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Macroeconomic and Idiosyncratic Factors of Non-Performing Loans: Evidence from Pakistan's Banking Sector

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Abstract

Using a panel data approach in the Pakistan banking sector over the period 2010 to 2016, this study examines the bank-specific and macroeconomic determinants of non-performing loans. We use quantitative research design with OLS random effect model. Regression and correlation analyses are used in this study. This study finds a rise in capital adequacy ratio, bank size, GDP growth rate, and inflation; reduce the non-performing loans (NPL) ratio. Our results also show that a rise in loan loss provisions enhances the NPL ratio. Our results suggest that banks with poor asset-quality can sabotage the growth of fiscal and the economic sector. Outcomes of the study emphasize the need to clear out the NPLs to keep the financial sector sound. NPLs can cause high loan loss provisions that affect the capitalization of banks that ultimately impact fiscal and economic growth. Bank supervisory agencies should, therefore, pay attention to the monitory and macroeconomic policies of the banks. This study examines the impact of idiosyncratic and macroeconomic determinants of non-performing loans on banks' asset quality using recent data from 2010 to 2016, when various banking sector reforms were implemented.

Keywords: Bank size, capital adequacy ratio, credit quality, GDP growth rate, inflation, non-performing loans,
JEL Classification: E50; E58; G21

Introduction

Among all the financial institutions, the role of banks is most significant and distributional. The bank is a body which amasses deposits from regulars and gives loans to organizations and indi-

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viduals (Ally, 2013). Banks are not only vital for the economy but also for organizational events predominantly for money related events. Industrial, agricultural and commercial development is not conceivable without the role of banks (Babar, Zeb & Lions, 2011).

The banking sector plays an important role in the economic growth of a country as banks are intermediary houses between the excess and deficit components of the economy, particularly keeping funds from the savers and proceeds loan to the investors for investments and channelizing the funds to productive investment. The economic growth of a country is the contribution of many factors and among these, performing the pecuniary zone is vital. Financial institutions mainly banks have momentous input in economic constancy, stable capital market, dissemination of capital, moving funds, effective risk supervision, dissipating and settlement of payments, amalgamation of assets and in viable development of economy (Hartlage, 2012).

Time-honored and regulated banking zone of a country leads to economic growth while poorly regulated banks can cause hindrance in economic progression which ultimately raises the poverty level (Richard, Chijoriga, Kaijage, Peterson, & Bohman, 2008). The role of banks has transformed from intermediaries towards the active financial actor (Khan, Rizvi & Sadiq, 2019). For the last 20 years, huge industrial growth clues to severe changes in operational activities of banks, management style, and performance. Now banks have many innovative products and services to increase the mobility of capital in an economy (Sehrish, Saleem & Yasir, 2012).

In Pakistan, from the 1960s up to the mid-1980s, financial institutions were key regulators of funds mobility in all segments of the economy. The most significant function of these bodies is to provide finance to the industrial and agricultural sectors for machinery and chemicals that support industrial and agriculture growth. The banking zone continues to its branch network, resulting in GDP growth. This flow of growth was disturbed because of changes in policies in the 1970s, which brought a change in the private credit market. In these reforms banks were imposed with legal restrictions such as bounded lending patterns,

monetary targets, credit boundaries and rate of interest was restricted with the rate of SBP (State Bank of Pakistan, 2017). Since the last two decades, the banking system in Pakistan has been well established because of a series of liberalization in policies and financial reforms. The progress of the banking industry is due to the vigilant supervision of the State Bank of Pakistan. 82% of the financial sector of Pakistan comprises banks that are categorized further as conventional, Islamic, specialized and foreign banks (State Bank of Pakistan, 2016).

The banking sector, not only in emerging but also in mature economies, observes many problems. The poor performance of banks results from many factors such as lack of management efficiency, low capital adequacy ratio, and poor asset quality. One of the biggest problems of the banking sector is the non-performing asset (Sharma, Tiwari & Sood, 2013). Commercial banks try to invest as much as possible in the form of loans and credit for the maximization of profit which shows most of the assets of banks exist in the form of loans but there is a huge risk of debt recovery (Achou & Tenguh, 2008). Although the loans are the largest assets of the banks and a major source of income, there is great risk in granting loans (Casu & Girardone, 2006; Honey, Tashfeen, Farid & Sadiq, 2019).

A huge amount of non-performing loans can influence the intermediary role of banks for the progress of the economy and nation. Research practices show that non-performing loans are top indicators of financial crises (Brownbridge, 1998; Greenidge & Grosvenor, 2010), however, poor and inefficient management and inefficiency of firms are also vital factors for non-performing loans (Fan & Shaffer, 2004; Girardone, Molyneux & Gardener, 2004). Failure to repay the debts causes the emergence of non-performing loans, which is the greatest financial problem (Heffernan, 2005). According to IMF (2009) definition: *"A loan is non-performing when payment of interest and principal are past due by 90 days or more, or at least 90 days of interest payments has been capitalized, refinanced or delayed by an agreement or payments are less than 90 days overdue, but there are other good reasons to doubt that payment will be made in full."*

Empirically, the occurrence of banking crises is closely related to a huge accumulation of non-performing loans that contains a major share of assets of an insolvent bank. Association of non-performing loans and banking crises can be proved from different financial crises in the world such as Asian financial crises of 1997 which spoiled the financial system and economies of many countries, in Indonesia 60 banks were collapsed and their 75% loan portfolio became non-performing, financial crises of 2007-2008 in America which then ruled over in different countries and cause financial instability (Caprio & Klingebiel, 2002). Non-performing loans agitate the overall bank efficiency and the high level of non-performing loans depicts the huge amount of credit defaults. The growth of non-performing loans involves the necessity of provision, which eventually decreases the profit level. The branch manager should know the causes of bad loans and should verify the customers before providing the loans because an effective and efficient monitoring system can increase the performance of the banking system which ultimately has a positive impact on the economic growth (Sharma et al., 2013).

Nigeria's banking industry observed a sharp upswing in the ratio of non-performing loans (NPLs) by 220% from December 2015 to December 2016 as the amount of NPLs climbed from 0.65 trillion to 2.08 trillion. NPL to total loan ratio (NPL ratio) increased from 4.88% to 12.80% in one year resulting in decreased profitability of commercial banks by 30.16% (NDIC). Non-performing loans were the major cause in Nigeria which limits the segmental growth of the economy (Boudriga, Taktak & Jellouli, 2010; Adeyemi, 2011; Bebeji, 2013).

1.1. Problem Identification

Non-performing loans are closely related to banking crises (Kroszner, Laeven & Klingebiel, 2007) as non-performing loans are important indicators of financial stability and in an increase in the level of non-performing loans cause bank failure (Bardhan & Mukherjee, 2016; Ghosh, 2015; Kasman & Kasman, 2015; Nkusu, 2011).In 2006, the level of non-performing loans started to increase in America which lead to the subprime mortgage crash in 2007 (Greenidge & Grosvenor, 2010).Global financial crisis of

2007-2009 which damaged the USA economy and economies of many countries was also because of the non-performing loan (Adebola, Yusoff & Dahalan, 2011).

An unparalleled climb of non-performing loans in the Japanese banking sector during the 1990s generated a protracted economic collapse, during the chaos government undertook the stabilization arrangements by advancing insurance, inserting public capital and bailing out concerned banks which results in a decrease of government assets (Hoshi & Kashyap, 2010; Montgomery & Shimizutani, 2009). Credit crises in Mexico after 1995 were also due to the bad loans because financial institutions were loaded with a huge amount of credit with the negative value which decreases their capability to provide further loans to different sectors of the economy (Krueger & Tornell, 1999).

A study on commercial banks of Bangladesh shows that managing non-performing loans are important in developing investor confidence. If their volume is not monitored appropriately, it may harm the opportunities for new borrowers. The volume of default loans of banks listed on Dhaka stock exchange has been increasing at a shocking rate and this situation is due to excessive political and illegal interference. The amount of non-performing loans was Tk.546.57 billion till 2015 which was Tk. 427.3 billion in 2012 and Tk. 200.1 billion in 2006, so high volume of non-performing loans cannot be profitable for an economy because non-recovery of funds confines the re-use of funds which leads to an economic sluggishness (Haruna, 2013; Buchory, 2015). In Pakistan, 80% of the banking sector is privately owned and when private banks are not willing to disburse loans to investors, it results in interest rate increase and diminishes the profitability of the banking zone that exemplifies the weak state of the economy (State Bank of Pakistan, 2016).

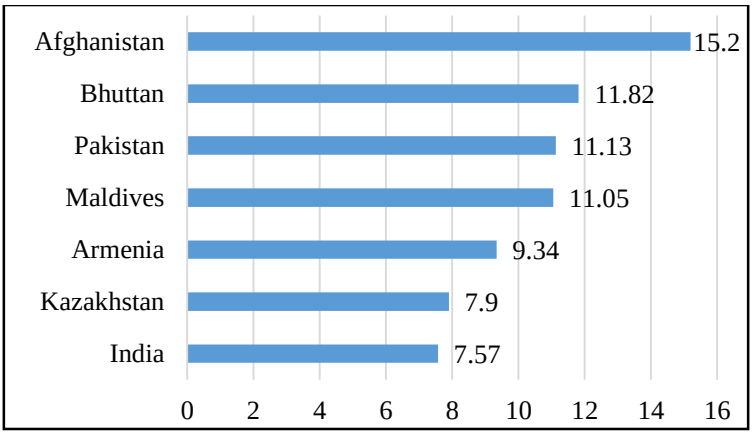


Figure 1: Non-performing loans as a percent of all banks loans: 2016[1]

As shown in Figure 1, Pakistan has the 3rd highest percent of non-performing loans in South Asia which is an alarming situation for the economy. An increase in non-performing loans would logically decrease the worth of assets, which subsequently leads to extensive losses and significant retrenchment in obligatory capital. The swift climbs in non-performing loans borders the lending activities of banks which ultimately has consequences in rendering economic proceedings due to stumpy speculation of money and reflected as a sign of financial crises (State bank of Pakistan Working Papers, 2015). In Pakistan, NPLs are also affecting the economic and financial sector performance. Despite the efforts of the Central Bank to control the ratio of NPLs the performance figures of the last 25 years didn't fall double-digit (SBP, 2016). In Pakistan from 1995 to 2016 the average level of NPLs is14.87% which is alarming for financial sector growth.Pakistan is 24th in terms of the highest level of NPLs states (State bank of Pakistan 2016).

1.2. Problem Statement

Boudriga et al., (2009) states that the regulatory framework has been established worldwide to control the activities of banks for a

[1]Source: Annual financial report of the World Bank

general perspective and also for lending operations but still NPLs are a big problem for local and international regulators. The negative impact of non-performing loans on banks and the economy is a problematic issue for supervisory institutions and policymakers all over the world (Sočuvková, 2013).

2. Literature Review

The financial stability of the economy and its growth are considerably influenced by the level of non-performing loans. An increased level of the non-performing loan is the symbol of shrinkage of economic progress due to the non-performance of assets that cause a high rate of unemployment and a gradual decrease in asset prices. (Klein, 2013; Farhan, Sattar, Chaudhry & Khalil, 2012; Nkusu, 2011; Sapkota, 2012). The association between the non-performing loans and idiosyncratic and macroeconomic factors is extensively investigated in the current literature due to the significant impact that non-performing loans have not only on financial institutions but the economy as well (Reinhart & Rogoff, 2011; Louzis, Vouldis & Metaxas, 2012; Castro, 2013; Makri, Tsagkanos & Bellas, 2014; Chaibi & Ftiti, 2015; Saba, Kouser & Azeem, 2012). Changes in the macroeconomic condition of a country lead to a change in the lending practices and their utilization as unemployment and rate of interest have a significant impact on loan quality of banks. Many prevailing studies explore macroeconomic determinants of NPLs for different countries, most of the studies find out the invers connection among macroeconomic atmosphere and non-performing loans. Rate of inflation, unemployment, external debt to GDP growth rate, amount of loan, credit to the private sector, exchange rate, share price, and lending rate of interest are the indicators of the non-performing loans and have a substantial impact on the economic growth of the country (Ghosh, 2015; Škarica, 2014; Zeng, 2012; Louzis et al., 2012; Espinoza & Prasad, 2010; Dash & Kabra, 2010; Swamy, 2012).

Studies on the banking sector which explore the impact of macroeconomic aspects on the level of non-performing loans show that GDP growth rate, rate of inflation, rate of interest, and exchange rate has a negative effect on non- performing loans in long-term perspective while lending rate of interest is positively related

with non-performing loans, as an increase in lending rate leads to decrease in reimbursement ability of borrower because it also increases the rate of inflation which reduces the monetary value of currency and has a negative impact on non-performing loans (Badar & Javid, 2013; Warue, 2013). Chiorazzo, D'Apice, Morelli & Puopolo, (2017) conclude that GDP growth rate, a high rate of interest, and efficient judicial system are major macroeconomic determinants of non-performing loans which influence the payback capacity of the borrower.

Empirical studies show that bank-specific factors such as last year NPLs ratio, bank size, net interest margin, credit risk, liquidity, ownership structure, corporate governance, legal terms of the loan agreement, and the current rate of loan growth have significant impact on the volume of non-performing loans. Macroeconomic factors such as inflation in previous as well as the current year, GDP per capita growth and exchange rate, interest rate, and inflation enhance the non-performing loan volume. However, in large banks, both types of factors, bank-specific and macroeconomic, influence the non-performing loan ratio while in small banks non-performing loans have only influenced by bank-specific factors. (Amuakwa & Boakye, 2015; Klein, 2013; Inekwe, 2013; Dash & Kabra, 2010; Swamy, 2012; Sadiq, et al., 2017).

A study by Farhan et al., (2012) on Pakistani banking sector shows that interest rate, energy crises, inflation, unemployment, and exchange rate have a significant positive impact on non-performing loans of banks while GDP growth has a negative impact on non-performing loans ratio, this study also shows how term loans become bad loans due to low production of industrial sector because of energy crises. Anisa (2015) state that deposit rate, loan to deposit ratio, and the lending interest rate have a positive impact on non-performing loans while solvency ratio of bank and GDP growth rate have a negative impact on non-performing loans. Angelos, Louzis, Vouldis and Metaxas (2012) evaluate the Greece banking system and conclude that macro-economic factors such as GDP, exchange rate, unemployment, and bank-related factors possess the ability to influence the level of non-performing loans of each category such as corporate loans, house loan, and car loans, etc.

The diverse trend towards the association between GDP growth rate and the magnitude of non-performing loans has been observed in the literature. GDP and non-performing loans are positively interlinked in a few studies, though frequent studies also show the negative correlation between non-performing loans and GDP. GDP growth rate for the same period has a negative effect on non-performing loans while the latency GDP growth rate has a positive effect on non-performing loans. Since GDP increases its indicators to a higher level of income which boosts the capability of borrowers to reimburse loans. When there is a depression in the economy (slowed or negative growth of GDP) the level of bad obligations will upturn (Salas & Saurina, 2002; Khemraj & Pasha, 2009; Dash & Kabra, 2010; Shingjergji, 2013).

Macroeconomic factors have an immense impact on the profitability of banks because these factors are not in the control of banks and management due to their impact at the macro level, so they influence the different levels of growth according to the size and nature of bank. Deterioration in the economic condition of a country reduces the debtor's ability for repayments because it decreases the per capita income (Mileris, 2014). Inflation is also assessed as the significant macroeconomic determinant of non-performing loans, although its relation is inconclusive. Loan payment capacity can be affected by the inflation positively as well as negatively depending upon the situation of the economy, as a high rate of inflation will lead to a decrease in the capacity of the borrower for loans because the monetary value of his income will decrease by the decrease in the value of the currency. Inflation rate has a positive relation with non-performing loan as a lower rate of inflation has a significant positive impact on financial condition of the borrower and thus on its repayment capacity (Mileris, 2012; Khemraj & Pasha, 2009; Gunsel, 2012; Thiagarajan & Ramachandran, 2011; Abid, Ouertani & Zouari-Ghorbel, 2014) while inflation has a negative association with non-performing loans according to (Warue, 2013; Shingjergji, 2013)**.**

When the rate of interest is high then, the organizations generate a high rate of return to cover the cost of capital to avoid the insolvency element. The higher the interest rate increases the debt burden which declines repayment capacity of the borrower

and ultimately the size of the non-performing loans increases (Aver, 2008; Castro, 2013; Skarica, 2014; Ghosh, 2015; Curak et al., 2012; Bardan & Mukjerjee, 2016).

Rate of unemployment has a positive relationship with the NPLs as an increase in unemployment leads to a decrease of a debtor's income, which disturbs their capability to reimburse the loan. Deviations in unemployment are reflected as a good sign of the recession (Charalambakis, Dendramis & Tzavalis, 2017). Increase in the rate of interest leads to a higher rate of the unemployment which has an ultimate impact on non-performing loans because unemployment reduces the flow of cash of a household which decreases the consumption in economy; on the other side, an increase in unemployment rate also affects the firm's cash flow, and it results in a decrease in their production. (Louzis et al., 2012; Makri et al. 2014; Chaibi, Hasna & Fititi, 2015). Furthermore, non-performing loans are also positively related with expected lending interest rates while the rate of interest has a negative link with the level of non-performing loans, because increase in rate of interest climbs the rate of inflation which decreases the purchasing power and thus the repayment capacity of borrower get decreased due to unemployment (Ali, Shingjerji & Iva, 2013; Akinlo & Emmanuel, 2014; Vardar, Gulin & Ozguler, 2015; Messai & Jouini, 2013; Skarica & Bruna 2014; Donath et al., 2014).

Ahmad and Ariff (2007) state that the credit risk is the most harmful one among all the risks the bank face, as non-performing loans affect the bank profitability and long-term operations. The high volume of problem loans in the credit folder of banks is incompatible to banks in attaining their goals. Adebola et al., (2011) state that the high build of non-performing loans indicates financial instability of the bank. Garr (2013) discusse that the credit risk strategy of a bank is contingent on the economic condition and its management is multifarious due to the fickle nature of macroeconomic dynamics and bank-specific features. Credit risk management is an important factor to determine the financial performance of banks because effective credit risk management leads to the greater financial performance of the banks and their profitability (Alshatti & Sulieman, 2015; Gizaw, Kebede & Selvaraj, 2015). An

increase in the default rate damages the entire banking system and as a result, the inflation, rate of interest, stock index, and industrial outcomes are affected by these defaults (Boss, 2002).

Bank size is a significant factor for non-performing loans. There are mixed results of the studies on the consequence of bank size on the level of non-performing. An inverse connection is endorsed to the point that large banks have better risk supervision tactics to come up with issues of non-performing loans. (Rajan, Rajiv & Dhal, 2003; Sales & Saurina, 2002). Large banks have a better opportunities to deal with non-performing loans, so they have a low level of non-performing loans hence, they find a negative relationship between bank size and non-performing loans (Hu Li & Chiu, 2004; Louzis et al., 2012; Swamy, 2012) conduct a research study in Nigeria for 20 years and the results show that huge ratio of non-performing loans reduce the performance of banks as it reduce, the return on capital employed in both short run and long run.

2.1. Conceptual Model

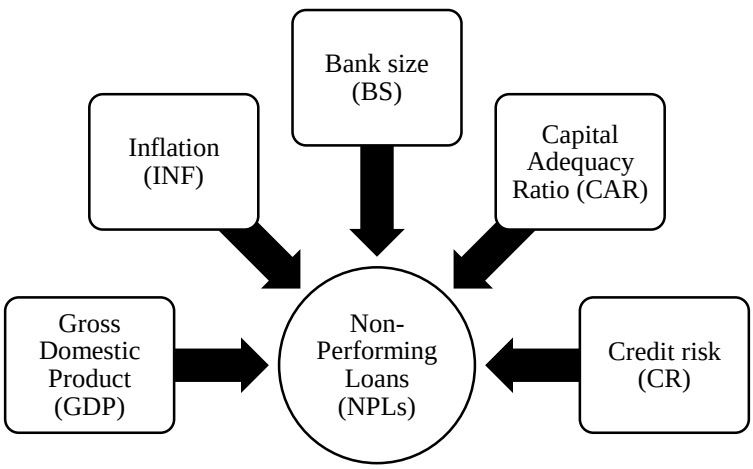


Figure 2: Conceptual Model

2.2. Research Hypotheses

H1: GDP growth rate has a significant impact on non-performing loans.
H2: Inflation has a significant impact on non-performing loans.
H3: Bank size has a significant impact on non-performing loans.

H4: Capital adequacy has a significant impact on non-performing loans.
H5: Credit Risk has a significant impact on non-performing loans.

3. Methodology

The current study opts to analyze the determinants of non-performing loans and their impact. The research problem is premeditated by the use of descriptive and explanatory research design which is concerned with outcomes of what and how the phenomenon has occurred. The descriptive research design allows for greater generalizability of the findings (Gremi, 2013; Park & Zhang, 2012; Mileris, 2012; Castro & Vitor, 2013; Igan, Deniz & Pinheiro, 2011; Vogiazas, Sofoklis D & Nikolaidou, 2011; Salas & Saurina, 2002). The explanatory research design describes the cause-and-effect relationship between the dependent and independent variable which is also observed in the current study in various macroeconomic variables (Kothari & Rajagopalachari, 2004).

3.1. Sampling

The way through which we select our sample is called a sampling technique. The target population for this study is all the commercial banks of Pakistan which include foreign banks, private banks, and public banks, which are registered with the State bank of Pakistan. Data sampling is done by using stratified sampling, stratas are made according to the ratings of the banks issued by PACRA. Banks that have ratings of AAA, AA+, AA- and AA are selected. Fourteen banks fall in this category of Rating, so these 14 banks are sample of the current study. Panel data of selected commercial banks in Pakistan covering the period from 2010 to 2016 is studied. The use of panel data instead of cross-sectional or time series is very beneficial in terms of efficiency of econometrics estimates because it contains a large number of observations which leads to the higher number of degree of freedom that helps in finding the answer of the wide range of questions (Hsiao & Cheng, 2014).

3.2. Data Collection

The secondary data for the study is collected from,

- Annual statements of banks
- World Bank annual database created by the world bank

- State bank of Pakistan

Table 1
Variable Description with the Expected Sign

Description of variable	Measurement	Notation	Expected sign
Non-performing loans (Dependent variable)	Non-performing loans / total loans	NPLs	
Gross Domestic Product	Real Annual GDP growth in %	GDP	+/-
Inflation	Annual inflation rate	INF	+/-
Credit risk	Loan loss provision / total loans	CR	+/-
Bank size	Natural log of total assets	BS	+/-
Capital adequacy ratio	Tier 1 capital + Tier 2 Capital / Risk-weighted assets	CAR	+/-

Source*: Researcher own computation with the help of previous studies*

3.3. Model Estimation

To analyze the bank-specific and macroeconomic determinants of non-performing loans, the following equation is supposed:

$$NPLi,t = \beta o + \beta 1GDPit + \beta 2INFit + \beta 3BSit + \beta 4CARit + \beta 5CRit + \mathcal{E}i,t$$

NPLi,t = NPL ratio of bank **i** at time **T**
β1GDPit = GDP growth rate at time **T**
β2INFit = INF rate at time **T**
β3BSit = **BS** at time **T**
β4CARit = **CAR** at time **T**
β5CRit = **CR** at time **T**
Ɛi,t = error term

4. Results and Discussion

4.1. Descriptive Statistics

Table 2
Descriptive Statistics

Variables	N	Means	Std. Dev.	Minimum	Maximum
NPLs	98	12.09	6.4219	1.40	32.80
CAR	98	15.77	6.4448	1.05	49.74

Variables	N	Means	Std. Dev.	Minimum	Maximum
CR	98	0.64	0.8203	0.02	6.02
BS	98	5.69	0.3308	5.04	6.50
GDP	98	4.17	0.9554	2.58	5.74
INF	98	8.10	3.8267	2.50	13.90

Note: Observation= N

Non-performing loans ratio has a minimum value of 1.40 and the maximum value of 32.8 with the mean value of 12.09 showing the deviation of 5.64% from its mean value. This shows that selected sample banks incurred 12.09% non-performing loans on average from its total loans. Credit risk which is measured as loan loss provision ratio in this study has a range from 0.02 to 6.02 with a mean value of 0.62 shows the deviation of -0.192 from its mean value. Capital Adequacy ratio has a minimum value of 1.05 and a maximum of 49.7 % with a mean value of 15.7% and has a deviation of 9.28%. The mean value for selected sample banks shows that CAR is higher than the minimum requirement of CAR according to the state bank of Pakistan which is 10%.

Bank size has a value of range from 5.03 to 6.5 with a mean value of 5.68 which shows the highest standard deviation of 5.35 that shows the presence of high variation in terms of size in selected banks. GDP growth rate has a range from 2.58% to 5.74% shows the mean value of 4.17 and has a standard deviation of 3.25. Inflation has value in the range from 2.5% to 13.9% and a mean value of 8.04% shows that it is deviated from mean value by 3.82%.

Table 3
Regression Analysis

Variable	Coefficient	Std. Error	t-Statistics	Prob
C	58.43325	11.34406	5.150999	0.0000
GDP	- 1.248122	0.581270	-2.147233	0.0344
INF	- 0.099226	0.164082	-0.604730	0.5468
BS	- 6.293707	1.817524	-3.462792	0.0000

CAR	- 0.344658	0.089736	-3.840780	0.0002
CR	1.457314	0.722173	2.017957	0.0465

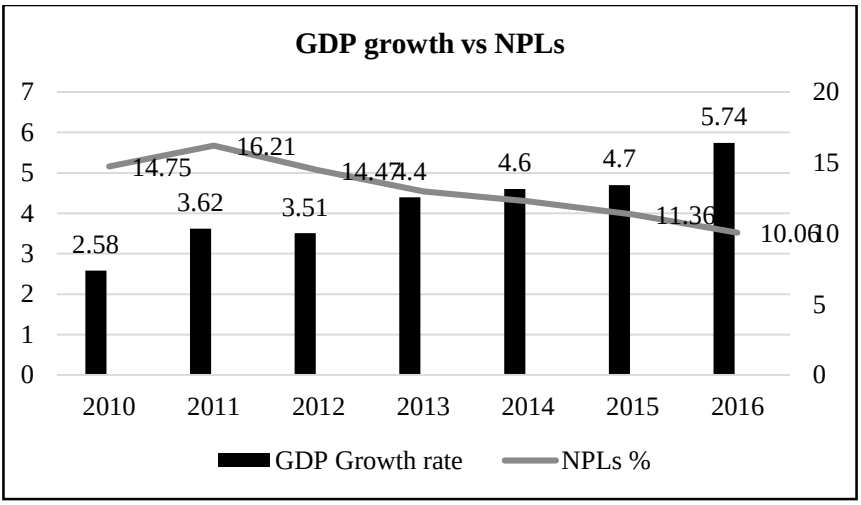
Weighted statistics	
R-squared	**0.266**
Adjusted R-Squared	0.22
SE of Regression	5.5621
F-Statistics	6.672133
Prob (F-statistics)	0.000024

Source: Financial statements of banks and own computation by EVIEWS'10

4.2. Discussion

4.2.1. Gross Domestic Product

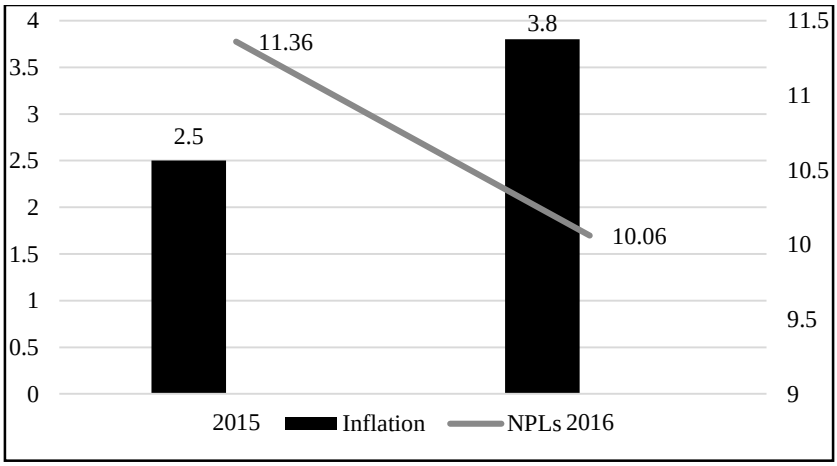
GDP has a negative/inverse relation with non-performing loans in the banking sector of Pakistan according to the results. A coefficient estimate of Gross domestic product is -1.24 which shows a negative relation at a 95% confidence interval. This inverse relation depicts that an increase in growth rate would decrease in the amount of non-performing loans which is based on the fact that a good growth rate shows the good health of the economy and ultimately the standard of living of the people. An increase in growth rate shows that the economy will perform its best level and hence the standard of living is going to be enhanced. GDP growth rate shows an increase of 122% from 2010 to 2016.This growth also shows that people of the country held good economic status both in terms of individual living and business entities, which prevents people from being a defaulter of their loans as NPLs ratio decreases to 31% from 2010 to 2016. Consistent results have been found in the studies of (Fofack & Hippolyte, 2005; Saba et al., 2012; Louzis et al., 2010; Klien & Nir, 2013). Graph 1 shows that in 2010 the GDP growth rate is 2.58% and the percentage of NPLs is 14.75% which tends to decrease at the rate of 10.06% with the increase in GDP growth rate.



Graph 1: GDP Growth Rate vs NPLs

4.2.2. Inflation

Another macroeconomic variable which is considered in this study is inflation. Inflation has a negative relation with non-performing loans in this study which is based on the notion that inflation reduces the time value of money because too much money chases too few goods. As it also affects the value of the remaining debts so the borrower will feel easy to repay his debts. Results show that inflation has a coefficient estimate of -0.09 and has a significant relation at a 90% confidence interval. Results of this study are supported by (Khemraj, Tarron & Pasha, 2009; Warue, 2013: Shingjergji, 2013) while few studies have also shown a positive relationship with non-performing loans such as (Nkusu, 2011; Farhan et al., 2012). Inverse relation of inflation and non-performing loans can be seen in *Graph 2* as in 2015 the percentage of NPLs is 11.36% which declined to 10.06% in 2016 with the increase in inflation from 2.5 % to 3.8%.



Graph 2: Inflation Rate vs NPLs

4.2.3. Capital Adequacy Ratio

Capital adequacy has a minimum requirement of 10% according to the Prudential Regulation of the State Bank of Pakistan. CAR is a bank-specific variable in this study which has a negative coefficient of -0.344 and it is statistically significant at a 99% confidence level. Results show that CAR has an inverse relation with non-performing loans which is supported by the justification that well-capitalized banks would sustain the different types of risk and losses arises from them because this enough capital would lead its better regulation process. As minimum CAR of 10 % by *Prudential regulation of State Bank of Pakistan* is maintained by most banks in the banking sector of Pakistan so they exhibit negative trends towards non-performing loans. Similar results are found in the studies of Zhang and Shihong (2012), Swamy (2012) and Makri Tsagkanos & Bellas (2014).

4.2.4. Bank Size

Researches have shown both positive and negative relation of the size of a firm with non-performing loans. Few studies exhibit that bank size has a direct and positive relation towards bad loans means larger the size of banks higher will be the ratio of their non-performing loans which is clinched by the fact that larger banks may avoid over-monitoring of borrowers not only after advancing the loans but also before advancing the loans. The problem of dis-

torted information such as lack of disclosing about financial status in larger banks would also be fundamental to a rise in the level of problematic loans. Notwithstanding the above phenomena, bank size in this study has a negative coefficient and significant at a 99% confidence level. This relation illustrates that increase in the size of a bank would decrease their volume of non-performing loans in Pakistani banking sector because bigger size banks have better monitoring system not only after advancing the loans that where are these loans being used and what is the purpose of taking loans but larger banks also have a monitoring system of the background of the loan taking firms and individuals. Bigger banks have an efficient and effective risk management system and better information system that how they would maintain equilibrium to minimize the risk of defaults (Al-Smadi, Mohammad & Ahmad, 2009; Godlewski, 2005).

4.2.5. Credit risk

Credit risk, which is measured in this study as loan loss provision, has a significant positive relationship with non-performing loans in this study. The positive result illustrates that high loan loss provision depicts that banks face a high level of non-performing loans. This result shows that banks owe a high amount of provision because of the perceptions that customers will not able to pay off their loans. Moreover, poor credit quality is also an issue that increases the risk portfolio of banks. *P-value* shows that this positive relation is confirmed on a 95% confidence interval. Results of this study are aligned with the results of (Chaibi & Ftiti, 2015; Boudriga, Boulila & Jellouli, 2009; Messai & Jouini, 2013)

5. Conclusion and Recommendation

The major objectives of this study are to examine the impact of different macroeconomic determinants of non-performing loans in the banking sector of Pakistan. To attain this goal, the quantitative research approach is used along with panel data analysis on the period from 2010 to 2016. Random effect model has been used for the analysis of the data. To accomplish the analysis, EVIEWS version 10 is used. GDP rate is negatively and statistically significant which shows that whenever the economy will be on its peak, the value of cash held for household and business will increase which

will reduce the behavior of nonpayment of their financial obligations. Inflation is also a significant element of non-performing loans and has a negative impact on bad loans because the increase in the rate of inflation decreases the worth of cash, therefore, it becomes easy to oblige financial obligations as the value of outstanding loans to become less. So overcoming the impact of inflation, there should always be a moderate level of inflation not very low or high. Bank size and credit risk also have a significant impact on bad loans. Banks should pay attention to their lending policies and monitoring system to avoid problem loans. Moreover, well-capitalized banks do not face the problems of bad loans.

5.1. Recommendation

According to the findings of this study, GDP growth rate, inflation, bank size, capital adequacy ratio, and credit risk have a significant impact on non-performing loans. To evaluate the macroeconomic impact, the concerned authority should make effective macroeconomic policies to avoid the problem of bad loans while to cure the problem of bad loans, better risk management systems, better lending policies and efficient monitoring systems of the borrower with a check of symmetry of information should be followed. Vigilant and vibrant credit policies would incorporate appropriate customer selection and sanction processes with clear retrieval policies. To ensure a sound financial system, the State Bank of Pakistan should direct the commercial banks that credit facility to a potential borrower would not be granted without the prior written approval of the State bank of Pakistan. Moreover, commercial banks should pay their attention to modern and inventive means of increasing their interior financial capability so they can handle their financial matters efficiently.

5.2. Limitations of the Study

This study considered only fourteen banks for a seven-year periods with three banks specific and two macroeconomic variables.

5.3. Direction for Future Research

As this study has considered only two macroeconomic factors of non-performing loans in the banking sector of Pakistan, and in this econometric model all macroeconomic determinants are not in-

cluded so future research can be accomplished by considering more variables. This study has considered fourteen banks as sample size which can be enhanced by including more banks in the future. Future research can also be done on those banks which are closed in the last ten to fifteen years to check the role of non-performing loans in those banks. This can also be studied in tackling social and political factors such as borrower's honesty and political interference, etc. Future study can be done by making the comparison of non-performing loans ratio between Islamic and conventional banks. This research has focused on a single country study. Future research effort can be directed towards multi-country study for a comparative purpose like investigating the macroeconomic determinant of non-performing loans in other Asian countries.

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Appendix: A

Hausman test specification

Correlated Random Effects- Hausman Test

Test Cross- Section Random Effect

Test Summary	Chi- Sq. Statistics	Chi- Sq.d.f	Prob.
Cross Section Random	0.000000	5	1.0000

Note: Cross- section test variance is invalid. Hausman statistics set to zero

Cross Secrtion Random Effects Test Comparison

Variable	Fixed	Random	Var (Diff.)	Prob.
BS	-7.262839	-6.293707	0.620373	0.2185
CAR	-0.253306	-0.344658	0.001466	0.0170

GDPOI	-1.001299	-1.248122	0.027818	0.1389
INF	-0.019916	-0.099226	0.007336	0.3545
CR	-0.635940	1.457314	1.707360	0.1092

Cross sectional random effect test equation:
Dependent Variable: NPLS
Method: Panel Least Squares
Sample: 2010 – 2016
Cross section included: 14
Total (balanced) observation: 98

Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	62.16621	12.24527	5.076755	0.0000
BS	-7.262839	1.980850	-3.666527	0.0004
CAR	-0.253306	0.097526	-2.596367	0.0112
GDPOI	-1.001299	0.604725	-1.655793	0.1017
INF	-0.019916	0.185092	-0.107603	0.9146
CR	-0.635940	1.492948	-0.425963	0.6713

Effect Specification
Cross Sectional Fixed (Dummy Variable)

R- Squared	0.431026	Mean dependent Var	12.090000
Adjusted R-Squared	0.301386	S.D. dependent Var	6.421879
S.E of Regression	5.367607	Akaike Information Criterion	6.370877
Sum Squared Resid	2276.085	Schwarz criterion	6.872044
Log Likelihood	-293.1730	Hanan- Quinn criter.	6.573589
F- Statistics	3.324799	Durbin- Watson stat	1.961787
Prob(F- statistics)	0.000116		

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