Impact of Interest Rate Changes on Banking Operations

(A Case Study of Dual Banking System in Pakistan)

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By

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CERTIFICATE

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Dedicated

To

My Beloved Parents

All my love to them because, having them made me feel the luckiest son in the world.

&

My Honorable Teachers

Who educate me and made me believe that I can do everything.

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Abbreviations

KIBOR	Karachi Interbank offer rate
IR	Interest rate
ROR	Rate of return
GDP	Gross domestic products
CPI	Consumer price index
M2	Money supply
BS	Bank size
PSX	Pakistan stock exchange
SBP	State bank of Pakistan
GMM	Generalized method of moment
SBP	State bank of Pakistan
PLS	Profit-loss sharing

Abstract

The aim of this thesis is to find the relationship between interest rate and banking operations. The study considered the comparative analysis between Conventional banks and Islamic banks. The study has used annual panel data of 40 banks (i.e. 22 conventional and 18 Islamic banks) for the period of 2008 to 2018. To mitigate the problem of endogeneity, Generalized method of moments (GMM) has been used for estimation.

The empirical results suggest that interest rate has positive impact on deposits of both conventional and Islamic banks. Results of the study fulfill the theoretical expectations however, the latter effect (interest rate versus Islamic bank deposits) is contrary to general expectation which indicates that although Islamic banks operate under the interest free principle (i.e., do not directly deal with interest) but still they are exposed to interest rate risk. Similarly, the impact of interest rate on bank financing for both conventional as well as Islamic banks is also negative. The relatively minor difference in response of Islamic and conventional banks to interest rate changes may make it difficult for the central bank to achieve the desired monetary policy objectives which stresses the need to revisit the monetary policy transmission mechanism and interest rate channel for Islamic banks. Similarly, to manage the credit supply in the economy, the findings of the study suggest that SBP needs to consider the nature of Islamic banking while devising the monetary policy instrument. Further, the study has drawn the intention of future researchers to know about the theoretical background of Islamic versus conventional banking models.

Key words: Interest rate, Monetary policy, Bank deposits, Bank financing, Generalized method of moments (GMM).

CHAPTER 1

INTRODUCTION

1.1 Back ground

Interest rate is one of the core variables of profit determination in banking industry. It is simply defined as the percentage or premium paid on money known as the price of money (Fischer, 1974). It works through monetary policy by which monetary authority (Central bank) uses it to regulate monetary resources in the economy (Fedral reserve board, 2006). To achieve the monetary objectives of this policy like sustainable economic growth, price stability, full employment and stability in exchange rate central bank announces two behaviors of this policy i.e., expansionary monetary policy (easy monetary policy) and contractionary monetary policy (restrictive monetary policy). The expansionary monetary policy is associated with low rate of interest that encourages people to consume more and save less, low interest rate also boosts general public to borrow more from conventional banks. On the other hand, the contractionary monetary policy decreases banks' credit supply as it discourages general public to borrow from conventional banks. The contractionary monetary policy can also increase unemployment and affect the economy adversely. Boyes and Melvin (2012) have concluded that the prime objective of efficient monetary policy is economic growth along with price stability.

Interest rate also provides a link between money supply and aggregate output of the economy. The channel through which monetary authority transmit this effect is called interest rate channel and the process is referred as monetary policy transmission mechanism. At the first stage changes in monetary policy effects the bank policy rate/interest rate i.e., KIBOR (Karachi interbank offer rate). All conventional and

Islamic banks use KIBOR as a benchmark so, the change (increase) in KIBOR increases the cost of financing and that causes a reduction in demand for credit. As a result, demand for goods and services goes down because people have less to consume. (State bank of Pakistan, 2016-2017). The transmission mechanism of monetary policy is associated with several channels through which monetary policy operates i.e. the interest rate channel, the exchange rate channel, the asset pricing channel, the bank balance sheet channel and the credit channel. Based on these complex facts Bernanke and Blinder (1995) referred the monetary policy transmission mechanism as "black box".

Interest rate is also considered as the main instrument for the channelization of wealth from surplus unit (Depositor) to deficit unit (Investor). A general increase in interest rate also effectuates the banking industry in several ways e.g. a potential reduction in income, net worth and a potential mismatch in liquidity (whereas a consistent fall in interest rate would have the opposite effect).

In the dual banking system, conventional banking has a counterpart of Islamic banking system. There are number of theoretical differences exist between both banking systems but the first and the foremost important difference between them is "interest rate" because, in conventional banking interest rate is considered as a backbone of this industry and due to interest rate money is considered as a commodity not a medium of exchange. In conventional banking, it is also used as a main tool to channelize money in the economy, banks receive interest from lenders and pay interest to depositors, so this particular phenomenon creates concentration of wealth as money always remains in few hands (Farooq, 2012).

On the other hand, in Islamic banking system, money is just a medium of exchange and cannot be sold at a price higher than its face value. Similarly, Islamic banks also provide the alternative for the mobilization and distribution of money through two ways. First, in Islamic banking, interest (Riba) is considered as an unbearable element and Islamic banks completely abolishes it, in accordance with the guidance of Quranic verses[1] and the Hadeeths of Prophet Muhammad (PBUH).

In financial system of the economy, Pakistan and some other Islamic countries like Malaysia, Indonesia has a structure of dual banking, where both conventional and Islamic banks operating side by side. Although in theory both banking systems have different philosophical and theoretical foundations, both systems also have its own sphere to work but the fact that they operate hand in hand may cause these two to be somehow related (Chong & Liu, 2009). In Islamic banking system, Islamic banks have also introduced some interest-free products that bear a resemblance to conventional banking products (Beck, Kunt, & Merrouche, 2013). Similarly, both Islamic and conventional financial institutions use KIBOR as a benchmark for their products. This all happens because in dual banking system Islamic banks follow the model of conventional banking system which is controlled by Central bank through conventional monetary policy so, to compete in the market, policy makers of Islamic banks left with no choice but to use the same interest rate that is used by conventional banks as a benchmark for their products. Therefore, any change in the KIBOR not only influences

[1] Surah Ar-Rum, verse # 39, Surah Al-Baqarah, verses # 275-81, Surah Al Imran, verses # 130-132 and surah Al-Nisa, verse # 161.

the operations of conventional banks but also influences the operations of Islamic banks as well.

This phenomenon has motivated the researchers to investigate that how both banking systems operate under the same monetary environment.

1.2 Problem Statement

Interest rate affects all sectors of the economy as Monetary authority (State bank of Pakistan) uses interest rate as a main instrument to control money supply and inflation in the economy, but its major implication is on banking sector because it directly deals with money. In banking system, bank deposits and bank financing are main operations of banking as both contribute in the profitability of the banks so, in a dual banking system like Pakistan where both interest based (conventional banks) and interest free (Islamic banks) operate side by side under the same monetary policy motivates the researchers to investigate the impact of interest rate on operations of both banking sectors because both systems have their own sphere to work i.e. contrary to conventional financial system, Islamic law of business transactions nullifies the concept of stipulated interest rate on lending and that allows variable returns in business transaction based on equity participation, trade dealings and other economic activities in accordance with the variety of contracts presented by Islamic law of business contracts. Further, in Islamic financial arrangements shariah advisory doesn't allow Islamic banks to deal in the interest-bearing products and loan contracts. Similarly, in Islamic financial system all financial agreements are based on risk and profit-loss sharing (PLS) agreements. Now since, Islamic banks are different in nature and composition of assets and liabilities as compared to their conventional counterparts then

how same monetary policy can affect the operations of both conventional as well as Islamic banks.

1.3 Research Questions

There are following research question:

1. Does interest rate has impact on deposits of Conventional banking system?
2. What is the impact of interest rate on conventional banking financing?
3. Does interest rate has impact on Islamic banking deposits?
4. What is the influence of interest rate on Islamic banking financing?

1.4 Research Objectives

The main objectives of the study are as follows:

- To investigate the impact of interest rate on deposits and financing of conventional banks.
- To analyze the impact of interest rate on deposits and financing of Islamic banks.

1.5 Research Gap

Number of studies carried out in various parts of the world discussed the operational differences between conventional and Islamic banks (Hanif, 2014; Kakakhel et al., 2013; Hisham et al., 2008). One more side of the literature discussed the role of both banking system in economic growth (Jaya Kumar et al., 2018; Sarwer et al., 2013). Similarly, number of studies addressed the role of interest rate's fluctuation on conventional bank deposits, conventional bank financing and same in the case of Islamic bank deposits and financing. One more side of previous literature has sighted the transmission mechanism of monetary policy in a dual banking system. However, the focus of these studies; like (Loayza & Shankar, 2000), (Athukorala & Sen, 2004) in

India, (Kassim, Abd. Majid, & Yusof , 2009), (Karim, Harif , & Adziz, 2007), (Karim & Saini, 2011) in Malaysia, (Kasri & Kassim, 2009) in Indonesia, (Hassan & Makinde, 2016) in Nigeria, were on macroeconomic data of conventional and Islamic banks, rather than the bank level data. These studies have documented that there is a potential gap to analyze the response of microeconomic or bank level data of conventional and Islamic banks due to change in monetary policy of a central bank. Similarly, conventional and Islamic banks both are the part of same financial system, then any change the monetary policy instrument should have to affect the economy by affecting both types of banking. So, it is worth exploring that whether Islamic banks behave or not by changing the monetary policy instrument. Yet, until now, the information about the efficiency differences and operational differences is available but the evidence on the response to monetary policy are exclusive especially in the context of Pakistan.

Further, the study also intends to explore the role of interest rate channel in monetary policy transmission mechanism through Islamic versus conventional banks in Pakistan. The study of Shah & Rashid (2019) discussed the credit supply channel of monetary policy transmission mechanism but still the role of Islamic banks in monetary policy transmission mechanism is not clear especially through the interest rate channel in which interest rate effects the deposit and lending behavior of banks. Therefore, this study aims to find out the response of conventional as well as Islamic banks due to change in interest rate.

Moreover, with the passage of time Islamic banks are becoming the part of emerging markets therefore, people interest can increase the insight of this phenomenon. So this research provides a gateway to future researchers in a new domain.

1.6 Significance of the Study

The study provides significance contribution to the existing knowledge with unique characteristics. First, this study contributes for researchers and monetary authorities to analyze the role of banking sector in monetary policy transmission mechanism by using the bank level data. Secondly, this study contributes for policy makers to understand the importance of interest rate channel in conventional as well as Islamic banks, Third, this study increases the understanding of household, investors and financial managers about monetary policy while taking the investment decisions, especially in a country like Pakistan where both banking system working under the same monetary environment. Fourth, the research will also help the decision makers particularly the Central Bank of Pakistan, to come up with significant policies that will control the interest rate and stimulate the growth and profitability of this sector. Fifth, The research work also come up with the conceptual framework of conventional and Islamic structure of banking in the monetary policy viewpoint. Sixth, the study also provides the conceptual framework of Islamic versus conventional banking model from the perspective of monetary policy. Seventh, the conclusion of this comparative study pioneer towards the most important significance of this research in the field of Islamic banking as this study will motivate the policy makers to bring some change in monetary policy for Islamic banks because, under the same monetary environment Islamic banks can not follow the true spirit of Islam.

The study also contributes to literature with empirical evidence to make them aware of salient features of Islamic banking conceptual model versus conventional banking model from the monetary policy perspective. Finally, this study provides the unique

contribution for students and researchers in the domain of monetary side of Islamic banks.

1.7 Organization of the study

By starting the research work with introduction of the study in chapter no 1 about the background of the study, research gap and narrowed down the discussion with significance of the study. Chapter 2 provides the brief review of the literature related to this topic. In chapter 3 we discussed about the data and its analytical framework, chapter 4 is about the results and its interpretation and at the end in chapter 5 we make the conclusion about the study.

CHAPTER 02

REVIEW OF THE LITERATURE

This chapter reviews the existing literature related to the basic concept of interest rate in banking sector and its impact on banking operations like bank deposits and financing. The review will cover both conventional as well as Islamic banking side.

First, this chapter introduces the theoretical background of interest rate and banking operations. Later, it follows brief discussion about interest rate and its impact on deposits and financing of conventional as well as Islamic banks.

2.1 Theoretical Background of Interest Rate

This section provides theoretical justification that how interest rate effects the operations of banking industry (i.e., bank deposits and bank financing).

The Classical Theory of Interest Rate

The Classical theory is also known as real theory of interest rate and it is associated with the names of David Ricardo, A.C. Pigou, Walras, Marshall, Cassels, Taussing and Knight. Classical economists explained that the rate of interest is purely determined by the real factors of investment and saving. According to classical theory, a decision of investment depends on the mobility of interest because, they consider interest rate as a price of investment. According to them, firms borrow money for investment so when interest rate rises cost of financing also rises which may cause decline in bank financing, that results into downfall in investment. Similarly, low interest rate enhances the bank financing that encourages high investment.

$$\mathbf{I(r) \uparrow F \downarrow I \downarrow}^{2}$$

Classical economists also presented the idea that the rate of interest is a function of saving. It has two effects on saving; Firstly income effect that results into inverse relationship between interest rate and saving, secondly substitution effect which usually dominates and results into positive relationship between interest rate and saving. In financial sector bank deposits are the true representative of people saving's habit, i.e. it explains the saving behavior of individuals, so rise in interest rate enhance the tendency of people to save more and forgo their present consumption.

$$\mathbf{I(r) \uparrow S \uparrow Bd \uparrow}^{3}$$

Classical theory is simply stated that intertest rate depends on saving and investment and that saving and investment is induced or dejected by rate of interest.

New Classical Theory of Interest Rate (Loanable fund theory)

The new Classical theory is also considered as loanable fund theory of interest and it is associated with the names of Wickells, D.H. Robertson and several other Swedish economists. This theory was the reformulation of Classical theory, they believed that the Classical theory was an inadequate theory because they ignored the monetary factors. So, with the advancement of Classical theory, this theory incorporates all monetary and non-monetary factors of investment and saving. Since this theory also considered all monetary factors with saving; it is often considered as monetary theory of interest.

[2] Where I(r) stands for interest rate F stands for bank financing and I stands for investment
[3] Where I(r) stands for interest rate S stands for saving and Bd stands for bank deposits

Classical economists firmly believed that the rate of interest is a function of investment and saving only, while new Classical added monetary factors like bank credit, hoarding etc. The combination of this saving, credit and hoarding is called loanable fund. This loanable fund can be divided into demand of loanable fund (investment, dissaving and hoarding) and supply of loanable fund (saving dishoarding and disinvestment) and both demand of loanable fund and supply of loanable fund depend on the movement of interest rate.

The General Theory of Employment, Interest and Money

This is the most influential book by a well-known English economist John Maynard Keynes (1936). This book was written when unemployment was increased, national income was shrink and firms were completely failed. In this book Keynes presented the idea about saving which is the remaining portion of our total income after the consumption.

$$\mathbf{I - C = S}^{4}$$

In this book he also described that interest rate is a reward of not hoarding money for a specified time period. According to him interest rate is a return on equity or it is considered the opportunity cost of present consumption.

Anyanwu & Oaikhenan (1995) categorized the saving's determinants into two factors; Quantitative and Non Quantitative factors.

[4] Where I stands for income C stands for consumption and S stands for saving

Quantitative Factors

Quantitative factors relate to inflation rate, interest rate, inflation rate expectation, and income level.

Non Quantitative Factors

Non Quantitative factors relate to psychology of individual like unforeseen events of future, social factors and habitual factors.

Pakistan is a Muslim populated country and so the religion factor can also be added in this context.

IS – LM Framework and Bernanke & Blinder (IS-LM-CC Model)

Bernanke & Blinder (1988) reviewed the New-Keynesian framework with credit channel, basically it was the extension of IS-LM framework. They defined how banks play their part in transmitting the monetary policy through credit channel. According to them borrowers and creditors take the decision of choosing bonds or loans according to the mobility of interest rate. In this framework, they explained that demand of loan is the function of interest on loans, interest on bonds and aggregate output.

$$L_d = f(i, p, y)$$[5]

[5] Where Ld is the demand for loans p (-) is the rate of interest on loans, i (+) is the rate of interest on bonds and y (+) is the real aggregate output, the positive and negative signs explain the relationship of variables with demand for loans.

2.2 Impact of Interest rate on Conventional Bank Deposits

The existing literature is rich about the concept of interest rate and bank deposit relationship. Number of studies in this context have been discussed to describe the impact of market rate or interest rate on bank deposits, in this section we briefly discuss the existing literature about this particular phenomenon.

Loayza & Shankar (2000) investigated the evolution of private saving over the period of 1960 to 1995 in India. They attempted to explain that how private saving is affected by macroeconomic variables. The study constructed the data of macroeconomic variables i.e. interest rate, income per capita, saving rate of government, dependency ratio and the portion of agriculture in gross domestic product (GDP). Error correction model (ECM) have been employed to check the statistical impact of these macroeconomic factors on private saving. The study found that interest rate, income per capita and GDP has a significant positive impact on saving while the impact of dependency ratio on private saving is negative. They further explained that the substitution effect of this change in interest rate dominates the income effect and it leads interest rate to influence the private saving in India positively.

Similarly Athukorala & Tsai (2003) attempted to work on a same paradigm and explained that the saving function captures the disposable income's growth, contribution of social security and also the financial reforms. The basic aim of this study was to explain the key factors of household saving in Taiwan. To achieve this objective of the study, they covered the period from 1952 to 1999 in Taiwan and found a result through Unrestricted error correction model (UECM). This methodology is opted because it minimizes the possibility of estimating spurious regression. The variable that

is helpful in our context of study is interest rate and according to them, rate of interest has significant positive influence on bank deposits in Taiwan.

Athukorala & Sen (2004) extended this debate and included lot of explanatory variables in this study that determine the private saving in India, i.e. rate of growth in real per capita, growth rate of the population, rate of inflation, interest rate, agriculture's share in total GDP, term of trade and some other macroeconomic variables. The research population is consisted for this study over the period of 1954 to 1998. Econometric evidence of the study reported that interest rate and rate of inflation has significant positive influence on domestic savings in India (variables that report in our study). Authors discussed that although rate of interest has positive influence on bank deposits but the magnitude of this effect is modest. They also explained other macroeconomic variables and their statistical influence on private saving.

Kassim et al., (2009) investigated the role of monetary policy shocks in Malaysian dual banking system. The study gathered the data from January 1999 to December 2006 and analyzed it through variance decomposition analysis and impulse response function based on VAR methodology. To achieve this objective they examined the impact of interest rate shocks on Islamic banks deposits and financing and compared it with conventional banks deposits and financing. Study provided the convincing evidence that shocks in monetary policy are more destabilizing for Islamic banking sector as compare to Conventional banking. According to them, although in theory the doctrine of Islamic banks is interest free banking and it is free from interest rate but contrary to general expectation, after changing in rate of interest the sensitivity in Islamic banking is much higher as compare to conventional banking.

Ergec & Arslan (2011) examined the role of interest rate fluctuation in banking sector of Turkey over the period of 2005 to 2009. The study was conducted using Vector error correction (VEC) methodology. Two different models were developed in the study. First model examined the impact of interest rate on deposits of Conventional banks. The second model investigated the impact of interest rate on deposits of Islamic banks. Results of the study found that rise in the rate of interest leads to enhance the conventional bank deposits in Turkey. They also discussed that although in theory, the general expectation of Islamic banks is based on free of interest principle and must not be affected by the movement of interest rate but the result of this study noticed that the Islamic banks operating in Turkey are significantly influenced by the movement of interest rate.

Moreover Ostadi & Sarlak (2014) worked on the same context and found strong and positive relationship between interest rate and deposits of conventional banks. The basic aim of the study was to explore how interest rate and other macroeconomic variables affect Isfahan Sepah Bank deposits, to achieve this objective they gathered the data of the Sepah bank deposits and concluded that internal factors like e-banking parameters; POS and ATM has positive and significant influence on bank deposits. Other macroeconomic factors i.e. rate of interest, money supply and growth in GDP all have positive association with bank deposits. The Authors also explained that some macroeconomic variables have negative influence on bank deposits i.e. inflation, competing money market share and exchange rate. Results of this study also proved that positive effect of the monetary policy factor (rate of interest) on bank deposits are consistent with Keynes, Friedman and Tobin's theories.

Additionally Ojeaga & Odejimi (2014) investigated the variation in rate of interest and its impact on saving behavior of customers in Nigeria. The study employed Quantile

regression method and collected the data over the period of 1989 to 2012 in Nigerian banking sector. First they identified all those factors that influence the customers' confidence which may affects the bank deposits i.e. Commercial lending, income, central bank monetary policy and total losses of Commercial banks. Result of this study showed that bank overnight function (rate of interest) affects the deposits of conventional banks in Nigeria. Statistical results confirmed that there is a positive relationship between Nigerian bank deposits and interest rate.

By the same token Mashamba et al., (2014) sought to explore the bank deposit mobilization and interest rate relationship. Data of this study was time series in nature and it is employed from 1980 to 2006. Among the main explanatory variable "interest rate" they also used some other macroeconomic factors that influence the deposits of conventional banks i.e. inflation rate, rate of interest spread and growth in Gross domestic product (GDP). Results of this study stated that rate of inflation has a significant negative impact on deposits of conventional banks while Gross domestic product and deposit rate of interest has positive influence on deposits. They further recommended that in order to mobilize the deposits of bank properly, deposit rate of interest should be in serious consideration by policy makers of the banks.

Identically Mushtaq & Siddiqui (2016) analyzed the role of interest rate in economic growth. To achieve the objective of this study, they considered saving and investment as a main measures for economic growth. Authors started the study with the Islamic principle that Riba or receiving interest on investment or saving is completely forbidden in Islam, so the aim of the study was how religion motivation factor influences the behavior of individual while taking financial decision. They covered the data from Muslim as well as non-Muslim countries and selected 17 Muslim and 17 non-Muslim countries over the period of 2005 to 2013. The study used the best econometric

techniques for panel data analysis; Random effect model (RE) and Generalized method of moments (GMM). Results of the study concluded that although interest rate is a main factor to determine investment and saving but in Muslim populated countries religious factor is also considered a main determinant for investment and saving.

According to them, in Islamic countries individual has no concern about the interest rate while taking the decision of investment and saving but in non-Muslim countries rate of interest is an important factor to save or invest. Statistical result of the study proved that in non-Muslim countries rate of interest has significant positive influence on saving while in case of investment, it has significant negative influence on it.

Another study conducted by Mushtaq & Siddique (2017) explained the impact of rate of interest on bank deposits. The study selected 23 countries from the panel of Islamic countries and 23 countries from the panel of non-Muslim countries and employed the data over the period of 1999 to 2014. They assumed that there should be different behavior of Islamic bank depositors as compare to Conventional bank depositors because of religion motivated factors. To prove this assumption, they used Panel Autoregressive distributed lag (ARDL) model for both Muslim populated and non-Muslim populated countries and noticed that in Muslim populated countries rate of interest has positive but insignificant influence on deposits of banks due to the religious restriction, but in non-Muslim countries, rate of interest has significant influence on deposits. They also proposed that Muslim countries should adopt different economic policies because of this religious motivation or religious based behavior of depositors.

Efendic et al., (2019) investigated about the negative interest rate and its implication for saving. They concluded that people would not tolerate negative interest rate on their deposits and would instead be motivated to spend or invest their money.

Testing of Hypothesis

H1: Interest rate is positively related to conventional bank deposits.

2.3 Impact of Interest rate on Islamic Bank Deposits

Several economists and researchers have turned the attention towards the role of interest rate in Islamic banking. In this section we specifically discuss the previous studies related to this concept. Haron & Ahmad (2000) explored the importance of interest rate and profit rate in the mobilization of Islamic banking deposits in Malaysia. The study noticed the negative relationship between interest rate and deposits of Islamic banks. Result of the study confirmed that the customers of Islamic banks are also profit motivated.

Similarly Rachmawati & Syamsulhakim (2004) observed the role of some macroeconomic factors that influence the deposits of mudharabah in Indonesian banking sector. The study was time series in nature and used the 10 years' data over the period of 1993-2003. Four explanatory variables; GDP, branches of Islamic banks, rate of return and interest rate are used in this study. Author noticed that Islamic bank deposits does not depend on GDP and interest rate. It (mudharabah deposit) purely depends on rate of return and Islamic bank branches.

A research conducted by Kasri & Kassim (2009) evaluated all the factors that influence the savings in Islamic banks. The study utilized the data over the period of 2000 to 2007 and concluded through VAR methodology that there is a negative association between interest rate and customers saving behavior in Islamic banks. According to them, an increase in the rate of return and decrease in the interest rate are the main factors that cause rise in Islamic bank deposits. Result of the study also confirmed the significance

of interest rate to Islamic bank deposits. By concluding the study, Authors also explained the reason of this negative association between interest rate and deposits of Islamic bank because, after comparing Islamic banks rate of return and interest rate, depositors in Islamic banks shift their funds from Islamic to Conventional banks if the rate of return is lower than the interest rate.

In the same way Zainol & Kassim (2010) analyzed the impact of variation in interest rate on profit rate of Islamic banks and also on deposits of Conventional and Islamic banks. The study employed the data over the period of January 1997 to October 2008 in the Malaysian banking sector. Result of the study concluded that after a rise in interest rate, depositors in Islamic banks deposit their money in Islamic banks only when the management increases the rate of return. Otherwise, depositors switch their funds from Islamic banks to conventional banks. The study further presented that interest rate has significant and negative influence while rate of return has positive association with deposits in Islamic banks and this indicates the profit motivation among customers of Islamic banks.

Identically Affandi & Tamanni (2010) focused on the performance of Islamic banks after the Asian financial crises. The study argue that the existing literature shows the negative association of interest rate and Islamic bank deposits. The major objective of the study was to confirm this inverse relationship between interest rate and Islamic bank deposits. To achieve the objective the study covered the data period over the year of 2004 to 2008 and confirmed the result through Vector Autoregression methodology (VAR). They concluded in the study that Islamic bank deposits are not sensitive to interest rate changes in Indonesia.

In contrast Abduh et al., (2011) investigated the link among macroeconomic factors and deposit in Islamic banks operating in Malaysia. The study used the Vector error correction approach and employed the data over the period of 2000 to 2010. Results of the study presented that interest rate, rate of return and growth in production have no significant influence on Islamic banking deposits but at the same time inflation has negative impact on Islamic banking deposits.

Another research conducted by Hassan & Makinde (2016) in Nigeria (A Muslim populated country) examined how interest rate affects the deposits of bank. Data has been collected in this study from 2000-2013 and analyzed it through Ordinary least square (OLS) a multiple regression technique. They used interest rate and GDP as explanatory variables and presented that interest rate and GDP have not any significant influence on the deposits of Nigerian banking setup.

Furthermore Meutia & Soediro (2017) studied the affiliation of rate of return and interest rate with Islamic banking deposits in Indonesia. Data has been employed in this study from 2012 to 2015, and noticed that both interest rate and rate of return in Islamic banks have negative association with deposits in Islamic banks but the impact of interest rate on deposits of Islamic banks is not significant.

Additionally Nazib & Masih (2017) analyzed the association among deposits in Islamic banks and monetary policy shocks. The study used macroeconomic factors like gross domestic products (GDP), policy rate (interest rate), money supply and consumer price index (CPI) as explanatory variables. Results of the study presented that deposits in Islamic banks are highly influenced by interest rate, money supply and GDP. Negative sign of coefficient shows that impact of all these variables on Islamic bank deposits is negative.

Likewise Arshad & Nurfadilah (2017) investigated about the factors that influence the deposits in Islamic banking. To achieve this objective, they selected Malaysian and Indonesian Islamic banks for the study and collected the data of 16 banks of Malaysia and 11 banks of Indonesia. Authors used bank reserves, non-performing financing (NPF), profit rates of Islamic banks and interest rate as explanatory variables. Results of the study confirmed that the interest rate and non performing financing have negative association with mudharabah deposits in Islamic banks of both countries whereas bank reserves and profit rates of Islamic banks have positive association with mudharabah deposits.

Some researchers also correlate the interest rate with profit rates of Islamic banks because in the system of dual banking, Islamic banks use the rates of conventional banks as a benchmark for their products.

The working of Chong & Liu (2009) is very important regarding this most debatable subject. They tried to investigate the association among deposit rates of conventional banks and profit rates of Islamic banks in Malaysia and Turkey. The study period used in this study from 1995 to 2004 and analyzed the causal relationship and dynamic interaction between variables. Result of the study found that Islamic banks are not free of interest because they noticed that profit rates of Islamic bank and deposit rates of conventional banks are closely correlated.

Similarly Bacha (2008) worked on the Malaysian Islamic banking system, he concluded that rate of return in Islamic banks are highly correlated with interest rate of conventional banks. According to him, it is not surprising because both banking system conventional as well as Islamic banks follow the same model. The author also explained

that due to the association of conventional and Islamic bank rates, Islamic bank may bear the interest rate risk.

Testing of Hypothesis

H2: Interest rate is positively related to Islamic bank deposits.

2.4 Pakistan's Review (Deposit Side)

Raza et al., (2017) analyzed the impact of interest rate on deposits of banks and savings in Pakistan. They covered the period from 2002 to 2006 and applied least square regression method. The findings of the study revealed that interest rate has positive association with bank deposits in Pakistan. According to the study, interest rate is a motivational factor for the depositors of the banks as they consider it before depositing the money and can change the decision also.

Another study conducted by Akhter at el., (2015) also investigated the link between some macroeconomic factors like base lending rate, increase in general price level, economic growth, money supply, Karachi stock exchange composite index (KSECI), Karachi interbank offer rate (KIBOR) and rate of return of Islamic banks with bank deposits of Pakistan. Data has been covered in this study from the 1st quarter of 2006 to last quarter of 2011. Both short term and long term relation was examined through ARDL approach. The study provided the evidence that in the system of dual banking both conventional bank depositors as well as Islamic bank depositors are influenced by the movement of interest rate. A rise in the interest rate increases the conventional banks deposits however decreases the deposits in Islamic banks. They also suggested that due to the competition in this dual banking system, Islamic banks should offer higher profit rates as compare to interest rates (deposit rates) of conventional banks.

Additionally Nishat & Bilgrami (1989) investigated about the determining factors of bank deposits in Pakistan. Data period of this study is consisted from 1959 to 1986. To capture the true picture of this study, they added number of variable in this study i.e. Gross national income at market price, National income from agriculture sector at market price, National income from non-agriculture at market price, interest rate, yield on government bonds and securities, Investment index on real state, bank branches in the country and bank credit in nominal terms. The result of the study supported that increase in income has significant impact on demand for deposits. This paper further finds that demand for time deposits are influenced by non-agriculture income, interest rate, bank credit and investment in real estate.

2.5 Literature on Determinants of Bank Deposits

In this section we briefly discuss the macroeconomic and bank specific factors that have been discussed consistently in the previous studies to determine bank deposits. Here we mention those factors and further discuss the literature about that.

Macroeconomic Factors 1) Economic growth **2)** Money supply **3)** Inflation.

Bank Specific Factors 1) Bank size **2)** Liquidity.

A study conducted by Aziz et al., (2014) examined the factors that influence the deposits of Islamic bank in Qatar. They used the quarterly data from the period of 2006 to 2013 and examined the impact of economic growth (GDP), a proxy of general increase in price level (CPI), interest rate (IR), money supply (MS), Doha stock market index (DSM), and Islamic banks profit rates or rate of return (PRF) on deposits of Islamic banks. They concluded that in the long run deposits of Islamic banks are not influenced by any explanatory variables but in the short run deposits of Islamic bank are influenced by conventional bank deposit rate, CPI and Islamic bank profit rates.

Haron & Azmi (2008) explained the macroeconomic factors that affect the deposits of conventional and Islamic bank in a system of dual banking in Malaysia. They measured both short term and long term association among variables through Cointegration and Error correction framework. According to them, rate of return in Islamic banks, interest rate, Kuala Lumpur stock exchange index, increase in general price level, money supply and economic growth have significant influence on conventional and Islamic bank deposits.

In the like manner Zainal et al., (2009) investigated the factors that influence the investment and mudharabah accounts. Authors used the secondary data from 1996 to 2007. Results of the study noticed that all macroeconomic variables influence the mudharabah deposits positively excepts inflation. The association of inflation with mudharabah account is negative in this study.

In the same way Siaw & Lawer (2015) specifically investigated the dynamic effect of deposit rate of conventional banks, inflation, policy rate, money supply growth and stock prices on deposits of the banks. Data has been employed in this study over the period of 2000 to 2013 and analyzed the both short and long term association among dependent and independent variables. The coefficient sign of growth in money supply and inflation is negative, it shows the inverse association of these variables with bank deposits in Ghana. However result of the study noticed the positive influence of interest rate on deposits of the banks.

Similarly Ferrouhi (2017) also explained the determining factors of deposits in Morocco. Data period has been covered in this study over the period of 2003 to 2014. In the study they used bank deposits as responding variables and twelve macroeconomic and financial variables as explanatory variables. Result obtained from

his study explained that bank size, rate of interest and unemployment rate have positive influence on deposits of the banks.

Furthermore Abduh (2015) studied about the factors that influence the deposits of Islamic banks in Indonesia. Data has been used in this study over the period of 2000 to 2011. The study intended to check how macroeconomic factors i.e. interest rate, income, Islamic deposit rate, inflation and financial crises influence the bank deposits. They also analyzed short run and long run association among variables through Cointegration approach. The study presented that financial crises has no significant effect on deposits of the banks while interest rate and inflation has significant negative influence on deposits of Islamic banks. He further stated that Customers of Islamic banks consider these variables as a main factor while taking the decision to deposit in Islamic banks.

Whereas, Eriemo (2014) brought some new variable in this picture like bank investment and number of bank branches along with the proxy of general increase in price level (CPI) and interest rate. Data period of this study consisted from 1980 to 2010 and analyzed the result through Vector error correction model (VECM). The Author stated that bank branches, consumer price index, bank investment and rate of interest are the significant determining factors of bank deposits. He also recommended that to mobilize the deposits of banks properly, government and policy makers should take into consideration about these factors.

Mobin & Masih (2014) come out with the result that most of the theories related to individual's saving behavior are not applicable in Islamic banking. They collected data of major macroeconomic variables i.e. GDP, Kuala Lumpur composite Index and inflation rate. They stated that in previous studies, higher inflation leads to higher

saving and higher GDP may cause decline in saving but according to them, these theories are applicable for conventional banks only because in Islamic banks there is a possibility that religious belief may affect the decision of customers. The idea was supported by statistical results of the study which show the negative impact of inflation and insignificant impact of GDP and KLCI on bank deposits.

Similarly Duran & Bengu (2017) assessed the association among macroeconomic factors and banking sector. The study compiled the quarterly data over the period of 2000 to 2016. They used gross domestic product (GDP), industrial production index (IPI), inflation (CPI), export and import as independent variables. Results of the study have been supported through Panel data estimation techniques and concluded that GDP, IMP and IPI influence the bank deposits negatively while the impact of CPI and EXP is positive.

Same result of negative impact of GDP on saving also discussed by Mobin & Masih (2014) in their study. They explained the permanent income theory in the study, the theory suggests that due to anticipation of rise in future income, higher growth reduces the current saving.

Finger & Hesse (2009) examines all those factors that affect the bank deposits in Lebanon. They discussed that at macro level economic activities, price and interest differential influence the bank deposits, while at micro side bank specific factors like bank riskiness, loan exposure and liquidity situation of banks influence the demand of deposits. Similarly Mora (2010) addressed that liquidity risk forces the depositors not to deposit in particular risky bank.

All the above literature proves that GDP, MS, CPI, BS and Liquidity influence the bank deposits either positive or negative.

2.6 Impact of Interest Rate on Conventional Banks Financing

After looking at the role of interest rate on bank deposits through the previous literature, researchers have also done lot of work to find the role of interest rate and bank financing. Bank financing also works through the interest rate channel i.e. response of bank credit supply to the movement of interest rate. At the first stage bank policy rate influences the money market interest rate such as KIBOR (Karachi interbank offer rate) which is the benchmark rate. In particular the change in KIBOR affects the decision of customer to borrow from the banks or not (SBP, monetary policy implication).

Bernanke & Blinder (1988) was the first who introduced the new variable "credit" in the IS-LM framework and proved that a tight or restrictive monetary policy reduces the aggregate lending of the banks. Bernanke & Blinder (1992) and Kashyap & Stein (1994) confirmed the role of monetary policy and bank credit in United States of America. Another study conducted by Kashyap & Stein (1997) also discussed that credit supply is an important channel of monetary policy. Overall these studies shows the importance of bank credit supply in the monetary policy transmission mechanism.

Similarly Gambacorta & Mistrulli (2004) examined the response of bank lending due to GDP and monetary policy shocks. The sample period used for this study goes over the period of 1992 to 3rd quarter of 2001. Author used the data of Italian banks and analyzed result through Generalized method of moment (GMM). Statistical evidence showed a negative association among bank lending and interest rate, whereas impact of GDP on bank loan supply is positive. The study also noticed that banks that are well capitalized can shield their credit supply from the effect of monetary and GDP shocks, in a better way.

Additionally Gupta (2004) compared the significance presence of transmission mechanism of monetary policy in Pakistan and India. The study covered the data over the period of 1957 to 2004. He used industrial production index for India and manufacturing production for Pakistan to measure the real economic activities. By using the Structural VAR approach, the findings of this study presented that shocks in the monetary policy influence the credit variable, which transmits these movements in the real side of the economy and affects the major economic activities.

Furthermore Ibrahim (2006) evaluated the association among bank financing and macroeconomic factors through Vector autoregressive technique. The study empirically found that bank financing is positively influenced by change in stock price and real output. The study also found the significant impact of interest rate on bank loans. Contrary to theoretical justification, he noticed the positive association among bank loans and rate of interest. Author also explained the link among exchange rate and financing of bank, he found no direct association among them. According to him, exchange rate effects the financing of bank through stock price and output.

By the same token Karim et al., (2007) investigated the link between bank lending behavior and monetary policy shocks for different sectors of the economy. The study used the Vector autoregressive (VAR) methodology to analyze this objective statistically. Authors noticed that bank loan supply is significantly and negatively associated with shocks in monetary policy but the impact of these shocks vary from sector to sector. They stated that as compare to other sectors in the economy agricultural sector, mining sector and manufacturing sector are more responsive due to these monetary shocks.

Similarly Karim & Saini (2011) attempted to assess the importance of bank lending channel in transmission mechanism of monetary policy. The study employed individual bank level data set of Malaysia and examined it through dynamic panel data method namely GMM. The findings revealed that monetary policy fluctuation effects the credit supply of the banks significantly and negatively. They also stated the interaction among monetary policy and liquidity of the bank have significant relation. They explained this interaction that low liquid banks relates with tight monetary policy and that tends to decrease in credit supply of the banks. The findings of the study advocate the vigilant implementation of monetary policy because it affects the economy through bank lending channel.

Additionally Olokoyo (2011) extended the scope of study and assessed the link between lending behavior in Nigeria and some macroeconomic and financial variables. The study employed inferential statistical analysis over the period of 1980 to 2005 in Nigeria. The proxy measure used in the study for bank lending or financing are bank loans and advances. Result of this particular study proved that rate of interest, GDP and liquidity influence the bank lending positively. He further suggested that the ability of bank loan services are associated with deposits of the banks, so to enhance this ability of lending, banks should mobilize more deposits.

Similarly Beutler et al., (2017) investigated the impact of interest rate on credit supply of the banks. Result of the study presented that the interest rate has a significant negative association with the operations of bank lending.

A study of Shah & Rashid (2019) discussed the credit supply channel of monetary policy transmission mechanism. The robust two step GMM method was applied in that

study and concluded the negative impact of interest rate on financing of conventional as well as Islamic banks.

Testing of Hypothesis

H3: Interest rate is negatively associated to conventional bank financing.

2.7 Impact of Interest Rate on Islamic Banks Financing

A relatively less number of studies in literature discussed about interest rate and financing of Islamic banks. Few of them are discussed here;

A study performed by Rosly (1999) investigated the impact of interest rate fluctuation on financing of Islamic banks under the dual banking system. Author stated that although Islamic banks claim to operate under interest free principle but still Islamic banks are not free from the risk of interest rate. He explained that when interest rate rises, conventional banks adjust their base lending rate accordingly. However, the Islamic bank cannot increase the rate of return because in Islamic banks the profit margin is fixed. So, customers may compare the installments of financing of Islamic banks and conventional banks. They know that the installments of Islamic bank financing is relatively cheaper as compare to conventional bank financing, so after this comparison, customers will choose the financing of Islamic bank if they expect that the rate of interest will rise in future.

Furthermore Kader & Yap Kok Leong (2009) provided the theoretical explanation to observe the impact of interest rate on demand of financing in Islamic banks. According to him, theoretically customers in Islamic banks are motivated by religion and they are not profit motivated so any change in interest rate should not influence the behavior of Islamic banks customers, it means there will be no significant change on Islamic

banking financing after changes in CB interest rates. However, their research found a positive and immediate response in demand of Islamic banking financing after changes in interest rate. It implies that customers in Islamic banks are motivated by profit and their decision to obtain the financing of Islamic banks will be influenced by substitutional effect of interest rate. Hence at the end they concluded that Islamic banks are exposed to interest rate risk despite dealing and operating with interest free principle.

Similarly Solarin et al., (2011) used the ARDL model to investigate the influence of interest rate and other macroeconomic factors on Islamic banks financing. The study enclosed the data over the period of 2006 to 2011 and concluded that interest rate has a negative influence on Islamic bank financing. Authors explained that after rise in the rate of interest, the attention of customers should divert towards Islamic banking because of the rise in conventional banks' cost of financing but contrary to our expectation, Islamic banks behave same as conventional banks because of the dual banking system under the same monetary environment (both banking system use same bench mark).

Additionally Halim & Masih (2017) worked on the same perspective that how Islamic financing behave with the change in macroeconomic variables. Data period in this study has been covered from 2010-2014 and explored the results through Autoregressive distributed lag (ARDL) methodology. The study noticed that interest rate has significant negative influence on Islamic bank financing whereas, the impact of Gross domestic products is insignificant. The study further suggested that policy makers can stabilize the market by controlling the interest rate with the channel of Islamic banking financing.

Furthermore Zulkhibri (2018) used the Panel regression methodology to evaluate the impact of interest rate on financing of Islamic banks. The study enclosed the data over the period of 2006 to 2012 from Islamic banks of Malaysia. To analyze the result comprehensively, the study used some control variables i.e. GDP, liquidity and capital. Result of the study found that interest rate has a significant negative association with financing in Islamic banks which is consistent with the results of interest rate and conventional banks' lending. In this study, inflation also has a negative influence on financing of Islamic bank because of uncertainty in futures' return on investment. Other variables like GDP and liquidity effects the Islamic banks financing positively. Author concluded the study with remarks that Islamic banking financing and conventional lending has no difference in terms of changing in monetary policy.

Similarly Caporale et al., (2019) examined the transmission mechanism of monetary policy in Malaysia over the period of 1994-2015. The study concluded that interest rate has negative influence on credit supply of conventional as well as Islamic banks, especially during the low growth period. The study also noticed that the response of credit supply to change in money supply is also negative in both banking system.

Further, a study conducted by Bacha & Smolo (2020) investigated the impact of interest rate on Islamic banking by employing the system GMM estimators on a unique panel data set of 77 Islamic banks from 13 countries over the period 2003–2017. They found that sale- and lease-based financing instruments are negatively correlated with the interest rate.

Testing of Hypothesis

H4: Interest rate is negatively associated to Islamic bank financing.

2.8 Pakistan's Review (Financing Side)

In the context of Pakistan Janjua et al., (2014) examined the bank's loan supply and centric view of monetary policy. The study enclosed the data over the period of 2006 to 2012. This research used the set of macroeconomic, bank specific and monetary policy measures as explanatory variables and examine their impact on loan supply of the banks. They noticed that bank size, credit risk, coverage ratio, bank liquidity, GDP and monetary measures have significant negative relationship with bank loans whereas, inflation has significant positive effect on bank loan supply.

Similarly Imran & Nishat (2013) examined the association among bank loan supply and macroeconomic variables. The study found the result through ARDL that Gross domestic product, exchange rate and monetary environment (Money supply) are significantly associated with credit supply. The impact of GDP is significantly positive on credit supply because it effects the domestic income, allowing people to save more money in banks that increase the capacity of banks to provide more credit supply. The study also explained the role of monetary condition on bank credit supply and found that when money supply goes up the credit supply of banks to the private sector also enhanced.

2.9 Literature on Determinants of Bank Financing

In this section we briefly discuss the macroeconomic and bank specific factors that have been discussed consistently in the previous studies to determine bank financing. Here we mention those factors and then discuss the literature about that.

Macroeconomic Factors 1) Economic growth **2)** Money supply **3)** Inflation.

Bank Specific Factors 1) Bank size **2)** Liquidity.

Podpiera (2007) explored the link among policy rate, GDP and inflation rate with the growth of total loans. Data has been incorporated in this study over the period of 1996 to 2001 in Czech's banking sector. For monetary policy rate, the study used Czech policy rate as a measure and concluded that interest rate has significant negative association with total loans of Czech's banking sector, while economic growth has significant positive and inflation has insignificant influence on total loans. Wenjie Du (2011) also referred the same result that higher GDP stimulate the bank financing.

Furthermore Schmitz (2004) investigated the role of banks in transmission mechanism of monetary policy. The study used the cross sectional data of 261 banks operating in Poland, Hungary, Czech republic, Latvia, Slovenia, Estonia and Slovak over the period of 1990 to 2001. Author noticed that GDP growth and bank size has significant positive association with credit supply of the banks, while inflation has significant negative influence on credit supply. This negative association among inflation and credit supply is because of macroeconomic disturbance, resulting to lower credit growth. Similarly Matthias et al., (2006) reported that bank size and liquidity are negatively associated with bank lending.

Another study conducted by Alper et al., (2012) also explored the relationship among the macroeconomic factors and lending operation of the banks. The main objective of this study is to analyze that whether monetary policy can affect the bank lending? Result of the study concluded that GDP and inflation influence the bank lending positively whereas interest rate has negative influence on it. According to him, the positive effect of inflation on lending operation of banks is reasonable because high inflation devalues the stock of savings in the banks.

Furthermore Chernykh & Theodossiou (2011) investigated the determining factors of bank loan supply in Russia. They used the total business loans as response variable, the study concluded that bank size significantly effects the loan supply of the banks. The positive coefficient sign of bank size indicates that large banks can better shield itself from the effect of credit risk, therefore, they provide more loans to the business sector.

Similarly Nahar & Sarker (2016) examined the macroeconomic variables that determine the financing of Islamic banks. From the population of all Islamic banks they selected 48 Islamic countries and collected the data of 172 Islamic banks. Data has been enclosed in this study over the period of 2004 to 2013. They analyzed the data through Feasible generalized least square (FGLS) methodology and concluded that economic growth and inflation has significant positive association with Islamic banks financing, whereas exchange rate and interest rate has negative influence on financing of Islamic banks.

In the same way Tabak et al., (2016) assessed the relationship between monetary expansion and the lending channel of bank. The study focused on the BRICS countries (Brazil, Russia, India, China and South Africa). Data of 1254 banks have been employed in this study over the period of 2000 to 2012 and presented that the relationship between money supply and bank loans have inverted u-shaped and after certain level money supply has a negative influence on loans of the banks.

Moreover Marshal (2017) explored the influence of macroeconomic and bank specific factors on bank lending. The study used policy rate, growth in money supply, inflation rate, exchange rate, bank capitalization and bank liquidity as explanatory variables. The study noticed the positive association among money supply and bank lending whereas

monetary policy rate, inflation rate and bank liquidity influence the bank lending negatively.

CHAPTER 3

The Data, Empirical Model and Methodology

This study explains the impact of interest rate with various control variables on dependent variables like bank deposits and bank financing. The study has used Generalized Method of Moments (GMM) technique.

3.1 Data Collection

To analyze the objective of the study, this research incorporated secondary data on yearly basis. The data of macroeconomic variables is collected from official website of State bank of Pakistan (SBP) and financial data of all variables is collected from Annual financial statements of all particular banks. This study utilizes the 22 Conventional banks and 18 Islamic banks (5 full-fledged and 13 Islamic windows of Conventional banks) data of Pakistan covering the period from 2008 to 2018 (11 years). We cover the data period from 2008-2018 because most of the conventional banks started Islamic windows after 2007-2008 and to explore the true picture of comparison we needed the required Islamic banks for the study. The selection criteria of these 40 banks completely depends on the availability of the data.

3.2 Variables Description

This section relates to the construction of dependent and explanatory variables, their measures and proxies that are used to examine the linkage among dependent and independent variables.

Here we briefly discuss the variables of our study;

3.2.1 Interest Rate

A set amount of money which is added on to the final loan amount as a charge of borrowing is called interest rate. Ojo, M.O (2001) and Adebiyi, M.A (2002) termed interest rate as a rental payment for credit or it can also be defined as a return for parting with liquidity. The understanding of interest rate is very important because, it influences the decision of general public to save, consume or invest.

This study uses Karachi interbank offer rate (KIBOR) as a proxy measure for interest rate because, it is considered a benchmark rate in all financial activities. KIBOR also has importance because, it tends to affect all other interest rates i.e. deposit rate, lending rate etc.

3.2.2 Economic Growth

Economic growth is the increase and growth of a country's potential GDP or national output (Samuelson & William, 1995). Technically economic growth relates to production possibility frontier (PPP), economic growth takes place when PPP shifts upward. Economic growth also means that an increase in the output of a country from one period of time to another period of time. This study uses GDP as a proxy for economic growth because it is the most comprehensive measure of total output of the economy. GDP is a monetary measure of the market value of all final goods and services produced during a period of one year.

This study consisted to the previous studies Ostadi & Sarlak (2014), Gambacorta & Mistrulli (2004) and many other studies related to GDP as a proxy measure for economic growth.

3.2.3 Money supply

Money supply is referred as total stock of money held by public or in circulation of money among the people at a specific point of time. There are a number of ways to describe "money" but standard measures usually include currency in circulation and demand deposits. Money supply is a stock variable and it is also known as money stock.

This study uses the components for money supply; a) currency in circulation b) demand deposits with SBP c) Total private and PSE deposits of which : RFCDs. The combination of all these components is called money supply. The use of this control variable MS is similar to the previous studies of Haron & Azmi (2008) Aziz et al., (2014).

3.2.4 Inflation

The persistent rise in the general price level of a country is known as inflation or it can be further defined as when too much money chases too few goods is called inflation. Inflation has two further types a) demand pull inflation b) cost push inflation. The study uses CPI as a proxy for inflation based on previous studies of Haron & Azmi (2008) Aziz et al., (2014).

3.2.5 Bank size

Bank size is measured by the natural logarithm of total assets Kashyap & Stein (1994). The size of banks plays an important role in financial system for several reasons. It is crucial because banking industry serves in all sectors generally and in real economy particularly, where customers want to do business only with large size banks. Secondly it is important because it is subject to risk stability. Thus measuring bank size is relevant for both clients as well as policymakers.

Moreover to judge the systematic importance of banks globally, Financial stability board uses five main categories and bank size is one of these five categories.

3.2.6 Liquidity

Liquidity is the availability of liquid assets to a company, market or trader/investor. In company or bank perspective liquidity is the ability to pay short term obligation. Liquidity of banks measured through cash and cash equivalent divided by total assets.

3.3 Analytical Framework

The main objective of the study is to explore the impact of rate of interest on banking operations in a dual banking system. Therefore the study has set of empirical models that are based on theoretical background and econometric techniques to estimate these models.

Model Specification

In this study we estimate four empirical models to investigate the impact of interest rate on deposits and financing of conventional and Islamic banks.

To explore the relationship between dependent variables and interest rate following equation is used.

$$\mathbf{Y}_{i,t} = \boldsymbol{\beta}_i + \mathbf{X}_{i,t}\boldsymbol{\alpha} + \mathbf{Z}_t\boldsymbol{\gamma} + \boldsymbol{\rho}\mathbf{M}_t + \acute{\varepsilon}_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$\boldsymbol{Y_{i,t}}$ Dependent Variables

$\boldsymbol{X_{i,t}}$ A set of bank specific variables

$\boldsymbol{Z_t}$ A set of macroeconomic variables

$\boldsymbol{M_t}$ Main explanatory variable (interest rate)

$\acute{\varepsilon}_{i,t}$ Error term

Where $Y_{i,t}$ is the deposits and Financing with four alternatives;

1. Deposits of conventional banks
2. Deposits of Islamic banks
3. Financing of conventional banks
4. Financing of Islamic banks

Interest rate (KIBOR) is our main explanatory variable. Bank specific variables include bank size and bank liquidity while a set of macroeconomic variables i.e. GDP, money supply and CPI also play their part as an explanatory variable. Similar equation is used by (Janjua, Rashid, & Qurrat-Ul-Ain, 2014).

3.4 Econometric Methodology

Types of Panel Model

There are various techniques to analyze panel data estimation like Pooled OLS, Instrumental variable least square (IVLS), Panel corrected standard error (PCSE), Feasible generalized least square (FGLS), Random effect model (REM), Fixed effect model (FEM), and Generalized method of moment (GMM) etc.

Some Related Econometric Issues

This study attempts to estimate the relationship between banking operations and interest rate. Here we discuss major econometric issues that are faced in this study:

Endogeneity

Endogeneity may cause due to omitted variables and the bidirectional causality between dependent and independent variables. Due to the endogeneity problem, the estimation gives biased estimates. To deal with this problem, instrumental techniques are employed. In this study interest rate (KIBOR) is endogenous variable and are correlated

with the error term as we examine in the LM model of interest rate determination that the supply of and demand for money determine the interest rate. There also exist the endogeneity between money supply and bank financing. According to Ahmad & Ahmad (2006) there exist the endogeneity between bank advances and money supply. To overcome the problem of endogeneity the most prominent econometric technique that is commonly used is Generalized method of moment (GMM). It is proposed by Arellano and Bover (1995) later Blundell and Bond (1998) fully developed this technique to cope the endogeneity problem.

Estimation Technique

Since this study is based on annual panel data which has time series dimension that's why we have used the estimation technique that is best and frequently used for the panel data. Pooled OLS, Fixed effect model (FEM) and Random effect model (REM) are most commonly used model to estimate the Panel data analysis. However, due to the problem of endogeneity these methods cannot provide the efficient and consistent result. The best available solution in such situation is to move towards the 2SLS technique. However, in the presence of heteroscedasticity it also arise with the same problem of inefficient and inconsistent results.

To overcome the problem of endogeneity, heteroscedasticity and autocorrelation the most prominent econometric technique that is commonly used is Generalized method of moment (GMM). It is proposed by Arellano and Bover (1995) later Blundell and Bond (1998) fully developed this technique to cope the endogeneity problem. In order to avoid all aforesaid problems, this study uses the Generalized method of moment (GMM).

CHAPTER 4

EMPIRICAL RESULTS AND DISCUSSION

This chapter is divided into 2 parts, section 4.1 deals with descriptive statistics and section 4.2 provides the estimation results and discussion.

Descriptive Statistics Analysis

This section consists of descriptive statics of all variables related to study.

Table 4.1 Descriptive Summary of the Variables (Conventional Banks)

Variables	Obs	Mean	St.Dev	Min	Mix	Skew	Kurt
Deposit	236	11.146	.6838	9.276	12.329	-.5583	2.648
Financing	236	10.876	.6703	9.363	12.033	-.5800	2.412
KIBOR	236	10.536	3.038	6.44	16.11	.1284	2.049
GDP	236	7.016	.0562	6.942	7.118	.3719	1.856
CPI	236	9.125	5.138	2.9	20.8	.7422	2.909
MS	236	6.961	.1705	6.680	7.219	-.1163	1.791
BS	236	11.298	.6430	9.724	12.480	-.4577	2.509
Liquidity	236	.0870	.0455	.0309	.3222	2.760	12.156

The table 4.1 of descriptive statistics shows that the average value of bank deposits and financing (lending) are 11.146% and 10.876% with the standard deviation of .6838% and .6703% respectively. The average value of deposits 11.146% and financing 10.876% indicate the average annual deposits and financing for the conventional banks in Pakistan. It shows that conventional banking system has more deposits as compare to credits. The maximum value of conventional banks deposit and financing is 12.329%

and 12.033% respectively. Similarly the minimum value of conventional banks deposit is 9.276% and for financing it is 9.363%. These stats indicate that overall conventional banking system has more deposit as compare to financing. The explanatory variable like KIBOR which is the benchmark for lending and deposit rates has a mean of 10.536% with the standard deviation of 3.038%, the maximum value of KIBOR is 16.11% which belongs to the year 2008.

The skewness and kurtosis describes the data distribution. If the data is normally distributed then skewness must be zero but for the real world data the perfect zero skewness is unlikely to a certain context. If it is positive that shows the data is skewed positively and skewed at right, means the longer is the right tail than the left and if skewness is showing negative values it means that the data is skewed negatively and the left tail is longer than right. In table 4.1 the results of skewness are negative for deposits, financing, money supply and bank size. While KIBOR, GDP, CPI and bank liquidity show the positively skewed distribution of data. The value of kurtosis is less than 3 for all variables except liquidity. The value of less than 3 indicates that normal distribution of data from the point. Kurtosis value is greater than 3 means that data distribution is relatively pointed and shows the peak and flatness of the data.

Table 4.2 Descriptive Summary of the Variables (Islamic Banks)

Variables	Obs	Mean	St.Dev	Min	Mix	Skew	Kurt
Deposit	172	10.410	.7744	7.270	11.895	-.7084	4.847
Financing	172	10.118	.7468	8.146	11.709	-.00051	2.5611
KIBOR	172	10.244	2.986	6.44	16.11	.2036	2.0757
GDP	172	7.024	.0567	6.942	7.118	.2030	1.7538
CPI	172	8.548	5.036	2.9	20.8	.8920	3.1618
MS	172	6.983	.1686	6.680	7.219	-.2762	1.8727
BS	172	10.537	.6700	8.948	12.002	.1223	2.672
Liquidity	172	.1025	.0671	.0070	.3783	1.5314	5.960

This table 4.2 of descriptive statistics briefly explains the summary statistics of all Islamic banks. Although the data period of Islamic banks is also from 2008 to 2018 but it has lesser observations because some Conventional banks started the Islamic windows after the year 2008.

The table shows that the average value of Islamic banks deposit and financing (lending) are 10.410% and 10.118% with the standard deviation of .7744% and .7468% respectively. The average value of deposits 10.410% and financing 10.118% indicate the average annual deposits and financing for the Islamic banks in Pakistan. The mean value of deposits and financing shows that Islamic banking system has also more deposits as compare to credits. The maximum value of Islamic banks deposit and financing is 11.895% and 11.709% respectively. Similarly the minimum value of Islamic banks deposit is 7.270% and for financing it is 8.146%. These stats indicate that overall Islamic banking system has more deposit as compare to financing. The

explanatory variable like KIBOR which is the benchmark for lending and deposit rates has a mean of 10.244% with the standard deviation of 2.986%, the maximum value of KIBOR is 16.11% which belongs to the year 2008.

The skewness and kurtosis describes the data distribution. If the data is normally distributed then skewness must be zero but for the real world data the perfect zero skewness is unlikely to a certain context. If it is positive that shows the data is skewed positively and skewed at right, means the longer is the right tail than the left and if skewness is showing negative values it means that the data is skewed negatively and the left tail is longer than right. In table 4.2 the results of skewness are negative for deposits, financing and money supply. While KIBOR, GDP, CPI, bank size and bank liquidity show the positively skewed distribution of data. The value of kurtosis is less than 3 for financing, GDP, KIBOR, money supply and bank size. The value of less than 3 indicates that normal distribution of data from the point. Kurtosis value greater than 3 means that data distribution is relatively pointed and shows the peak and flatness of the data. In table 4.2 the kurtosis value of deposit, CPI and liquidity is greater than 3.

Autocorrelation

Autocorrelation is defined as the relationship between current value of a variable and its past value. Autocorrelation effects the efficiency of the estimators. The study used the Wooldridge test to check the autocorrelation.

Model 1 Conventional banks deposit

H0 : No autocorrelation

F(1, 21) = 30.222

Prob > F = 0.0000

Model 2 Islamic banks deposit

H0 : No autocorrelation

F(1, 17) = 56.366

Prob > F = 0.0000

Model 3 Conventional banks financing

H0 : No autocorrelation

F(1, 21) = 43.193

Prob > F = 0.0000

Model 4 Islamic banks financing

H0 : No autocorrelation

F(1, 17) = 25.109

Prob > F = 0.0001

The results show that there exists problem of autocorrelation in above models.

Heteroscedasticity

Method of least square assumes that the disturbance term has homoscedasticity (constant variance) across all observations. When that's not the case we have the problem of heteroscedasticity of the error term. It is typically encountered in cross sectional data. Due to this problem the OLS estimates are still unbiased but standard error of estimators are biased due to which t statistic, f statistic and LM statistic can't be used for drawing inferences.

Model 1 Conventional banks deposit

The Modified Wald Test for the group wise heteroskedasticity.

Wald chi2(6) = 8394.55

Prob > chi2 = 0.0000

Model 2 Islamic banks deposit

The Modified Wald Test for the group wise heteroskedasticity.

Wald chi2(6) = 1952.62

Prob > chi2 = 0.0000

Model 3 Conventional banks financing

The Modified Wald Test for the group wise heteroskedasticity.

Wald chi2(6) = 1698.69

Prob > chi2 = 0.0000

Model 4 Islamic banks financing

The Modified Wald Test for the group wise heteroskedasticity.

Wald chi2(6) = 1076.46

Prob > chi2 = 0.0000

The above results show there exists problem of heteroscedasticity in all models of this study.

Estimation Results and Discussions

This section covers the empirical analysis of the role of Interest rate on banking operations. The estimation of the study is divided into four models. The model no.1 explains the role of interest rate on Conventional bank deposits while model no.2 estimates the impact of interest rate on Islamic bank, model no.3 and model no.4

estimates the impact of interest rate on Conventional and Islamic bank financing respectively.

Impact of Interest Rate on Banking Operations

To investigate the impact of interest rate on banking operations, the following results associated with interest rate and other macroeconomic and bank specific variables are given in the following table.

Table 4.3 Impact of interest rate on banking operations

	Deposit Models		Financing Models	
	Model 1	**Model 2**	**Model 3**	**Model 4**
Variables	**C.B**	**I.B**	**C.B**	**I.B**
KIBOR	.0058539	.0054702	-.0060956	-.0115373
	(0.000)*	(0.004)*	(0.003)*	(0.015)*
GDP	.9851631	-2.542204	1.17032	5.876442
	(0.006)*	(0.000)*	(0.007)*	(0.000)*
CPI	-.0235883	-.0047879	.0369399	-.012642
	(0.000)*	(0.001)*	(0.000)*	(0.218)
MS	-1.143632	.9140652	.7030623	-2.546238
	(0.000)*	(0.000)*	(0.008)*	(0.000)*
BS	.4625143	1.060405	.0317928	.6096204
	(0.000)*	(0.000)*	(0.314)	(0.000)*
LIQ	.0138868	.1240437	-.2157214	-1.909827
	(0.766)	(0.162)	(0.024)**	(0.000)*
No. of Observations	167	136	167	136
Number of Banks	22	18	22	18
AR (2) P value	0.315	0.336	0.652	0.567
Hansen Test P value	0.838	0.215	0.867	0.541

Figures in parenthesis represent p- statistics
*** Significant at 10%; ** significant at 5%, * significant at 1%;
Source: Authors' estimates

The result of the model 1 shows that all the determinants of Conventional bank deposits are significant at 1% level except for the bank specific variable liquidity. Interest rate has significant positive impact on Conventional bank deposits, its mean a rise in interest rate attracts depositors. On average an increase of 1% in the interest rate will result in 0.585% increase in Conventional bank deposits keeping all other factors constant. The result of the model is also consistent with theories of interest rate and the studies of (Ergec & Arslan, 2011; Ostadi & Sarlak, 2014; Athukorala & Tsai, 2003; Athukorala & Sen, 2004). This positive relationship between interest rate and bank deposits is explained by the theories of interest rate that when interest rate rise, it induces the savers to save more because depositors are attracted to deposit their money in the banks only when opportunity cost of holding money is high and this opportunity cost of holding money will be high when interest rate is high. It is also related to utility maximization because depositors will choose an action that maximize their welfare. Other macroeconomic variables like economic growth which indicates an increase in output of a country effects the bank deposits positively, the result is in the line with Life-cycle hypothesis. According to this theory, lifetime of an individual is divided into working period and retirement period. In the light of that increase in GDP may cause a rise in per capita income and that increases the earning and saving of younger age group relative to older age group. Modigliani (1966) also pioneer that increase in growth rate increases the total income of working population and it causes a rise in aggregate saving. The result is also consistent with the previous studies of (Ostadi & Sarlak, 2014; Athukorala & Sen, 2004; Mashamba, Magweva, & Gumbo, 2014; Loayza & Shankar, 2000). It shows that during high growth period, increase in economic growth increases the per capita income of individuals, resulting a positive influence on bank deposits. Money supply which is the most important tool of monetary policy has a significant

negative impact on conventional bank deposits. The result of this hypothesis is consistent with the theories of interest rate that increase in money supply decreases the real interest rate and that decreases the cost of borrowing as well so people borrow more which in turn leads to increase in consumption and decrease in saving. The finding of our hypothesis is also in a row with the study of Siaw & Lawer (2015). In this study Inflation represented by consumer price index also show the negative relationship with bank deposits because during inflation consumers in an attempt to maintain the same standard of living will forgo current saving. Similarly higher inflation means that people need more money to fulfill their expenses which leads customers toward the low level of saving. Our finding is also consistent with the previous studies of Siaw & Lawer (2015), Haron & Azmi (2008). The study also shows a positive and significant association of bank size with bank deposits. The study noticed that larger banks with economies of scale as well as the banks having larger number of branch network attract the depositors. Bank liquidity and bank deposits are also positively associated in this study but the impact of liquidity is insignificant. It shows that people will be willing to save only in those banks that provide the certainty to withdraw the money whenever they want. Its mean the more liquid banks attract more deposits. Our results are in line with the studies of Finger & Hesse (2009) and Ferrouhi (2017) that shows the positive impact of these particular bank specific variables on bank deposits.

The result of the model 2 (see column B) shows that all the determinants of Islamic bank deposits are highly significant at 1% level except the bank specific variable liquidity. Contrary to our expectation, interest rate has a significant positive impact on Islamic banking deposits. It shows a rise in interest rate attracts the depositors of Islamic banks as well because, Islamic banks follow the conventional interest rate as a benchmark for their products. On average an increase of 1% in the interest rate will

result in 0.547% increase in Islamic bank deposits keeping all other factors constant. The result of the model is also consistent with the study of Mushtaq & Siddique (2017). The study of Chong & Liu (2009) also supports this result because Islamic banks use conventional interest rate as a bench mark so, rise in interest rate increases the rate of return of Islamic banks and that in turn induces the depositors of Islamic banks to save more.

Other macroeconomic variables like economic growth which indicates an increase in output of a country effects the Islamic bank deposits negatively. Results of our study is supported by the theory of permanent income hypothesis. According to this theory, expectation of future, s high income reduces the saving. The result shows that depositors of Islamic banks might be inclined to dissave or withdraw their money during the high growth period. The result is also in line with the study of (Akhter, Akhtar, & Shahbaz , 2015). It shows that during high growth period, deposiors of Islamic banks also save less because of the anticipation of high income in future. Money supply which is the most important tool of monetary policy has a significant positive impact on Islamic banking deposits. The result of this hypothesis shows that the excess supply of money indicates that individuals will have more money to hold or save in banks for speculative motive as postulated in liquidity preference theory. The finding of this study is also in a row with the study of (Akhter, Akhtar, & Shahbaz , 2015). In our study Inflation shows the negative relationship with Islamic banks also because, during inflation customers of Islamic banks also need more money to fulfill their present expenses which leads toward the low level of saving. Our finding is also consistent with previous studies of (Akhter, Akhtar, & Shahbaz , 2015; Zainal , Yusof , & Jusoff, 2009). In this study bank size and bank liquidity influence the bank deposits positively but the impact of liquidity is insignificant. Study of Finger & Hesse (2009),

Ferrouhi (2017) also shows the positive impact of these particular bank specific variables on bank deposits. To prove the results of bank specific variables, we use studies as a reference that are related to conventional banks because of the limited literature related to bank specific and Islamic bank deposits.

The result of the model 3 shows that all the determinants of conventional bank financing are significant at 1% and 5% level except for the bank specific variable bank size. Interest rate has significant negative impact on Conventional bank financing (loan supply), its mean a rise in interest rate decreases investors' demand for funding due to the high cost of borrowing. On average an increase of 1% in the interest rate will result in 0.609% decreases in Conventional bank financing, keeping all other factors constant. The result of the model is also consistent with theories of interest rate and the studies of (Karim, Harif , & Adziz, 2007; Janjua, Rashid, & Qurrat-Ul-Ain, 2014). Other macroeconomic variables like economic growth which indicates an increase in output of a country effects the bank financing positively and it is in line with the previous studies of (Imran & Nishat, 2013; Podpiera, 2007). It shows that high growth in the economy allows banks to supply more credit in the economy because increase in economic growth increases the domestic income or per capita income. The high level of income allow customers to save more in banks, enabling banks to issue more credit in the economy. Money supply is positively and significantly associated with conventional banks financing because when there is an excess supply of money interest rate adjust itself according to the movement of money supply, so increase in money supply decreases the interest rate which may cause a rise in conventional bank financing. In other words, increase in money supply lowers the market interest rate, making it less expensive for consumer to take out a loan. The finding is also in a row with the study of (Imran & Nishat, 2013). Inflation is also positively and significantly

associated with bank financing because high inflation devalues the banks' savings, allowing them to supply more and more credit. In other words banks would prefer to supply more credit because during the period of inflation cash holding costs them a lot. Our finding is also consistent with the findings of (Alper, Hulagu, & Keles, 2012). In this study bank size has insignificant positive association with bank financing, the result is in line with the study of (Schmitz, 2004; Alper, Hulagu, & Keles, 2012). The coefficient of bank liquidity is negative which indicates that when there is more liquidity in banks, they would issue less loan and when there is shortage of liquidity stock, they will supply more credit because they are not able to absorb monetary policy shocks. Previous studies of Alper, Hulagu, & Keles (2012) and Janjua, Rashid, & Qurrat-Ul-Ain (2014) are also in line with our findings.

Finally the result of the model 4 shows that all the determinants of Islamic bank financing are significant at 1% level except for the macroeconomic variable CPI. Interest rate shows the significant negative association with Islamic banks financing because Islamic banks also use KIBOR as a bench mark for the Islamic financing. On average an increase of 1% in the interest rate will result in 1.153% decreases in Islamic bank financing, keeping all other factors constant. The result of the model is also consistent with conventional theories of interest rate and the studies of (Solarin, Yusoff, & Dahalan, 2011; Nahar & Sarker, 2016; Zulkhibri , 2018). It shows that a rise in interest rate decreases investors' demand for funding in Islamic banks, due to the high cost of borrowing. The study also indicates that Islamic banks financing is not the substitute of conventional banks financing as mentioned in the study of (Kader & Leong, 2009). Other macroeconomic variables like economic growth which indicates an increase in output of a country effects the bank financing positively in line with the study of (Nahar & Sarker, 2016). It shows that high growth in the economy allows

banks to supply more credit in the economy because increase in economic growth increases the per capita income, he high level of income allow customers to save more in banks, enabling banks to issue more credit in the economy. Money supply which is the most important tool of monetary policy also has a significant negative impact on Islamic bank financing, suggesting that increase in money supply causes a rise in inflation as it is discussed in quantity theory of money because there is more money chasing the same number of goods. So, during inflation, Islamic banks would not rush to supply more credit because of the uncertainty about the future's return on investment. The result of this model is also consistent with the study of (Caporale, Çatık, & Helmi, 2019). In this model, inflation influences the Islamic banks financing negatively because high inflation makes the market trend uncertain and it can increase the risk of banks, in other words the negative association of inflation can also be justified that the Islamic banks would not rush to supply more credit because of the uncertainty about the future's return on investment. Our finding is also consistent with the findings of (Zulkhibri , 2018). In our study bank size has insignificant positive impact whereas bank liquidity has significant negative impact on Islamic banks financing. Previous studies of Schmitz (2004), Alper, Hulagu, & Keles (2012) and Kashyap & Stein, (1997) are also in line with our findings.

CHAPTER 5

CONCLUSION

Interest rate is the core variable in banking industry but there is still question about its role in the dual banking setup. In this context the prime objective of the study was to find the impact of interest rate on banking operations. To fulfill this objective the study attempted to find the impact of interest rate on bank deposits and bank financing of both conventional as well as Islamic banks. To explore the true picture of the results, several bank-specific variables and macroeconomic indicators are included in the specification of the model as control variables. We have constructed an unbalanced annual panel dataset for both banking sectors. The study used 4 models to investigate this impact, in 1st model we examined the impact of interest rate on bank deposits, in our 2nd model we used Islamic bank deposits as dependent variable and examined the impact of interest rate on it. Similarly 3rd and 4th model are used to examine the role of interest rate in conventional and Islamic bank financing.

Estimating the baseline model, we have found strong empirical evidences that deposits and financing of conventional as well as Islamic banks respond to the interest rate shocks. The regression result of the study shows that the rate of interest has significant positive impact on deposits of conventional as well as Islamic banks. The study noticed that in demand side of the banks, the response of Islamic banks, due to the change in interest rate is not different from conventional banks. Deposits held in conventional and Islamic banks increased with an increase in KIBOR.

Further we investigated the impact of rate of interest on financing of the banks in the dual banking system. Our empirical analysis noticed that the financing of both conventional and Islamic banks are negatively influenced by change in rate of interest.

The study provides information that Islamic banks interest rate channel is very similar to conventional banks interest rate channel. The result of the study also contradicts with the argument and assumption that Islamic banks are interest free Akhter at el., (2015) because our results indicate that Islamic banks are facing a serious risk of interest rate. The study indicates that due to change in monetary policy, the sensitivity of both banking system is different, mainly due to the unique nature of contracts and the fundamental differences between the conceptual models and practices of Islamic and conventional banks. The result of the study are in line with Athukorala & Tsai (2003), Athukorala & Sen (2004), Chong & Liu (2009), Bacha (2008), Karim et al., (2007), Janjua et al., (2014), Solarin et al., (2011) & Zulkhibri (2018) and Shah and Rashid (2019).

The empirical analysis of the study indicates that demand and supply side of Islamic banks react similarly to change in interest rate because Islamic banks are using KIBOR as a benchmark for determining the rate of return on deposits and financing of banks. The study also noticed that in supply side of the banks, Islamic banks are relatively more sensitive to change in rate of interest which indicates that although Islamic banks claim to provide the interest free services that increase the economic activities in the society but actually they highly rely on fixed return that is influenced by the policy rate of the State bank of Pakistan. Similarly, the result of the study supports us to confirm the presence of interest rate channel for conventional banks as well as Islamic banks in Pakistan.

The study indicates that in Pakistan, in spite of different structure of Islamic banks in theory, these findings reveal the fact that Islamic banking operations are highly influenced by rate of interest. It provides the evidence that Islamic banking operations highly rely on fixed rate of return based investing.

5.2 Policy Implications

Results indicate that interest rate channel is active for both conventional as well as Islamic banks. Which means that if monetary policy is implemented without evaluating its impact on both banking sectors could lead to inadequate policy implementation and subsequently disturb the economic activities as well. Therefore, there is a need that monetary authorities should monitor the policy rate carefully in order to stabilize the deposit and credit supply of the banks. Similarly, by considering interest rate channel for Islamic banks, the study helps policy makers to manage the economy in a smoother way because it reveals that through Islamic banks monetary policy transmission mechanism is also affective.

5.3 Future Research

The analysis of this research can be further extended to compare the behavior of banking system in a dual banking setup with some other countries that have similar monetary environment for Islamic and conventional banks. Similarly, there is still gap to investigate the profit rates of Islamic banks relationship with conventional banks interest rate as it can further analyze the behavior of Islamic banks in dual banking system. Similarly, there are number of macroeconomic and bank specific variables like exchange rate, stock market index, bank profitability and bank capital that determine the bank deposits and bank financing so, in future impact of these variables on banking operations can also be examined.

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Appendix A

Variables	Description	Sources
Conventional banks deposits	Log of total deposits of conventional banks	Financial statements of banks
Islamic banks deposit	Log of total deposits of Islamic banks	Financial statements of banks
Conventional banks financing	Ratio of gross loans to total assets of conventional banks	Financial statements of banks
Islamic banks financing	Ratio of financing to total assets of Islamic banks	Financial statements of banks
Interest rate	Interbank Offered Interest Rate	SBP
Economic Growth	GDP	SBP
Money Supply	currency in circulation + demand deposits with SBP + Total private and PSE deposits of which : RFCDs	SBP
Inflation	CPI	SBP
Bank Size	Log of total assets	Financial statements of banks
Liquidity	Cash and Cash Equivalent / Total Assets	Financial statements of banks