



Why Banks Need Adequate Capital Adequacy Ratio? A Study of Lending & Deposit Behaviors of Banking Sector of Pakistan

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ABSTRACT

This study focuses on the impact of Capital Adequacy Ratio on bank's lending and deposit behavior and also on the importance of maintaining certain level of capital reserve. CAR is examined using two different ratios leverage ratio and risk-based capital ratio. This study is beneficial for the banking industry in determining enough CAR and to make decision for taking deposits and issuing loans. The sample of the study includes 25 banks of Pakistan; 20 conventional and 5 Islamic banks and the study period is of 10 years. Panel data methodology is used. Data is collected from secondary sources. Findings show that CAR has impact on change in capital and change in loans.

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1. Introduction

Economic activity in every country depends on the financial sector. The role of the banking sector is vital in driving public savings to be productively invested that leads to economic growth. In Pakistan, the banking sector comprise of Islamic and conventional banks. In today's global environment, banks that provide multiple functions and provide a range of products and services and offers the most modern facilities to its customers are considered successful. The banks are one of the essential part of the of the country's growth. A modern bank offers valuable services to the people. To achieve growth there must be a well-developed financial system to upkeep not only the economy but the society as well. Therefore, a modern bank plays an important role in solving the country's socioeconomic problems (Nikhat Fatima 2014).

Pakistani banks fulfil the needs of government agencies, subsidize the budget deficit, participate in trade finance and serve big corporations. Small and medium-sized enterprises, residential construction and agriculture sectors, which have created more growth and employment opportunities in Pakistan were

denied loans/financing by the banks. In addition, Pakistan's financial system was also under political influence, which resulted in more political interference in credit decisions and the appointment of executive officers of the banks (Ishrat Hussain 2005).

1.1 Capital adequacy ratio

Banks hold chunks of capital as required by the central bank and known as minimum capital requirement. Banks are exposed to various kinds of risks, when they advance loans to various sectors. With the intention to keep themselves well balanced and proactively managed it is essential that the banks must have enough capital to cover the losses, if it happens. If the banks have sufficient capital, they can protect their depositors of the unforeseen likelihood and encourage the stability and competence of the financial systems. Is the Capital Adequacy Ratio (CaAR) protects banks from excessive leverage, insolvency and also keeps them safe from any contingency? This is the ratio of banks in relation to their current liabilities and their risk weighted assets. Risk weighted assets are considered as the measure of the volume of the bank assets, adapted for risk. A reasonable amount of capital reserve ensures, the banks have sufficient capital to grow its business, but at the same time have enough to absorb any financial slump without getting insolvent. It is the ratio that determines the banks' ability to meet the liabilities and all the risks like operational risk, credit risk, market risk, etc. (Nikhat Fatima 2014, Mastura et al 2013).

The capital adequacy ratio can be defined as: $CAR = \frac{\text{Tier I} + \text{Tier II}}{\text{Risk Weighted Assets (RWA)}}$

1.2 Components of Capital

The elements of the Tier I are paid-up capital (common shares), disclosed free reserves like untaxed reserves, statutory reserves, Perpetual Non-Cumulative Preference Shares (PNCPS) according to the laws in force with time to time, Innovative Perpetual debt instruments (IPDI) and reserves Funds to the excess of the proceeds from the sale of the asset. It is usually referred as the essential capital to absorb the risks and losses suffered by the bank, without stopping the trade/business of the bank and thus ensures better protection to the depositors (Nikhat Fatima 2014).

The Tier II capital includes revaluation reserves, hidden reserves, hybrid capital, general provisions and loss reserves, investment reserve account and subordinated liabilities. It is additional capital, which therefore absorbs losses at the time of liquidation and offers a lesser degree to safeguard depositors. Tier II elements are considered regulatory capital to the degree, as they absorb the risks and losses from the activity of the bank.

To make sure banks develop and keep the minimum requirement of capital (CAR) is critical to prevent them from getting failed. A bank with a strong capital position is capable to better track business opportunities and have more time and elasticity to deal with the difficulties arising from unexpected losses and thereby achieve a higher return (Athanassoglou et al., 2008). Bank for International Settlements (BIS) in 1996 when firstly introduced the minimum capital requirement the purpose was to ensure that banks are careful in maintaining a sufficient reserve to protect their depositors and themselves. The idea behind the capital adequacy ratio is to ensure safety of the bank by their own reserve fund. Riskier Banks will require more capital to set aside in order protect their depositors. This ensures a more secure investment returns for both depositors and shareholders.

The dependence on bank loans through most of Indonesian companies led to a crisis of mismatch, thus, the banks at that time were using to finance abundant of their short-term deposits as long-term investment on large scales, which later contributed to the economic crunch in Indonesia (Vandenbrink, 2005).

Some researchers believe that the minimum capital adequacy ratio CAR is irrelevant to the Islamic Banks (IBs) because the contract of profits and the sharing of losses supports to reduce overall investment risk faced by the banks (Pellegrina, 2007). The Islamic banking system is an ethical system that based on the non-interest and profit and loss sharing contracts. (Adebayo and Hassan (2013), Farook et al. (2012), Rashid et al (2012).

From theoretical point of view, the profit-and-loss sharing in the IBs should be less dangerous, but the conceptual theory is hard to explain in real world because of the information asymmetries and market imperfections (Muljawan et al., 2014). This information problem can make bank managers react heterogeneously that could affect efficiency, stability and soundness of banks. Moreover, Hassan et al. (2011), Smolo and Hassan (2010), Hassan and Chowdhury (2010), Grais and Kulathunga (2007), and Hassan and Dicle (2005) suggest that the CAR is important for the safety of the IBs because they have specific risk with their products and their nature as intermediaries.

The purpose of this study is to examine and compare the performance of loans and deposits of banks in relation to the degree of coverage and in different conditions of competition. In fact, to identify the role of the competitive conditions on the relationship between the adequacy of the capital relation and behavior of the bank.

2. Literature review

Santomero (1984) used three ways to explain the existence of banks or financial intermediary. The first involves the role of the bank itself, which is that of transformation assets. Banks work in two different dimensions: asset diversification and financial riskiness of assets.

Secondly, the bank can be described as demand deposit, the bond exchange. The nature of the activities is to borrow money from the depositors and the bank adds its own money and uses it to generate a return for the owners of the bank. There is a description of the third bank by bank Santomero vision combined with the assets and liabilities side.

Asymmetric information is helpful in explaining the theory of Banking, that banks exist to reduce transaction costs. The banks suffer from the high transaction costs hence, unable to hold risky assets themselves. In this case, banks can benefit from their wealth of assets and special knowledge (Leland and Pyle, 1977).

In literature, there are two opposing theories about the impact of competitiveness on the behavior of banks. The first shows that a competitive market may increase the risk behavior/risk appetite of banks in order to maintain their previous levels of profit (Allen & Gale, 2004; Hellman et al, 2000, Kouser *et al* 2016). This risk behavior can be observed with both the increase in credit risk in the loan portfolio, with the fall of "buffer layer" of the capital or both. These risky policies may lead to an increase in the level of non-performing loans and therefore a high probability of failure of a bank. However, the second theory postulate limits the competitiveness and suggest that competitiveness should encourage banks to protect their "franchise value", very high security by pursuing policies that contribute to the stability of the entire banking system. Therefore, according to the paradigm of "franchise value", banks limit their risk when they have pensions, i.e. when they have market power. This theory has been theoretically and empirically supported in the banking literature.

Special attention to the question of regulation is on the market and the special nature of the effects collected between the borrower and the leader of the deposit. Most importantly, the operation of the effect of higher studies in general and examined the risk of leaving the asymmetry of information. Depending on the choice of when you train, and exit be great distress in the competitiveness of the conditions of the portfolio, variance, emulations, on a letter in character, as far as what is comfortable.

To make sure that banks develop and keep the minimum requirement of capital (CAR) is critical to prevent them from failing. The economic crisis in the late 1990s, which occurred in many countries in East Asia and the credit crises of 2007 in the United States, were partly due to the weaknesses of banks, conventional banks were affected most significantly. After the crisis the need for enough capital was found; a bank with a strong capital position is capable to better track business opportunities and have

more time and elasticity to deal with the difficulties arising from unexpected losses and thereby achieve a higher return (Athanasoglou et al., 2008, Kouser et al 2011, 2012). So, it is necessary to maintain minimum CAR for both deposits and lending. The banks' maturity mismatch causes the interest rate risk; these are the important issues that needs to be addressed. There is literature on this concept in OIC countries (Mastura et al 2013.) and several other empirical studies have considered this issue in different developed countries (Chernykh and Cole, 2015; Flannery and Giacomini, 2015) but no study is done in developing countries specially countries like Pakistan. This paper will investigate this issue taking in account the country of Pakistan. The Purpose of the study are: (i) To explore how deposit and lending patterns respond Banking sector with a particular capital adequacy ratio. (ii) To investigate the impact of macroeconomic factors on deposit and lending growth of Banking sector.

Allen and Santomero (1997) analyzed the role and performance of the banks as financial intermediations in the context of today, which has been neglected by the traditional banking theory. They said emphasis should be given to the important role of the bank related to the transfer of the risk and the cost of reducing the role and not just to reduce transaction costs and information asymmetry, which is underlined by traditional theories. Banks focus and provide the borrower's demand for money, and this allows banks to share the risks, thereby enhancing the market competitiveness. In Islamic banking, there are few theories to explain the existence of Islamic Banking in the industry. Many scholars using conventional banking system tried to explain the contemporary Islamic banking model. Aggarwal and Yousef (2000) model of Islamic banking profit share a vision and decided that this model is used more, because of the agency, and concluded that the model to work properly only when the risk of behavior is low. Frost (2004) categorizes bank capital into four parts:

- i) Support shareholders' capital need
- ii) Capital risk capital to clearly understand where losses can occur ahead of time as these losses lead to insolvency
- iii) Capital Economic capital investment made by the shareholders in the business (share capital, retained earnings and premium account)
- iv) Regulatory capital-capital that must be maintained to protect investments from losses resulting from the failure of loan.

Capital Management includes all needs to be done to ensure the best possible combination of the best in the capital instruments. Banks among the most important institutions, as they provide liquidity to markets (Diamond and Rajan, 2000).

Lower capital has been identified as the main reason for the decline in bank credit. However, this does not mean that you will not really be in bank debt and capitalization. Bank Islam Malaysia, for example, became bankrupt in 2006 in spite of having CAR of 31% in 2004 (Chong and Liu, 2009). A low level of CAR means that banks have additional capital more investors. However, if the banks are not selective in their investments and do not risk an open mind, they may be exposed to risk than they can manage.

Bank loan supply has shown to be a powerful influence on real banking activities Heuvel (2004) and Gambacorta and Mistrulli (2004) suggests that lack the desired level of capital which will supply loan move down.

One way to gauge the impact of bank capital requirements is to look at the main bank account as administrator of property. From this point of view, the impact of capital improvement system is dangerous to encourage banks to select a strategic portfolio. Results of Koehn and Santomero (1980) and Kim and Santomero (1988) analyzed the effect of capital requirements on the folder options. Items first two account design folders chosen on the analysis request hostile in the price of the property bag and heart designs data and identify the folder very well to increase the benefits expected from time saving, in turn, depends on the risk aversion of the bank.

2.1 Impact of prudential regulations on the banking behavior

Most of today's theorists make use of the traditional banking system to explain the pattern of Islamic

banks. Aggarwal and Yousef (2000) defines the Islamic financial model as the perspective of risk and profit sharing and concludes that this model is not widespread because of problems with moral hazard and agencies.

The theoretical model of Islamic banks is different from the conventional banks. Contracts based on interest conventional banks replace their conventional counterparts, for profit, based on contracts where profits and losses are shared between the bank and the borrower. Moreover, Islamic banks have the right to deposit mainly in the form of current accounts, without interest, except when the bank is obliged to pay the principal holders on demand, and investment accounts (savings) as defined generate as accounts based on (Iqbal, Ausaf & Khan, 1998) performance on profit, so it can be adjusted based on the profit, even in the loss, which would later be split between the Islamic bank and investment accounts holders.

Previous studies have confirmed that Islamic banks differ from their theoretical models by adopting conventional banking strategies. In this context that the activities of Islamic banks are based on the sale of instruments rather than in association. Bourkis and Nabi (2013) found that Islamic banks will imitate traditional banks, and therefore there is no difference in the behavior of the two banks. It is Khediri et al. (2015) that sync both types of banks operate in the same competitive position and is regulated in the same way in most countries, is likely to be similar behavior, and similar strategies.

In economics, Islamic banks play the same role as conventional banks. They claim that savers and investors benefit from their capital through credit allocation and financial management. Islamic banks are therefore subject to a number of risk categories, as is common with conventional banks and other risks that are specific to Islamic financial institutions. In this context, the regulatory capital for better risk coverage and focuses on monitoring and risk management.

Mastura et al (2014) argues that capital management must be done in a way that ensures an optimal combination of capital instruments. Banks are the leading institutions that provide market liquidity (Diamond and Rajan, 2000). The optimal level of capital allocation of banks should be considered as mandatory controls imposed by regulators as the banking sector is one of the most regulated industries in the world. Bank regulation is mainly based on minimum capital requirements. Although the required legal capital is determined by the ratio of minimum requirements, Berger (1995) argues that the capital adequacy ratio of banks should increase to ensure better stability conditions.

Several studies have examined the relationship between Capital and risk. In the case of United States, a series of studies; Jacques & Nigro (1997) found that bank has responded to the new regulatory capital excessive risks. Ghosh (2014) examines the relationship between capital and risk in banks and 57 conventional banks in the period 1996 to 2011. The results show that banks stab at their capitalization level as a reaction to a higher risk than the other way around. In this context, Mastura et al. (2014) suggests that there is a positive and significant relationship between the solvency index and the banking system. Their study was carried out on a sample of 18652 Islamic banks and conventional banks in 14 countries in the period 1999-2009.

Cebenoyan and Strahan (2004) says that the banks with the credit markets (securitization) for risk management has less capital, and thus are profitable but also riskier.

Although most previous studies support the positive relationship between the bank's capital and risk behavior, and the other showed the contrary studies. For example, consider the British banks, Alfon et al(2004) and a negative relationship between capital and risk during the period 1998/2003. In addition, Ghosh was and (2004), Indian banks and the Pride (2007) for German banks themselves. Ghosh (2014) suggest that the lack of correlation between these different studies using different measures of risk may be due to the variables. Francis and Osborne (2012) of the financial crisis resulting from a better

understanding of how to develop the impact of the behavior of capital adequacy rules for banks. It has been said that the low bank capitalization, the principal for the decline in loans and default by the bank.

The theoretical and experimental studies of banking showed that credit has a significant impact on real banking activities. Van den Heuvel and Gambacorta and Mistrulli (2004) suggest that the deficit in the financing ratio may cause a decrease in the loans granted by the bank. Adrian and Shin (2008) said, that a negative shock to the capital, result in a decline in the supply of credit, that banks adjust their balance sheets. Peek and Rosengren (1995) argue that credit problems can arise if the bank's capital is reduced, which also leads to difficulties in meeting capital requirements. It describes this situation as a crisis of capitalism, in which pushed the liabilities of banks to limit the contraction of their assets. During the Asian financial crisis, Korean banks cut lending for investment and increased their investments in risk-free assets, in order to meet capital requirements granted by regulatory authorities. Berger and Udell (1994) consider this scenario from the supply side of credit, that banks are not prepared as a result of the decline in the supply of credit and the depletion of the bank's capital to provide credit.

Carlson and Warusa (2013) believe that the gap between supply and demand is the main problem in credit growth before facing the effects of capital. For example, changes in the economic environment that affect the bank's capital may affect the potential demand for loans. Damage to the economic environment can lead to losses of banks leading to the reduction of the bank's capital. Declining capital of banks can lead to increasingly powerful regulatory requirements and cause the bank to reduce lending. At the same time, the change in economic activity also reduces the number of borrowers seeking loans.

2.2 Hypothesis

H1: Capital ratio have positive association with deposit and lending growth of banking sector

H2: Capital adequacy ratio has positive association with deposit and lending growth of banking sector

H3: Change in bank equity has positive association with deposit and lending growth banking sector

H4: Bank size has positive association with deposit and lending growth of banking sector

H5: Liquidity has positive association with deposit and lending growth of Islamic banks and Conventional banks.

H6: Fee income has positive association with deposit and lending growth of banking sector

H7: Inflation has positive association with deposit and lending growth of banking sector

H8: GDP has positive association with deposit and lending growth of banking sector

3. Research Methodology

3.1 Sample selection and data source

Financial sector of Pakistan is the overall data population. This sector is consisting of 8 different financial institutions named Development Financial Institutions, Exchange Companies, Insurance Companies, Housing Finance and Venture, Investment Banks, Modaraba Companies, Leasing Companies, Mutual Funds. Further going specific the study sample is based on banking sector. Although, the State Banks of Pakistan (SBP) has segregated the banking sector in 4 parts; public sector commercial banks, domestic private banks, foreign banks and specialized institution. Currently 35 banks are listed in stock exchange, out of that 20 Conventional Banks (CBs) and 5 Islamic Banks (IBs) are selected as sample. Rest of the banks are not selected as the data relevant to my dependent and independent variables is unavailable in the financial statements of those banks. Data is collected through 2006 to 2015.

Data relevant to the study is of secondary nature. That's why the audited banking annual financial statements related to each bank of Pakistan are the major source of data collection. Data relevant to the bank reports is taken from the site of State Bank of Pakistan and the web sites of each bank. Furthermore, here are also some macroeconomic variables (GDP, Inflation). Data related to these indicators is obtained from the web site of World Bank.

3.2. Research model

Bank behavior is studied using two dependent variables, first is change in deposit (Δ Deposit) and second is change in loans (Δ Loans). Both of these variables are examined with same independent variables which are categorized in two fragments one is capital adequacy ratios and other is set of control variables (bank specific variables as well as economic indicators). For estimation study practices the Multivariate analysis. Purpose of the selection of Multivariate analysis is to avoid multiple univariate tests applied on the variables. The two dependent variables are separately analyzed. The estimation model used follows Peek and Rosengren (1995) and Chiuri et al. (2002), Mastura et al (2013). with some modification in the variables.

By following the literature, the study uses a panel data methodology.

3.2.1 Deposit Model (DM)

DM model consists of 1 dependent variable and 10 independent variables. The dependent variable is Change in deposits (Δ Deposits) whereas the independent variables are Leverage ratio (CR), Risk-weighted ratio (CAR), Interactive term of CR using leverage ratio (CMCR), Interactive term of CAR using risk-weighted ratio (CMCAR), Change in equity (Δ EQT), Bank size (SIZE), Liquidity ratio (LQDT), Fee income (FEE), Inflation (INF), Log of Real GDP ($\Delta \ln$ GDP). The model equation signifies all the factors which effect the dependent variable. Following is the equation for DM model:

Equation

$$\Delta \text{Deposite}_{it} = \alpha + \beta_1 CR_{it} + \beta_2 CMCR_{it} + \beta_3 CAR_{it} + \beta_4 CMCAR_{it} + \beta_5 \Delta EQT_{it} + \beta_6 SIZE_{it} + \beta_7 LQDT_{it} + \beta_8 FEE_{it} + \beta_9 INF_{it} + \beta_{10} \Delta \ln GDP_{it} + \varepsilon_{it}$$

Description for variables like measurement and symbols are given in following table:

Table 1

Variable Description	Proxy	Variable Measurement
Change in deposits	Δ Deposits	=Log of current year – Log of previous year
leverage ratio	CR	=TIER-1/Weighted average assets
Leverage Ratio using risk-weighted ratio	CAR	=TIER-1+ TIER-2/Weighted average assets
Interactive terms using leverage ratio	CMCR	(CR * Δ EQT/TA _{t-1})
Interactive terms using risk-weighted ratio	CMCAR	(CAR * Δ EQT/TA _{t-1})
Change in equity	Δ EQT	=Log of current year – Log of previous year
Bank size	SIZE	Log of Total Assets
Liquidity ratio	LQDT	= Cash + Cash equivalent/Total asset
Fee income	FEE	=Log of current year – Log of previous year
Inflation	INF	Inflation Rate
Log of Real GDP	$\Delta \ln$ GDP	Change in natural log of Real GDP

3.2.2 Loan Model (LM)

LM model has 1 regressed variable and 10 regressor variables. The name of regressed is Change in loans (Δ Loans) while the regressors are Leverage ratio (CR), Risk-weighted ratio (CAR), Interactive term of CR using leverage ratio (CMCR), Interactive term of CAR using risk-weighted ratio (CMCAR), Change in equity (Δ EQT), Bank size (SIZE), Liquidity ratio (LQDT), Fee income (FEE), Inflation (INF), Log of Real GDP ($\Delta \ln$ GDP). The model equation shows that all regressors have influence on the regressand. Following is the equation for LM model:

Equation

$$\Delta \text{Loans}_{it} = \alpha + \beta_1 CR_{it} + \beta_2 CMCR_{it} + \beta_3 CAR_{it} + \beta_4 CMCAR_{it} + \beta_5 \Delta EQT_{it} + \beta_6 SIZE_{it} + \beta_7 LQDT_{it} + \beta_8 FEE_{it} + \beta_9 INF_{it} + \beta_{10} \Delta \ln GDP_{it} + \varepsilon_{it}$$

Depiction for variables like their measurement and symbols are given in following table:

Table 2

Variable Description	Proxy	Variable Measurement
Change in loans leverage ratio	$\Delta Loans$	=Log of current year – Log of previous year
Leverage Ratio using risk-weighted ratio	CR	=TIER-1/Weighted average assets
Interactive terms using leverage ratio	CAR	=TIER-1 + TIER-2/Weighted average assets
Interactive terms using risk-weighted ratio	CMCR	$(CR * \Delta EQT / TAt - 1)$
Change in equity Bank size	CMCAR	$(CAR * \Delta EQT / TAt - 1)$
Liquidity ratio	ΔEQT	=Log of current year – Log of previous year
Fee income	SIZE	Log of Total Assets
Inflation	LQDT	= Cash + Cash equivalent/Total asset
Log of Real GDP	FEE	=Log of current year – Log of previous year
	INF	Inflation Rate
	$\Delta LnGDP$	Change in natural log of Real GDP

3.3 Variables Definition

Change in deposit ($\Delta Deposits$)

Money kept by depositors in banks for safekeeping is known as bank deposits. Money is deposited in different bank accounts like checking accounts, saving accounts and money market accounts. Change in loans tell us that how much more or less money is being deposited in bank's accounts as compared to last year. In this study it is calculated as:

$$\Delta Deposits = \text{Log of current year deposit} - \text{Log of previous year deposit}$$

Change in loans ($\Delta Loans$)

Bank uses the depositor's funds for issuing loans. This concept is called lending which provides money to repay in future. There is a fixed time period and a certain interest rate charged on loans. Bank provide short term (1 year), medium term (1 to 5 year) and long-term loan (5 to 10 year). Change in bank loans shows that how much money bank lend more than the previous year or less than the previous year. Change in loans is calculated as:

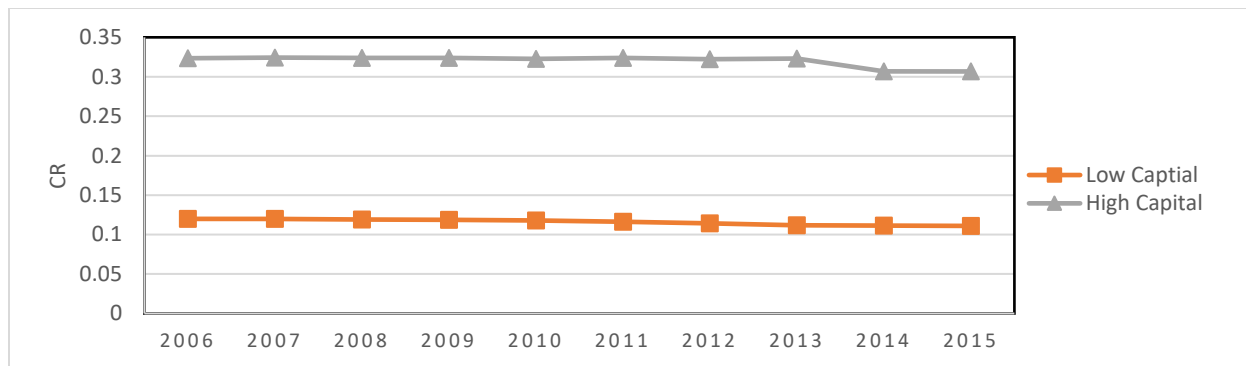
$$\Delta Loans = \text{Log of current year deposit} - \text{Log of previous year deposit}$$

Capital Adequacy Ratio (Car)

Is the ratio that protects banks from excessive leverage, insolvency and also keeps them save from any contingency. This is the ratio of banks in relation to their current liabilities and their risk weighted assets. Risk weighted assets is considered as the measure of volume of the bank assets, adapted for risk. A reasonable amount of capital reserve ensures, the banks have sufficient enough capital to grow its business but at the same time its wealth is enough that can absorb any financial slump without getting insolvent. It is the ratio that determines banks' ability to meet the liabilities and all the risks like operational risk, credit risk, market risk etc.

Capital adequacy ratio is defined as: $CAR = \text{Tier I} + \text{Tier II} / \text{Risk Weighted Assets (RWA)}$

Fig 1. Comparison of Capitalization Ratio



Components of Capital

Tier I Capital: Tier I capital has elements of the paid-up capital (common shares), disclosed free reserves like untaxed reserves, statutory reserves, Perpetual Non-Cumulative Preference Shares (PNCPS) according to the laws in force with time to time, Innovative Perpetual debt instruments (IPDI) and reserves Funds to the excess of the proceeds from the sale of the asset. It is usually referred to as essential capital to absorb risks and losses without a bank needed to stop the trade and thus ensures better protection to the depositors.

Tier II Capital: The Tier II capital has elements of revaluation reserves, hidden reserves, hybrid capital, general provisions and loss reserves, investment reserve account and subordinated liabilities. It is additional capital, which therefore absorbs losses at the time of liquidation and offers a lesser degree to safeguard their depositors. Tier II elements are considered regulatory capital to the degree, as they absorb risks and losses from the activity of the bank.

Change in equity (ΔEQT) In balance sheet it is the amount or funds contributed by stockholders. It also includes retained earnings. In margin accounts it is the value of securities. In real estate it is the difference of a property's current market value or the amount in form of mortgage. Its equation is: $Equity = Assets - Liabilities$. Change in equity shows the increase or decrease in capital with respect to time. It can be calculated as: $\Delta Equity = \text{Log of current year deposit} - \text{Log of previous year deposit}$

Bank size (SIZE) As the bank size is the value of all the securities or total the assets of banks. Bank size can be calculated as: $Bank\ size = \text{Log of Total Assets}$

Liquidity ratio (LQDT)

It includes cash in bank accounts, liquid short-term investments, assets available for sale and any other relevant amounts in balance sheet. Valued at market value on closing date. All these are easily converted in cash that's why are known as liquid assets. This research contains liquidity ratio which consists of cash and cash equivalents and total assets. Can be calculated as:

$$\text{Liquidity ratio} = \text{cash and cash equivalents} / \text{total assets}$$

Fee income (FEE) It is revenues earned by bank from depositors; the money which they are charged against their accounts. Following are the charges that generate fee income:

1. Amount charged on overdrafts
2. Non-sufficient funds fee
3. Over-the-limit-fee
4. Monthly service charges
5. Wire transfer fees
6. Account research fees
7. Late fees and more

Inflation (INF) Due to the change in demand and supply of money a general increase in price of goods and services is termed as inflation. In result the purchasing power for currency fall. Central bank uses monetary policy to control inflation and also to save from deflation for the smooth working of economy.

Log of Real GDP ($\Delta \ln GDP$) It is the monetary value of total services and finished goods that are produced in a country in a particular time period. It is calculated annually but can also be calculated on quarterly basis. It includes all public and private consumption, expenditures of government, investments

and balance of payment means exports minus imports within specific country. It is the measure of overall economic activity of a nation in a broader sense.

It is calculated by using formula: $GDP = C + G + I + NX$

Real GDP is calculated as: $Real\ GDP = Nominal\ GDP - Inflation$

Or $Real\ GDP = Nominal\ GDP / GDP\ deflator$

In this study the real GDP is taken from SBP site. And the change is calculated by taking natural log of Real GDP and then taking its change as log of current minus log of previous.

4. Results and Discussions

This study contains two models i.e. Deposit Model (DM) and Loan Model (LM). These two models have their own independent variables i.e. Leverage ratio (CR), Risk-weighted ratio (CAR), Interactive term of CR using leverage ratio (CMCR), Interactive term of CAR using risk-weighted ratio (CMCAR), Change in equity (ΔEQT), Bank size (SIZE), Liquidity ratio (LQDT), Fee income (FEE), Inflation (INF), Log of Real GDP ($\Delta \ln GDP$) Change in deposits ($\Delta Deposits$) and Change in loans ($\Delta Loans$); and to analyze their impacts on them. To test these models empirically different kinds of tests are applied like: Descriptive Statistics, coefficient diagnostics, and Panel Data Regression Analysis. Where all these tests are applied using Eviews 9.

4.1 Descriptive statistics

These are used to explain the basic features and to measure the simple summary of the data sample.

Table 1-2 shows the descriptive statistics of total and capital wise data set. From these table it is noted that the variables of low capitalized Bank are more varied then high capitalized banks. This variation of low capitalized bank is added in overall data that's why table 1 also shows large amount of variation.

Table 3: Descriptive Statistics

Variable	Total			
	Mean	SD	Min	Max
Δ deposit	0.024	0.215	-1	0.45
Δ loans	0.021	0.207	-0.89	0.47
Δ real GDP	0.018	0.014	0	0.05
Fee income	0.588	2.469	-0.98	16.93
Δ equity	0.006	0.143	-0.6	0.23
Bank size	11.102	0.616	9.4	12.07
Liquidity ratio	0.094	0.038	0.05	0.25
CR	0.177	0.171	0.01	1.12
CAR	0.198	0.175	0.02	1.2
CMCR	3.39E-09	1.62E-08	-2.62E-08	1.16E-07
CMCAR	3.39E-09	1.62E-08	-2.62E-08	1.16E-07
Inflation	9.979	4.844	2.37	20.15

Δ deposit, Δ loans and Fee income are highly volatile as their SD is greater then mean all other variable are normal and their mean is greater then SD.

Table 4: Descriptive statistics of capital wise categorization.

Variable	Low Capitalized				High Capitalized			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Δ deposit	0.003	0.243	-1	0.45	0.079	0.093	-0.22	0.25
Δ loans	-0.004	0.233	-0.89	0.47	0.086	0.092	-0.06	0.34
Δ real GDP	0.018	0.014	0	0.05	0.017	0.014	0	0.05
Fee income	0.249	0.772	-0.78	6.1	1.476	4.429	-0.98	16.93
Δ equity	0.006	0.131	-0.42	0.18	0.005	0.17	-0.6	0.23
Bank size	11.241	0.514	9.67	12.07	10.739	0.711	9.4	11.98
Liquidity ratio	0.096	0.041	0.05	0.25	0.089	0.027	0.05	0.15
CR	0.116	0.076	0.01	0.49	0.337	0.237	0.1	1.12
CAR	0.139	0.074	0.02	0.51	0.352	0.254	0.12	1.2
CMCR	8.30E-10	2.47E-09	-2.71E-09	1.32E-08	1.01E-08	2.96E-08	-2.62E-08	1.10E-07
CMCAR	8.30E-10	2.47E-09	-2.71E-09	1.32E-08	1.01E-08	2.96E-08	-2.62E-08	1.10E-07
Inflation	9.844	4.896	2.37	20.15	10.333	4.725	2.54	20.15

If we compare the descriptive statistics of high and low capitalized banks we can see that low capitalized banks behavior is same like overall sample and the same three variables Δ deposit, Δ loans and Fee income are highly volatile but high capitalized banks data behavior is normal as there is not much difference in mean and SD.

Table 5: Correlation analysis

	Δ deposit	Δ loans	Δ real GDP	Fee income	Δ equity	Bank size	Liquidity ratio	CR	CAR	CMCR	CMCAR	Inflation
Δ deposit	1.00	.842**	-0.04	0.06	.576**	-.287**	.134*	.149*	.130*	0.12	0.12	.370**
Δ loans		1.00	-0.10	0.07	.471**	-.257**	.138*	.157*	.139*	.130*	.130*	.232**
Δ real GDP			1.00	-0.02	-0.03	-0.12	0.11	0.01	0.02	-0.07	-0.07	-0.08
Fee income				1.00	0.06	-.182**	-0.05	0.12	0.10	.305**	.305**	-0.01
Δ equity					1.00	-0.12	0.12	0.03	0.03	.298**	.298**	.336**
Bank size						1.00	-0.12	-.200**	-.133*	-.349**	-.349**	-.182**
Liquidity ratio							1.00	.136*	.136*	-0.02	-0.02	0.12
CR								1.00	.994**	.221**	.221**	0.01
CAR									1.00	.200**	.200**	0.00
CMCR										1.00	1.000**	0.07
CMCAR											1.00	0.07
Inflation												1.00

*, **, *** Respectively significant to 10%, 5% and 1%.

Table 5 shows the correlation of the variables. From this table it can be noted that the correlation coefficient of change in equity, bank size and inflation is highly significant with change in deposit and change in loan. Some of the regressor have significant relationship to examine the strength of their relationship (Multicollinearity) we use VIF and the results of VIF for each variable is less than 1.5 that why none of the regressor is considered as multicollinear.

Table 6: Model Estimation Results

	Total				Low capitalization				High capitalization			
	Δ deposit		Δ loan		Δ deposit		Δ loan		Δ deposit		Δ loan	
(Constant)	0.828***	0.859***	0.809***	0.84***	1.164***	1.175***	0.828**	0.792**	0.163	0.179	0.486**	0.503**
Δ real GDP	-0.757	-0.776	-1.779**	-1.797**	-0.626	-0.628	-1.508	-1.468	0.534	0.530	-0.968	-0.973
Fee income	0.002	0.002	0.002	0.002	-0.001	-0.001	0.030	0.030	0.000	0.000	-0.001	-0.001
Δ equity	0.813***	0.812***	0.665***	0.664***	1.259***	1.257***	0.993***	0.99***	0.014	0.014	0.021	0.021
Bank size	-0.08***	-0.083***	-0.074***	-0.077***	-0.11***	-0.111***	-0.078**	-0.074**	-0.015	-0.016	-0.037**	-0.039**
Liquidity ratio	0.077	0.076	0.283	0.283	0.255	0.275	0.501	0.545	-0.524	-0.535	0.37	0.358
CR	0.146**	-	0.141**	-	0.044	-	-0.225	-	0.1**	-	0.107**	-
	-	-	-	-	-	-	-	-	218911.	-	297817.	-
CMCR	2291306.9***	-	1630427.7**	-	9489721.2	-	3094280.7	-	1	-	4	-
CAR	-	0.137**	-	0.132**	-	0.02	-	-0.261	-	0.094**	-	0.101**
	-	-	-	-	-	-	-	-	-	219437.	-	298225.
CMCAR	-	2287804.1***	-	1624845.1**	-	9432773.7	-	2933357.5	-	1	-	6
Inflation	0.007***	0.007***	0.001	0.001	0.006**	0.006**	0.004	0.004	0.007**	0.007**	-0.005**	-0.005**
R2	0.416	0.416	0.278	0.277	0.595	0.576	0.413	0.414	0.235	0.131	0.098	0.097
F-test	22.849***	22.795***	12.784***	12.737***	31.025***	31.013***	16.552***	16.631***	2.263**	2.258**	1.906*	1.902*

CR, CAR, CMCR, CMCAR, ΔEQT, SIZE(-1), LQDT(-1), FEE, INFL, and GDP

refer to capital adequacy ratio (using leverage ratio), capital adequacy ratio (using risk-weighted ratio), interactive terms using leverage ratio, interactive terms using risk-weighted ratio, change in equity, one year lag of bank size, one year lag of liquidity, fee income, inflation rate and change in real GDP.

* Significance at 1%.

** Significance at 5%.

*** Significance at 10%.

The results show that deposit and loan growth in both overall and high capitalized banks react positively to changes in capital (CAR or CR) but reverse in low capitalized banks. Most of the coefficients for β_1 and α_1 for Δ Deposits and Δ Loans are significant and positively associated with a change in CAR. The significant, positive coefficients on Δ Deposits and Δ Loan provide evidence that bank loans react in the same manner as bank capital, and this supports the supply-side theory that credit behavior is particularly influenced by the level of bank capital. The positive coefficient on Δ Deposits suggests that an increase in bank deposits is also influenced by changes in CAR. This result implies that deposits are the main source of funding for the banks. The positive, significant impact of CAR on lending and borrowing behavior of banks is consistent with the documented evidence [Peek and Rosengren (1995), Chiuri et al. (2002), Yudistira (2002), Schmitz (2007), Mastura *et al* (2013)].

This study is useful for the banking system. Firstly, bankers facing capital requirement issues can take help from this study as it guides them in choosing a certain level to be achieved in order to maintain their liquidity level and to balance their deposits and loans.

Secondly, as State Bank has function to fix a certain percentage for banks to keep a level of capital reserve with them as required by regulatory authorities. State bank can get knowledge from the experiences of banks who maintain capital at different levels and also from the issues faced and privileges they get from their circumstances.

This study has certain limitation as well. Firstly, sample size is limited to Pakistan and more limited to banks' specific industry. So, its result is only limited to banks. This phenomenon should also be studied on different industry levels and with different sample size and designs.

Secondly, time period is limited to 10 years. If time is taken from 1950 to till today, then it will provide a better picture of how capital requirements change at different level and what steps should be taken by the bank and regulatory authorities. What effect Basel1 and Basel 2 have on the bank's performance. This time frame can provide a complete information about the ups and downs of the banking industry at different steps or time frames.

Thirdly, quantitative analysis for CAR is performed. There is need of qualitative studies in order to examine the qualitative aspects of this important topic. Improved skills and management should be focused that can positively affect change in deposits, change in loans and capital requirement.

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Appendixes

Table 1 List of IBs and CBs in Pakistan

Table 1

Conventional banks CBs	Islamic banks IBs
United Bank Limited	Meezan Bank Limited
Standard Chartered Bank	Dubai Islamic Bank Pakistan Limited
Soneri Bank Limited	Burj Bank Limited
Silkbank Limited	BankIslami Pakistan Limited
Samba Bank Limited	Albaraka Bank Limited
NIB Bank Ltd	
National Bank of Pakistan	
MCB Bank Limited	
KASB Bank Limited	
JS Bank Limited	
Habib Metropolitan Bank Limited	
Habib Bank Limited	
First Women Bank Limited	
Faysal Bank Ltd	
Bank of Punjab	
Bank of Khyber	
Bank Alfalah Limited	
Bank Al Habib	
Askari Bank Limited	
Allied Bank Limited	