Macroeconomic Fluctuations and Banking Risk

MUHAMMAD HAMZA RAMZAN & HASAN MUHAMMAD MOHSIN
Economics and Finance
Pakistan Institute of Development Economics
Quaid-i-Azam University Campus, Islamabad
PAKISTAN
Muhammadhamza_16@gmail.com

Abstract: - This study attempts to examine the effects of Macroeconomic variables and their fluctuations on banking risk. This impact has been examined using 20 commercial banks from Pakistan from the year 2001-2017. The study has estimated the dynamic panel using the Generalized Method of Moment (GMM). The empirical evidence suggests that GDP growth fluctuations, Exchange rate fluctuations, and Inflation fluctuations are the key variables that have a major effect on credit risk and liquidity risk exposure. Therefore, it is prudent for policymakers to keep on monitoring and make sure that the current system can diminish such fluctuations; in addition, timely measures should be implemented to dampen the effects. The study also found proof of change in this interactive process according to the type of bank control. Banks in the Private sector respond more efficiently to the impacts of the macroeconomic factors as compare to public banks mainly, because public banks face more legal barriers and political pressures which do not allow them to diminish those effects and manage their loan efficiently.

Key-Words: - Credit risk, Liquidity risk, Legal barriers, and Political pressures

1 Introduction

The financial crisis of 2007-08 has redirected the attention to the consequences that banking crises can have on the economy. At the same time, it has also initiated a fresh debate to seek the factors that may cause a banking crisis (Agnello and Sousa, 2011; Agnello *et al*., 2011). Macroeconomic variables and their fluctuations are reckoned to play a key role in this matter. Precisely, adverse economic conditions, where growth is low or negative, with changes in level of unemployment, fluctuations in interest rates, low GDP and high inflation, can result into banking crises (De Grauwe, 2008; Laeven & Valencia, 2008).

Given these arguments, it is apparent that there is inter-dependency between economic and financial System. Similarly, most of the banking crises are followed by fluctuations in the economic environment that causes to change the economic cycle. Several studies have pivoted their attention and extracted the results that, macroeconomic environment is an important factor in the determination of the banking risk (Llewellyn, 2002).

Similarly, in last few years the world has experienced numerous changes in the banking industry because of large-scale bankruptcies in the banking institutions like Lehman-Brothers and Bear Stearns. Investigating the factors which are responsible to increase bank risk has become of one the important discussion in recent years.

In particular macroeconomic factors are considered as key elements to the general economy on national and regional level. Macroeconomic variables are usually those factors which are beyond the control of banks but they have an impact on the efficiency and profitability of commercial banks. The liquidity and quality of loans are indirectly affected by macroeconomic variables and their fluctuations thus, it is important for banks to make policies by considering the changes in macroeconomic environment (Agade, 2014).

Banks which are operating in developing countries are also affected by macroeconomic shocks. Economic shocks occur because of the financial-political system that is prone to fragility thus, causing instability. The shocks which are caused by external and internal economic instabilities are the main root cause of macroeconomic volatility in developing countries (Montiel, 2008).

Similarly, as a developing country, banks in Pakistan have encountered a large number of risks such as the liquidity risk, credit risk, market risk, Nominal exchange risk, operational risk, interest

rate risk and many more mainly due to the unstable and volatile environment of the country. This may require the undertaking of studies to cover pertinent areas (Shafiq & Nasr 2010).

Studies which tried to explain the link between macroeconomic variables and risk in banking sector are very rare and not in general consensus; many studies have concluded that the link became strong after the financial crises. So it is important to identify the impacts of macroeconomic fluctuations on bank risk as it will help in providing a more composite view of the modern financial system (Buch*et al*., 2010).

This study consists of all four types of banks working in (Public Banks, Private Banks, Specialized Banks and Foreign Banks). As for quantifying bank risk, Credit risk and liquidity risk are used as risk proxies for Banks.

1.1 Study Objective

The objective of this study is to explore the relationship between Macroeconomic fluctuations and Banking risk in Pakistan.

This study is based on following specific objectives.

- To analyze the impacts of Macroeconomic fluctuations on bank risk.

- To examine the impacts of Macroeconomic fluctuations on bank risk according to the type of bank control. (Government Owned Banks or Private Owned Banks)

2 Literature Review

Credit risk is one of the most engraved risks in the banking industry. It is a loss which occurs when a creditor defaults on loan payment. It was suggested that Banks should organize ways to analyze the creditworthiness of borrowers (NBR Annual Report, 2009).

2.1 Credit Risk and Macroeconomic Interaction

Credit risk increase is mainly attributed to factors including economic decline, primarily volatility in macroeconomic factors, deterioration in trade, high interest rate and moral hazard are some of the key macroeconomic variables effecting credit risk are exchange rate GDP growth, interest rate, unemployment rate and house prices. GDP growth is one of the key variable which contribute to credit risk expansion (Festic & Beko, 2008; Tanaskovic & Jandric, 2015). Similarly it is observed that credit

risk is one of the biggest challenges which banking sector faces (Boudriga *et al*., 2009). Despite many efforts to regulate lending activities credit risk is still credit risk remains a major problem for bank regulators as well as for global economy. Economic growth is observed to have a negative response to high credit risk. In this new global contemporary economy banks must consider the macroeconomic factors to manage the risk they face (Roy *et al*., 2014).

Banks can react to a fall in reserves due to a contradictory monetary policy by relying more on non-receivable liabilities such as, a certificate of deposits, to finance loans. However, these alternative funds are not covered by deposit insurance, thus banks may choose to not fully offset the effects of the policy, and they may let lending fall as a result. This effect occurs on top of the contraction in loans derived from a lower demand for credit. Spreads can be expected to increase with lending falling (Kashyap & Stein, 1997).

The Banks can respond to a drop in reserves due to a conflicting monetary policy by depending more on non-receivable liabilities, for instance a certificate of deposits. Conversely, these substitute funds are not covered by deposit insurance, thus banks may prefer to not fully counterbalance the effects of the policy, and they may allow lending to fall (Kashyap & Stein, 1997).

Louzis *et al.* (2012) used generalized method of moment to analyze the effects of macroeconomic variables on non-performing loans in Greek. The divided loans into three categories and analyze all three categories separately. They argued that macroeconomic variables such as lending interest rate, unemployment and GDP growth rate have a significant impact on non-performing loans. Lack of proper management system and performance regarding of loan portfolios is responsible for changes in non-performing loans which increases credit risk faced by banks.

2.2 Liquidity Risk and Macroeconomic Interaction

After the financial crises actions were taken to recover the financial system that needed proper adequate liquidity system so that more liquidity asset could be maintained which could help in future for solving financial and economic distress. (Mugenyah, 2015) (Tabari, Ahmadi and Emami, 2013) explained that commercial bank failed to boost their assets and decrease their liabilities which resulted in high liquidity risk for commercial banks.

Liquidity risk arises due to the inefficiency of a bank. It is a risk that is faced by a bank when they are not in a position to fulfil their obligation and it also affects Bank income and capital. It is important for a bank to maintain capital adequacy ratio to meet the demand of borrowers. Liquidity risk can also arise when bank demand extra interest in their assets which hinder bank sales and it transforms into sizeable losses (Jeane and Svensson, 2004).

The financial crises of 2007 indirectly affected the Albanian banking system. Public lost all confidence in banking industry whereas foreign inflows depleted. Madhi (2017) used 13 banks the main objective was to evaluate the effects of macroeconomic variables on liquidity risk. A positive and significant relationship was found between capital adequacy ratio, interest rate, and liquidity risk. Sheefani and Nyambe (2016) tried to evaluate the impact of macroeconomic determinants and banking liquidity. Bound test and ECM model was applied and result revealed that real GDP is the most important variable in determining the liquidity of commercial banks. Monetary policy had a significant and positive relationship with bank liquidity meanwhile inflation had a negative and significant relationship.

The liquidity of banks reduces during the crises period which affects the profitability of banks. Among others Bank liquidity is affected by macroeconomic factors primarily profitability of banks increases with positive movement of gross domestic product and decreases with growing unemployment, while the interest rate, the interest margin, inflation and non-profitable loans have no considerable impact on the liquidity of Slovakian commercial banks (Vodová, 2011).

Financial crisis affected many countries which resulted in unfavourable financial conditions. Trenca *et al*., (2015) used 40 commercial banks from the period 2005 to 2011. They explored the relationship between macroeconomic fluctuations and liquidity of banking system and concluded that the main variables which effect banking system liquidity are GDP, Interest rate, and public deficit. Meanwhile, he argued that Liquidity risk and credit risk are interconnected.

3 Pakistan's Banking System

Banking system of Pakistan is categorized as one of the leading performing sectors of Pakistan. Like many countries, Pakistan's banking sector plays a key role in financial development and growth of the Country (Parera *et al*., 2006).Banking sector of Pakistan is controlled and regulated by State bank of Pakistan. Over the course of the period, many changes have been done such as, inclusion of commercial banks which resulted into better management and technological changes which made the environment of banking industry more competitive and improved the performance even after economic instabilities and global financial crises (Ahmad and Arif 2007).

According to Quarterly Compendium (Statistics of banking system 2016), there is 34 Schedule (Commercial Banks) in Pakistan.

- Public sector Banks (5)

- Private sector Banks (20)

- Foreign Banks (5)

- Specialized Banks (4)

Likewise, it is evident that banking sector of Pakistan has contributed a lot in the expansion of economy. After the independence, there was less capital available but with changing banking sector of Pakistan the capital needed for economic growth was attained. After 1960s banking sector capital was largely invested in the manufacturing sector of Pakistan. The manufacturing sector of Pakistan improved eventually with a total consumed capital of 37%. Meanwhile, it was raised to 50% after 10 years in the 1970s. So banking sector of Pakistan has done a lot in the growth of industrial sector. In recent years Pakistan's banking sector went through a dramatic growth.

Pakistan banking sector has gone through different scenarios. In the early 1970s, the participation of government in the banking sector was considerably improved. The main sources of deposit in banks were public corporations, and the key users of banks' funds were also government-run entities. Therefore, the financial system of the 80s was made up of just the banking sector which was mostly government controlled. As per SBP Pakistan's banking sector assets were grown at tremendous rate meanwhile industry assets rose to $60 million.

Subsequently in the early 90s authorities focused more on private sector contribution as financial intermediaries; developing more vigorous regulatory frameworks, restructuring banks, and developing non-bank financial institutions. The financial sector was basically given a completely new look, during the course of that decade. By 1997 State Bank of Pakistan removed all the limitations

and government of Pakistan took a sector changing initiative of privatizing banks (Ashraf *et al.*, 2016).

Pakistan's banking industry was seemed to be stuck due to the global financial crises of 2007-08. Although Pakistan's financial industry was not big enough to be affected by the global meltdown, the increasing fiscal and external deficits, gave an opportunity for banks to narrow down the choice of banking assets to government borrowing. The restructuring process of banks started to gain pace in 2007-08 by the government of Pakistan when they planned to Float Global Depositary Receipts.

4 Research methodology

The main focus of this research is to analyze the effect of Macroeconomic fluctuations on banks risk by using the data of 20 banks working in Pakistan. Banks are further divided into four categories (Public, Private, Specialized, and Foreign Banks). The full sample consists of 20 Banks which include Twelve Private Banks, Four public Banks, Three Specialized Banks and One Foreign Banks. This study will use Liquidity risk and credit risk as dependent variable whereas independent variables are Exchange rate fluctuations, lending interest rate fluctuations, GDP Growth fluctuations (Business cycle fluctuations), Unemployment fluctuations and Inflation fluctuations.

An index has been generated which comprises of GDPG (Business cycle) Fluctuations, Lending interest rate Fluctuations, Exchange rate Fluctuations, Unemployment Fluctuations and Inflation fluctuations. This index is interacted with dummy for government banks to account for the effects of macroeconomic fluctuations on government owned banks and private owned banks similarly to examine the effects of macroeconomic fluctuations on democratic era and military era atime dummy of democracy has been interacted with fluctuations index. Macroeconomic fluctuations were collected by using (3 Years Moving Average Standard Deviation) the same method was used by (Kenen and Rodrik, 1986 and Koray and Lastrapes, 1989).

The study will examine the impact of Macroeconomic fluctuations on banking risk in Pakistan by estimating the following model.

$$\mathbf{R_{it} = \delta R_{i,t-1} + \beta_1 X_{it} + \mu_{it}}$$

Where,

R_{it}= vector of observations on the bank risk measure of the bank I at time t
R_{it-1}= the lagged bank risk variable
X_{it}= vector of time-varying macroeconomic variables

4.1.1 Model I
Model one is to find the impact of macroeconomic fluctuations on credit risk.

$CRR_{it} = \delta CRR_{i,t-1} + \beta_1 ERf_{it} + \beta_2 LIRf_{it} + \beta_3 GDPGf_{it} + \beta_4 UNf_{it} + \beta_5 INFf_{it} + \beta_6 BCON_{it} + \beta_7 BS_{it} + \beta_8 CAR_{it} + \beta_9 Govt\ bank\ D * Fluctuations + \beta_{10} Democracy\ D * Fluctuations + \nu_{it} + \mu_{it}$

4.1.2 Model II
Model two is to find the impact of macroeconomic fluctuations on liquidity risk.

$LRR_{it} = \delta LR_{i,t-1} + \beta_1 ERf_{it} + \beta_2 LIRf_{it} + \beta_3 GDPGf_{it} + \beta_4 UNf_{it} + \beta_5 INFf_{it} + \beta_6 BCON_{it} + \beta_7 BS_{it} + \beta_8 CAR_{it} + \beta_9 Govt\ bank\ D * Fluctuations + \beta_{10} Democracy\ D * Fluctuations + \nu_{it} + \mu_{it}$

Where,

CRR=Credit risk, LRR=Liquidity risk, ERf = Exchange rate fluctuation, UNf=Unemployment fluctuation, LIRf = Lending Interest rate fluctuations, GDPGf= Business cycle fluctuations, CON=Bank Concentration, CAR=Capital adequacy ratio, INFf = Inflation fluctuation, BS=Bank Size, Govt bank D*fluctuations=Government bank dummy, Democracy D*fluctuations=Democracy dummy, vit = unobserved effects of specific banking institutions, μ_{it}=error term, where i and t stand banks and year.

4.2 Correlation Analysis

Table-1: Correlation Matrix

	GDPF	INFF	LIRF	ERF	UNF	CAR
GDPF	1.00					
INFF	-0.11	1.00				
LIRF	0.14	0.17	1.00			
ERF	0.18	0.01	0.61	1.00		
UF	-0.15	-0.18	0.52	0.48	1.00	
CAR	-0.16	0.03	0.18	0.16	0.17	1.00
BZ	-0.15	-0.04	0.17	0.15	0.15	-0.06
BCON	0.53	0.54	-0.17	-0.19	-0.38	-0.21

Table-2: Correlation Matrix

	GDP	INF	LIR	ERF	UN	CAR
GDP	1.00					
INF	-0.36	1.00				
LIR	-0.76	0.29	1.00			
ER	0.29	-0.46	0.20	1.00		
UN	0.19	-0.46	-0.11	0.18	1.00	
CAR	-0.11	-0.02	0.25	0.28	-0.01	1.00
BZ	-0.14	-0.05	0.29	0.29	0.03	-0.06
BCON	-0.19	0.62	-0.17	-0.70	-0.43	-0.21

In table-1 the correlation matrix shows that Business cycle (GDPG) is positively correlated with Unemployment rate (UN) and Exchange rate (ER), whereas it is negatively correlated with the Lending interest rate (LIR) and Inflation rate (INF). The correlation matrix is refuting the existence of Multi-co linearity between the independent variables as all the correlations are less than 0.90.

Macroeconomic variables are not independent and therefore multi co-linearity may be a problem when using these variables in the same regression equation. In table-2 the correlation matrix shows that Business cycle fluctuations (GDPGF) are positively correlated

with Lending interest rate fluctuations (LIRF) and Exchange rate fluctuations (NERF), whereas it is negatively correlated with Unemployment fluctuations (UN) and Inflation fluctuations (INFF). The correlation matrix is refuting the existence of Multi-co linearity between the independent variables as all the correlations are less than 0.90.

5.1 Unit Root Test

One of the requirements for regression analysis using time series data is that the data to be analyzed must be stationary i.e. integrated of order zero or have no unit root unless there is co-integration. Panel unit root tests are used to examine whether there is a unit root in the time series and to determine if non-stationary data should be first differenced or regressed on deterministic functions of time to render the data stationary.

Study also tests for the existence of unit roots in this study. The tests used to proceed with such task are the Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS). In table-3 all variables are stationary at a 5% significance level except unemployment fluctuations and exchange rate fluctuations which are stationary at first difference. Hence, this study can carry on with the analysis using above stationary variables in the econometric model.

Table-3: Results of LLC and IPS Unit Root Test for Macroeconomic fluctuations

Variable	Test Applied	Significance	Conclusion
GDPGF	Levin, Lin and Chu Test	0.0027	I(0)
	Im, Pesaran, Shin Test	0.0001	I(0)
UNF	Levin, Lin and Chu Test	0.0032	I(0)
	Im, Pesaran, Shin Test	0.0012	I(1)
INFF	Levin, Lin and Chu Test	0.0000	I(0)
	Im, Pesaran, Shin Test	0.0000	I(0)
ERF	Levin, Lin and Chu Test	0.0000	I(0)
	Im, Pesaran, Shin Test	0.0075	I(1)
LIRF	Levin, Lin and Chu Test	0.0000	I(0)
	Im, Pesaran, Shin Test	0.0000	I(0)

6.1 System GMM for Credit Risk

After selecting appropriate measurement of the model and explaining the methodology in detail in the previous chapter. The study now estimates the impact of macroeconomic variables and their fluctuation on bank risk by using system GMM. The empirical analysis proceeds in four steps. The first step involves running a system GMM regression to interact macroeconomic fluctuations with credit risk exposure model. The second step involves running a system GMM regression to interact macroeconomic fluctuations with liquidity risk exposure model. The third step involves running a system GMM regression to interact macroeconomic variables with credit risk exposure model. The fourth step involves running a system GMM regression to interact macroeconomic variables with liquidity risk.

Table-4: Influence of Macroeconomic Fluctuations and bank-specific variables on Credit risk

VARIABLES	RE	FE	GMM
Cr i,t-1			0.968 *** (0.045)
GDPGF	-0.011* (0.045)	-0.042** (0.021)	0.153 *** (0.044)
INFF	0.483 (0.314)	0.645 (0.386)	0.017*** (0.005)
LIRF	0.093*** (0.014)	0.002 (0.026)	1.121* (0.590)
NERF	0.054 (0.092)	0.088 (0.071)	0.130** (0.065)
UNF	-0.031 (0.097)	-0.039 (0.031)	0.061** (0.032)
Bank Size	-0.058 (0.036)	-0.068 (0.075)	-0.953 (0.636)
CAR	0.276 (0.277)	0.155* (0.0811)	-0.875** (0.372)
BCON	-0.032** (0.003)	-0.003 (0.025)	-0.076** (0.037)
Govt: bank D*Fluctuation			0.245*** (0.095)
Democracy D *Fluctuations			0.109*** (0.097)
Observations	340	340	331
R-Squared	0.676	0.654	
Number of Cross-sections	20	20	20
AR(2) P-Value			0.624
Hansen test			1.00

For testing appropriateness and adequacy of the given Model-2 and estimation method, Arellano-Bond AR test and Hansen test of over-identifying restrictions are calculated. The p-values of Arellano-Bond AR (2) and Hansen test are high (0.624, 1) respectively which suggest that instruments used in the regression are valid. The probability value (P-Value) of Hansen test is enough high so the null hypothesis that instruments as a group are exogenous as a group. In Table-4 all variables are found to be. The estimated coefficient of lagged credit risk (CR_{it-1}) shows a positive and significant relationship at 1% significant level. Similarly, as the coefficient is less than 1, which shows that credit risk is not persistent in banks and it should be analyzed further as it will it take time to return to the mean, The results are in line with (Castro, 2013; Kingori, 2015).

The relationship between GDP growth fluctuations and credit risk exposure is found to be Positive and statistically significant at 1%. This implies that an increase in fluctuations of GDPG growth will increase credit risk exposure. The result is in-line with the finding by Love and Ariss (2013) according to their result a negative shock to GDP growth affects the credit channel by increasing loan loss reserves and a deterioration of the loan portfolio. Similarly, Ramayandi *et al*. (2014) found that a better economic condition with relatively few fluctuations reduces the overall credit risks of banks. According to the result in table-3 fluctuations in inflation have a positive and significant relationship with credit risk at 1% level.

The result shows that an increase in fluctuations will increase credit risk for banks; similarly as pointed out by Bohachova (2008) changes in inflation can affect banks real rate of returns which can result into increase in non-performing loans ultimately credit rationing. Similarly, fluctuations in inflation rate can negatively impact the earning of borrowers which affect their behaviors and previously extended loans.

The result indicates a positive and significant relationship between lending interest fluctuations and credit risk at 10% significant level. When lending interest rate fluctuates; it changes bank earnings, expenses as well as their off-balance sheet position (Greuning and Bratanovic, 2003). Moreover, lending interest rate fluctuations are expected to harm banks' balance sheet; if bank transfer those losses to their borrowers it increases a larger fraction of non-performing loans. This implies that changes in interest rate increase credit risk exposure and this is similar to the finding by Love and Ariss (2013).

The positive statistically significant value at 5% of exchange rate fluctuation suggests that there is a positive relationship between exchange rate fluctuations and credit risk which is in line with the findings of Gunsel *et al.* (2009), Zribi and Boujelbene (2001) but it mainly depends on the foreign currency exposures. In case of Pakistan domestic currency depreciation is expected to increase credit risk for banks.

Unemployment rate is another macroeconomic factor which has effected and caused a massive volume of non-performing loans particularly in the consumer financing. There is a positive and significant relationship between unemployment rate and credit risk at 5%. Changes in the unemployment rate in the country negatively affect credit risk in Pakistan primarily because Pakistani suffered a lot due to the increasing unemployment rate in the country. An increase in negative fluctuation will increase credit risk.

In order to make sure that our results are driven by a set of particular banks, interactive dummy is used to control for government and private banks. The result shows that in case of Government-owned banks the sign of the coefficient of interaction dummy is positive and significant; as compared to private banks macroeconomic fluctuations have 24.5% more impact on public banks. There are few explanations in case of public banks the fluctuations in the spread results into defensive actions by public banks regarding issuing new loans which help in reducing the risk level but still, it damages and increases credit risk mainly due to political pressures. In case of private banks there is more liberty to opt for assets and borrowers; the only purpose of maximizing profits affect the risk/return strategies of private banks that is why macroeconomic fluctuations have more impact on public banks rather than private banks.

Similarly to make sure that our results are determined by a set of particular time, interactive time dummy is used to control for democratic era and military era. The result of shows that in case of democratic era the sign of the coefficient of interaction dummy is positive and significant; as compared military era macroeconomic fluctuations have 10.9% more impact on credit risk in democratic era. Possible interpretation of this result is democratic era started write after financial crises though it had limited effect on Pakistan banking sector but still it affected bank risk; likewise in military era foreign aid increased and economy improved which could be the reason of more impact of macroeconomic fluctuations in democratic era rather than in military era.

6.2 System GMM for Liquidity Risk

After testing credit risk model now we interpret liquidly risk model. For testing appropriateness and adequacy of the given model (4.3) and estimation method, Arellano-Bond AR test and Hansen test of over-identifying restrictions are calculated. The p- values of Arellano-Bond AR (2) and Hansen test are high (0.523, 0.649) respectively which suggest that instruments used in the regression are valid. The probability value (P-Value) of Hansen test is enough high so the null hypothesis that instruments as a group are exogenous as a group. In Table 5.10 all variables are found significant. The estimated coefficient of lagged Liquidity which indicates that liquidity risk is not persistent in the banking sector.

The relationship between GDP growth fluctuations (GDPGF) and liquidity risk exposure is found to be positive and statistically significant at 1%. This explains that fluctuations in GDP growth (Business cycles) will affect banks by increasing liquidity risk exposure. Results are in line with (Menike, 2006).

Pakistan has experienced different macroeconomic conditions over the course of the period including phases of both high and low inflation. The liquidity position of a bank is very sensitive to macroeconomic fluctuations (Eichengreen and Arteta 2002). According to the result inflation rate fluctuations have a positive and significant relationship with liquidity risk of banks at 10%. The result is in line with Hutchison and McDill (1999) the increase or sudden changes in inflation have a negative impact on banks liquidity and a positive impact on liquidity risk.

In case of Pakistan, lending interest has been fluctuating over the past years. The result showed a negative and significant relationship between lending interest fluctuations and liquidity risk exposure at 5%. From the year 2001–2017 in Pakistan lending interest rate increased in most of the time which may be the reason of negative relationship. When interest rate falls, Investors start borrowing and it increases liquidity risk exposure for banks similarly when interest rate increases investors stop borrowing money and liquidity risk exposure declines.

The result shows that there is a positive relationship between Exchange rate fluctuations (Pak /USD) and the bank`s liquidity risk exposure at 1%. It means that as Pakistan's currency depreciated in value the liquidity risk exposure of banks increases it mainly due to banks foreign currency exposures. Large foreign exchange losses could lead to bank failures besides causing huge burdens on banks liquidity (Jamal and Khalil, 2011).

Table-5: Influence of Macroeconomic Fluctuations andbank-specific variables on Credit risk

VARIABLES	RE	FE	GMM
LRi,t−1			0.546* (0.266)
GDPGF	-0.0429 * (0.023)	-0.0356 * (0.014)	0.039 *** (0.121)
INFF	0.530 **** (0.201)	0.500 *** (0.201)	0.032 * (0.011)
LINF	0.146 *** (0.053)	0.138 *** (0.049)	-0.561** (0.300)
NERF	0.088 *** (0.034)	0.083 *** (0.031)	0.128 *** (0.044)
UNF	0.546 (0.519)	0.545 (0.518)	0.058* (0.045)
CAR	-0.264 (0.303)	-0.281 (0.306)	-0.017 ** (0.020)
Govt: bank D* Fluctuations			0.468 *** (0.197)
Democracy D* Fluctuations			0.267** (0.145)
Observations	340	340	334
R-Squared	0.698	0.6079	
Number of Cross-sections	20	20	20
AR(2) P-Value			0.523
Hansen test			0.649

According to the result there is a positive and significant relationship between unemployment fluctuations and liquidity risk at 10%. The possible interpretation of the result is in expansionary phases borrowers stop demanding loans, similarly increase demand for loans in recession. In case of Pakistan unemployment rate is fluctuating negatively, thus it has increased the demand for loans. This fact is also the cause why banks are inclined to lend more (which decrease their liquidity) even in periods of higher unemployment.

An interactive dummy is introduced in to account for bank ownership. The result shows that in case of Government-owned banks the sign of the coefficient of interaction dummy is positive and significant as compared to private banks macroeconomic fluctuations have 46.8 % more impact on public banks. By seeing the results Macroeconomic fluctuations have more impact on public banks rather than in private banks.

An interactive dummy is introduced to account for bank ownership. The result shows that in case of Government-owned banks the sign of the coefficient of interaction dummy is positive and significant as compared to private banks macroeconomic fluctuations have 46.8 % more impact on public banks. By seeing the results Macroeconomic fluctuations have more impact on public banks rather than in private banks. A plausible interpretation of this result is private banks have more liquidity and it has been increasing rapidly in last seven to eight years. Also, most of the assets of public banks are financed by deposits which affect their liquidity ratio. Banks with more liquidity ratio has greater chances to coup with macroeconomic fluctuations. This result is line with Al-Khouri (2012).

Similarly to account for particular time, interactive time dummy is used to control for democratic era and military era. The result shows that in case of democratic era the sign of the coefficient of interaction dummy is positive and significant; as compared military era which explains that macroeconomic fluctuations have 26.7% more impact on liquidity risk in democratic era. Possible interpretation of this result is foreign direct investment overall money supply increased in the country so as interest rate which boosted the economy it may be a reason of more impact of macroeconomic fluctuations in democracy era rather than in military era.

7. Conclusion

High growth of credit and liquidity risk in last decade; particularly in last few years where Pakistan suffered economic disruptions, double digit inflation, declining and steady economic growth, considerable exchange rate depreciation, balance of payment deficits has affected the repayment capacity of the borrowers. Likewise the cost of borrowing restricted the borrowers to pay in time have caused to increase credit and liquidity risk in Pakistan which has affected the overall profitability of banks.

One of the core functions of bank is risk taking and risk transformation. Conversely, each time risk-taking becomes extreme it damages and jeopardizes the solvency of banks, thus the cost for the financial and the real sectors may well be critical.

Since unfavourable macroeconomic factors consecutively affect a large number of institutions, it is vital to understand macroeconomic influences on risk position of banks and to what extent bank risk is affected by macroeconomic factors. Secondly, a broader view of microeconomic factors alongside macroeconomic fluctuations should be explored with regard to bank risk.

The study investigated the macroeconomic factors and bank-specific factors which can influence risk exposure of banks working in Pakistan. It is argued that competition resulting from globalization and fluctuations in macroeconomic variables can increase bank risk exposure. The results indicate that there is some support for both hypotheses.

Annual bank financial performance data and economic data from 2001-2017 is used to analyze the impact of macroeconomic fluctuations and bank-specific variables on bank risk. Moreover, this study has also used macroeconomic variables and checked their effect on bank risk. Credit risk and liquidity were used as bank risk variables. Credit risk was found to be persistent mainly affected by macroeconomic fluctuations but was less than 1 which shows explains that it will eventually return to its mean; business cycle fluctuations had a significant relationship with credit risk at 1%. Whereas inflation fluctuations, exchange rate fluctuations and unemployment fluctuations had a significant relationship at 5%.

On the other hand, the coefficient of the lag dependent variable of liquidity risk indicated that liquidity risk is not persistent. Likewise inflation fluctuations rate and exchange rate fluctuations had a significant relationship at 1%. Meanwhile, business cycle fluctuations had a significant relationship at 10%. Similarly, further analysis of the factors contributing to the persistence of credit risk exposure needs to be analyzed. The real GDP growth rate has a negative relationship with and the biggest effect on credit risk exposure and liquidity risk exposure.

Hansen Test Statistic and Arellano-Bond test are applied on GMM regression to identify the autocorrelation of errors. The autocorrelation test is used in order to differentiate residues and is under the null hypothesis of autocorrelation. Hansen tests check the validity of the instruments used and if the instruments used are exogenous as group.

The empirical evidence suggests that GDP growth fluctuations, exchange rate fluctuations, and inflation fluctuations are the key variables that have a major effect on credit risk and liquidity risk. Therefore, these fluctuations pose main threats to lending risk and liquidity risk. Thus, it is prudent for policymakers to keep on monitoring and make sure that the existing institutional structure can diminish such fluctuations or that timely measures can be implemented to dampen the effects.

References:

[1] Ahmad, N. H., & Arif, M. (2007).Multi-country study of bank credit risk determinants. *International Journal of Banking and Finance*, 5(1), 6

[2] Al-Khouri, R. (2011). Assessing the risk and performance of the GCC banking sector. *International Research Journal of Finance and Economics*, *65*(1), 72-81.

[3] Arif, A., & Nauman A. (2012).Liquidity risk and performance of banking system. *Journal of Financial Regulation and Compliance*, *20*(2), 182-195.

[4] Ashraf, B. N., Arshad, S., & Hu, Y. (2016). Capital regulation and bank risk-taking behavior evidence from Pakistan. *International Journal of Financial Studies*, 4(3), 16.

[5] Bohachova, O. (2008). The impact of macroeconomic factors on risks in the banking sector: a cross-country empirical assessment IAW Diskussionspapiere.

[6] Boudriga, A., Boulila Taktak, N., &Jellouli, S. (2009). Banking supervision and nonperforming loans: a cross-country analysis. *Journal of financial economic policy*, *1*(4), 286-318.

[7] Buch, C. M., Driscoll, J. C., & Ostergaard, C. (2010). Cross-Border Diversification in Bank Asset Portfolios. *International Finance*, 13(1), 79-108.

[8] Castro, V. (2013). Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI. *Economic Modeling*, 31, 672-683.

[9] De Grauwe, P., 2008. The banking crisis: Causes, consequences, and remedies. University of Leuven and CESifo. Mimeo.

[10] Eichengreen,B.,& Arteta, C.(2002).Banking crises in emerging markets: presumptions and evidence. *Financialpolicies in emerging markets*, 47-94.

[11] Festic, M., & Beko, J. (2008). The banking sector and macroeconomic indicators: some evidence for hungary and poland in makroekonomskiindikatorji:nekaj evidence Madzarsko in Poljsko. *NaseGospodarstvo: NG*, *54*(5/6), 118.

[12] Greuning, H. V., and Bratanovic, S. B. (2003).Analyzing and Managing Banking Risk. Washington, D.C.: *International Bank for Reconstruction and Development*, 2nd edition.

[13] Kashyap, A. K., & Stein, J. C. (1997). The role of banks in monetary policy: A survey with implications for the European monetary union. *Economic Perspectives-Federal Reserve Bank of Chicago*, *21*, 2-[14

[14]]Llewellyn, D., 2002. An Analysis of the Causes of Recent Banking Crises. *European Journal of Finance, 8,* 152-175.

[15] Laeven, L., Valencia, F., 2008. Systemic banking crises: A new database. International Monetary Fund Working Paper 08/224.

[16] Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking & Finance*, 36(4), 1012-1027.

[17] Love, I., & Ariss, R. T. (2014). Macro-financial linkages in Egypt: A panel analysis of economic shocks and loan portfolio quality. *Journal of International Financial Markets, Institutions and Money*, 28, 158-181.

[18] Menike, L. M. C. S. (2006). The effect of macroeconomic variables on stock prices in emerging SriLankan stock market. *Sabaragamuwa university journal*, *6*(1), 50-67.

[19] Mugenyah, L. (2015). Determinants of liquidity risk of commercial banks in Kenya. Unpublished Master's Thesis. University of Nairobi.

[20] Madhi, D. (2017). The Macroeconomic Factors Impact on Liquidity Risk: The Albanian Banking System Case. *EJES European Journal of Economics and Business Studies* Articles, 7.

[21] Perera, S., Skully, M., &Wickramanayake, J. (2006). Competition and structure of South Asian banking: a revenue behavior approach. *Applied Financial Economics, 16*(11), 789-801.

[22] Shafiq, A., & Nasr, M. (2010). Risk management practices followed by the commercial banks in Pakistan. *International Review of Business Research Papers, 6*(2), 308-325.

[23] Tabari, N., Ahmadi, M., & Emami, M. (2013) The Effect of Liquidity Risk on the Performance of Commercial Banks. *International Research Journal of Applied and Basic Sciences. 6*, 1624-1631.

[24] Tanasković, S., & Jandrić, M .(2015) Macroeconomic and institutional determinants of nonperforming loans. *Journal of Central Banking Theory and Practice*, *4*(1), 47-62.

[25] Vodova, P. (2011). Liquidity of Czech commercial banks and its determinants. *International Journal of*

mathematical models and methods in applied sciences, 5(6), 1060-1067.

[26] [26]Zribi, N., & Boujelbegrave, Y. (2011). The factors influencing bank credit risk: The case of Tunisia. Journal of accounting and taxation, 3(4), 70-78.