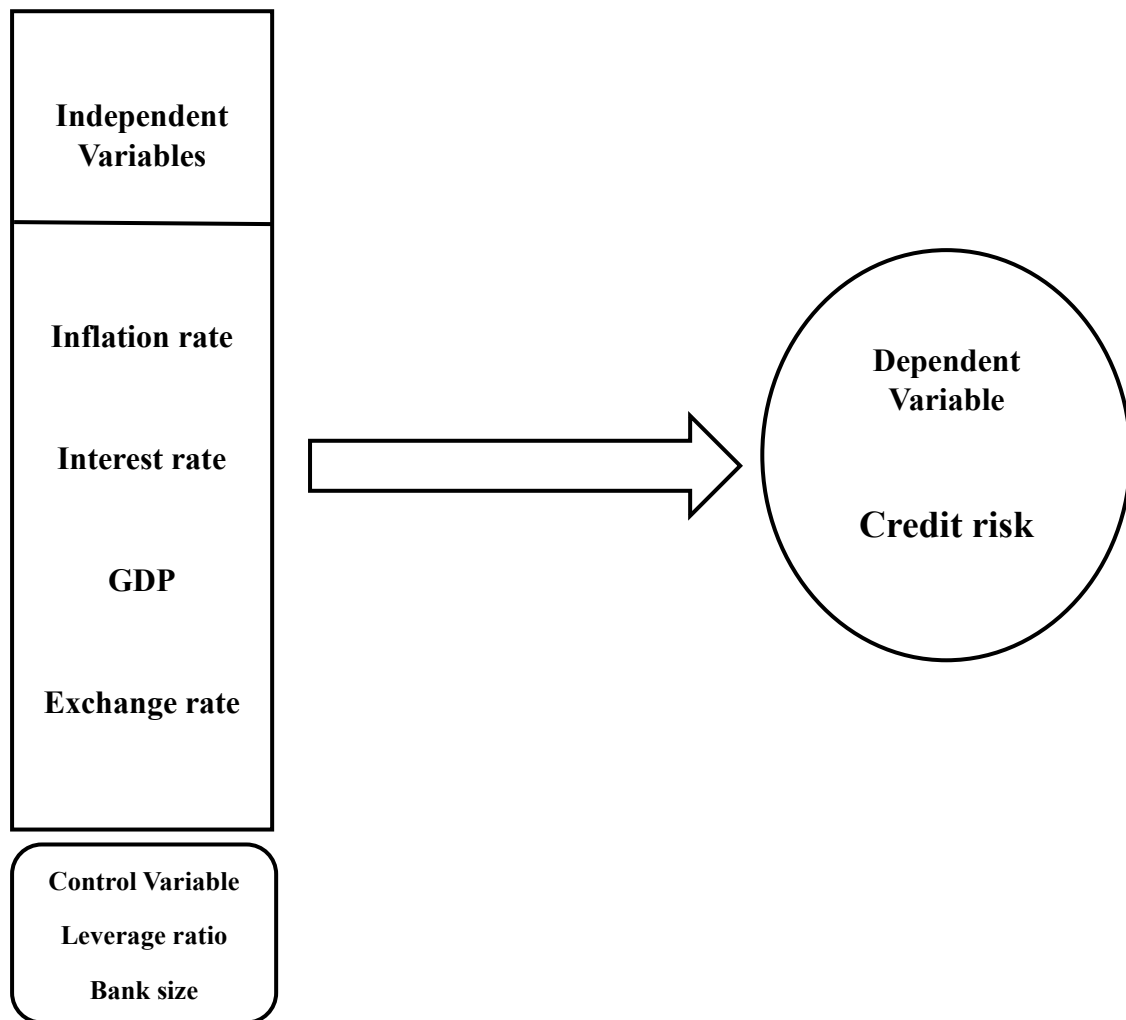


Figure 1: Theoretical Framework for Credit Risk

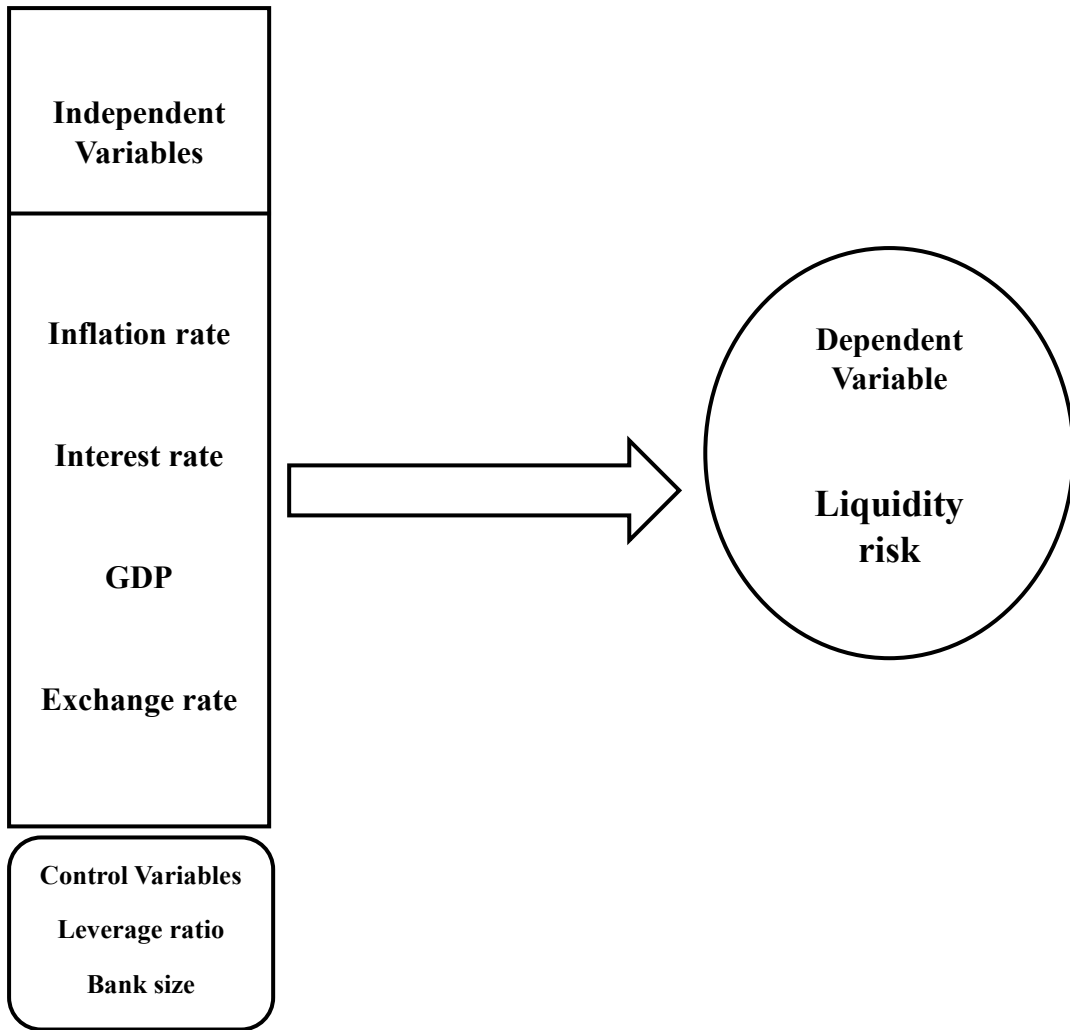


Figure 2: Theoretical Framework for Liquidity Risk

3.2 Hypothesis

The following hypothesis has been developed based on the literature review and the conceptual framework.

H₁: GDP growth has significant negative impact on credit risk.

H₂: Inflation rate has significant positive impact on credit risk.

H₃: Interest rate has significant positive impact on credit risk.

H₄: Exchange rate has significant negative impact on credit risk.

H₅: GDP growth has significant negative impact on liquidity risk.

H₆: Inflation rate has significant positive impact on liquidity risk.

H₇: Interest rate has significant positive impact on liquidity risk.

H₈: Exchange rate significant has positive impact on liquidity risk.

Chapter 03

Research Methodology

3.1 Research Design

This study uses secondary data i.e. the model is based on data collected from sources such World Development Indicator (WDI). Also, it has been seen that the dependent variable is affected by the independent variables this has proved the validity of the hypothesis presented before. An answer is devised by using an empirical technique, which has resulted in new debates and achievements of the findings.

3.2 Data and sample

To study the effects of credit risk and liquidity risks that are faced by the Pakistani banking sector and its impact on the overall economy, we will take variables such as GDP growth, inflation rate, interest rate and exchange rate. The sources that has been used are the financial statements of 23 commercial banks including first women bank, national bank of Pakistan, Sindh bank of Pakistan, Albarka bank. Allied bank, Askari bank, Bank al Habib, Bank Alfalah, Bankislami Pakistan, Dubai Islamic bank, Faysal bank, Habib bank, Habib metropolitan bank, Js bank, MCB bank, Meezan bank, Samba bank, Silk bank, Soneri bank, Standard chartered bank, Summit bank, UBL bank and SME bank. In addition, we have also used data from WDI (World development Indicators) for our variables interest rate, inflation rate, GDP growth and Exchange rate.

3.3 Variable Measurement

Total number of observations taken for this analysis are 253. Data has been collected from the year 2011 to 2021.

GDP is defined as the products or services that are produced in the country in a specific period. The growth in the GDP explains how much it does has expanded as compared to last year. To explain this variable, we have used data from WDI from the year 2011-2021.

Interest rate is the rate of premium that is paid on the money borrowed or is received when money is landed to someone. To explain this variable, we have used secondary obtained from WDI.

Inflation rate is the percentage change in the average cost of goods and services in an economy over an interval of time is referred to as the inflation rate. It represents the average rate of rise in prices, thereby decreasing the purchasing power of a certain amount of currency. Again data from World Development Indicator (WDI) has been utilized.

Exchange rate is the value of the currency of one country in comparison to that of another is commonly referred to as the exchange rate.

3.4 Econometric Model

The following equation for this thesis can represent the common effect model:

$$CR_{it} = \beta_0 + \beta_1 INF_{i,t} + \beta_2 INT_{i,t} + \beta_3 GDP_{i,t} + \beta_4 ER_{i,t} + \beta_5 \text{Control Variables}_{i,t} + \varepsilon_t$$

Where:

CR_t risk Credit Risk observation i at time t ,

β_0 is the common intercept.

β_1 is the common slope coefficient for the independent variable Inflation rate.

β_2 is the common slope coefficient for the independent variable Interest rate.

β_3 is the common slope coefficient for the independent variable GDP.

β_4 is the common slope coefficient for independent variable Exchange rate.

$\varepsilon_{i,t}$ is the error term

Control Variables, Bank size and leverage rate.

$$LR_{it} = \beta_0 + \beta_1 INF_{i,t} + \beta_2 INT_{i,t} + \beta_3 GDP_{i,t} + \beta_4 ER_{i,t} + \beta_5 \text{Control Variables}_{i,t} + \varepsilon_t$$

LR_t risk Credit Risk observation i at time t ,

β_0 is the common intercept.

β_1 is the common slope coefficient for the independent variable Inflation rate.

β_2 is the common slope coefficient for the independent variable Interest rate.

β_3 is the common slope coefficient for the independent variable GDP.

β_4 is the common slope coefficient for independent variable Exchange rate.

$\varepsilon_{i,t}$ is the error term

Control Variables, Bank size and leverage rate.

3.5 Panel data estimation Models

To compute the results, the data will be quantified according to its size, structure, validity, and relevance. The usefulness of the data will determine how each data sheet is put together. STATA was used to conduct the tests. The following tests were performed on the data in Excel after it had been cleaned and formatted:

Random Effect GLS regression, correlation and significance test.

The data type chosen was panel data, hence "Random Effect GLS regression" was applied. The GLS regression model is preferred over the OLS regression model due to its ability to account for both individual and group level effects, whereas the OLS regression model only takes into account homoscedasticity. Although winsorized data was used, choosing OLS over GLS could still result in heteroscedasticity, which could lead to inaccurate estimates. Unless the factors that regress are strictly exogenous, which is generally considered problematic, OLS is inconsistent. GLS only needs pre-determined regressors in order to get consistent estimates. This should contribute to reversing the trend of GLS-based techniques being used instead of mechanically applying OLS+HAC (Perron, 2021).

Also Correlation and significance test were conducted these shows that strength and statistical significance between dependent variable and independent variables.

The Pearson co-relation coefficient which ranges between -1 to +1. The positive value shows a positive co-relation. It means that if there is increase in one variable then there will be increase in another variable as well. The negative value shows that a negative co-relation exist

between two variables. This means an increase in one variable will result in decrease in other. The closer the values are to +1 and -1 the stronger is the positive or negative correlation. A value of 0 indicate that no co-relation exists.

A significance test indicates that whether the observed relation between the variables is statistically significant to it or has occurred just by chance or randomly.

In significant test there is a test called the null hypothesis, it indicates that there is no relationship between the variables. In this study there is no significance value that is equivalent to 0, so null hypothesis is removed. Another hypothesis called the alternative hypothesis is true in this study, this indicates that there correlation between variables.

Chapter 04

Results and Analysis

4.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.
wcr	253	0.3206	0.089
wgdp	253	0.0427	0.0148
wir	253	0.0742	0.0267
wintrate	253	0.1076	0.0188
wer	253	1.18	0.2566
wlev	253	0.1362	0.0536
wbz	253	19.6427	1.1589

Table 1: Summary Statistics

The dependent variable, represented by the symbol "wcr" and signifying credit risk, acts as the dataset's central point. Throughout the dataset, the average observed credit risk level is around 0.321. We can establish a baseline understanding of the typical credit risk in the dataset by using this average value as a central measure. Understanding the variation in credit risk levels is also essential, though. The standard deviation of 0.089 that is included with the data illustrates how much each credit risk value shifts from the average. A standard deviation of 0.089 in this case implies that credit risk levels are fairly diverse, this may be due several factors such as company size, industry and financial health. The mean of other variables like GDP (wgdp), Inflation rate (wir), interest rate wintrate, exchange rate (wer), leverage ratio (wlev), and bank size (wbz) also have their own mean values within their respective ranges.

Credit risk (wcr), GDP (wgdp), Inflation rate (wir), and Interest rate (wintrate) have relatively low standard deviations, suggesting that their values tend to be closer to the mean. This means that most companies in the dataset have credit risk, economic growth, interest rate, and win rate values that are relatively close to the average. Exchange rate (wer) and leverage ratio (wlev) have higher standard deviations, indicating a wider spread in their values. This means that there is a greater disparity in the values of these variables across the companies in the dataset.

4.2 Correlation matrix

	wcr	wgdp	wir	wintrate	wer	wlev	wdz
wcr	1						
wgdp	0.2243	1					
wir	-0.16543	-0.5947	1				
wintrate	0.2879	-0.7944	0.684	1			
wer	0.1232	0.0261	0.3952	-0.3068	1		
wlev	0.4685	0.126	-0.0752	-0.2161	0.1938	1	
wdz	-0.0806	0.1077	-0.0329	-0.2216	0.2653	0.4296	1

Table 2: Correlation matrix

Strong positive correlation between wcr (credit risk) and wlev (leverage) suggests that banks with higher leverage tend to have higher credit risk, indicating a potential risk factor to monitor. The correlation coefficient of 0.4685 is statistically significant at the 99% confidence level, indicating that there is a strong likelihood that the relationship is not due to chance.

Weak negative correlation between wcr and wbz (bank size) denotes that larger banks might have slightly lower credit risk, potentially due to greater diversification or stronger capital buffers. The correlation coefficient of -0.0806 is not statistically significant at the 95% confidence level, so it is less likely that the relationship is meaningful. Moderate negative correlations between wcr and wgdp, wir, and wintrate: These suggest that credit risk might be lower during periods of economic growth, lower inflation, and lower interest rates. The correlation coefficients of -0.2243, -0.1654, and -0.2879 are all statistically significant at the 95% confidence level.

4.3 Regression Analysis

4.3.1 Impact of Macro-Economic Variables on Credit Risk

Adjusted R-sq 0.3477			Wald chi2(6) 154.31	
Variable	Coefficient	Std. Error	z-value	p-value
wgdp	-0.04118	0.494518	-0.08	0.934
wir	0.354536	0.431164	0.82	0.411
wintrate	1.449106	0.793458	1.83	0.068
wer	-0.02254	0.0378856	-0.59	0.552
wlev	1.130749	0.112149	10.08	0.000
wbz	-0.02295	0.008443	-2.72	0.007
_cons	0.775366	0.196301	3.95	0.000

Table 3: Regression analysis: Credit risk and macro-economic variables

4.3.2 Interpretation

The adjusted R-squared of 0.3477 indicates a moderate level of explanatory power in the model examining credit risk (*wcr*) within the banking sector in Pakistan. The collective influence of the independent variables—interest rate (*winrate*), inflation (*wir*), GDP growth (*wgdp*), exchange rate (*Wer*), leverage rate (*Wlev*), and bank size (*Wbz*)—can therefore be used to explain about 34.77% of the variation in credit risk.

This shows that the model captures some important relationships, but it also shows that the complexity of factors influencing this financial risk is highlighted, as approximately 65.23% of the variation in credit risk remains unexplored.

The model has a Wald chi2 of 154.31 with 6 degrees of freedom. The corresponding p-value is 0.0000, which is extremely small. This strongly suggests that the independent variables (*wgdp*, *wir*, *winrate*, *wer*, *wlev*, *wbz*) jointly have a significant effect on the dependent variable (*wcr*).

For Pakistani banks, the model suggests a complicated movement between financial conditions and credit risk. It is precise throughout each bank, with 39% of credit risk changes waltzing with changes in economic forces such as GDP and interest rates. This is a moderate fit, indicating the model explains a decent, but not outstanding, portion of the credit risk variation. However, when all banks are considered, the relationship reduces considerably, explaining approximately 36% of the total risk picture. This shows that unseen results in aside from economics are impacting the risk rhythm, needing more investigation to improve the model and depict the whole choreography of credit risk in Pakistan's dynamic banking environment. Remember that a strict 10% threshold decides whether a variable significantly changes the dance, ensuring that only the most influential partners gain consideration. While the model explains over 40% of the variation in credit risk among banks (39.47% R-squared), other factors are still at work. Risk is reduced with economic growth (-4.11% per 1% GDP), but higher interest rates (+35.45% per 1% rate) and leverage (+1.13 unit per 1% leverage) enhance it. Interestingly, larger banks had reduced risk (-2.2% per 1% size), maybe due to the benefits of diversity. This moderate-fit model emphasizes the complicated relations of factors influencing credit risk, emphasizing the need for effective risk-management strategies that incorporate both internal and external impacts into consideration.

The model presents an advanced risk situation in Pakistani banks. It explains roughly 40% of the deviation in credit risk, with economic growth providing a silver Correlations provide more detailed narrative. While credit risk has a perfect 1:1 correlation, indicating a strong, direct association with another variable, GDP only has a 22% positive correlation, indicating the presence of other factors. To highlight this detail, the liquidity risk model merely explains 11% of the fluctuation. The fact that all of your chi-square test findings have p-values highly near to 0% (probably less than 0.05) implies significant evidence in approval of the alternative hypotheses (H1) over the null hypothesis (H0). It also suggests that the observed data patterns are exceedingly unlikely to have occurred by chance alone, lending confidence to the existence of significant correlations between the variables one has examined.

Changes in capital structure and earnings management, as well as new goods and business strategies, modify the Pakistani banking sector. These transformations are interconnected, resulting in a dynamic environment in which progress and risk coexist. Consider random effects. GLS regression is a statistical master who illuminates this delicate dance. It recognizes that businesses are not identical; invisible elements like as culture and policy impact both credit risk (the priority) and economic indicators (e.g., GDP). Ignoring these concealed dancers results in inaccurate computations. GLS intervenes, rating observations depending on their confidence, thereby silencing the unseen, and revealing the underlying pattern of risk and innovation in Pakistani banking.

The data demonstrates an interesting interrelationship with economic parameters such as GDP, interest rates, and bank size when analyzing the relationship between Pakistani banks and financial risks. When applied to individual banks, the model reveals a substantial relationship: 39.47% of credit risk fluctuations within each institution advance in accordance with changes in key economic indicators. When expanded at to incorporate all banks, the fit gets more precise. The model efficiently describes 35.82% of the whole credit risk landscape, suggesting a large yet moderate collaboration. While these economic actors clearly have power, the evidence suggests that there are hidden interactions impacting the risk pattern that have yet to be effectively characterized.

Pakistani banks are in a riskier movement impacted by significant variables such as leverage and size. Higher debt (leverage), like an irrational performing partnership, raises risk by 1.13 points for every additional amount added. This restricted correlation indicates that banks that rely significantly on loans suffer higher risk increase.

Size, on the other hand, provides a more stable relation. Larger banks, with their diversified activities and strong financial defenses, reduce risk by 0.023 points for every increased point of size. This significant relationship shows that larger institutions are better at dealing with risk's challenging phases.

While it appears that every additional step increases risk by 1.45 points, the relationship isn't quite as significant in terms of interest rate.

wgdp (Coeff. = -0.0411793, $z = -0.08$, $p = 0.934$): No significant relationship with credit risk (wcr). Holding other variables constant, a one-unit increase in wgdp is associated with a negligible decrease in wcr, but this effect is not statistically significant.

wir (Coeff. = 0.3545356, $z = 0.82$, $p = 0.411$): No significant relationship with credit risk (wcr). Holding other variables constant, a one-unit increase in wir is associated with a slight increase in wcr, but this effect is not statistically significant.

wintrate (Coeff. = -1.449106, $z = -1.83$, $p = 0.068$): Marginally significant negative relationship with credit risk (wcr). Holding other variables constant, a one-unit increase in wintrate is associated with a 1.45-unit decrease in wcr, but this effect is only marginally significant (p-value close to 0.05).

wer (Coeff. = -0.0225403, $z = -0.59$, $p = 0.552$): No significant relationship with credit risk (wcr). Holding other variables constant, a one-unit increase in wer is associated with a slight decrease in wcr, but this effect is not statistically significant.

wlev (Coeff. = 1.130749, $z = 10.08$, $p = 0.000$): Highly significant positive relationship with credit risk (wcr). Holding other variables constant, a one-unit increase in wlev is associated with a 1.13-unit increase in wcr, and this effect is highly significant.

wbz (Coeff. = -0.0229466, $z = -2.72$, $p = 0.007$): Significant negative relationship with credit risk (wcr). Holding other variables constant, a one-unit increase in wbz is associated with a 0.023-unit decrease in wcr, and this effect is statistically significant.

_cons (Intercept, Coeff. = 0.775366, $z = 3.95$, $p = 0.000$): Highly significant positive value, indicating the expected credit risk when all other variables are zero.

4.4 Discussion

This section defines the impact of credit risk on macroeconomic variables such as GDP growth, inflation rate, interest rate and exchange rates. Discussion about the impact of each variable on credit risk is considered.

4.4.1 Positive Co-relation between Inflation Rate and Credit Risk

The correlation between inflation rate and credit risk has been found to be positive. The positive correlation observed here shows that as the inflation rate in the country increase this result in direct increase in credit risk. The reason for this increase is due to the fact the inflation acts as the proxy for the performance of overall economy stability of the country. When inflation is high the purchasing power of the consumer decreases. Also, the per capita income which again shows the purchasing power of the consumer decreases and as a result due lower saving and higher cost the chances of them being in default increases hence with higher chances of default credit risk also increases. A rise in inflation also affects the behaviour of consumer. As because of rise in inflation the cost-of-living increases so it changes the spending and saving behaviour of consumers. Understanding the positive relations is also important for the policy makers and other regulatory institutions. Because of this relation regulatory bodies have to adopt proactive approach to handle inflation pressures and acknowledging their possible repercussions on the banking industry's stability. Also, for banks they need to incorporate inflation policies to anticipate and manage the potential increase in the credit risk.

This analysis has made it clear that there is a positive correlation between credit risk and inflation rate. However more study into this could unhide temporal aspects of this correlation and would help to established that how different economic sectors are influenced by the dynamics factors of inflations. This positive relation has been confirmed by the study of Kasidi & Mwakanemela (2013). In their study they indicate that the inflation has reverse effect on the economic growth since credit risk and economic growth are inverse relation so it proves our claim that inflation rate has positive impact on credit risk.

4.4.2 Positive Co-relation between Interest Rate and Credit Risk

From the perspective of Pakistani banking industry, the study has shown that there is positive relation between interest rate and credit risk. One of the most important factors that interest rate affect directly is the cost of borrowing. The cost of borrowing is the expense that

consumer has to bear to get a loan from the any corporation or institute. Here this study consider banks which pay loan at a determined interest rate. So higher the interest rate higher would be the cost for the consumer and lessor would they prefer to get borrow loan. Higher interest also increases the chance of default. again, just like inflation rate the interest rate also act as barometer for the economic condition of the country. In period of expansion main central banks like state bank of Pakistan may increase interest rates to curb the inflation so as result businesses may face problems in adapting to high cost of borrowings, therefore increasing the risk of credit risk. The positive correlation in credit risk and that of interest rate is of particular significance for banks who hold a large portfolio of variable-rate debts. Variable-rate loan or debt borrowers may find it extremely difficult to adjust to the repayment obligations when interest rates fluctuate, which increases the likelihood of bankruptcy.

In the industry such as banking, a proper understanding of co relation between credit risk and interest rate is important to manage the risk. To evaluate the impact of interest rates with different magnitude on credit risk, financial institutions such as banks should stress-test their overall portfolios and include interest rates effects in their risk management models. In order to manage different negative impacts of rising interest rates, proactive strategies like diversified prudent loan portfolio and hedging techniques become necessity. According to (Kasman et al, 2011) interest rate have negative effect on conditional bank stock return which is inverse of credit risk hence it further prove our analysis of the positive co relation of interest rate with credit risk.

4.4.3 Negative Co-relation between exchange rate and Credit Risk

The strengthening of domestic currency decreases the credit risk for the banks. Because a stronger currency shows that the economy is strengthening, and it also indicate that the inflation is in control. It also indicates the overall economic confidence of the country. With higher exchange rate the per capita income also improve hence it improve the repayment capability of the lender. In case of Pakistan which is dependent on high imports the strengthening of currency makes the imports cheaper and more feasible for the end consumers. People instead of saving money in foreign currency would prefer to save it I their own domestic currency. This has also been proved by the work of Kutum, (2017). According to Kutum, (2017) after running regression analysis they were able to find out that in Romanian banks that the there is negative co-relation between exchange rate and money supply growth rate.

4.4.4 Negative co-relation between GDP growth and Credit Risk

As discussed before the strengthening of economy increases the purchasing power of the consumers, corporations, and institutions. The higher the per capita income the higher would be the buying power of the people. When they have surplus of fund, they will be then able to pay their outstanding debts and hence this decreases the risk of credit risk for banks. Higher growth in the economy also produces higher employment opportunities. The higher the employment rate in the country the lesser would be the chances that they would get default and hence lesser the chance that they would go bankrupt. Hence again reduced credit risk.

To support this discussion the study of Vitor, (2013), credit risk decreases with increase in GDP growth and the share price and house indices increases, because this decreases the unemployment and hence reduced default risks. A healthy economy lowers a company's dependency on bank credit and lowers the risk to banks overall by providing alternatives to bank loans. Second, when confidence soars, investors gravitate towards riskier assets, which makes traditional bank loans—especially the riskier ones—less appealing and preserves the health of credit portfolios. Thirdly, Pakistani banks frequently tighten internal credit assessments to weed out potentially risky borrowers, even in the midst of the growth-related competitive frenzy. Furthermore, the type of growth also matters; expansion driven by exports may have a different effect on credit risk than growth driven by domestic consumption. Lastly, during periods of strong growth, watchful central banks may raise interest rates, further discouraging borrowing and reducing overall credit risk. Proactive approaches are needed to navigate this paradoxical dynamic, such as putting asset quality first, diversifying funding sources outside of loans, and working with regulators to identify and handle any credit issues that may arise during rapid expansion. Pakistani banks can strengthen the resilience of the financial system by taking advantage of growth opportunities and mitigating potential credit risks by comprehending these complex relationships and adjusting their approach accordingly.

4.5 Impact of Macro-Economic Variables on Liquidity Risk

4.5.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.
wlr	253	0.3406	0.09
wgdp	253	0.0433	0.0158
wir	253	0.0752	0.0277
wintrate	253	0.1086	0.0198
wer	253	1.28	0.2676
wlev	253	0.1482	0.0626
wbz	253	19.8827	1.1599

Table 4; Summary Statistics

The dependent variable, represented by the symbol "wlr" and signifying liquidity risk, acts as the dataset's central point. Throughout the dataset, the average observed liquidity risk level is around 0.3406. We can establish a baseline understanding of the typical liquidity risk in the dataset by using this average value as a central measure. Understanding the variation in liquidity risk levels is also essential, though. The standard deviation of 0.09 that is included with the data illustrates how much each liquidity risk value shifts from the average. A standard deviation of 0.09 in this case implies that liquidity risk levels are fairly diverse, this may be due several factors such as company size, industry and financial health. The mean of other variables like GDP (wgdp), Inflation rate (wir), interest rate wintrate, exchange rate (wer), leverage ratio (wlev), and bank size (wbz) also have their own mean values within their respective ranges.

liquidity risk (wlr), GDP (wgdp), Inflation rate (wir), and Interest rate (wintrate) have relatively low standard deviations, suggesting that their values tend to be closer to the mean. This means that most companies in the dataset have credit risk, economic growth, interest rate, and win rate values that are relatively close to the average. Exchange rate (wer) and leverage ratio (wlev) have higher standard deviations, indicating a wider spread in their values. This means that there is a greater disparity in the values of these variables across the companies in the dataset.

4.5.2 Regression Analysis

Adjusted R-sq 0.0851		Wald chi2(6) 56.83		
Variable	Coefficient	Standard Error	z-value	p-value
wgdp	-0.631	0.193	-3.27	0.001
wir	0.327	0.168	1.94	0.052
wintrate	1.245	0.31	4.02	0.000
wer	0.016	0.015	1.08	0.282
wlev	-0.029	0.046	-0.63	0.532
wbz	0.001	0.004	0.21	0.835
_cons	-0.113	0.089	-1.27	0.204

Table 5: Regression analysis: Liquidity risk and macro-economic variables

Interpretation

With an adjusted R-squared of 0.0851, the model analysing liquidity risk in Pakistani banks has comparatively little explanatory power. This indicates that only approximately 8.51% of the variation in liquidity risk can be accounted for by the combined impact of all the independent variables in the model.

The Wald chi-square test's significant result ($p < 0.0001$) strongly supports the overall validity of chosen model. 56.83 ($p < 0.0001$): This statistically significant result ($p\text{-value} < 0.1$) means the model as a whole is significantly different from chosen variables. It suggests that the chosen variables, as a group, have a meaningful impact on liquidity risk, rather than just random chance. The significant model confirms that a relationship exists between the independent variables (wgdp, wir, wintrate) and the dependent variable (liquidity risk)

A one unit increase in economic growth is associated with a 0.631 unit decrease in liquidity risk. This means when the economy grows, banks tend to face less liquidity risk, possibly due to improved borrower repayment ability and increased overall economic activity. One unit increase in inflation is associated with a 0.327 unit increase in liquidity risk. This suggests that higher inflation could slightly increase liquidity risk for banks, potentially due to higher borrowing costs and decreased consumer confidence. However, the significance is marginal, so further investigation is needed to confirm this relationship. A one-unit increase in interest rates corresponds to a 1.245-unit increase in liquidity risk. This suggests that higher interest rates considerably raise banks' liquidity risk, most likely as a result of higher borrowing costs and probable loan defaults. Economic growth appears to reduce liquidity risk, while

inflation has a weak positive association and higher interest rates significantly increase liquidity risk.

Explains the variation in dependent variable liquidity risk is explained by Interest rate GDP and bank size. The value obtained as 20.09% means there is variation in the dependent variable within each group explained by the model accurately. Only 4.79% of the variation in the dependent variable between groups is explained by the model. 11.04% of the total variation was validated by our data in the dependent variable explained by chosen regression model, it demonstrates potential for making meaningful, predictions about liquidity risk based on the included macroeconomic factors.

The result indicates that the macroeconomic factors examined in the model do not fully explain 0.022987 units of the overall variation in liquidity risk among Pakistani banks. As a result, the differences are caused by of specific characteristics as well as processes inside particular institutions that were not completely examined.

Errors $\sigma_e = 0.022347$ represents the variance in liquidity risk that's due to random errors or fluctuations in the data, not explained by either macroeconomic variables or company. It shows that factors specific to each bank have a significant impact on liquidity risk. While the macroeconomic indicators selected give information on the larger economic situation, internal policies, risk culture, governance, and lending strategies all play important roles in defining a bank's sensitivity to liquidity concerns. Ignoring internal differences can result in insufficient and even misleading risk evaluations. Even under difficult economic times, a bank that has adequate internal protections may suffer lesser liquidity risk, but another, with showing positive macroeconomic indications, may be more exposed owing to internal deficiencies.

Small Error Variance $\sigma_e = 0.022347$ the regression model performed well in identifying systematic patterns in liquidity risk, leaving less opportunity for uncertainty. In other words, the model's predictions are less likely to be off target at random owing to unidentified factors. While the model has constraints, this discovery gives some confidence in the ability to identify significant relationships between factors and liquidity risk. Company-Specific Effects Explained as a Fraction of Variance ($\rho = 0.514124$): This number demonstrates that more than half (51.41%) of the overall variance in liquidity risk among Pakistani banks is due to factors specific to each bank that are not reflected by the included macroeconomic variables

4.5.3 Positive Co-relation between Inflation Rate and Liquidity Risk

Liquidity risk and inflation rate have been found to positively correlate. A positive correlation between these two suggests that the banks' liquidity risk will rise along with the rate of inflation. Inflation rates fluctuate in response to changes in interest rates. Liquidity risk consequently moves in the same direction. The cost of borrowing for banks rises in response to the rate of inflation. Consequently, investors might encounter difficulties when trying to buy or sell assets. An unpredictable rate of inflation contributes to an uncertain financial environment. Due to the volatility of inflation, investors will become less willing to take risks, which will reduce market liquidity. According to Sopan et al., (2018) inflation rate and GDP has positive and negative effects on the liquidity risk of the banks (Indian banks which include state bank of India).

Growing inflation reduces the purchasing power of cash holdings, which makes people and companies want to hoard more money in order to keep real spending at the same level. Increased withdrawals from deposit accounts as a result of this increased demand for cash deplete banks' liquidity reserves.

Second, cycles of loan repayment are upset by inflation. When there is significant inflation, borrowers who find it difficult to make fixed-rate loan payments may experience an increase in delinquencies and non-performing loans. The disruption of loan repayments, a vital source of cash inflow, caused by this decline in asset quality puts pressure on banks' liquidity positions will grow risk averse in response to inflation, which will decrease market liquidity. This complicated picture is further compounded by portfolio shifts and investment uncertainty. Investors frequently migrate from riskier assets to safer havens like government bonds when inflation picks up speed. Customers looking for other investment options may cause banks to see withdrawals from interest-sensitive deposits, such as time deposits, because of this change. Bank liquidity risks are further increased by the ensuing drop-in deposit bases.

Inflation puts banks under cost pressure in addition to demand-side factors, raising overhead, insurance, and salary costs. Operating margin compression strains profitability, making it more difficult for banks to keep sufficient capital buffers and withstand possible liquidity shocks. Notably, a bank's overall solvency and resistance to liquidity constraints are weakened when its capital declines in high inflation environments.

Nevertheless it's important to understand that this relationship is not static and can change based on a number of variables, such as:

Monetary policy responses: The degree to which inflation affects liquidity risk can be influenced by central bank interventions, such as changes in interest rates and other policies.

Features specific to banks: Banks that have a variety of business strategies, high capital adequacy ratios, and efficient risk management procedures may be better able to withstand the liquidity pressures brought on by inflation.

Macroeconomic context: The influence on liquidity risk is significantly shaped by the state of the economy as a whole and the fundamental causes of inflation.

Understanding these intricacies is crucial in formulating effective approaches that overcome the challenges presented by this positive correlation. Pakistani banks should think about putting policies in place to encourage long-term deposits, such as maximising deposit offerings, focusing on asset quality to reduce non-performing loans (NPLs), diversifying funding sources, keeping sufficient capital buffers, and bolstering risk management frameworks to effectively identify and control inflation-related risks.

In conclusion, a thorough understanding of the underlying mechanisms and how they interact with macroeconomic and bank-specific factors is imperative due to the positive correlation observed between inflation and liquidity risk. By using this information, regulators and banks in Pakistan can create strategies that effectively manage these risks and encourage a stronger financial system that can withstand inflationary pressures.

4.5.4 Negative Co-relation between GDP growth and Liquidity Risk

GDP growth has negative impacts on the liquidity risk. This has been tested on different banks of India, including the State bank of India. (Sopan et al, 2018).

Strong GDP is concerned with the stable economic conditions. When economy is growing businesses make stable profits and individual may have higher income potential. This economic stability contribute to overall wellness of the economy and hence reduces the risk of liquidity. Gdp growth can also lead to increased economic activities and higher trading in the stock markets. Higher trading usually indicate more liquid market, this is due to increased numbers of sellers in the market and also the buyers. Higher GDP also take part in the stability of the banking system. Banks will face lower default problems and the the financial position

of the lenders may improve. A stable and growing market will help in stable banking system hence reducing the systemic liquidity risk.

Illustrations of a booming economy full of activity and plenty of money flowing through banks may come to mind. But in Pakistan, an unexpected phenomenon shows up: bank liquidity is squeezed as the economy grows. A closer look at this seemingly incompatible relationship is necessary. First, picture companies operating in a prosperous economy. Borrowing from banks loses appeal when one has access to alternative financing sources and plenty of opportunities. A major source of cash inflow for banks, the decline in loan demand adds to the overall increase in liquidity.

Second, consider investors to be confidence-driven seekers. Their willingness to take on more risk increases as the economy does, and they start looking for investments outside of conventional bank deposits. The banks' hold on cash may become even more tightly held as a result of this move towards riskier assets like stocks and potential withdrawals of low-risk, interest-sensitive deposits.

Moreover, banks may be tempted to relax lending standards in this race for expansion in order to take advantage of the positive economic momentum. Although there may be an initial spike in lending as a result, the loan portfolio may end up becoming riskier. Although it won't have an immediate effect on liquidity, this hidden risk may present problems down the road if the economy shifts.

The protectors of financial stability, central banks, are also involved in this dynamic. Strong growth could force them to raise interest rates by tightening monetary policy. This can therefore further reduce the demand for loans and raise the cost of borrowing for banks, further taxing their liquidity reserves.

It's critical to keep in mind that not every economic expansion is the same. The particular growth drivers—whether driven by domestic consumption or exports—can have a big impact on how growth and liquidity interact.

What steps can Pakistani banks take then to deal with this paradoxical relationship? It can be beneficial to attract and retain funds to diversify deposit options with attractive rates, especially for longer-term investments. It becomes imperative to uphold stringent credit risk management protocols, even during periods of expansion, in order to minimise the likelihood of future loan defaults. Lastly, by looking into other funding options like dedicated debt or

securitization, banks can lessen their reliance on interest-sensitive deposits and have more room to manoeuvre.

In conclusion, Pakistan's GDP growth and liquidity risk are negatively correlated, which serves as a reminder of the complex relationships that exist within the financial system. Even in the face of a booming economy, Pakistani banks and regulators can navigate this economic paradox and promote a stable and resilient financial system by understanding the underlying mechanisms and adjusting their strategies accordingly.

4.5.5 Positive Co-relation between Interest Rate and Liquidity Risk

A positive correlation between liquidity risk and interest rate indicates that as the interest rates in the markets rises, the liquidity risk also increases. Liquidity risk indicates that an asset cannot be sold or bought in the market without a significant change in its price. Higher interest rate increase the cost of borrowing for end consumers. This may result in the limited borrowing in the market, making the whole process to access funds more difficult. This in return will result in the increase liquidity risk due shortage of cash. Fixed income securities are sensitive nature to interest rates. When there is a rise in interest rates, the value of fixed securities decreases. As a result the holders of these securities faces problems to sell hence increases the liquidity risk. The evidence of this positive co relation has been found from the study done by Khan et al, (2014). They have indicated that banks liquidity risk has direct positive co relation with interest rates, Increase in interest increase the liquidity risk.

The Cash is King Factor: Keeping cash on hand becomes more alluring as interest rates rise. Delaying purchases, they would rather sleep on their mattresses or have low-risk accounts with guaranteed returns. This "flight to cash" reduces the amount of money that banks can lend and make investments with, thereby strengthening their hold on the available resources.

The Investment Shuffle: As interest rates rise, investors are drawn to safer investments like government securities or bonds. This "disintermediation" may cause bank withdrawals, especially from savings accounts and other interest-sensitive deposits. Banks' difficulties with liquidity worsen as a result of a decrease in these deposits' availability of easily accessible cash.

Rising rates have dampened the enthusiasm of borrowers. Loan demand is declining as a result of people and businesses finding loans to be more and more expensive. The decrease in an essential revenue stream adds to the banks' already tight liquidity situation.

4.5.6 Positive Co-relation between Exchange rate and Liquidity Risk

A depreciating currency can result in increased liquidity risk, especially when the decrease in the value of currency is rapid. Investors will not be ready to take risk by investing in the depreciating currency hence it will give rise to liquidity risk. Hence a positive correlation exists here. Also, if the bank holds assets in foreign currency in other countries and the value of the currency depreciates, this will create a problem of liquidity because they will be getting less cash than they actually desired to. There are methods to decrease liquidity risk such as hedging techniques, using forward or futures. Also, currency options can decrease this risk but at the end the relation still remains positive if these techniques do not exist. Roman & Sargu, (2015) has worked and used OLS regression analysis. The data has been used is from 2004 to 2011, their results confirm this relation.

Stronger exchange rates would seem to make sense since they would increase a bank's liquidity, but in Pakistan there is an unexpected correlation between fluctuating exchange rates and a higher risk of cash shortages in banks. The complex relationship between domestic financial stability and global forces is highlighted by this paradoxical dynamic. Now let's untangle the complex threads:

Import woes: As exchange rates rise, the cost of imports rises as well, putting pressure on profit margins and lowering the demand for loans from businesses. A major source of cash inflow for banks, the decline in loan origination adds to their overall liquidity.

Investor Jitters: Foreign investors often flee Pakistani assets in search of safer havens abroad when exchange rates become unstable. This "capital flight" may lead to bank withdrawals, especially in the case of foreign currency deposits, which would further tighten the banks' hold on the available cash.

Export bottlenecks: Varying exchange rates have the potential to impede export transactions, thereby causing ambiguity and deterring exporters from bringing their overseas profits back to their home countries. This may result in a drop in foreign exchange inflows for banks, making their liquidity problems worse.

Trade Finance Crunch: Banks may become less willing to lend money to import and export companies when currency rate fluctuations increase the risk associated with trade financing. Bank liquidity may be impacted by this decreased availability to trade finance, which may also further restrict trade activity and foreign exchange inflows.

The Central Bank Factor: In order to stabilise the currency, central banks frequently step in. Selling foreign exchange reserves may be one of these interventions, which could reduce banks' available liquidity and possibly tighten interbank lending markets.

Chapter 05

Conclusion and Recommendation

5.1 Conclusion

In the end this study indicates a certain level of agreement with earlier research on key macroeconomic parameters. It also show consistency with the base research paper. The study sought to explain the multifaceted impact of GDP growth, inflation rate, interest rate, and exchange rate on credit risk and liquidity risk, offering an important perspective that contributes to the broader understanding of risk management within the banking sector.

The findings of this study provide evidence regarding the impact of GDP growth on credit risk. The analysis reveals a negative relationship. This result confirm the previous work done regarding the association between economic expansion, as measured by GDP growth, and credit risk.

Furthermore, the study sheds light on the positive impact of inflation rates on credit risk, aligning with economic theories that proves a positive correlation between inflation and risk. The findings suggest that the inflationary environment in Pakistan may contribute to heightened credit risk within the banking industry, potentially influenced by factors such as increased operating costs and reduced purchasing power. Such insights hold implications for financial institutions and policymakers alike, emphasizing the importance of adaptive risk management strategies in the face of inflationary pressures.

The empirical results highlight the importance of monetary policy dynamics in determining the risk environment of Pakistani banks, as interest rates have a positive effect on credit risk. The results suggest that interest rate shifts could complicate credit risk management and call for a proactive, adaptable strategy to reduce any adverse effects on the banking industry.

In addition, the study highlights the relationship between global economic conditions and the credit risk of Pakistani banks by showing the negative impact of exchange rates on credit risk. The sensitivity of financial institutions to credit risk can be affected by exchange rate volatility, which can bring about uncertainties and challenges in an increasingly interconnected global financial system.

Transitioning to the evaluation of liquidity risk, the study provides insightful perspectives on the impact of macroeconomic factors on this critical dimension of risk management. The negative impact of GDP growth on liquidity risk suggests that economic expansion may not necessarily translate into enhanced liquidity for banks in Pakistan. This important finding underscores the importance of aligning liquidity management strategies with the specific economic conditions prevalent in the country.

Similarly, the positive impact of inflation rates on liquidity risk shows the complex relationship between monetary dynamics and liquidity management. Inflationary pressures may introduce challenges for banks in maintaining optimal liquidity levels, necessitating a thorough understanding of the inflation-risk nexus for effective risk mitigation strategies.

The positive impact of interest rates on liquidity risk reinforces the critical role of interest rate dynamics in shaping liquidity conditions within the banking sector. Interest rate fluctuations, as reflected in the empirical results, underscore the need for adaptive liquidity management frameworks that account for the interest rate sensitivity of banking assets and liabilities.

Lastly, the positive impact of exchange rates on liquidity risk provides valuable insights into the challenges posed by currency fluctuations on liquidity management in the Pakistani banking industry. The findings emphasize the need for robust risk management practices that account for the interconnectedness of global financial markets and their impact on liquidity dynamics.

In essence, this research contributes to the existing body of knowledge by highlighting the complex relationships between macroeconomic factors and financial risk within the context of Pakistan's banking industry. The empirical findings challenge conventional assumptions, providing a nuanced understanding of the specific dynamics at play in the Pakistani economic landscape. The insights gained from this study have practical implications for banks, policymakers, and regulators, guiding the formulation of adaptive risk management strategies that are attuned to the unique challenges and opportunities within the Pakistani banking sector. As the financial industry continues to navigate the complexities of a rapidly evolving economic environment, the findings presented in this study serve as a valuable resource for stakeholders seeking to enhance their understanding of risk dynamics and optimize risk management practices for sustainable financial institutions.

5.2 Recommendation

In light of the comprehensive findings presented in this study, several key recommendations emerge for stakeholders within the banking industry, policymakers, regulatory bodies, and academia. These recommendations are designed to enhance the resilience of financial institutions in Pakistan and contribute to the ongoing discourse on effective risk management strategies in the face of macroeconomic dynamics.

Firstly, some financial institutions operating in the Pakistani banking sector should reconsider traditional risk assessment frameworks that assume a positive correlation between GDP growth and credit risk. The negative relationship uncovered in this study suggests the need for a more understanding of the complex factors influencing credit risk during periods of economic expansion. Banks are encouraged to refine their credit risk models, incorporating the unique economic dynamics of Pakistan to ensure more accurate risk assessments and proactive risk mitigation measures.

In response to the positive impact of inflation rates on credit risk, banks should implement adaptive risk management strategies that account for inflationary pressures. This includes robust stress testing scenarios that simulate varying levels of inflation, allowing institutions to assess their resilience under different economic conditions. Additionally, financial institutions are recommended to explore innovative financial products and services that can act as hedges against inflation, providing a layer of protection against the potential adverse effects of rising prices on credit risk.

The positive impact of interest rates on credit risk underscores the importance of interest rate risk management for banks in Pakistan. Institutions should regularly assess their interest rate risk exposure, considering the implications of changes in interest rates on both assets and liabilities. This necessitates a proactive approach to interest rate risk management, involving the development of interest rate sensitivity models and the implementation of dynamic hedging strategies to mitigate potential adverse effects on credit risk.

Moreover, the negative impact of exchange rates on credit risk highlights the need for banks to enhance their capabilities in managing currency risk. Given the interconnectedness of global financial markets, financial institutions should develop robust currency risk management frameworks that encompass both traditional and innovative hedging instruments.

Cross-border collaborations and partnerships may also offer avenues for mitigating the impact of exchange rate fluctuations on credit risk.

Turning to liquidity risk, the negative impact of GDP growth on liquidity risk suggests that banks should adopt a cautious approach in anticipating liquidity needs during periods of economic expansion. Liquidity risk management frameworks should be designed to account for potential challenges in maintaining optimal liquidity levels despite positive economic growth. Stress testing scenarios that incorporate varying economic conditions, including different levels of GDP growth, can be instrumental in preparing financial institutions for liquidity challenges.

Similarly, the positive impact of inflation rates on liquidity risk necessitates a thorough assessment of liquidity management strategies. Banks should enhance their liquidity risk models to account for the potential impact of inflation on liquidity conditions. Implementing dynamic liquidity management practices that consider inflationary pressures will be crucial for ensuring the resilience of banks in the face of evolving economic dynamics.

The positive impact of interest rates on liquidity risk reinforces the need for financial institutions to adopt adaptive liquidity management frameworks. Interest rate sensitivity analyses should be integrated into liquidity risk management practices to assess the potential effects of interest rate fluctuations on liquidity conditions. Developing contingency funding plans and stress testing scenarios that incorporate interest rate dynamics will be vital for maintaining robust liquidity risk management practices.

Finally, the positive impact of exchange rates on liquidity risk emphasizes the importance of cross-border liquidity risk management for banks operating in an interconnected global financial system. Financial institutions should actively monitor and manage cross-currency liquidity risk, taking into account the potential impact of exchange rate fluctuations on liquidity conditions. Collaborative efforts with international counterparts and the use of innovative financial instruments can aid in mitigating the challenges associated with currency-related liquidity risk.

In conclusion, the recommendations outlined above are intended to guide stakeholders in the Pakistani banking industry toward the development and implementation of adaptive risk management strategies. The findings of this study offer valuable insights into the complex relationships between macroeconomic factors and financial risk, providing a foundation for

enhancing the resilience and sustainability of financial institutions in Pakistan. As the banking sector navigates the complexities of an evolving economic landscape, the adoption of proactive and adaptive risk management practices will be integral to ensuring the stability and growth of the industry in the years to come.

5.3 Limitation of the Study

5.3.1 Methodological limitations

Limitations of the model: Although the selected econometric model is valid, it might not capture all pertinent interactions and non-linear relationships among the variables. More sophisticated econometric techniques or investigating different model specifications might produce more informative results.

Financial risk and macroeconomic variables may be causally related in both directions. Although the present investigation helps to tackle this matter, subsequent studies may utilise instrumental variables or alternative methodologies to additionally alleviate the possibility of endogeneity bias. Generalizability: It's possible that not all financial institutions or market environments will benefit equally from the study's conclusions. To offer more specialised insights, future research may concentrate on particular categories of financial instruments or institutions.

5.3.2 Conceptual limitations

Market and operational risk, two other crucial financial risk categories, were not taken into account in favour of the study's focus on credit and liquidity risk. Subsequent investigations may broaden the focus to encompass a more diverse array of financial hazards. Disregarding microeconomic factors: The study only considered macroeconomic variables, omitting the possibility that firm- and industry-specific traits could have an impact on financial risk. Microeconomic factors may be included in future research to provide a more comprehensive understanding of risk dynamics.

5.3.3 Future research directions

Policymakers may benefit from knowing how particular policy interventions, like monetary policy or fiscal stimulus, affect financial risk. Expand on your understanding of risk transmission mechanisms. Understanding the precise pathways by which financial risk is influenced by macroeconomic variables may help to clarify the underlying dynamics. Examine the function of legal frameworks: Examining how capital adequacy requirements and

regulatory frameworks affect risk management strategies used by financial institutions may have important policy ramifications. Include big data or machine learning techniques: Large datasets and cutting-edge statistical methods may reveal previously unnoticed trends and connections between macroeconomic variables and financial risk.

This research adds to a deeper understanding of the complex interactions between macroeconomic factors and financial risk by identifying and resolving these limitations. By advancing research efforts in these areas, we can improve risk management techniques and our understanding of the subject, which will ultimately strengthen and stabilise the financial system.

References

- Ali, B. J., & Oudat, M. S. (2020). Financial risk and the financial performance in listed commercial and investment banks in Bahrain bourse. *International Journal of Innovation, Creativity and Change*, 13(12), 160-180.
- Adaramola, A. O., & Dada, O. (2020). Impact of inflation on economic growth: evidence from Nigeria. *Investment Management & Financial Innovations*, 17(2), 1.
- Ahamed, M. M., & Mallick, S. K. (2019). Is financial inclusion good for bank stability? International evidence. *Journal of Economic Behavior & Organization*, 157, 403-427.
- Ahmed, Z., Shaoork, Z., Khan, M. A., & Ullah, W. (2021). The role of financial risk management in predicting financial performance: a case study of commercial banks in Pakistan. *The Journal of Asian Finance, Economics and Business*, 8(5), 639-648.
- Alexander, C. (2005). The present and future of financial risk management. *Journal of Financial Econometrics*, 3(1), 3-25.
- Alper, E., Clements, B., Hobdari, N., & Moya Porcel, R. (2020). Do interest rate controls work? Evidence from Kenya. *Review of Development Economics*, 24(3), 910-926.
- Arif, A., & Nauman Anees, A. (2012). Liquidity risk and performance of banking system. *Journal of Financial regulation and compliance*, 20(2), 182-195.
- Aron, J., & Muellbauer, J. (2002). Interest rate effects on output: evidence from a GDP forecasting model for South Africa. *IMF Staff papers*, 49(Suppl 1), 185-213.
- Avdjiev, S., Bruno, V., Koch, C., & Shin, H. S. (2019). The dollar exchange rate as a global risk factor: evidence from investment. *IMF Economic Review*, 67, 151-173.
- Bashir, A., & Hassan, A. (1997). Interest rate sensitivity and stock returns in the United Arab Emirates. *Journal of King Saud University*, 9(11), 79-89.
- Bauer, M. D., & Rudebusch, G. D. (2020). Interest rates under falling stars. *American Economic Review*, 110(5), 1316-1354.
- Bigio, S., & d'Avernas, A. (2019). *Financial risk capacity* (No. w26561). National Bureau of Economic Research.

- Bord, V. M., Ivashina, V., & Taliaferro, R. D. (2021). Large banks and small firm lending. *Journal of Financial Intermediation*, 48, 100924.
- Bostanci, G., & Yilmaz, K. (2020). How connected is the global sovereign credit risk network?. *Journal of Banking & Finance*, 113, 105761.
- Cooperation Council (GCC) Countries. *International Journal of Economics and Finance*, 9(12), 278-290.
- Chen, W. D., Chen, Y., & Huang, S. C. (2021). Liquidity risk and bank performance during financial crises. *Journal of Financial Stability*, 56, 100906.
- Davis, E. P. (1996). The role of institutional investors in the evolution of financial structure and behaviour. *The Future of the Financial System*, 33, 49-99.
- De Leon, M. (2020). The impact of credit risk and macroeconomic factors on profitability: the case of the ASEAN banks. *Banks and Bank Systems*, 15(1), 21-29.
- Dechow, N. (2012). The balanced scorecard: Subjects, concept and objects – a commentary. *Journal of Accounting & Organizational Change*, 8(4), 511–527.
- Diamond, D. W. (1997). Liquidity, banks, and markets. *Journal of Political Economy*, 105(5), 928-956.
- Ekinci, R., & Poyraz, G. (2019). The effect of credit risk on financial performance of deposit banks in Turkey. *Procedia Computer Science*, 158, 979-987.
- Fabozzi, F. J., Mann, S. V., & Choudhry, M. (2003). *Measuring and controlling interest rate and credit risk* (Vol. 104). John Wiley & Sons.
- Finger, M., Gavious, I., & Manos, R. (2018). Environmental risk management and financial performance in the banking industry: A cross-country comparison. *Journal of International Financial Markets, Institutions and Money*, 52, 240-261.
- Goodhart, C. (2008). Liquidity risk management. *Banque de France Financial Stability Review*, 11(6), 39-44.
- Gomez, M., Landier, A., Sraer, D., & Thesmar, D. (2021). Banks' exposure to interest rate risk and the transmission of monetary policy. *Journal of Monetary Economics*, 117, 543-570.
- Hassan, M. K., Khan, A., & Paltrinieri, A. (2019). Liquidity risk, credit risk and stability in Islamic and conventional banks. *Research in International Business and Finance*, 48, 17-31.

- Kanwal, S., & Nadeem, M. (2013). The impact of macroeconomic variables on the profitability of listed commercial banks in Pakistan. *European journal of business and social sciences*, 2(9), 186-201.
- Khan, I. , Akhter, S. , Faiz, J. , Khan, S. , Amir, M. , Shah, N. and Khan, M. (2023) Determinants of Credit Risk and Operational Risk in Banking Sector Evidence from Pakistani Banking Sector. *Journal of Financial Risk Management*, 12, 15-27.
- Khan, W. A., & Sattar, A. (2014). Impact of interest rate changes on the profitability of four major commercial banks in Pakistan. *International journal of accounting and financial reporting*, 4(1), 142.
- Kaliva, K., & Koskinen, L. (2008). Stock market bubbles, inflation and investment risk. *International review of financial analysis*, 17(3), 592-603.
- Kasidi, F., & Mwakanemela, K. (2013). Impact of inflation on economic growth: A case study of Tanzania. *Asian Journal of empirical research*, 3(4), 363-380.
- Kishwar, A., & Ullah, A. (2019). The role and impact of merger & acquisition of banking sector in pakistan.
- Kolapo, T. F., Ayeni, R. K., & Oke, M. O. (2012). CREDIT RISK AND COMMERCIAL BANKS' PERFORMANCE IN NIGERIA: A PANEL MODEL APPROACH. *Australian journal of business and management research*, 2(2), 31.
- Kusumaningtyas, N., Widagdo, B., & Nurjannah, D. (2021). The Effect of Interest Rate, Inflation and Exchange Value on Stock Returns with Profitability as Intervening Variables. *Jurnal Manajemen Bisnis Dan Kewirausahaan (JAMANIKA)*, 1(02), 97-108.
- Kutum, I. (2017). The impact of credit risk on the profitability of banks listed on the Palestine exchange. *Research Journal of finance and accounting*, 8(8), 136-141.
- Lelgo, K. J., & Obwogi, J. (2018). Effect of financial risk on financial performance of micro finance institutions in Kenya. *International Academic Journal of Economics and Finance*, 3(2), 357-369.
- Le, T. N. L., Nasir, M. A., & Huynh, T. L. D. (2023). Capital requirements and banks performance under Basel-III: A comparative analysis of Australian and British banks. *The Quarterly Review of Economics and Finance*, 87, 146-157.

- Lian, C., Ma, Y., & Wang, C. (2019). Low interest rates and risk-taking: Evidence from individual investment decisions. *The Review of Financial Studies*, 32(6), 2107-2148.
- Madhi, D. (2021). The macroeconomic factors impact on liquidity risk: The Albanian banking system case.
- Mazreku, I., Morina, F., Misiri, V., Spiteri, J. V., & Grima, S. (2019). Exploring the liquidity risk factors in the Balkan Region banking system.
- Mohammad, S., Asutay, M., Dixon, R., & Platonova, E. (2020). Liquidity risk exposure and its determinants in the banking sector: A comparative analysis between Islamic, conventional and hybrid banks. *Journal of International Financial Markets, Institutions and Money*, 66, 101196.
- Naser, N. (2019). The Interaction between Profitability and Macroeconomic Factors for Future Examinations of European Banks Soundness—Theoretical Study.
- Patatoukas, P. N. (2021). Stock market returns and GDP news. *Journal of Accounting, Auditing & Finance*, 36(4), 776-801.
- Pakurár, M., Haddad, H., Nagy, J., Popp, J., & Oláh, J. (2019). The service quality dimensions that affect customer satisfaction in the Jordanian banking sector. *Sustainability*, 11(4), 1113.
- Panizza, U., & Taddei, F. (2020). *Local currency denominated sovereign loans: A portfolio approach to tackle moral hazard and provide insurance* (No. HEIDWP09-2020). Graduate Institute of International and Development Studies Working Paper.
- Perron, P. (2021). Conditions for OLS and GLS to be Consistent in Models with Serially Correlated Errors.
- Priyadi, U., Utami, K. D. S., Muhammad, R., & Nugraheni, P. (2021). Determinants of credit risk of Indonesian Shari'ah rural banks. *ISRA International Journal of Islamic Finance*, 13(3), 284-301.
- Raghavan, R. S. (2003). Risk management in banks. *CHARTERED ACCOUNTANT-NEW DELHI-*, 51(8), 841-851.
- Rafiq, M. Z., Jun, J. C., Naseem, S., & Mohsin, M. (2019). Impact of Market Risk, Interest rate, Exchange rate on Banks stock return: Evidence from listed Banks of Pakistan. *Amazonia Investiga*, 8(21), 667-673.

- Rizvi, N. U., Kashiramka, S., & Singh, S. (2018). Basel I to Basel III: Impact of credit risk and interest rate risk of banks in India. *Journal of Emerging Market Finance*, 17(1_suppl), S83-S111.
- Roman, A., & Sargu, A. C. (2015). The impact of bank-specific factors on the commercial banks liquidity: Empirical evidence from CEE countries. *Procedia Economics and Finance*, 20, 571-579.
- Sadiq, M., Alajlani, S., Hussain, M. S., Ahmad, R., Bashir, F., & Chupradit, S. (2022). Impact of credit, liquidity, and systematic risk on financial structure: comparative investigation from sustainable production. *Environmental Science and Pollution Research*, 29(14), 20963-20975.
- Samuel, O. L. (2015). The effect of credit risk on the performance of commercial banks in Nigeria. *African Journal of Accounting, Auditing and Finance*, 4(1), 29-52.
- Setiawan, S. A. (2020). Does macroeconomic Condition matter for Stock market? Evidence of Indonesia Stock market Performance for 21 years. *Jurnal Perencanaan Pembangunan: The Indonesian Journal of Development Planning*, 4(1), 27-39.
- Shamas, G., Zainol, Z., & Zainol, Z. (2017). The Moderating Role of Staff Efficiency in the Relationship between Bank's Specific Variables and Liquidity Risk in Islamic Banks of Gulf
- Sopan, J., & Dutta, A. (2018). Determinants of liquidity risk in Indian banks: A panel data analysis. *Asian Journal of Research in Banking and Finance*, 8(6), 47-59.
- Sultan, N., & Mohamed, N. (2023). Challenges for financial institutes in implementing robust customer due diligence in Pakistan. *Journal of Money Laundering Control*, 26(5), 926-946.
- Svenfelt, Å., Alfredsson, E. C., Bradley, K., Fauré, E., Finnveden, G., Fuehrer, P., ... & Öhlund, E. (2019). Scenarios for sustainable futures beyond GDP growth 2050. *Futures*, 111, 1-14.
- Xu, M. T., Hu, K., & Das, M. U. S. (2019). *Bank profitability and financial stability*. International Monetary Fund.

Faheem thesis.pdf

ORIGINALITY REPORT

6%

SIMILARITY INDEX

4%

INTERNET SOURCES

2%

PUBLICATIONS

2%

STUDENT PAPERS

PRIMARY SOURCES

1

Submitted to Higher Education Commission
Pakistan

Student Paper

<1%

2

Submitted to University of Leeds

Student Paper

<1%

3

www.kimep.kz

Internet Source

<1%

4

X. Cuong Nguyen, T. Phuong Nguyen, V. Son Lam, Phuoc-Cuong Le et al. "Estimating ammonium changes in pilot and full-scale constructed wetlands using kinetic model, linear regression, and machine learning", Science of The Total Environment, 2024

Publication

<1%

5

Submitted to University of Wales Institute,
Cardiff

Student Paper

<1%

6

library.uniglobe.edu.np

Internet Source

<1%

7

www.tesisenred.net

Internet Source