Impact of Macroeconomic and Bank Specific Variables on Credit Risk in Pakistan:

A Comparative Analysis of Islamic and Conventional Banks

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Registration No: PIDE2016FMPHILEAF25

MPhil Economics and Finance

A Dissertation Submitted to the Pakistan Institute of Development Economics, Islamabad, Pakistan in Partial Fulfillment of the Requirement of the Degree Master of Philosophy in Economics and Finance

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CERTIFICATE

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Declaration

I proclaim that this dissertation is exclusively my own endeavor, and has never been published or presented in any form elsewhere.

Ameer Hamza Khan Burki

Acknowledgement

All praise to Allah, the Almighty for making me able to complete this work. I am unable to thank Him for his countless blessings in my life. I would like to express my deepest gratitude to my supervisor, Respected Dr. Hafsa Hina, for his excellent guidance and supervision. I would also like to extend my sincere gratitude to Dr. Muhsin Ali, Dr.Taqi Raza and Dr.Farhat Mahmood for their useful suggestions and unconditional support.

I would further like to thank my father and mother. Thanks to them for their endless support, patience and infinite sacrifices that made it possible for me to reach this stage of my life. I want to express my heartfelt thanks to my Elder brothers Abu baker Bhai, for his moral support and faith in me which kept me going this far and finally led to completing this thesis. I am also thankful to my sisters, my brothers; Amina Baji, Mamona ,Bilal Bahi ,Mujahid Bahi, my niece and nephew; Aneeza, Zamail and little Saad for their unconditional love. They always made me feel better when I was struggling with my thesis .I would further like to thanks Faizi Chacha and Papu Bahi for their love and encouragement.

Finally, I am thankful to all of my friends for their sincerity and kindness.

Dedicate

This work is dedicated to Allah, the Almighty, who is the most merciful and the most beneficent. Furthermore, I would like to dedicate my work to the last prophet of Allah, Hazrat Muhammad (*ṣallā llāhu ʿalayhi wasallam).*

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ABRREVIATION

GMM……Generalized Method of Moments

CR……Credit Risk

GDP……..Gross Domestic Product

BSV……...Bank Specific Variable

MEV……..Macroeconomic Variable

UN……Unemployment Rate

REER……....Real Effective Exchange Rate

ROA……...Return on Asset

ROE……....Return on Equity

NPF……Non Performing Finance

NPL……....Non Performing Loans

WDI……...World Development Index

SBP……State Bank of Pakistan

CAR……....Capital Adequacy Ratio

BIS……..Bank of International Settlement

BS……...Bank Size

INT……..Interest Rate

INF……..Inflation

FE……....Fixed Effect

RE……...Random Effect

OLS……....Ordinary Least Square

KPMG……Klynveld Peat Marwick Goerdeler

IPI……....Industrial production Index

LLP……..Loan Loss Provision

FLP……...Financing Loss Provision

IV……..Instrumental Variable

IB……..Islamic Bank

CB……Conventional Bank

INEF……..Inefficiency

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ABSTRACT

This study attempts to investigate the impact of macroeconomic and bank specific variables on credit risk for the banking sector of Pakistan. This impact has been examined for 4 Islamic and 13 conventional banks over the period 2007-2017. The Study has estimated the dynamic panel model by using Generalized Method of Moments (GMM) technique to identify the factors which influence the behavior of credit risk. The findings of the study suggest that in conventional banking system, GDP growth, inflation, unemployment, real exchange rate, interest rate, capital adequacy ratio, return on assets, loan loss provision, inefficiency ratio and bank size significantly affect the behavior of credit risk. Similarly, in Islamic Banking, all the mentioned variables significantly cause the credit risk's behavior, except the interest rate and financing loss provision. Therefore, to attain a more stable banking system in the country, the government should devise prudent macroeconomic policies. Additionally, keeping in view the prevailing economic situation, the high-ups in the financial institutions should also consider the endogenous structure of the institutions to lower the likelihood of credit risk.

CHAPTER 1

INTRODUCTION

The most considerable matter for the regulatory authorities is concerning about the financial institution stability and oversight the bank operations. It is commonly acknowledged that most of the banking sector failures and financial crises in countries are due to credit risk[1]. The risk of financial loss from the failure of counterparty to fulfill its contractual obligations represents as credit risk (Jorion and Zhang, 2009). According to the BIS (2000), credit risk is a significant source of financial instability in the banking industry. It was observed that, the core seed of recent global financial instability (2007-2008) was sown in the credit boom. In the light of these facts, explore the factors which can influence the expansion of credit risk has become one of the strong debate in recent years (Adebola *et al.*, 2011).

Macroeconomic environment has a great influence on credit risk in banking sector and the key factor which could influence the soundness of banking sector. Furthermore, sluggish economic conditions, where economic growth is very low, accompanied by a high level of unemployment, high inflation are the main contributors of the banking industry crisis (Demirgüç-Kunt andDetragiache, 1998; Llewellyn, 2002). The macroeconomic instability has an utmost influence on the structure of banking industry (Nursechafia and Abduh, 2014). From these arguments, it is proclaimed that there is interdependency between financial and economic system. Macroeconomic environment translate into changes in the quality of a loan in banks. Suitable macroeconomic environment coincides with better ability to loan payment and lower chances of loan default to total loan amount (Festić *et al.*, 2011).

It is generally believed that macroeconomic variables across banks are a cause of systemic risk that effect the value of a loan portfolio, which can be expressed as a credit risk.

[1] Basel Committee (2001) has recognized credit risk as the central risk for banking industry. Credit risk is connected with the main business of banks, which comprise loan lending and deposit activities.

An increasing ratio of credit risk may be an indicator of deterioration in the banking sector[2]. In addition, most of the banking crisis are connected with the change of economic environment and that risk to be pro-cyclical within an economic cycle (Llewellyn, 2002; Schinasi, 2005). Further, banks should be vigilant about advancing loans; in case of not suitable macroeconomic circumstance, all attempt of banks in this concern become worthless. Therefore, it is a requirement to deeply view the macroeconomic factors impact on credit risk with maximum care(Louzis *et al.*, 2012).

Banks which are working in developing countries are also affected by the macroeconomic conditions. Following Aghion *et al*.(2005) the soundness of a financial system particularly in developing countries are directly linked to the prosperity of an economy. The uncertain economic condition which arises due to unsuitable government policies, political instability, and inflation are some of the common sources of financial distress in developing countries. These economic environment which is sourced by internal and external economic instabilities are the core root cause of macroeconomic changes in developing countries (Salas and Saurina, 2002). Similarly, the banking sector in Pakistan has faced several risks included liquidity risk, credit risk, market risk, nominal exchange risk, operational risk, interest rate risk. All these risk are mainly arises due to the unstable economic situation of the country (Shafiq and Nasr ,2010).

Evidently, financial institution is largely dominated by banks. The banking sector performs a significant role in the financial and economic efficiency of a country. Because, they boost productivity by revitalizing the investment. A healthy and profitable banking system is better capacity to ensure protection against negative economic shocks. Further, a sound banking system is pre-requisite for long-term economic growth. A failure of banking sector

[2] Credit risk factors could be define two types, namely the systematic (macroeconomics) and un-systematic (bank-specific) risk(Haryono *et al.*, 2016)

affects economic growth, thus, it is one of the essential components of a countries economy (Das and Ghosh, 2007). Noteworthy, the principal aim of banks is the creation of credit and perform the functions by using the deposit amounts of their customers and lending which is a substantial source of revenue for the banks (Daniel and Wandera, 2013). If such assets do not generate revenue, the bank's ability to pay back the amount of depositor would be in question.

It is noteworthy that Islamic banking industry has one of the fastest growing sector in global financial services. This success of the Islamic banking industry is proved by its total assets worth which estimated US$2.5trillion in 2017(IFSB, 2018). The stability and growth especially shown in the rouse of global financial instability by the Islamic financial industry have led to its wider appreciation as a viable and competitive component of the financial system. Recently, the Islamic banking industry is fully functional and work in most parts of the world side by side the conventional banks[3]. However, the Islamic banks are not spared but equally vulnerable to risk like the other banking industry. Islamic banks operate under the guidance of Islamic sharia principles in which interest (Riba) is prohibited and encourage the risk sharing between two parties[4]. According to Dridi and Hasan (2010) Risk sharing and financing asset based nature of Islamic bank can help to enable better risk management, both for the clients and financial institution. The exceptionality is that the nature of risk facing by Islamic banking industry has a unique structure from the rivalry banking system. The uniqueness arises from the structure of its assets & liabilities. The different nature of its assets and liabilities structure and the profit and loss sharing basis change the nature of risk that Islamic banks deals with (Khan and Ahmed, 2001).

One of the main efficiency indicators to check the stability level of banks are Non-performing finance (for Islamic banks) and non-performing loans (for conventional

[3]more than 300 Islamic financial institution working in almost 75 countries (Anwar,2010)

[4] Riba means to an extra to be returned on money lending.

banks).Since in Pakistan is working under two kind of banking system i.e. (Islamic and conventional banks). So in risk analysis point of view, it is significant for stakeholder (investor and depositors) to distinguish that whether these two types of banking system shows different level of credit risk with principles that the basis of the Islamic banks on profit& loss sharing base, while conventional banks utilizing the funds on interest-based. Therefore, explore that factors which one banking system is more vulnerable.

1.1. Quantifying the Bank Risk

The rapid changes in the global financial landscape introduce several risks to the banking sector. Risk takes many forms, each affecting the economic activity on a lesser or greater extent (Solomon and Muntean, 2012).Mitigation of risk is the most important concern for the financial institution including banks. Each aspect of its operations, banks faces a lot of financial risks which includes foreign exchange risk, interest rate risk, liquidity risk, market risk, and credit risk. According to European Banking Authority (2013) the most imperative risks that banking sector is facing are (a) market risk, (b) operational risk, (c) reputational risk, (d) interest rate risk, (e) credit risk, (f) legal risk, (g) concentration risk .According to Arunkumar and Kotreshwar (2005) explain that the credit risk causes 70% of the overall banking risk whereas the remaining 30% are shared between the market and operational risk.

Credit risk is central and dangerous risk in banking sector. Its impact have too significant as compared to other risks, because it directly leads towards the failure of financial sector and more specifically for the overall banking sector: that is why credit risk is considered a very harmful risk in banking sector (Chijoriga,1997).Credit risk is harmful because bankruptcy can happen, due to the failure of payment of a small number of key customers which can lead to great losses (Bessis, 2002). A loan will be classified as a Ki credit risk, if the debtor has unable to pay the interest payment and principal amount, as mention in loan

payment agreement (SBP Glossary). Credit risk is the risk that the other contracting party will not fulfill its obligations in accordance with the agreed terms (BCBS, 2000).

In Islamic banking , credit risk can be explain as a chance that, the buyer will not be able to pay the agreed installments (Murabahah); the lessee will not be able to pay the agreed rent or will withdraw from the business earlier (Ijarah);the seller will not deliver the goods in time or the buyer will not pay the mutually agreed price (Salam),the manufacturer or contractor will not deliver the requested assets at the specified time duration or the buyer will not pay the settled price (Istisna); the financed project will not bring the expected return Mudarabah and Musharakah (Akkizidis and Khandelwal, 2007).Moreover, such a risk happen more frequently in Musharakah and Mudarabah types of the contract whenever the entrepreneur fails to pay the banks share.

The method used in this study to quantify bank risk is the credit risk. Several studies have analyzed empirically the impact of macroeconomic and specific banking sector factors on credit risk and used credit risk as a risk measure in banking sector. The study of the credit risk is critical because it can provide signs of distress when the financial sector becomes highly unprotected to shocks. Moreover, it can help the relevant authorities to take compulsory actions to avoid a possible crisis (Agnello and Sousa, 2011; Agnello and Schuknecht, 2011) and may affect the stability of the banking system and also to quantify their influence.

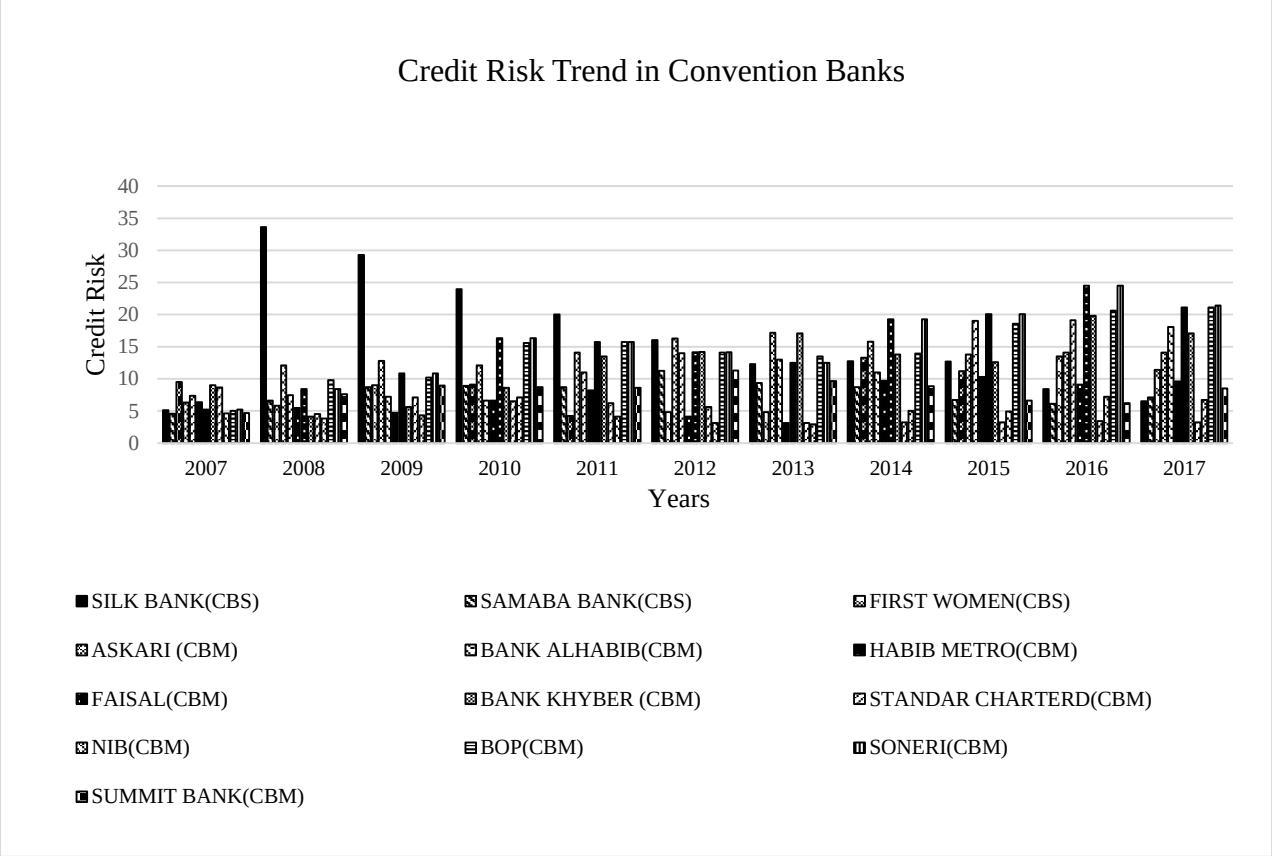
1.2. Banking Industry and Credit Risk Trend in Pakistan

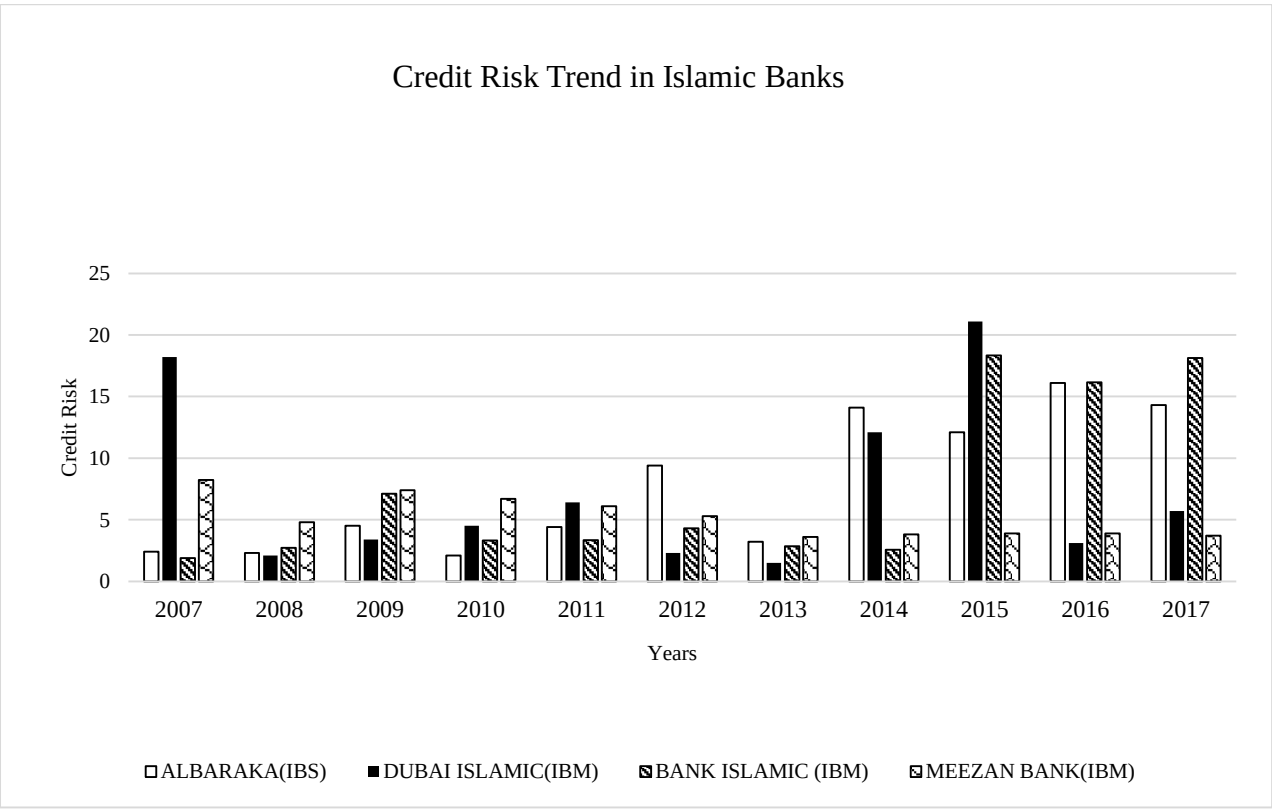
Banking sector is categorized as one of the key performing sectors in Pakistan. Pakistan's banking sector plays an important role in financial development and growth of the country. Pakistan banking sector is controlled and oversight by State bank of Pakistan. In Pakistan, three types of Islamic banking institutions are offering Islamic banking services and they work under the direction of Islamic Shariah law viz(a) full-fledged Islamic banks,(b) Islamic bank subsidiaries of conventional banks, (c)standalone Islamic banking branches of the conventional

bank.The state bank of Pakistan (SBP) has permitted Islamic banks to work parallel with the conventional banks, with a principal objective to offer multiple banking opportunities to build a sound financial system through Shariah-compliant financial operations. Like several countries in the world, in Pakistan, conventional banking sector are lead yet. However, Islamic banking is strengthen and becoming popular between all segments of the society with the passage of time.

Islamic banking industry has grown largely industry since it re-launch (2001-2002).In June-2018, Islamic banking industry asset reached to (2,482 billion rupees) and growth recorded of 21.9 percent (12.9% market share in the overall banking industry). In term of a number of Islamic banks service provider, 5 full fledge banks and 16 Islamic banks branches of conventional banks are delivering sharia-compliant and services. Assets and deposits of Islamic banks have displayed a significant growth over the last ten years. The number of branches has increased and spread across the country. NPF to total financing (gross) ratio has moved down to 3.0 percent by the end of Dec-17 from 4.1 percent at the year of Dec-2016 and showing improvement in asset quality of Islamic banking industry. Net NPF to Net Financing ratio reduced from 0.7 percent to 0.5 percent in December 2017. The total NPLs stood at Rs 623 billion in conventional banking sector exclusive of finance development institutions, as per data provided by State bank of Pakistan (SBP) on June-2018. Similarly, asset quality has also improved and NPLs to loans ratio came down from 10.1 percent in CY16 to 10 years low of 8.4 percent in CY17. Net NPLs ratio reduced from 1.6 percent to 1.2 percent in December 2017. Figure 1 shows Credit risk Trend in Conventional and Islamic Banks.

Figure 1: Credit Risk Trend





Source: author's self-conceptualization

1.3. Research Gap

In the area of research, the sharp rise in credit risk has caught the attention of bank management and regulatory authorities around the world to try to explain this phenomenon; which factors are responsible to increase credit risk. Credit risk affect the bank's liquidity and profitability which are the main components for the overall efficiency of the banking sector. An increase in credit risk provision diminishes income. Again, mismatch of maturities between asset and liability create liquidity issue for the banks that deteriorate bank's overall credit rating including its repute (Badar and Javid, 2013).

Credit risk are one of the major causes of the economic stagnation problems. Each credit risk in the financial sector is viewed as an obverse mirror image of an ailing unprofitable enterprise. From this point of view, the mitigation of credit risk is a necessary condition to improve the economic status. If the credit risk are kept existing and continuously rolled over, the resources are locked up in unprofitable sectors; thus, hindering the economic growth and impairing the economic efficiency(Akerlof ,1978).

Therefore, the determinants of credit risk should be given a due consideration because of its adverse effect on the survival of banks. (Waemustafa and Sukri, 2015) and Waemustafa (2013) explained that there is dire need to understand how credit risk is formed in Islamic & Conventional banks by considering the Internal factor (Bank specific factor) and external factor (Macroeconomic factors) determinants.

But unfortunately, there are not many studies have been conducted to investigate the effect of macroeconomic and banks specific variables on credit risk in conventional and Islamic banks somewhere in the world for instance: Lin *et al.* (2016) in Indonesia and Waemustafa and Sukri (2015) in Malaysia. In Pakistan, few studies have been done just on the conventional banking sector. For instance(Badar and Javid ,2013; Mehmood *et al.*,2013)etc.But this study will analyse empirically Islamic and conventional banking industry to check the impact of

macroeconomic and bank-specific variables on credit risk in Pakistani banking sector. Thus this study sought to answer the research question:

- Is there any impact of macroeconomic and bank specific factor on credit risk in Conventional banks in Pakistan?
- How macroeconomic and bank specific variables influence on credit risk in Islamic banks in Pakistan?
- Which one banking system are vulnerable to change in macroeconomic and bank specific factor on credit risk in Pakistan?

1.4.Objective of the Study

- To analyze the impact of macroeconomic and bank-specific factors on credit risk in Islamic banks of Pakistan
- To check the affect of macroeconomic variables and bank-specific factors on credit risk in conventional banks of Pakistan.
- To compare which one banking system are vulnerable to change in macroeconomic and bank specific factors on credit risk in Pakistan.

1.5. Significance of Study

Firstly, this study findings provide a better idea of local banking risk and also provide the opportunity to enrich their knowledge and serve as a reference for other researchers in the related area; while also providing a foundation for further studies. Secondly, this study contribute to the literature by providing new information in the similarities and differences between credit risk predictor of Islamic banks and conventional banks in Pakistan.

Thirdly, the study provide a better view of the macroeconomic and banks specific variables which can change the risk of conventional and Islamic banks in Pakistan .So the impact of macroeconomic factor is a key topic which concerns many participants as banking

crises can have catastrophic impacts on the overall economy resulting into restricting credit and costly liquidation thus creating output losses and high unemployment (Sijben, 2002).

Fourth, the identification of these components gives information that the policy maker and bank management should pay attention to the key credit risk determinants, in order how to mitigate and reduce the effect of macroeconomic and bank-specific variable on credit risk in Conventional and Islamic Banks. Fifth, This study findings enable investors which banking system is stable with the change of economic environment. Finally, this study also help government authorities and bank manger to identify probable causes of banking risk and induce concern authorities to make certain policies by recognizing the factors that can impact credit risk in Pakistan.

The research findings are expected to facilitate bankers, investors, academics and policy makers to build a better understanding of CRM practices as adopted by CBs and IBs. The findings would be useful in formulating policy measures for the progress of the banking industry in Pakistan.

1.6. Plan of the Study

Chapter 1 is the introductory part of the study. Chapter 2 is based on the previous theoretical as well as empirical works and describe difference between in dual banking system. Chapter 3 consist of methodological structure which shelters the economic models. In Chapter 4, empirical results and analysis are given .In chapter 5, discuss the summary &conclusion, policy recommendation and the way forward.

CHAPTER 2
REVIEW OF LITERATURE

This chapter provide a theoretical as well as empirical indications of macroeconomic and bank-specific factors which effect the credit risk of banks. As per deeply review the literature of credit risk, several studies identify that two factors responsible for the expansion of credit risk and furthermore discuss that those factors have been comprehensively effect the financial stability and soundness of banking sector in both types of banking sector over the time period. One group stress on the macroeconomic environment which affects borrower's ability to paying their loans, whereas the other group look in the variability of credit risk across the banks responsible for the level of credit risk due to the bank level factors. Empirical indication show that macroeconomics factors were root cause behind every financial crisis, consequently slowdown the overall economic activities. When growth slow down or becomes negative it leads to decrease in the cash inflows of firms and households which make them unable to pay back their loans amount. On the other hand, if recession happen in the economy (households & firms) will face liquidity problems and therefore it leads to delay in fulfilling their financial commitments. Hence, banks credit conditions become non-lenient and selective in the credit crunch, which can be source of complications for firms and households. This empirical study focus on the macroeconomic and bank-specific variables affect on credit risk of the dual banking system in Pakistan

2.1. Overview of Islamic Banking

Islamic banking and finance growth has generated considerable interest in the financial world recent years. The concept of Islamic banking has received encouraging response from different corners of the globe as one discovers its ideological dimension and practical significance.Given its ability to offer an innovative financial solution for basic financial needs in under-served markets especially in the muslim world and to meet complex financial requirement of the modern times, it is seen socially responsible and ethical banking model with considerable

growth potential.In the Muslim world and increasingly in the west, significant segments of the institutional and retail market are choosing Islamic finance for their financing and investing needs. Islamic financial system also draws its strength from it being asset-backed nature and directly linked to the real economic transactions and avoidance of any element of interest and speculative activity

Islamic banking refers to a system of banking, which is based on Islamic Sharia principal (law) and forbids the payment and collection of Riba (interest). One of the forms of capitalism that has been flourishing in non-Islamic societies of the world is the interest-based investment. There are normally two participants in such transactions. One is the investor who provides capital as on loan against interest and the other is the manager who runs the business. Whereas, in conventional banking system investor has no concern whether the business runs into profit or loss, he automatically gets an interest (Riba) in both outcomes at a fixed or variable rate on his capital but in Islam prohibited this kind of business. The main discussion against the interest, according to the Institute of Islamic Banking & insurance, money in Islam is not regarded as an asset from which it is ethically allowed to earn a direct return and money tends to be viewed purely as a medium of exchange. Interest can lead to injustice and oppression in society. Therefore, this notion encourage to invest the money in concrete projects and profit sharing instead of interest earned. The comparison between these two kinds of concept is presented in Table1.

Table 2.1.Diffrence Between Interest and Profit and Loss Sharing

Aspects	Interest	Profit & Loss sharing
Determination of Profit	Predetermined of interest rate.	Determine at the time of the contract with the possibility profit or loss.
Risk Ownership	Customers bear all risk to loan (risk transfer)	The risk of loss will be borne by two parties (risk sharing) between investor and entrepreneur or

		between lender and borrower (according to contract)
Determinationof percentage of return	Based on the loan amount.	Based on the activities done to achieve some profit.
Payment	As promised without consideration profit or loss.	Based on the increase in the total revenue.

Source:Antonio (2001)

While credit risk is link with each financial product which is deliver by the banks. Thus, the nature of credit risk in Islamic banks differs significantly from conventional banks. Following are the main modes of financing of Islamic banks in table 2.2.

Table 2. 2.Modes of Financing of Islamic banks

Mudaraba: a profit-sharing partnership between "Rabb al maal (capital provider)" and "Mudarib (manager)". The profit shared among the two in a pre-agreed ratio, while the losses are borne exclusively by capital provider. The entrepreneur is covered by limited liability provisions.
Murabaha: a sales of goods contract which the payment include a profit margin agreed upon by the two parties. This product is predominantly offered by Islamic banks in asset financing, property, and commodity export and import.
Musharaka: a profit-sharing partnership in the agreement to share profits with a pre-agreed ratio and share losses based on the ratio of contribution.

Source :Waseem (2014).

2.1.1. COMPARISON BETWEEN CONVENTIONAL AND ISLAMIC BANK

Pakistan is one of a country who implemented under a dual banking system in compliance with the Pakistani banking architecture. Conventional and Islamic banking system jointly supports an extensive public fund mobilization in the framework financing capability of economic sectors. Conventional banking is based on the principle of making a profit from lending rates of interest and borrowing. Interest collect on a loan can be multiple of the principle, depending

on the span of the loan period. Moreover, the principle is contradicted with Islamic banking. Table 2.3.is presented to give an understanding about the comparison between those dual banking systems.

Table 2. 3.Differences between conventional banks and Islamic banks

Aspects	Conventional Banks	Islamic Banks
Principle	Based on the interest transaction.	The absence of interest-based (Riba) transaction, but based on profit and loss sharing.
Operational	Profitable transaction. Halal is not a major consideration.	Halal (legal, permitted based on Islamic rule) and profit business transactions only.
Relationship	Relationship is often defined as that of creditor-debtor.	Relationship is often defined as that of creditor-debtor.
Financing criteria	Do not permit financing to industries that cause harm to the society such as alcohol, tobacco, etc.	All type of industries are financed, only business deemed illegal by the law of the land are not permitted.
Product-level implementation	Islamic banking products are usually asset-backed and involved trading of asset, renting of asset and participation on profit &loss.	CB treat money as a commodity and lend it against as its compensation.
Business Model	IB business model is based on trade, thus IB need to actively participate in trade.	Generally, CB do not involve themselves in trade and business as they act only as money lenders.

Contract structure of loan between investor and entrepreneur	The investor/lender is guaranteed a predetermined rate of interest or returns.	It promotes risk sharing between investor and the user of funds /entrepreneur.

Source:Antonio (2001) ; Bakar (2010); Islamic Finance Book written by Dr.Muhammad Imran Ashraf Usmani Usmani (2012)

2.2. Macroeconomic Variable and Banking Risk

Macroeconomic factors are not control by the banking authorities and effect the soundness of banks by the external environment including government policies and it also effect the execution of decisions. Meanwhile, changing in rules and obligation, surprising events, economic and political changes are macroeconomic factors. The association between banking risk and the macro-economy can be explain on the basis of quality of loans which is affect by systematic risk from the exposure to macroeconomic risk factors across banks.

2.2.1. Economic Cycle Variation

Banking sector play a very pivotal role of intermediary for the real sector which exposes them to the economic cycle changes. As the economic environment change the risk face by the bank tend to increases. As banks are vulnerable to agency cost, asymmetric information of their borrowers and it's been observed that these vulnerabilities are higher for banks during the time of business cycle movement (Baele *et al.*, 2004). Meanwhile during the time of the negative business cycle movement bank profitability is low. Similarly, in economic slowdown banks interest rate margin decreases; thus it could be expect that risk of banks is negatively correlate with business cycle when economic condition is slow or negative.

It is consider that a higher risk in the banking system is may be because of cyclic downturn. It indicate that financial systems have a tendency to act pro-cyclically which means that business and financial cycles co-move. In economic growth, when security value is high, banks lend funds more eagerly which increases credit growth.

Macroeconomic factor changes are link with banking risk and their performance. An important component to measure banking performance is the gross domestic product with slightly macroeconomic factor changes guides banking industry towards bad performance.

Noteworthy, better gross GDP performance of a country can help banking sector by improvement in credit risk and fewer default chances. To explain default risk of banking sector the key macroeconomic variable is Gross Domestic Product. A better GDP performance leads to an increase in profitability and less default risk (Naceur andOmran, 2011).

2.2.2. Change in Exchange Rate

A theoretical relationship between banking risk and exchange rate change depends on the movement of currency and how much banks are expose to movement in foreign exchange. Change in domestic currency is vital for bank risk any bank whose foreign exchange liabilities significantly go above their assets in foreign currencies is likely to be hurt by exchange rate movement. whereas, Lindgren *et al.* (1996) explain that movement in exchange rate effect banks profitability and depreciation in domestic currency increases credit risk associate with importers and decrease credit risk for exporters[5]. Movement in the exchange rate is linked to having a diverse effect on banks with different kind of exposures. Severe exchange rate changes affect economic and financial soundness in a country and it reveal that the exchange rate movement was the reason for financial crises in most of the countries (Lindgren et al., 1996). The real exchange rate is extremely relevant to degree the competitiveness of an economy(Moosa, 2003).

2.2.3. Interest Rate Changes

While interest rates changes, the first impact on banks is their earnings and expenses vary, further the change in value of their assets, liabilities and off-balance-sheet positions. The effect

[5] High exchange rate (depreciate domestic currency) effect the foreign products to become relatively more costly while causes domestic products relatively cheaper (Mankiw *et al.*, 2003).

of these changes is reflected in the banks' overall income and capital(Greuning and Bratanovic, 2003). High-interest rates will discourage borrowers to prefer secure projects, thus risk composition of the loan applicants will move to bad risks. In addition, an increase in interest rates will change the behavior of borrowers to consider for more risky projects (Stiglitz and Weiss, 1981).

Banks act as the key party in financial transactions which put them in different risky situations. The banks sometimes fail to shift those risks toward the borrowers because several risks are correlate which forces banks to face the risks alone (Santomero, 1997).Banks earnings and expenses change with interest rate changes.

Several studies have tried to explore the impact of interest rate changes on banking performance. Banks are exposed to interest rate changes thus a short-term increase in interest rate changes could cause a major banking shocks and these short-term changes occur due to macroeconomic movement(Demirgüç-Kunt and Detragiache, 1998). They further added that interest rate changes could lead to bank financial statement problem and increase credit risk. In Islamic bank, the amount charged by the fund provider as compensation for the loss of asset or capital uses as the interest rate. Bashir (2003) investigated empirically and found that suitable macroeconomic conditions, such as lower interest rate increases Islamic bank profitability.

2.2.4. Changes in Unemployment

There is a support of the positive and significant relationship between unemployment and credit risk[6].Unemployment movement in the country negatively affect the income level of the individuals which increases their debt burden, it is understandable when a person losses his source of income it makes it difficult for him to return his loans, likewise a sudden increased

[6] Unemployment rate is defined as the ratio of whole labor force that is unemployed but strongly looking for a job and keen to contribute (Bernstein, 2014).

in unemployment negatively affects the demand of consumers which ultimately affects the production, this change leads to a drastic decline in the revenues of the firms (Louzis et al., 2012; Nkusu, 2011).

2.2.5. Inflation

In literature indicate mixed empirical prove for the correlation between credit risk and inflation (Fofack, 2005; Khemraj and Pasha, 2009)[7].On the other group explained that the association could be either negative or positive. A general increase in price and declined in the purchasing power of money. According to different author explained negative or positive effect on the payment ability of household, higher inflation decreases the actual value of outstanding debt increasing loan repayment capacity because it is correlation with low employment as Philips curve advice. Whereas at the same time it could be deteriorate loan payment capacity of borrower because it reduced the real income of borrower when wages.

2.3. Bank Specific Variable and Banking Risk

Noteworthy, bank-specific factors are caused by the internal activities and function of banks which effect bank practices and decision of concerned department. These factors are manageable in which the official of banks can deal with the suitable practices, determination and exclusion of weakness and improvement practice (Haron, 2004).

2.3.1. Financial Risk

A risk is defined as the volatility of net cash flows of the firm and the purpose of a firm is usually to add worth to the shareholder's equity by maximizing the risk-adjusted return. For non-financial firms, huge losses can be incurred as a consequence of poor financial risk management. If the core business operations are sound; it hardly ever leads to liquidation. On

[7] The most common approach used to measure the rate of inflation is the (CPI). The increase in consumer price index shows inflation condition that negatively affects the banking deposits (YFrusoff, etal., 2008)

the other hand, financial risk management is the core business of banks; since in extreme cases, insufficient risk management may threaten the solvency of a bank. Therefore, the profitability and shareholder value-addition for banks depend on the management of financial risks (Heffernan, 2005).

2.3.2. Theory of Asymmetric Information

Stiglitz and Weiss (1981) proposed a theory of information asymmetry. According to this theory, it is hard for banks to point out good and bad borrowers (Richard, 2011). Which may result moral hazards and adverse selection problems. This type of difficulty arises due to incomplete information available to the lenders. Banks try to increase their prospects of expanding their business in doing so they face a problem of complete information (Khatib, 2010). The theory explains a condition where not all parties have to compete for appropriate information. Lending activities by banks are pro-cyclical, banks expand their lending activities during business cycle upturns and cut their lending activities in downturns. Likewise, if there is a possibility of macroeconomic risks due to movement or shocks in the economy; banks reduce their lending activities. Furthermore, the party that has less information about the transacted items will making difficulty for a right decision regarding the transaction and that problem may be lead to the substantial accumulation of nonperforming loans (Bester, 1994).

2.3.3. Bad Management Hypothesis

This hypothesis was formed by (Berger and DeYoung, 1997). According to Bad management hypothesis predicted that cost efficiency exerts an influence on non-performing loans, low calculate cost efficiency is a sign of poor management practice; which apply to managed the loan portfolio and daily operations. The main problem arises, bank manager doesn't sufficiently oversight and controlled their operating expense. Furthermore, Managers in these banks also do not practice suitable loan underwriting, monitoring, and control their routine operations.

2.3.4. Moral Hazard Hypothesis

The theory was formulated by Keeton and Morris (1987) and later on more comprehensively explained by (Berger andDeYoung, 1997). According to moral hazard hypothesis small banks are more interested in expanding by increasing their earning through loan portfolios which, in the process, lead to higher non-performing loans and ultimately high credit risk in future. These particular practices by small banks are qualified as moral hazard; since banks understand that their enterprise is completely capitalized, still they decide to increase loan portfolio riskiness (Klien *et al.*, 2013).According to Quadt and Nguyen (2016) the moral hazard hypothesis suggests that low capitalized banks have faced a high level of credit risk.

2.3.5. The Bad Luck Hypothesis

This theory was developed by (Berger and DeYoung, 1997).According to their theory there are several external factors indirectly responsible to rise in Credit risk. Those external factors such as slowdown of an economy increased the cost of banks while dealing their loans, In result weakened the cost efficiency of banks. According to this hypothesis, macroeconomic factors such as high unemployment, Failure in production, low GDP, energy crises and terrorist attacks are responsible to contributed in non-performing loans which leads to higher credit risk for banks. Therefore adverse economic situation, firms profit and earnings declined; in results higher bad loans (Ahmad and Bashir, 2013; Podpiera and Weill, 2008).

2.3.6. Financial Intermediation Theory

This theory proposed by Allen and Santomero (1997) explained that banks are able to efficiently supervised by borrowers and thus perform the role of delegated monitoring. If the role of delegated monitoring is performed efficiently, then the intermediation process will run smoothly and there will be less or no market frictions(Diamond, 1984).Otherwise, financial intermediary not efficiently monitored the borrower worthiness, it could face a high level of risk. Financial intermediation theory stressed on the role of banks as reduced the frictions of

transaction cost and asymmetric information. Its tasks that a suitable intermediation process led to profitable and stable financial institutions.

2.4.Empirical Review of Conventional and Islamic Banking Structure

2.4.1. Credit Risk and Macroeconomic Interaction in Conventional Banking Structure

Castro (2013) employed the dynamic panel data technique on 15 year quarterly data (1999-2011) of specific group of GIPSI countries to investigate the association between macroeconomic factors and banking credit risk. The statistical results explained that macroeconomic circumstances have strong and substantial effect on banking credit risk. The study found that GDP growth, share and housing price indices have statistically significant and negative linked with the credit risk. However,other macroeconomic variables, such as unemployment rate, interest rate, appreciation of the real exchange rate and credit growth were found to have positive influence on credit risk in GIPSI countries. Additionally, we could observe that a considerable expansion in credit risk during the financial crisis period.

Kumar and Kishore (2019) used panel data methodology including Random effect model to identify the bank-specific and macroeconomic determinants of non-performing loans in UAE conventional banks for the period 2008-2015. They found that bank-specific variables were included liquidity ratio has negative relationship with NPL, whereas capital adequacy ratio and return on asset was found to have an insignificant linked with NPL. On the other hand, macroeconomic determinants, namely GDP, inflation, domestic credit to private sector, unemployment and government debt appeared to be insignificant in determining the level of NPL.

Koju *et al.*, (2018) studied the influence of macroeconomic and bank-specific determinants of nonperforming loans in Nepalese banking system through both Static and dynamic panel estimation technique using 30 commercial banks data from 2003 to 2015.The finding showed that NPLs have positive and significant linked with export to import ratio,

inefficiency and asset size .However, GDP growth, capital adequacy ratio and inflation rate were found to have negative influence on NPLs.

Rivai and Indiastuti (2019) Examined the impact of business cycles and other macroeconomics factors on non-performing bank loans in Indonesian banking industry using 119 commercial bank data over the period 2001-2006.Using Robust Least Square Technique, result showed that effect of GDP, interest rate, exchange rate, Credit/GDP ratio, Third Parties Fund, Unemployment are most dominant and significant factors affecting the nonperforming bank loan, besides interest rate. Whereas, foreign exchange rate has no influence at all on NPLs. Furthermore, during the period of expansion economic environment in the country, the NPL is Procyclical with the business cycle.

Khan *et al.* (2015) examined the effect of specific macroeconomic factors on non-performing loans in Pakistani commercial banks for the period (2006-2010). The random effect and fixed effect model were followed to examine the effect of macroeconomic factor namely: GDP, Inflation, Exchange rate, unemployment rate and tax rate. The study revealed that the GDP growth and inflation rate have negative linked with Credit risk, whereas, the exchange rate, unemployment rate and tax rate have positive associated with NPLs. Results indicated that higher the exchange rate in return higher the NPLs and higher the unemployment rate less ability to repay the loan amount.

Kumar *et al.* (2018) studied the determinants of non-performing loans in banking sector Fiji through Pooled OLS, Random Effect, Fixed Effect econometric technique and data taken from 2000-2013─period. The results showed that return on equity, capital adequacy requirement, market share based on asset and unemployment had negative and significant associated with nonperforming loans. On the other hand, net interest margin has positive and statistically significant associated with NPL.

Qwader (2019) identified the influence of macroeconomic variable such as GDP, unemployment rate, Interest rate, remittances of workers abroad and external grants on NPL in Jordanian banks over the time horizon extended from the year 2001 till 2017 and population of this study 25 banks. To examine empirically used ARDL econometric technique .The study found that inverse and substantial effect on the long and short term for both external grants, GDP, and interest rates on non-performing loans. On the other side, showed not significant impact on the long and short run for both remittance of worker abroad and the rate of unemployment on NPL.

Mazreku *et al.* (2018) analysed the determinants of nonperforming loans in commercial banks of transition countries with the help of data from the period (2006-2016).In order to analysed the determinants of non-performing loans was used (Fixed and Random effect Model) econometric technique The results demonstrated that GDP growth and inflation had negative impact on problem loans. Whereas, unemployment and NPL showed positively association with each other.

Khemraj and Pasha (2009) used the empirical model to identify the determinants of NPLs in Guyanese banking sector. The empirical analyses confirmed that real effective exchange (REER) has a positive impact on the quality of loans. However, results showed that whenever local currency appreciated; the NPL collection of credit organization are predictable to be high. Moreover results explained that GDP growth is negatively impact on NPL, proposing that expansion in GDP leads to decline in the ratio of credit risk. They also detected that when banks giving the loans with high margin of interest rate are proposed to acquire a higher levels of default in loan amount.

Adebola *et al*. (2011) conducted the empirical study to examine the determinants of non-performing loans using data 9 largest Greek banks for the time period (2003-2009). In order to check the determinants through the GMM Model .The results explained that

macroeconomic factors such as unemployment rate, real GDP growth, and lending rate have the ability to increases the risk of bank. However, Credit risk was a significantly negative linked with GDP growth and explained that GDP growth rate has strong effect on business loans. whereras, unemployment rate does not have any prominent effect on credit risk. Further-more empirical result demonstrated that real lending rate has a positive and significant impact on paying the loan amount.

Diamond and Rajan (2001) studied the issue which factors are responsible to banking crisis employing a multivariate logit econometric technique, used large sample from the developed and developing countries for the time period (1980-94). The results showed that banking crises evolve when the macroeconomic condition will be weak, specifically growth is slow and inflation is high. whereas,for the empirically analysed the effect of macroeconomic factors, namely Growth rate, TOT change, and depreciation had found a negative and significant influence on banking crises. On the other side, Real interest rate, Inflation, M2/Reserve (capital adequacy) and credit growth have positively linked with banking crisis.

Fofack (2005)studied the distress in banking sector Africans countries using the Granger causality with pseudo panel-based prediction. Explained that main causes of credit risk during the economic and banking industry crises that affected several countries in time period (1990s) sub-Saharan Africans countries. The study found significant relation with macroeconomic variables and credit risk. The study also highlighted a strong causality between these variables economic growth, the real interest rate, real exchange rate appreciation, inter banks' loan. GDP growth has a negative relation between the credit risk .however, other macroeconomic variables included real interest rate, real exchange rate appreciation, inter banks' loan had a positive association with credit risk. He concluded that if a country was economically stable there will be low Credit risk otherwise high level of credit risk faced by the financial sector.

More specifically, a real exchange rate increase may has decreased the efficiency of an export-oriented sector of the economy.

Warue (2013) checked the effect of bank specific and macroeconomic variables on NPL in Kenyan commercial banks. Using both pooled (unbalanced) panel and fixed effect panel models over the time span (1995 to 2009) 44 commercial bank in Kenya. The statistical result proved that ROA was negative and significant linked to NPLs levels in (Large& Small) banks but insignificant result in medium banks[8]. On the other hand, per capita income has negative and statistically significant linked to NPLs levels across the all categories of banks. However the results showed that banks size was no linked with NPLs levels. This study also revealed that bank specific variables higher contribute to NPLs as compare with macroeconomic variable.

Swamy (2012) used the panel data methodology to identify the effect of macro-economic and endogenous factors on credit risk assets during the time span 1997-2009. He discovered that the lending rate not affecting the credit risk, which is different to the common opinion .Those assets have a negative and significant effect, precisely explained that a large banks may have good risk management practices and technology which categorically permits them to end up with lower levels of credit risk assets as associated to smaller banks.

Salas and Saurina (2002) employed a dynamic panel data model in order to check the determinants of credit risk for the time duration (1985-1997) in Spanish banks. They found that market power, rapid credit growth, banks size, capital ratio, interest rate, real growth in GDP variables describe the fluctuation in credit risk. Empirical Results demonstrate that credit growth, GDP growth have positive and significant relation with problem loans and other

[8] ROA is a sign of a bank financial performance and managerial efficiency.it indicate that how proficient management is in employing asset into net profit.

variables like market share and banks size are not effect on non-performing loans. Also point out that GDP and Interest rate are main macroeconomic variable to influence on credit risk.

Shu (2002) used the data Hong Kong banking sector for the time duration (1995-2002).Employing a simple OLS regression model technique to probe the correlation with macroeconomic variables and loan quality. They detected that an increase in interest rate has significant positive impact on credit risk. However, CPI and Real GDP have significant and negative impact on credit risk. They also proposed the insignificant effect of equity prices and unemployment on credit risk.

Farhan *et al.* (2012) analyzed the causes of macroeconomic factors on credit risk in 10 Pakistani banks since 2006.The study sample comprised top 10 Pakistani banks, data collected through questionnaire technique from 201 bankers who are involved in the credit risk control and lending decision. Regression analysis and correlation was carried out to check the impact of selected independent variables on credit risk in Pakistani banking industry. The results demonstrated that Unemployment, Interest Rate, Exchange rate, Energy Crisis, Inflation has positive linked with credit risks, except GDP has significantly negative associated with credit risk in Pakistani banking sector.

Mehmood *et al.* (2013) in order to examined empirically macroeconomic and bank-specific covariant of NPLs in Pakistan using 13 Pakistani commercial banks for the time span (2003-2012).Using fixed effect model, they found a strong negative effect of Market share, ROA, ROE, GDP on NPL in Pakistani banks. Whereas, both macroeconomics variable (Inflation rate, and interest rate) showed a negative effect on NPLs.

Tehulu and Olana (2014) conducted an empirical study in order to explore the determinants of bank risk that affect the soundness of the financial system .This study just identify the bank specific factor in Ethiopian commercial banks. For identification of determinants to employed the random effect GLS regression model and take balanced panel

data of ten commercial banks in Ethiopia both government and private owned banks for the time duration 2007 to 2011 .The estimation results revealed that credit growth and bank size have negative and statistically significant effect on credit risk. Similarly the results demonstrated that profitability, capital adequacy, and bank liquidity have negative but statistically insignificant linked with credit risk.

Aver (2008) studied the macroeconomic factors influence on credit risk through multiple regression Model and capture data for the time period 1995-2002 from Slovenian banks. They found that real interest rate, employment rate and stock exchange index have a strong influenced on credit risk. Increase in Interest rate has negative and statistically significant effect on credit risk because the increases in interest rate added the value of credit risk. Employment rate has positive linked with credit risk because increase in employment raises the chance for repaying the loans amount. This study also concluded that Asian and Russian crises most probably influenced the range of the portfolio credit in during 1997 and 1998.

Gabeshi (2016) examined the impact of macro-economic variable and internal variable (bank Specific variables) on credit risk in Albanian banking system for the time span 2005-2014.In order to empirically checked using the multiple regression econometric model. Empirical statistics explained that increase in inflation, Exchange rate, Size of bank and loan to deposit ratio will increase the NPL .while increase in ROE, GDP and credit growth will decrease the NPL ratio. The results showed that fluctuating in exchange rate, bank size and LDR a positive and statistically significant linked between the credit risks. On the other side, credit growth rate are negative and statically significant associated with the NPL in Albanian banks.

Muratbek (2017) checked the effect of macroeconomic and banks specific factor on non-performing loans in Kazakhstan banking industry a sample taken from 29 banks over the

time duration (2007-2014).In order to examined the effect using GMM panel data model. The statistical results showed that the macro-economic &bank specific variables have a substantial effect on the level of NPL in specific banks. While, results showed that GDP growth rate, Bank Size, and ROE have indirect and statistically significant associated with NPL .On the other side exchange rate and loan growth rate have direct and significant linked with NPL except exchange rate.

Beck *et al.* (2015) described the macroeconomic determinants of NPL between 75 countries using dynamic Panel data technique. According to the results of variables GDP growth rate, share prices, exchange rate and lending interest rate that substantial effect on NPL ratio. GDP growth rate has negative relation with NPL. Another important result is that the nominal exchange rate and lending interest rate have positive impact on NPL. However observed that exchange rate effect is higher in particular countries where the regulatory authorities implemented the pegged or managed exchange rate.

Ahmad and Bashir (2013) described the effect of macroeconomic factors as a determinants of NPL in Pakistani banking sector. This study used 9 macroeconomic variables over the time span (1990-2011) and employed OLS econometric technique for checking the macroeconomic variable as a causes of NPLs. The Statistical results proved a significant and negative association of GDP growth, interest rate, inflation rate, exports and industrial production with NPLs, Whereas real effective exchange rate, foreign direct investment have negative and statistically insignificant associated with NPL. Furthermore, CPI shown a positive and statistical significant linked with NPLs.

Badar and Javid (2013) studied the short run and long run dynamics between credit risk and external factors(inflation, exchange rate, interest rate , GDP and money supply) capturing the duration from Jan 2002 to Dec 2011 in commercial banks Pakistan. In order to check the relationship between variable use Johansen and juselius multivariate co-integration

test. Econometric result showed a long run relationship between the macroeconomic variables and NPLs. whereas, the vector error correction model found a short relationship among the variables.

Chaibi and Ftiti (2015) studied the effect of bank-specific and macroeconomic factors on loan quality varies in a market based (France) and bank based (Germany) economy. They examined non-performing loans' determinants of French and German banks over the period 2005 to 2011 through dynamic panel data approach. They observed a significant effect of GDP growth, exchange rate, the rate of unemployment and interest rate on loan quality in both countries. However, the inflation rate was significant in market-based economy only. Bank size and profitability from bank-specific factors showed a strong effect in both economies. They observed that credit risk is high in market-based economy (i.e. France) because inefficiency and loan loss provisions were significant determinants of credit risk in market-based economy; whereas leverage was significant in German Banks.

Siddiqui *et al.* (2012) examined the causes of credit risk .This study covering data for the time duration 1996 to 2011 and using generalized autoregressive conditional heteroskedasticity econometric technique .Results of this study explained that interest rate changes has a significant effect on credit risk, similarly all other macroeconomic factors and political factors have no prominent influence on increasing credit risk.

Farika *et al.*(2018) Analyzed the macro and microeconomic variables that affect the credit risk in Islamic and conventional banks Indonesia over the period 2008 to 2016 .In this study used VECM model, in order to examined the macro (Money supply ,CPI, Exchange rate, GDP)and micro(CAR, operational efficiency ratio) factors. The statistical results showed that bank Indonesia certificate and money supply as a macroeconomic variables have a substantial effect and capital adequacy ratio as an internal variables to main contribute in credit growth. Whereas, GDP, CPI, BIC gave positive responses although other macroeconomics variables

Exchange rate and money supply have negative responses. On the other side, Microeconomic variables (CAR) has positive linked with credit risk but LDR (loan deposit ratio) and OER (operational efficiency ratio) factors have negative impact on credit growth.

2.4.2. Credit Risk and Macroeconomic Interaction in Islamic Banking Structure

Isaev and Masih (2017) examined the effect of macroeconomic and bank specific determinants on Nonperforming financing in Malaysian Islamic banks for the time span (2010q4 till 2016 q3) using the Dynamic OLS technique. The empirical finding indicated that macroeconomic factor, specifically the unemployment rate has positive and strong impact on the level of non-performing finance for each financing portfolio. Thus increased in unemployment level effect the ability to pay back the loan amount. Furthermore, different results showed that different financing area namely(consumer financing, mortgage financing, home financing) have statistically significant linked with MEV and BSV .In this study found economic growth rate has negative linked with non-performing financing ratio for all types of financing. Implementation of active risk management policy may ensure to decrease the systematic risk resulting from macroeconomic environment changes and increase the level quality of asset.

Ozili and Outa (2017) studied the influence of macroeconomic and banking factors on credit risk in Islamic banking by panel data methodology and data taken from the period 2010 to 2016.The study found that size of bank influence positive and significant with credit risk. Other variables tested were financing expansion, financing quality, GDP and inflation have negative and significant impact with credit risk.

Effendi *et al.* (2017) examined the factors influencing non performing finance at sharia banking (BUS) using a quarterly data from q12012 to q32016.Method used in this research is panel data analysis .The results showed that revenue sharing financing(RR), Return on Asset (ROA),inflation, capital adequacy ratio and bank size have negatively correlated with NPF.

However GDP and operating cost to operating income (BOPO) have a significant positive influence.

Wulandari and Utami (2019) studied the determinants of non-performing finance in Indonesian Islamic bank using data six banks over the period 2013-2018.Identifying the determinants used panel data regression technique. The results showed that Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR) have a significant negative effect on NPF. While the Bank Indonesia Sharia Certificates (SBIS) rate has no effect on NPF. Concluded that increased in CAR and FDR, in return decreases the NPF and when SBIS increases, do not observed effect on NPF.

Fakhrunnas (2019) Studied the relationship between macroeconomic and bank-specific variables to risk taking of Islamic bank through panel co-integration approach by using quarterly data from 2010-Q4 to 2017-Q4.The empirical result confirmed that the risk taking behavior of all banks has long term linked with macroeconomic factors. Whereas, bank specified characteristic, bank size become substantial factor for the bank's risk mitigation. When the samples are grouped based on Islamic bank size, the bigger size of Islamic banks has no long term co-integration to macroeconomic variables. On the other side, the small and middle size of Islamic bank have found long term correlated with macroeconomic actor.

Adebola *et al*. (2011) examined the source of NPL in Malaysian Islamic banks .This study covering the time span from 2007 to 2009.They utilized the ARDL model to examine the impact of few macroeconomic factor's which comprises are Industrial production index (IPI), producer price index (PPI).The statistical finding explained that the long run relationship between the variables and interest rate has statistically significant and positive long run effect on NPLs. Moreover, IPI has positive but insignificant sign. The producer production index (PPI) has negative and statistically significant linked with NPL .The statistical results explain that influence of interest rate has stronger than to the producer price index and industrial index

Ahmad and Arif (2004) described the important factors influencing the credit risk of Malaysian Islamic banks by taking data from one full fledge Islamic bank, 6 Islamic windows and 6 conventional banks for the time period 1996-2002 through CARTER model. This study demonstrated that risk weighted assets, management efficiency, have a substantial effect on credit risk in Islamic banks Malaysia. Such as conventional banks credit risk were significant influence by loan exposure to risky sectors, risk weighted assets, regulatory capital and loan loss provision.This study also explained that similarities and differences in Islamic banks and conventional banks determinants of credit risk. Furthermore described that Islamic banks should have adopt better risk management outline and sufficient exposé the information on concentration of financing risk and asset: which arise in CBs financial reports of credit risk compare with convention banks.

Haryono *et al.* (2016) analyzed the determinant of factors affecting credit risk in Islamic banks Malaysia using panel data collected from 11 full-fledged Islamic banks and 22 conventional banks open Islamic windows operations for the time span (2004-2012). The study used GMM econometric model for the identification of credit risk determinants. The results of the study demonstrated that macroeconomic variables like GDP growth rate and inflation rate have strong and negative linked with credit risk in Islamic banks and unemployment rate has statistically insignificant but positive linked with credit risk. On the other hand, bank specific variables like capital adequacy ratio (CAR) and banks size was negatively related to bank credit risk. If the banks keep higher capital adequacy ratio faces a lower chance of default. Furthermore, the study explained that if the banks larger in size to ensure that the loan quality remains better because larger banks have enough resources to deal with any kind of financial risk.

Firmansyah (2014)studied the determinants of non-performing loan in Islamic banks Indonesia through the Classical Assumption test. This study used the monthly data of Islamic

banks for the time span (2010-2012). The empirical results found that bank size and OEOI have negative and statistical insignificant linked with NPLs thus bank size does not affected the NPF (non-performing finance).whereas, GDP and Inflation had negative and significant relation between the NPF (non-performing finance).They concluded that an expansion in GDP, the more people are capable to fulfil obligation and vice versa. Further results suggested that, Inflation is a macroeconomic indicator, when people have decrease the purchasing power, it does not affect the repaying loan amount capability.

Waemustafa and Sukri (2015) used the multivariate regression analysis model to analyse the macro-economic and bank specific determinant in 13 Malaysian Islamic & conventional banks over the time period (2000-2010).The empirical results found that risky factor financing, size of bank had negative and statistical significant linked with credit risk. whereas earning management, liquidity ratio, regulatory capital had positive linked with credit risk of Islamic banks. On the other side conventional banks, earning management, liquidity ratio had negative linked with credit risk; but REGAP, debt to total asset ratio, Size of bank positive and significant influenced on credit risk for conventional banks. Such as macroeconomic variables included M3 and inflation was negative and statistical significant linked for the both kinf of banking system.

Summary of Literature Review

As per study the literature review, it is clear that banks are at risk to a variety of macroeconomic variables and their changes. The recent crises of 2007 made it apparent that movement in macroeconomic variables affects liquidity risk exposure, market risk exposure, credit risk exposure, and eventually capital risk exposure. Many have concluded, macroeconomic environment changes in employment rate, growth in gross domestic product, inflation rate, and exchange rate movements are vital for banking risk irrespective of Islamic and conventional banks. Whereas, bank level factors can be contribute to banking risk. However, bank size,

inefficient management, return on asset and capital adequacy ratio are important variable toward the change in behavior of credit risk. In short, the macro-economic environment as well as bank level factors deterioration should be consider significantly for banking risk.

CHAPTER 3

DATA AND METHODOLOGY

This chapter introduces the econometric technique that will be used to empirically examine the impact of macroeconomic and bank-specific variables on credit risk of Islamic and Conventional banks in Pakistan for the time period 2007 to 2017.

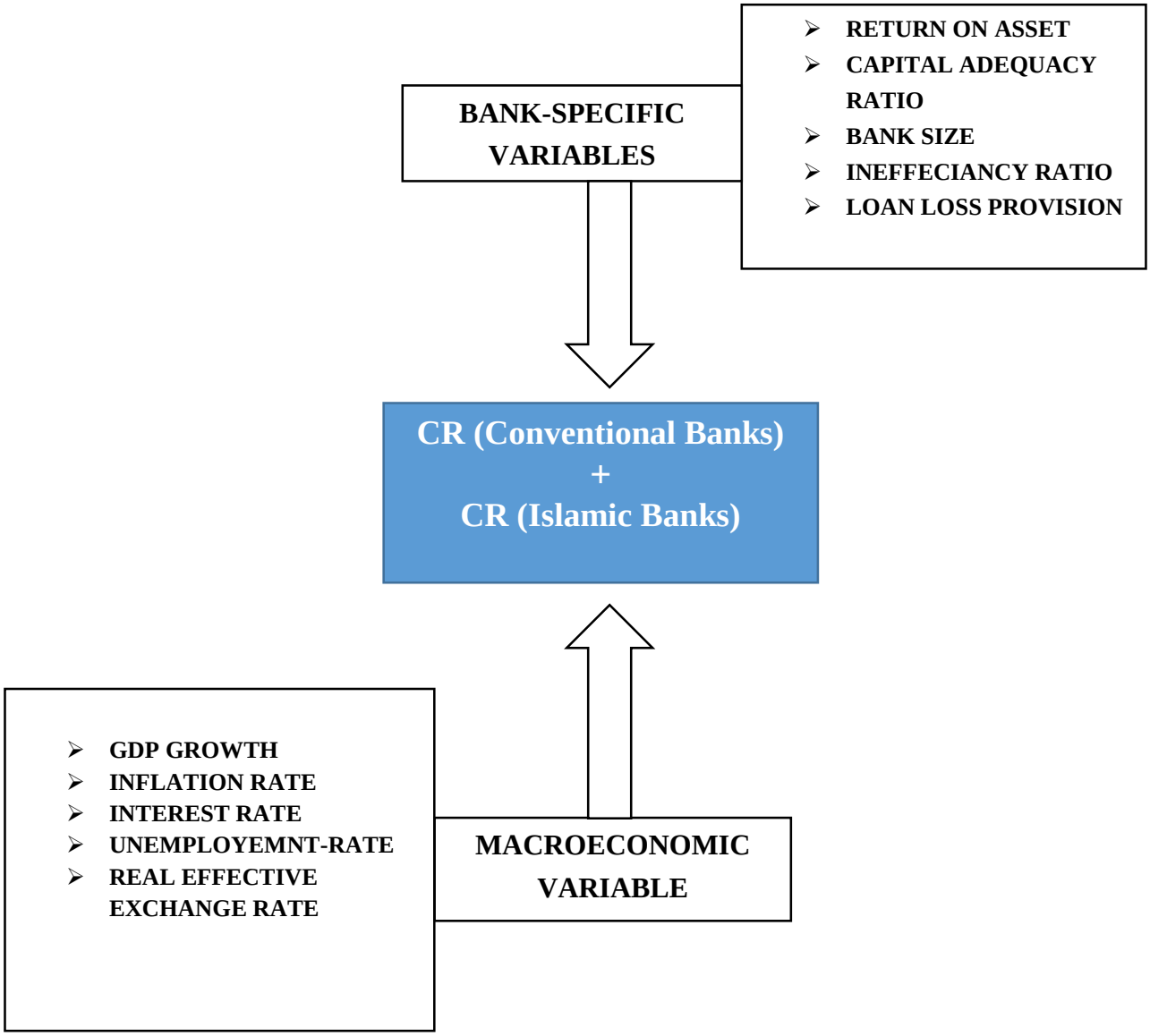
3.1. Conceptual Framework

As earlier discussed in the relevant literature review, credit risk are affected by both macroeconomic and bank specific variable. Macroeconomic variable are GDP growth, interest rate, inflation rate, unemployment rate, exchange rate, money supply. Whereas Bank specific variables are, capital adequacy ratio, return on asset, bank size, poor credit assessment, return on equity, lenient credit terms and conditions, aggressive lending, profitability, capital structure, weak institutional capacity, liquidity ,unfair competition among banks. These all above mentioned variables uses author in studies namely; Wulandari and Utami (2019);Farika *et al.* (2018);Haryono *et al. (*2016);Waemustafa and Sukri (2015);Firmansyah (2014); Badar and Javid (2013);Castro (2013);Farhan *et al*. (2012);Louzis *et a*l. (2012) and Shu (2002).

So, the following conceptual model is framed to summarize the main concentration and scope of this study in terms of variables included.

Figure 2: Macroeconomic and Banks Specific Variable

(Conceptual Frame for Islamic &Conventional Bank)



Source: author's self-conceptualization

$$CR_{i,t}=\alpha_1+\beta_1 CR_{i,t-1}+\beta_2 GDPG_t+\beta_3 INF_t+\beta_4 INT_t+\beta_5 REER_t+\beta_6 UN_t+\gamma_7 INEF_{i,t}+\gamma_8 ROA_{i,t}+\gamma_9 BS_{i,t}+\gamma_{10} CAR_{i,t}+\gamma_{10} LLP_{i,t}$$ (For conventional banks)

$$CR_{i,t}=\alpha_1+\beta_1 CR_{i,t-1}+\beta_2 GDPG_t+\beta_3 INF_t+\beta_4 INT_t+\beta_5 REER_t+\beta_6 UN_t+\gamma_7 INEF_{i,t}+\gamma_8 ROA_{i,t}+\gamma_9 BS_{i,t}+\gamma_{10} CAR_{i,t}+\gamma_{10} FLP_{i,t}$$ (For Islamic bank)

3.2. Model Specification

Based on the conceptual framework two models are defined for conventional banks model and

Islamic banks due to the different measure of credit risk in each case, these are

Model 1
Credit Risk (Conventional Banks)

$$CR_{i,t} = \alpha_1 + \beta_1 CR_{i,t-1} + \beta_2 GDPG_t + \beta_3 INF_t + \beta_4 INT_t + \beta_5 REER_t + \beta_6 UN_t + \gamma_7 INEF_{i,t} + \gamma_8 ROA_{i,t} +$$

$$\gamma_9 BS_{i,t} + \gamma_{10} CAR_{i,t} + \gamma_{10} LLP_{i,t} + v_{i,t} \qquad \textbf{3.1}$$

Model 11
Credit Risk (Islamic Banks**)**

$$CR_{i,t} = \alpha_1 + \beta_1 CR_{i,t-1} + \beta_2 GDPG_t + \beta_3 INF_t + \beta_4 INT_t + \beta_5 REER_t + \beta_6 UN_t + \gamma_7 INEF_{i,t} + \gamma_8 ROA_{i,t} +$$

$$\gamma_9 BS_{i,t} + \gamma_{10} CAR_{i,t} + \gamma_{10} FLP_{i,t} + v_{i,t} \qquad \textbf{3.2}$$

Where

$CRc_{i,t}$: The dependent variable for first model, represents loans quality indicator in conventional banks (i.e. Proxy of non-performing loans) for bank (i) at time (t).

$CR_{i,t-1}$: The first lagged of dependent variable which capture the persistence in loan quality over time in conventional banks.

$CR_{i,t}$:The dependent variable for second model, represents loans quality indicator in Islamic banks (i.e. Proxy of non-performing finance) for bank (i) at time (t).
$CR_{i,t-1}$: The first lagged of dependent variable which capture the persistence in loan quality over the time in Islamic banks.

$GDPG_t$: Annual growth of real gross domestic product for bank at time (t).

INF_t: Annual inflation rate (i.e. CPI proxy) for bank at time (t).

$REER_t$: Real effective exchange rate for bank at time (t).

INT_t : Interest rate (i.e. KIBOR) for bank for bank at time (t)[9].

[9] Karachi interbank offered rate (KIBOR) is taken as a measure of interest rate for conventional banks. For Islamic banks, the rate of profit offered by banks to its customers is taken to examine its effect on the deposits. Interest rate used proxy of KIBOR.

UN_i: Unemployment rate for bank at time (t).

$INEF_{i,t}$: Inefficiency for bank (i) at time (t).

$ROA_{i,t}$: Rate of return on Asset for bank (i) at time (t).

$BS_{i,t}$: Bank Size for bank (i) at time (t).

$CAR_{i,t}$: Capital adequacy ratio For bank (i) at time (t).

$LLP_{i,t}$: Loan loss provision for bank (i) at time (t)

$v_{i,t}$: the composite error ($v_{i,t} = a_i + u_{i,t}$) Un-observed bank-specific effect and the idiosyncratic error are represented by $a_i$and $u_{i,t}$respectively.

β, γ: coefficients to be estimated using dynamic panel estimation performed by the general method of moments (GMM) system estimator Developed by (Blundell andBond, 1998).

3.3. Estimation Technique

3.3.1. Description of Panel Data

Panel data, it is also called longitudinal data; a multi-dimensional data involving measurements over the time; contains observations of multiple phenomena obtained over multiple time periods for the same firms, individuals, countries etc. However, the advantage to usage of panel data can overcome the issue of identification. Currently, there is growing use and popularity of the panel data in different spheres of economic fields. According to (Baltagi, 2008)panel data always have the same cross-section over the different time period.

The advantage to usage the panel data set is that increases the number of observation and allow to control variables that cannot be observed or measured like differences in business practices across companies/banks; or variables that change over time but not across entities. Furthermore, panel data usually contains more degree of freedom, which reduces the problem of multicolinearity. Hence improving the efficiency of econometric estimates (Hasiao et al., 1995).

Noteworthy, Panel data set consist on two types (Balanced and Un-Balanced). Balanced panel data set consist every observation of variables across all the time period. It means a single observation are not having miss in data. Whereas, unbalanced panel data has consist some missing observation for some variables across the time period.

3.3.2. Dynamic Panel Data

This study comprises of Dynamic Panel data econometric technique for analysis. Credit risk (CRc) for conventional banks and (CRi) for Islamic banks will be used as a dependent variables to examine the impact of macroeconomic and bank specific variables on credit risk in dual banking system. There is also a need to examine the persistence of shock in credit risk structure, so the study has also used dynamic approach. A dynamic panel data model is a model in which lagged dependent variable looks on the right-hand side of the equation (Baltagi, 2008). The simplest dynamic panel data model is where the dependent variable, $y_{i,t-1}$along with $X_{i,t}$ as regressor;

$$y_{i,t}=\alpha_i+\beta y_{i,t-1}+\alpha X_{i,t}+\delta_i+\mu_{i,t}$$

Where the subscripts *i* and *t* show the cross sectional and time dimension of the panel sample respectively,α is a scalar, and β and $X_{i,t}$ (explanatory variable) are each k x1vector of explanatory variables other than $y_{i,t-1}$, δ_i are the unobserved bank specific effect and $\mu_{i,t}$ are the error term.

There are several conventional econometric techniques which are applied by researchers over the time some popular technique are Pooled OLS, Fixed Effect, Instrumental fixed effect, Random Effect produce the bias estimates. Thus we rely on Generalized Method of Moments (GMM) estimates, which is commonly used to check the impact of macroeconomic and bank specific variable on credit risk.

3.3.3. The GMM Estimator

To estimate dynamic panel data model practitioners considers GMM as a best and superior estimation technique. The GMM estimation technique is uniquely to arrive at efficient and reliable estimates of the variables in dynamic panel data models, when one or more lagged dependent variables are used as covariates. The GMM estimation technique, developed by Arellano and Bover (1995);Arellano and Bond (1991) and Blundell and Bond (1998)is specially designed for the econometric analysis of the dynamic panel data models. Furthermore, the GMM estimation technique is applied to tackle the problem of endogineity, when the regressors in the model are not strictly exogenous but correlated with current or past values of the error term. In addition, GMM estimator gets into account the problem of heteroskedasticity and autocorrelation within individuals, but not across them.

3.3.4. Why the Blundell-Bond (1998) Estimator (System GMM Estimator)

Since in this study we are using dynamic models, in equation 3.1 and 3.2, lag dependent variable is used as an explanatory variable, Due to the use of lag dependent variable on explanatory side, it can lead towards the problem

If we estimate our models through pooled OLS method, it will produce inconsistent estimates. The leading feature of classical estimators (OLS) is to minimize the residual sum of squares and it assumes that regressors and error terms are not correlated. However, our models clearly violates this main assumption of OLS, in our model parameter the lag dependent variables are correlated with v_i, that creates problem of autocorrelation in the error term. Hence, pooled OLS estimator arrives at inconsistent, unreliable coefficient estimates. Similarly, the coefficient estimated by pooled OLS for the lagged dependent variable is upward-bias, because lagged dependent variable and error term are positively associated.

The other conventional strategies, researchers have applied to tackle inconsistency of the pooled OLS in panel data analysis are the (a) Fixed Effect Models (FEM) and (b) Random

Effect models (REM). The FEM model sort out the fixed effect (υ_i) from the model, as it creates inconsistency in the coefficient estimates, through the procedure called within transformation. The within transformation subtracts the mean value of each dependent and independent variable from respective variable, as a result the model eliminates the fixed effect (υ_i). On the other hand, the REM considers no heterogeneity among the cross section and let heterogeneity to be included in the error term. To select between FEM and REM the decision is made through the Hausman test. However, we must know that, the FEM and REM can only sort out the unobserved fixed effect (υ_i) form the model and decreases inconsistency of the coefficient estimate of pooled OLS to some extend but cannot fully eliminate it, as lagged dependent variable is still correlated to error term. In short, since our models include one period lag dependent variable as regressor, the estimating of FEM and REM yield downward biased estimate of the coefficient of lagged dependent variable. Hence, we do not apply these estimation methods. The suitable way of estimating our models is to move toward instrumental variable (IV) approach.

The IV approach proposed by Anderson and Hsiao (1981, 1982) is a two-step process, 1) difference transformation, is to remove individual fixed effect, 2) forms instruments for the lagged dependent variable from the lag levels of the dependent variable, is to remove inconsistency of coefficient estimates. The property of the instrument is that, it's highly correlated with lagged dependent variable and is not correlated with the error term. If error term is i.i.d, then second lag of dependent variable can be highly correlated with the lagged dependent variable (and its difference) but not correlated with the composite error process. However, a common criticism on the IV technique is that, it produces inconsistent coefficient estimates, as it does not incorporate all the available movement conditions. In case if the number of available instruments is greater than the number of regressors (r>k).

The GMM estimator proposed by Arellano and Bond (1991) removes individual fixed effect by taking first difference of the model and then use lags in level of the dependent variable as instruments for the lagged dependent variable or its difference to remove endogeneity from the model. If Yi.t is dependent variable then, the GMM estimators use Yit-2 (the second lag of the dependent variable) as instrument for Yit-1 (lagged dependent variable). Furthermore, if the model is in transformed form, then Yit-2 and ΔYit-2 are used as instruments for difference of lagged dependent variable (ΔYit-1), since both the instruments are correlated to difference of lagged dependent variable (ΔYit-1), and are not correlated to error term. As a result the difference GMM estimation provides reliable and consistent coefficient estimates of the dynamic panel data models.

Infact, Blundell and Bond (1998) estimator is supposed to perform well than several other estimation techniques, however difference GMM produce bias and inaccurate results, specifically, when the dependent variable follows random walk. So, if the dependent variable follows random walk, then lags in level of the dependent variable (i.e Yit-2,3….t) are weak instruments, as they are weakly correlated to difference of lagged dependent variable (ΔYit-1). This means that, past levels convey little information about future changes, so untransformed lag levels are weak instruments for transformed regressors Roodman (2009). To account for the problem of weak instruments Arellano and Bover (1995) and Blundell-Bond (1998) proposed an augmented approach, the system GMM[10].

In system GMM the instrument are increased as the difference of lagged dependent variable (i.e ΔYit-1,2…. t) are used as a new set of instruments for the level of the lagged dependent variable (Yit-1).Hence, for estimating the dynamic panel data models the system GMM uses this additional lag difference instruments as well as the lag level instruments. In

[10] The System GMM covers two equations, namely, level equation and difference equation, that's why it's called System GMM.

short, the system GMM mitigates the fixed effect (υ_i) from the model by taking the first difference of the model and handle the problem of endogeneity by using lags in level of the dependent variable (i.e Yit-2, 3…t) as instrument for lagged first difference regressor (ΔYit-1) and the difference of lagged dependent variable (i.e ΔYit-1, 2…t) as instrument for the level of the lagged dependent variable (Yit-1). The system GMM combines equation in difference with equation in level as a system of equation, and estimate it in a single operation. Likely, Blundell and Bond (1998) find that system GMM produces more consistent estimates than the difference GMM even if dependent variable is near to random walk. The system GMM is fairly flexible as it allows the researcher to use additional instruments with different lag structure for both level as well as first-differenced equations.

3.3.5. Concluding Remark

We can conclude that estimation of dynamic panel data model through pooled OLS produce biased estimates of the coefficients. Similarly the strategy of FEM and REM models fails as the inconsistency of the coefficient remains in the model. Moving towards the IV approach, where the fixed effect is removed from the model through first difference and an appropriate instrument is found for the lagged dependent variable. However, the IV does not exploit all the available information and results in biased estimates of the coefficients. The GMM estimator, which is the extension of IV approach, is considered a good estimator for the dynamic panel data, as it incorporates all the available moment condition. However, the difference GMM weakly performs if the dependent variable is near to random walk[11]. A more suitable estimation technique for analyzing the dynamic panel data models in the literature is the system GMM proposed by Blundell and Bond (1998)[12]. The system GMM uses this additional lag difference

[11] For estimating the dynamic models the difference GMM, first transform all the regressors, by taking difference of them to wipe out fixed effect and then utilize generalize method of moments to get coefficient estimates.

[12] For instance, according to Perera and Lee (2013), GMM produces consistent and efficient estimates even in the presence of heteroskedasticity.

instruments as well as the lag level instruments and produce consistent and reliable coefficient estimates of the model. This study also used the two step system GMM for empirical analysis of the model. For the validity of the instruments we use J test of Hansen (1982) and for the diagnosing second order serial correlation in the residuals we use Arellano-Bond AR(2) tests.

3.4. Data and Measurement of Variables

In Pakistan, presently five full fledge Islamic banks are delivering their services and running their operations under the direction of Islamic sharia. The MCB Islamic Bank Limited was established during 2015, so it was excluded from this study. On the other side, 30 conventional banks (20 local private banks, 5 foreign banks and 5 specialized banks) working in Pakistan but our sample take 13 conventional bank out of 30 banks. Furthermore, the data of macroeconomic variables GDP growth, Unemployment rate, Inflation rate, real effective exchange rate, Interest rate are obtained from economic survey of Pakistan and State Bank of Pakistan (SBP). Meanwhile, the data of bank-specific variables (Bank Size, ROA, CAR, Inefficiency ratio, Loan Loss provision) are obtained from consolidated annual reports (Income statements and balance sheets) of the respective banks. Table 3.1 provides the definition and measurement of variables selected in this study.

Table 3. 1. Definitions of the Variables

Independent Variables	**Definition**	**Source**	***References***
Inflation	measures the overall percentage increase in Consumer Price Index (CPI) for all goods and service use proxy of inflation $INF_i = \frac{CPI_2 - CPI_1}{CPI_1} * 100$	SBP	Rahmawulan(2008),Al-Smadi (2010),Kabir *et al.* (2015) and K. A. Effendi and Yuniarti (2018).
Real effective exchange rate	Real effective exchange rate is the nominal effective exchange rate divided by a price deflator or index of cost. Number of units of the domestic currency that can purchase a unit of a given foreign currency	SBP	Al-Wesab (2012): ,Kabir *et al*. (2015), Haryono *et al.* (2016)

Unemployment rate	Unemployment refers to the share of the labor force and educated force that is without work but available for and seeking employment.	PBS	Al-Wesabi (2012)
Interest rate	It is defined as the percentage of the amount charged by owner (the bank) of an asset from the borrower for using it.Use KIBOR as measure of interest rate	SBP	Diyanti and Widyarti (2012)
Real GDP growth (GDPG**)**	Used as a broad measure business cycle.	SBP	Nugraini and Setijawan (2015)
Capital adequacy ratio	It is a relationship between risk-weighted assets and current liabilities. Combinations of risk are taken into account when measuring the risk-weighted asset $CAR_{i,t}=\frac{\text{TIER 1 CAPITAL + TIER 2 CAPITAL}}{\text{TOTAL RISK WEIGHT ASSETS}}100$	Annual reports	Beck *et al.(*2015)
Return on asset	ROA is a good indicator of a bank's financial performance and managerial efficiency. It shows how competent the management is in allocating asset into net profit. $ROA_{i,t}=\frac{\text{Net profit}}{\text{Total asset}}*100$	Annual reports	Setiawan and Putri (2013)
Inefficiency ratio	This ratio indicates total operating expense to non-interest income. It gives the %age of administrative expense experienced in earning non-interest income. It is used to test bad management $INEF_{i,t}=\frac{\text{Operting Expenses}}{\text{Operating Income}}*100$	Annual reports	Abid *et al.* (2014); Isaev and Masih (2017)
Bank size	Natural logarithm of bank's assets This ratio is used to test size effect hypothesis whether size of a banks affects credit risk or not. $BS_{i,t}=\frac{\text{Total Asset}}{\sum TOTAL\ ASSET}$	Annual reports	Babihuga (2007); Safakli (2007)
LLP	This ratio measures the quality of credit portfolio of financial institution. $LLP_{i,t}=\frac{\text{Provsion aganist NPL}}{\text{Total Gross Loans}}*100$	Annual reports	Gadzo *et al.* (2019);Zolkifli *et al.* (2018);Salim *et al.* (2017)

FLP	This ratio measures the quality of credit portfolio of financial institution. $FLP_{i,t}=\frac{\text{Provsion aganist NPF}}{\text{Total Gross Financing}}*100$	Annual reports	Abid *et al.* (2014); Isaev and Masih (2017)

Dependent variables	**Definition**	**Source**	
Credit Risk Convention Banks (CR)	It is a risk which occurs when a borrower fails to repay their payments amount and used as a proxy for banks' credit risk $CR_{i,t}=\frac{\text{Non Performing Loans}}{\text{Total Gross Loans}}*100$	Annual reports	Babihuga (2007); Safakli (2007)
Credit risk Islamic Banks (CR)	It is a risk which occurs when a borrower fails to repay their payment amount and used as a proxy for banks' credit risk $CR_{i,t}=\frac{\text{Non Performing Financing}}{\text{Total Gross Financing}}*100$	Annual reports	Gadzo *et al.* (2019); Zolkifli *et al.* (2018); Salim *et al.* (2017)

3.5. Sample Selection Criteria

KPMG Hadi & co. (2017) survey Pakistani banking sector categorized in (Large, Medium, and Small) according to total asset worth of banks[13]. However "Islamic Banks" have been introduced as separated group and all Islamic banks fall in Medium and small size. This survey carrying the full-fledge Islamic banks only and that survey to facilitate the comparison of peer group. According to survey report three Islamic banks fall in medium category and one Islamic bank fall in small. For the comparative analysis take same category 4 Islamic banks and 13 conventional banks explain below in (appendix) name of selected bank according to size.

3.6. Descriptive Statistics

3.6.1. Macroeconomic Variable Descriptive Summary for Conventional and Islamic Bank

In table 3.2 descriptive summary of the variables for Macroeconomic variable are shown. The largest average value among the series is of interest rate (9.99) followed by the mean of inflation rate (9.29) .The lowest mean value is associated with unemployment rate (5.8) which

[13] Selection criteria of 13 conventional banks according to Total asset of Peer group of Islamic bank respectively. KPMG 2017 annual report make categories Small, medium, Large banks. However, Islamic bank mostly fall in small & medium category that is why select same peer group conventional bank.

is followed by the average value of GDP growth (3.82).The remaining average value of variable that is real effective exchange rate (2.12). In column 2 the standard deviation of the series is given. The lowest standard deviation is of unemployment rate (0.3) and then business cycles (1.4) and interest rate (3.1).While the largest value of standard deviation is associated with inflation (5.9) followed by real effective exchange rate (3.6). Additionally, Skewness indicates how symmetrical the distribution is .The largest skewed value among the series is of real effective exchange rate (1.22) followed by the skewed of inflation rate (0.83) .The lowest skewed value is associated with unemployment rate (-0.07) which is followed by the skewed value of GDP growth (-0.36). On the other hand, kurtosis represents the "peakedness" of the distribution of random variable. In the other words, it indicates the height and sharpness of the central peak of the standard bell curve. In column 6 the kurtosis of the series is given. The lowest kurtosis value is of GDP Growth (1.77) and then unemployment (2.11) and interest rate (2.22).While the largest value of kurtosis is associated with real effective exchange rate (3.91) followed by inflation (2.44).whereas in column 7 Jarquebera test values are cited and all values are greater than 0.05 .It shows that data is normally distributed[14].

Table 3. 2.*Descriptive Summary of Macroeconomic Variable for Full Sample*

Variables	***Mean***	***Std.Dev***	***Min***	***Max***	***Skewness***	***Kurtosis***	***Jarquebera***
GDP Growth	3.82	1.42	1.2	5.7	-0.36	1.77	0.93
Inflation	9.29	5.98	1.81	20.66	0.83	2.44	1.40
Interest rate	9.99	3.11	6.44	16.11	0.51	2.22	0.76
Unemployment	5.83	0.38	5.2	6.5	-0.07	2.11	0.36
Real Effective Exchange rate	2.12	3.63	-3.18	8.83	1.22	3.91	3.12

Source: Author's own calculation (11x13=144) for conventional banks
(11x4=44) for Islamic banks

[14] In table 2.3 mention Kurtosis and skewness results as well Jarque bera test results. Basically macroeconomic variables data have same series across all bank. whereas, bank specific variable series are difference across the bank

3.6.2. Descriptive Summary of Bank Specific Variable for Conventional Banks

In table 3.3 descriptive summary of bank-specific variables of conventional banks are shown. The largest average value among the series is of capital adequacy ratio (14.86) followed by the mean of non-performing loans (10.85) and loan loss provision (5.79).However the lowest mean value is associated with bank size (5.08) and followed by inefficiency ratio (2.96) and return on asset (1.75).In column 3 the standard deviation of the series is given. The lowest standard deviation is return on asset (0.56) and then followed by the bank size (0.58) and inefficiency ratio (1.34). While the largest standard deviation value is associated with loan loss provision (26.07) followed by capital adequacy ratio (6.60) and non-performing loans (5.84).

Table 3. 3.*Descriptive Summary of the Bank Specific Variables for Conventional Banks*

Variables	***Mean***	***Std.Dev***	***Min***	***Max***
Non-performing loans	10.85	5.84	2.90	33.64
Capital Adequacy Ratio	14.86	6.60	5.55	29.56
Bank Size	5.08	0.58	3.86	6.48
Loss Loss provision	5.79	26.07	0.01	21.14
Return on Asset	1.75	0.56	0.09	3.5
Inefficiency Ratio	1.67	1.34	0.77	6.91

(11x13=144) Source: Author's own calculation

3.6.3. Descriptive Summary of Bank Specific Variable for Islamic Banks

In table 3.4 descriptive summary of bank-specific variables of Islamic banks are shown. The largest average value among the series is capital adequacy ratio (16.82) followed by the mean of non-performing financing (6.89) and bank size (5.09).However the lowest mean value is associated with financing loss provision (0.63) and followed by the return on asset (2.68) and inefficiency ratio (2.96).

Table 3. 4. Descriptive Summary of the Bank Specific Variables for Islamic Banks

Variables	***Mean***	***Std.Dev***	***Min***	***Max***
Non Performing Financing	6.89	5.47	1.51	21.10
Capital Adequacy Ratio	16.82	7.59	9.58	24.04
Bank Size	5.09	3.10	3.95	8.08
Financing Loss provision	0.63	0.61	0.02	2.60
Return on Asset	2.68	3.52	-1.50	9.94
Inefficiency	2.96	1.34	0.77	6.91

Source: Author's own calculation (11x4=44)

In column 2 the standard deviation of the series is given. The lowest standard deviation is loan loss provision (2.60) and then followed by inefficiency ratio (1.34) and banks size (3.10). While the largest standard deviation value is associated with capital adequacy ratio (7.59) and followed by non-performing finance (5.47) and return on asset (3.52).

3.7. Correlation Analysis

The variables are into two categories: Islamic banks and conventional banks. The matrix is used to check whether there is any existence of multi-collinearity problem among the variables or not.

3.7.1. Correlation Matrix

Table 3.4.Shows correlation matrix that explains the correlation among the variables used in this study. On the left hand side, the data for Islamic banks are presented, whereas the right hand side illustrates the data for conventional banks. The results show that most of the variables included in the study are not highly correlated with each other .So we can conclude that on the bases of low correlation among the variables that there is no existence of multi-collinearity problem among most of the variables. The correlation matrix is refuting the existence of multi-colinearity between the independent variables as all the correlations are less than 0.80

level(Gujarati, 2003).Further, Bryman and Cramer (2001) discussed that multicollinearity exist in model when correlation is exceeds 0.80 or 0.90

Table 3. 5. **Correlation Matrix Islamic & Conventional Banking System**

Conventional Banks

		GDPG	INFL	INTR	UN	REER	CAR	BS	INEF	LLP	ROA
ISLAMIC BANKS	**GDPG**	**1.00**	-0.64	-0.47	-0.13	-0.08	0.01	-0.01	-0.31	-0.01	-0.01
	INFL	-0.64	**1.00**	0.62	-0.30	-0.45	-0.08	-0.10	-0.05	0.12	0.10
	INTR	-0.47	0.62	**1.00**	-0.25	-0.29	-0.13	-0.10	-0.04	0.11	0.15
	UN	-0.12	-0.30	-0.25	**1.00**	0.33	0.08	0.16	0.09	-0.13	-0.13
	REER	-0.07	-0.45	-0.29	0.33	**1.00**	0.09	0.16	0.13	-0.10	-0.14
	CAR	0.14	0.24	0.09	-0.45	-0.22	**1.00**	-0.27	-0.04	-0.11	-0.08
	BS	0.01	-0.30	-0.28	0.46	0.32	-0.51	**1.00**	0.04	-0.20	-0.11
	INEF	0.13	-0.23	-0.32	-0.07	0.25	-0.13	-0.18	**1.00**	-0.48	-0.51
	FLP	-0.04	0.03	0.07	-0.05	-0.081	-0.13	-0.17	0.11	**1.00**	-0.42
	ROA	-0.06	0.03	0.04	0.04	0.03	0.05	-0.07	-0.01	0.42	**1.00**

Source: Regression results using panel data

Macroeconomics variables namely: Growth in Gross domestic product (GDPD), inflation rate (INFL), interest Rate (INTR), and Unemployment rate (UN) and Real effective exchange rate(REER) whereas bank-specific variable included: .Capital Adequacy Ratio(CAR),Bank Size(BS),Inefficiency ratio (INEF),Loan Loss Provision (LLP) and Return on Asset(ROA),Financing Loss Provision (FLP)

CHAPTER 4
RESULTS & ANALYSIS

4. Introduction

This chapter discuss the results of the study as set out in the research objective and research methodology.

4.1. Empirical Results

After selecting appropriate measurement of the model and explaining the methodology in detail in the previous chapter. This study now investigate the impact of macroeconomic and bank specific variable on credit risk by using GMM Model.

For testing the appropriateness and adequacy of the given models (3.1) and (3.2).In this section to check the effect of macroeconomic and bank specific variables on credit risk by splitting the sample into Islamic & conventional banking system. Noteworthy, this study estimate different panel data model, as reported in table (4.1) and rely on the estimates of GMM model. Basically, Arellano-Bond model AR test and Hansen test are calculated over-identifying restrictions. The p-values of Arellano-Bond AR (2) (0.318 & 0.647) and Hansen (1.00 &0.886) test suggest that instruments used in the regression are valid for both Islamic and conventional banks respectively. The probability value (P-Value) of Hansen test is enough high so the null hypothesis that instruments as a group are exogenous as a group cannot be rejected.

The results of GMM estimator are shown in Table 4.1 the analysis to takes in account, all variables are found significant for conventional banks. On the other side, in Islamic banks all variables are significant except FLP and interest rate. The coefficient lag of credit risk (CR*i*,t-1) suggest a significant shock of previous year credit risk which is observed in current year credit risk for both Islamic and conventional banks. It can be seen in table 4.1, that higher credit risk in the last year has a positive impact on current credit risk level in banks. Nevertheless, such lag of credit risk is observed to be higher magnitude for the conventional

banks. The coefficient associated with (CR*i*,t-1) predicts that 0.21% and 0.11% credit risk in current year is driven by the previous year credit risk for the conventional banks and Islamic banks respectively. The reason behind higher magnitude of the coefficient is explained by the fact that in conventional banks the advances are extended to client as a loan. These approaches of conventional banks are interest-based and credit risk is borne completely by a bank. It may be another reason could be for higher magnitude that the size of conventional banks portfolio which is larger than rivalry bank and that is why makes the evaluation of their risk portfolio highly complicated. However, In Islamic banks persistence of shock is low as compared to conventional bank because Islamic banks can absorb more credit risk through sharing the profit and loss basis .Furthermore, Islamic bank does not utilize fund in risky project and bank itself involve in business activities; for instance (Musharka,Mudaraba) financing mode. Islamic banks shares their risk with their depositors/accountholders which keeps the bank on safer side and also the lend funds to the borrowers are retrieved because they place highly emphasis on evaluate customer's character, financial condition and capacity to repay the loan. Actually Islamic banks risk pass through depositor and accountholder and comparatively low default rate of Islamic borrower that arises possibly from their religious beliefs. The finding is also consistent with, (Ahmad *et al.,* 2010).

4.1.1. Credit Risk Influence by Macroeconomic Variables in Islamic and Conventional Banking System

Gross Domestic Product Growth

In table 4.1 result shows macroeconomic variable impact vary on credit risk for the two kind of banking system (Convention & Islamic bank). The GDP growth rate has negative and significant correlation with credit risk of conventional banks and Islamic bank.

Table 4. 1 *Results Impact of Macroeconomic and Bank Specific Variables on Credit Risk*

	Conventional banks						Islamic banks				
VARIABLES	**Pooled OLS**	**RE**	**FE**	**FE (IV)**	**GMM**	**VARIABLES**	**Pooled OLS**	**RE**	**FE**	**FE (IV)**	**GMM**
CRC*i,t*-1					0.769***	CRI*i,t*-1					0.613**
					(0.301)						(0.310)
GDPG	-0.055	-0.026***	-0.046	-0.116***	-0.232***	GDPG	0.259	-1.877*	0.504	-0.644**	-0.316***
	(0.073)	(0.007)	(0.056)	(0.036)	(0.094)		(0.551)	(2.892)	(0.504)	(0.310)	(0.140)
INFL	-0.141	-0.172***	-0.187**	0.0604	0.158*	INFL	-4.877**	0.0741	-2.919	0.116	-0.226**
	(0.115)	(0.0651)	(0.0687)	(0.197)	(0.0841)		(1.957)	(0.122)	(2.833)	(1.081)	(0.111)
INTR	-0.0226	0.0333	-0.0291	-0.664	0.414**	INTR	0.0741	-0.871***	0.105	0.201***	0.296
	(0.228)	(0.137)	(0.145)	(1.427)	(0.2010)		(0.140)	(0.263)	(0.0802)	(0.0726)	(0.316)
UN	0.00923	0.0129	0.0151	-0.0223*	0.137**	UN	-0.871***	0.243	-0.850*	0.160	-0.079***
	(0.0133)	(0.0107)	(0.0103)	(0.0127)	(0.0752)		(0.238)	(0.245)	(0.297)	(0.364)	(0.030)
REER	-0.0254	-0.0187	-0.00803	-0.0554	0.435**	REER	0.243	0.245	0.234	0.398***	-0.325*
	(0.0881)	(0.0323)	(0.0381)	(0.147)	(0.210)		(0.190)	(0.032)	(0.239)	(0.141)	(0.180)
CAR	-0.0437	0.126	0.235*	0.180	-0.214**	CAR	0.190	-0.00282**	-0.127	0.031***	0.151**
	(0.0735)	(0.117)	(0.124)	(0.128)	(0.109)		0.1030	(0.00127)	(0.612)	(0.247)	(0.071)
ROA	-0.0020	0.0109	0.0136	0.0153	0.388***	ROA	0.00282	-0.0798	-0.00374	0.0102	-0.212**
	(0.00830)	(0.0106)	(0.0130)	(0.00993)	(0.1460)		(0.000945)	(0.638)	(0.000798)	(0.00257)	(0.101)
BS	0.0195**	0.0202	0.00915	-0.0176	0.323**	BS	-0.0798	0.113	0.230	-2.582*	-0.080**
	(0.00804)	(0.0169)	(0.0268)	(0.0178)	(0.1620)		(1.102)	(1.385)	(0.868)	(1.387)	(0.037)
INEF	0.310	0.0299	-0.0390	0.0246	0.115**	INEF	0.113	0.179	-0.365	0.628**	0.415**
	(0.300)	(0.0904)	(0.0539)	(0.149)	(0.05)		(1.565)	(0.145)	(1.560)	(0.311)	(0.207)
LLP	-0.0258**	0.0277***	0.0473***	0.0763*	0.192*	FLP	0.179***	11.22	0.618***	-0.492*	0.092
	(0.0108)	(7.60e-05)	(0.0107)	(0.0429)	(0.109)		(0.074)	(24.28)	(0.773)	(0.271)	(0.071)
Constant	0.751	-4.295	-2.905	3.264	3.600**	Constant	9.711	7.223*	2.105	5.291	-3.356*
	(13.98)	(8.188)	(9.897)	(43.19)	(14.8)		(6.81)	(4.01)	(2.31)	(2.21)	(1.81)
Observations	142	142	142	142	142	Observations	44	44	44	44	44
R-squared	0.571	0.417	0.451	0.593		R-squared	0.439	0.4979	0.515	0.6719	
AR(2) P-Value					0.647	AR(2) P-Value					0.318
Hansen test					0.886	Hansen test					1.00

In parentheses, ***, ** and * represent 1%, 5% and 10% significance level respectively. Definitions of the variables could be found in chapter 3.Macroeconomics variables namely: Growth in Gross domestic product (GDPD), inflation rate (INFL), interest Rate (INTR), and Unemployment rate (UN) and Real effective exchange rate (REER) whereas bank-specific variable included: Capital Adequacy Ratio (CAR), Bank Size (BS), Inefficiency ratio (INEF), Loan Loss Provision (LLP), Financing Loss Provision (FLP) and Return on Asset (ROA)

Hence, GDP growth is observed higher magnitude for Islamic banks. The coefficient associated with (0.76, 0.61) conventional and Islamic bank respectively. The reason behind the higher magnitude is that Islamic bank lending funds based on trade and it works on asset backed base (i.e. Real economic activities). Islamic banks working is closely associated to the real economy (Dridi and Hasan, 2010).That is why, Islamic banks are more vulnerable to change in economic condition. In addition, GDP growth gives information about the country economic prosperity. If the country GDP growth increases, then the entrepreneur or community re-payment capacity will be high, thereby, credit risk portfolio can be reduced. This study result are consistent with the past studies by (Al-Smadi, 2010; Effendi and Yuniarti, 2018; Rahmawulan, 2008).Whereas, GDP growth has negative association with credit risk for conventional bank. In general, improvement in the economy of the country increases the capability of the borrower due to increase in income. In this instance, the borrowers are able to increase their financial stability, and subsequently able to repay their debts. Hence, credit risk portfolios of conventional banks can be reduced when there is improvement in the real economy. The result of conventional banks is also consistent with(Ali and Daly, 2010).

Inflation Rate

The association between inflation rate and the following period credit risk exposure is found to be positive and significant for conventional banks. If the central bank implements an expansionary monetary policy, the firms and household might experience losses the demand inflation. Based on the fact that, inflation resulting from the changes in money supply cannot controlled by the companies and household, the ability to meet their credit obligation reduces fall which consequently result to increase in credit risk in conventional bank. Another possible reason may, in high inflation circumstances people may prefer to meet their basic needs instead to fulfill their debt obligation amount. The study are in line with the finding by (Brownbridge, 1998; Nkusu, 2011).In Islamic banks, results shows inflation is significant and has negatively

impact on credit risk. One of the effects of inflation is on real income of the community. There are groups of people who are able to increase the real income. The worsening of the real income of this society will affect the problematic financing, because it will be difficult for the community to pay the obligations to the bank. According to (Huda et al., 2008) the impact of inflation causes people are reluctant to save because the value of the currency is declining. This will lead to a decrease in third party funds or bank assets.so that the distribution of fund will decrease .The decrease in financing disbursed will also reduce the value of credit risk. Further, if the inflation occurs from the supply side, it will reduce the level of credit risk. Hence, companies have higher incentive to repay the bank financing due to enabling environment that helps in boosting their revenue through increase in the price of good. Indeed, cost arising from the supply side. As such it is assumed that an increase in inflation could lead to a decline in the credit risk. This study findings are line with (Al-Wesabi, 2012; Firmansyah, 2014; Kabir *et al.*, 2015) and etc.

Interest Rate

Our estimates suggest that interest rate has positive and significant association with credit risk level for conventional banks. Increase in interest rate will reduce the capability of borrower to repay the loan. However, borrower income is most likely fixed and with increased burden of higher interest rate on fixed income will lead to default loans by the borrower of loans .Another possible explanation is that, when interest rate increase the cost of borrowing will increased because the banks tend to charge high for a given loan which consequently increase the credit risk. This study findings are also consistent with (Adebola et al., 2011; al., 2015; Warue, 2013). On the other side, in Islamic banking interest rate shows insignificant influence to credit risk due to the principal (Islamic Sariah) of Islamic banks and follow the profit &loss sharing mode instead of interest (RIBA).The theoretical reason for the insignificance is that the structure of financing contract is different with conventional banking, for example, the risk will be endure

by two parties between a provider of funds (investor) and the user of capital (entrepreneur).Due to the risk sharing, the two parties will emphasis greater attention to developing project and assessment instead of relying on interest rate .The finding of the study is consistent with Al-Wesabi (2012) who indicate that the interest rate is insignificant on credit risk in Islamic bank.

Unemployment Rate

For unemployment rate, conventional banks shows a positive and significant correlation between unemployment rate and credit risk. When unemployment rate increase which consequently reduces the household disposable income. Thereby, weaker the borrower capacity to repay their loan installments in the future. Likewise, sales and production activities of industry are also affected by unemployment because buyer has low purchasing capacity leads to decrease in revenue and increase debt. In addition, a high unemployment rate means drop in the effective demand and in result will decrease the production. In fact, unemployed customer cannot fulfill their obligation and repay the amount which can increase the level of credit risk. In this case, the dynamic of the two variables (GDP growth and the unemployment rate) is closely related to household, firms and the ability to meet their financial commitments. An increase in the unemployment rate limits the current and future purchasing strength of household and is generally associated with a decrease in the production of goods and services. Unemployment negative affects the cash flow of households and increase the debt burden .Regarding firms, rising in unemployment could lead to decline in production due to the decline in effective demand. This can lead to a decline in revenue and a fragile state of debt. This study finding is in line with (Bofondi and Ropele, 2011; Nkusu, 2011) and etc. On the other side, unemployment rate and credit risk is significantly negative associate with Islamic bank. It means that if unemployment rate increase, then the level of credit risk in Islamic bank will fall. Basically, Islamic bank lend fund on trade and works asset backed base. These activities are closely to the real economic activities. This possible explanation of result is that, with rising in

unemployment rate, the financing of credit to borrower will fall. Because, banks follow the strict credit conditions, one of which is the capital that must be sufficient. In result provision of credit to borrower declines. If a given credit declines, it may result in a credit risk that will also fall. This study finding are in line with (Castro, 2013; Rinaldi ;Sanchis-Arellano, 2006 and Louzis et.,*al* 2010).

Real Effective Exchange Rate

The real effective exchange rate (REER), is also included in the model to examine the external competitiveness .Therefore, real effective exchange rate have positive influence on credit in conventional bank. For instance, a real appreciation of the domestic currency reflects that the goods & services produced in country are relatively more costly. In results the competitiveness of export-oriented industries will weakens and affects badly their capacity to services their loans. This study finding are consistent with (Fofack, 2005; Khemraj and Pasha, 2009) and etc. Thus, the ratio of credit risk increases. Whereas, Real effective exchange rate has negative impact on credit risk in Islamic bank. Theoretically, the main problems the firms face are the frequent appreciation of foreign currencies against the local currency, and the difficulty in retaining local customers because of the high prices of imported inputs which tend to affect the prices of their final products sold locally .As the domestic price of foreign exchange rate rises (depreciated) it becomes more expensive to take foreign product and services as their cost would have increased thereby demanding more units of domestic currency to acquire the same quantity of foreign goods and services than before. This results in an increase in the demand for bank credit to support finances for covering the additional expenditure required as a result of exchange rate depreciation (Ngerebo, 2011) and reduce the firm's profitability. If the firm's profitability decreases, then firm face the problem to serve their obligation This study findings are in line with previous literature (Moosa, 2003).

4.1.2 Credit Risk Influenced by Bank-Specific Variables in Islamic and Conventional Banking System

Capital Adequacy Ratio

Capital adequacy ratio shows negative and significant impact on credit risk for conventional banks. In conventional banks, level of bank risk is also influenced by bank's sound capital regulation. If banks having high ratio of capital adequacy might be encouraged to take the risk. In short, if the capital adequacy ratio is high banks deals adequately with unexpected financial shock. This study finding is in line with previous researches, (Koehn and Santomero, 1980). On the other side, CAR has negative and significant link with credit risk in Islamic banks .If the capital adequacy ratio decreases, it indicates that decline in portion of capital .The fall in portion of capital is caused by the decreasing the profit ratio or the increasing of risk weighted asset. Consequence of fall in ratio of profit indicate the higher credit risk. The results are in line with (Nugraini and Setijawan,2015).

Return on Asset

Return on asset shows positive and significant relationship with credit risk for conventional banks. The finding of the study are in line with our theory, most of the management are selected on political references. Specifically, the top administration which is more effective in managing the credit risk. They initiate loans on political basis and not on merit or rather with the approval of branch manager. So the top administrations plays a key role in bank management policies, which consequently facing a higher credit risk(Yang *et al.*, 2010) . Whereas, ROA has negative and significant link with credit risk in Islamic bank. Theoretically explain that, the higher the RAO show the bank performance is better, because of the earned larger the profit. With the increase in profit gained by bank, the bank will overcome the expected loses prudently.so the credit risk will low. The results are in line with previous study(Setiawan and Putri, 2013).

Bank Size

Banks size are positive and statistically significant correlate with credit risk for conventional bank. The findings point out that lager the bank size the higher is probability to be exposed a credit risk. The lucrative return encourages the large bank to lend money to risky borrowers or take high risk in confidence because they have enough capacity to absorbing the losses. In result bank exposes to higher risk. Our result is in line with previous studies (Aldoseri, 2012; Rajan and Dhal, 2003).On the other side, bank size variables have negative and significant correlation with credit risk in Islamic banks .Larger size of banks may be better able in assessing the credit worthiness of borrowers. Bigger bank, avert risk due to the sound credit evaluation mechanism. Larger banks have huge amount of resources that support them against higher credit risks. Another possibility to explain this findings, large banks will have more opportunity to facilitate clients(via Information technology) which comprise ease method of payment which assist the client to repay back the loan In short, when size of bank increase it reduces the credit risk due to more diversification opportunities ((Diyanti and Widyarti, 2012).

Loan Loss Provision/Financing Loss Provision

Loan loss provisions have positive and significant influence on credit risk in conventional bank. It means that banks were allocated high provision with credit risk, because they anticipated that borrower would not be able to suitably service their loan amount. Furthermore, LLP use as cushion to absorb forecasted loss on bank portfolio and higher provision was not used for signalizing financial soundness of banks. This study finding are in line with past studies (A. Ahmad et al., 2010; Ahmed, 1998; Anandarajan *et al.*, 2003).In addition, a higher loan loss provision is required to cushion higher non-performing loans and point out a weakens in loan services as credit risk increase. On the other side, loan loss provisions have positive but statistical insignificant impact on credit risk in Islamic bank. The reason behind insignificant results is that the Islamic banks follow sharia principal in which it shares risk with the

depositors and the rise in amount of FLP is not as much as increase in credit risk although it has a positive relationship. Furthermore, Islamic bank not invest capital in risky projects; that is why not set aside a portion of fund gradual increase with credit risk. It may another reason for insignificant result that Islamic banks are better in applying their risk management technique to reduce expenses and expected loses. The finding of the study in line with (Parab and Patil, 2018)

Inefficiency Ratio

The finding of this study shows a positive and significant association with inefficiency and credit risk for Islamic and conventional bank. Nevertheless, such inefficiency ratio magnitude is observed higher for Islamic bank. The coefficient value (0.41% and 0.11%) associated with Islamic and conventional banks respectively. The reason behind higher magnitude is that Islamic banks are relatively new in market, with low market share do not enjoy the benefit of economies of scale, lack of management or operations skill, lack of modern technology and offer limited product to client. Another possibility to explain this result, Islamic banking model operate under the guidance of sharia principal due to which it endure extra cost for ensuring their activities permissibility and if they are deemed acceptable according to the sharia law. Basically, inefficiency ratio specifies the operative efficiency of bank, demonstrating the expenses of the banks 'operations as compared to its income. The result are in line with (Azhar *et al.,* 2003).On the other side, conventional banks are deep-rooted and vast experienced in the banking business; and have larger share in the financial sector (Ferawati, 2016; Seballos and Thomson, 1990) and etc.

Summary of Results

The findings of the study suggests that in conventional banking system GDP growth, inflation, unemployment, real exchange rate, interest rate, capital adequacy ratio, return on assets, loan loss provision, inefficiency ratio and bank size significantly affect the behavior of credit risk.

Similarly, in Islamic Banking, all the mentioned variables significantly cause the credit risk's behavior, except the interest rate and loan loss provision. In short, the overall results indicate that credit risk is not influenced by only external factor but also affect by internal factors like inefficiency ratio ,return on asset etc irrespective both kind of banking system.

CHAPTER 5
CONCLUSION & RECOMMENDATION

5. Introduction

This chapter presents conclusion of this thesis and the next section provides directions for policy recommendation. The final section provides the way forward for future studies.

5.1. Conclusion

One of the main business of bank is risk-taking and risk transformation. Conversely, each time risk-taking becomes largely damages the soundness of banking sector. Since unfavorable macroeconomic and bank specific factors consecutively affect a large number of institutions. Thus, it is important to understand these factors influences on risk position of banks. However, it is important to analyze to what extent banks risk is affected by macroeconomic and bank-specific factors.

This study deeply examined the macroeconomic factors and bank specific factors which can influence risk exposure of Islamic and conventional banks operations in Pakistan. It is claimed that due to globalization increase competition in banking sector and change in macroeconomic variables as well as bank specific variables can increase bank risk exposure.

This study has estimated dynamic panel data using GMM model to investigate the impact of macroeconomic and bank specific variables on credit risk for two kind of banking system in Pakistan. Annually bank specific and macroeconomic data taken from 2007-2017 is used to analyze the effect on credit risk. In this study credit risk (CRc) use as proxy of non-performing loan for Conventional bank and credit risk (Cri) use as a proxy of non-performing finance for Islamic bank. Lag of credit risk was found in Islamic and conventional bank to be persistent largely, but we could observe that magnitude of coefficient is higher in conventional bank as compare to Islamic banks.

Such as GDP growth rate have negative and significant correlation with credit risk for Islamic and conventional banks respectively. Further, the magnitude of Islamic banks observed higher as compare conventional banking system, because Islamic bank closely associated to real economy. Whereas association between inflation rate and following period credit risk is found positive and significant for conventional banks but negative and significant link with Islamic bank. Furthermore, interest rate has positive and significant link with credit risk for conventional bank but in Islamic banks observed positive but insignificant association. The reason it may be that, Islamic banks follow Sharia principal, in Islam strictly forbid the interest (RIBA).Moreover, due to the risk sharing between two parties will emphasis greater for the successes and developing of project instead of relying on interest rate.

Macroeconomic variable namely unemployment rate shows a positive and significant association with credit risk for conventional bank but negative and significant link with credit risk in Islamic bank. While, real effective exchange rate has positive and significant link with credit risk for conventional bank but negative and significant link with Islamic bank.

On the other side, we find that several bank specific variables are significant role in shaping the credit risk in which included capital adequacy ratio shows positive and significant association with credit risk for conventional bank but negative and significant link with Islamic bank. If the capital adequacy ratio is high bank can deals prudently with unexpected financial shocks. Whenever, Return on asset shows positive and significant link with credit risk of conventional bank but negative and significant impact for Islamic bank. It is a key indication of the performance of a bank meanwhile it can decide the profitability of the bank based on its asset. In short, ROA indicates how proficiently asset are managed by the banks to make profits.

However bank size has positive and significant correlation with credit risk for conventional bank but negative and significant association with Islamic bank. Loan loss provision positive and significant correlation with credit risk for conventional but financing

loss provision has positive and insignificant link with Islamic bank. LLP provide banks to cushion from expected losses to deal this situation. Inefficiency ratio shows positive and significant correlation with credit risk for Islamic and conventional bank but observed that magnitude of coefficient is higher for Islamic bank compare with conventional bank. The reason behind higher magnitude is that the Islamic banking model operate under the guidance of sharia principal due to which it endure extra cost to manage their operations. Higher inefficiency ratio reveals banks` strength to run their operation at a high cost, in result lowering the profitability and depress the financial soundness of the bank.

In short, the above discussion justify that the Islamic and conventional banking system are different from each other in terms of their credit risk. We can described that Islamic banks are better able to deal risk a as compare to rivalry counterpart because Sariah rules prevent pure speculation in monetary term and permit work on asset back based, more the distinguish feature of Islamic bank is profit & loss sharing and these features provide a shelter from shocking situation through sharing risk with depositor or investor. Further, Islamic banks are relative new as compare to rivalry counterpart but operate little bit better than deep rooted and larger work experience banking system.

5.2. Policy Recommendation

The empirical findings would be helpful in formulating policy measure for the stability of the banking sector in Pakistan. Some recommendations:

This study provide a clear outlook of bank-specific and macroeconomic factors influence on credit risk. By knowing this, bank-level decision-makers can focus on capital, size, and loans to increase their profitability. Bank-level policy-makers should also think about how they can manage deposits effectively to switch them from cost-generating to profit-generating activities. Regarding macroeconomic variables, bank-level decision-makers cannot manage them as these variables are beyond their control. However, they should be supportive and put more

investment/effort into establishing strong research departments inside the banks to properly analyze and forecast the macroeconomic changes. This would allow them to better manage effects coming from the economic activity, expected inflation and unemployment.

Policy makers should apply policies that help lending like lowering interest rate (IR), stable exchange rate and low rate of inflation through real application of expansionary and contractionary monetary policy. Government should implement sound macroeconomic policies that will stimulate sustainable growth, business friendly and favorable environment that will increase capacity utilization of industries.

The government should also work to promote the development of local investments and explore new international markets to attract Pakistani labor in order to develop the local economy and reduce unemployment. Interest rate which is critical driver of credit risk, therefore, monetary authority should tinker with it to keep the trend in credit risk on the desired path. State bank should provide adequate buffers to hedge against exchange rate risk. At the same time, prudential regulation policy must be coordinated with monetary policy, since both interest rate and exchange rate variation affect the systemic risk.

Lastly, this study recommends that banks should consider the influence of macroeconomic factors when giving out loans. More precautionary measures should be adopted in periods of low economic growths. Maintaining high credit standards to reduce credit risk. Further, regulators should also focus on a continual managerial performance evaluation in order to improve the stability of the financial system.

5.3. The Way Forward

There are several aspects and avenues on which future research can be conducted to further explore the issue. Some possible areas are:

a) To analyses the effect of internal and external factors on credit risk included other risk factors etc. (Liquidity risk, Operational risk, Market risk)

b) This study can extended in deferent aspects. An increase the sample size across several countries can be analyzed to reach substantive decision about the influence of macroeconomic and bank specific variables on credit risk in two kind of banking system. Further, use more advanced empirical techniques which can allow us a more a more powerful analysis.

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APPENDIX

Table. A. 1.List of Selected Islamic &Conventional Bank

Medium Size Bank	
ISLAMIC BANKS	**CONVENTIONAL BANKS**
	Habib Metropolitan Bank limited
	Askari Bank Limited
	Standard Charted Bank(Pakistan) Limited
Meezan Bank Limited	Faysal Bank Limited
Bank Isalmic	NIB
Dubai Isalmic Bank	Bank of Punjab
	Soneri Bank Limited
	Bank of Khyber
	Summit Bank
	Bank AL Habib
Small Size Banks	
	Silk Bank Limited
AL Baraka Bank(Pakistan) Limited	Samba Bank Limited
	First Women Bank Limited

KPMG Hadi & co. (2017) survey Pakistani banking sector

Table. A. 2: Supportive Results of Credit Risk with Conventional Bank Findings

Variables	***Estimated Results***	***Supportive Results***
GDP Growth	Negative	Salas and Saurina (2002),Fofack (2005),Ali and Daly (2010),Farhan *et al.* (2012) and Salas and Saurina (2002)
Inflation	Positive	Brownbridge (1998), Farhan *et al.* (2012), Derbali (2011)
Interest	Positive	Warue (2013),al. (2015); Aver (2008); Nkusu (2011)
Real Effective Exchange Rate	Positive	Fofack (2005),Farhan *et al*. (2012); Khemrajand Pasha (2009),
Unemployment	Positive	Bofondi and Ropele (2011)and Nkusu (2011)

Capital Adequacy Ratio	Negative	Koehn and Santomero (1980)
Bank size	Positive	Aldoseri (2012)
Loan Loss Provision	Positive	Ahmed (1998) Anandarajan *et al.* (2003)
Return of Asset	Positive	Yang *et al.* (2010)
Inefficiency	Positive	Bofondi and Ropele (2011),Nkusu (2011)

Table. A. 3.Supportive Results of Credit Risk with Islamic Bank Findings

Variables	***Estimated Results***	***Supportive Results***
GDP Growth	Negative	Rahmawulan (2008),Al-Smadi (2010),Kabir et al. (2015) and K. A. Effendi and Yuniarti (2018).
Inflation	Negative	Al-Wesabi (2012),Kabir *et al*. (2015), Haryono et al. (2016)
Interest	Positive	Al-Wesabi (2012)
Real Effective Exchange Rate	Negative	Bohachova (2008)
Unemployment	Negative	Bikker and Hu (2001), Castro (2013)
Bank Size	Negative	Diyanti and Widyarti (2012)
Capital Adequacy Ratio	Positive	Nugraini and Setijawan (2015)
Loan Loss Provision	Negative	Beck *et al.(*2015)
Return of Asset	Negative	Setiawan and Putri (2013)
Inefficiency	Positive	Saiful and Mohd (2003),Alam *et al.* (2013)