AN INVESTIGATION OF MACROECONOMIC FACTORS ON NON-PERFORMING LOANS: A STUDY BASED ON COMMERCIAL BANKS OF PAKISTAN

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ABSTRACT

Following privatisation, Pakistan's banking industry grew and is now one of the main drivers of the country's economy. Nonetheless, the sector is vulnerable to a number of hazards, the most important of which is credit risk. This risk appears when borrowers fail to make their loan payments on schedule, which leads to non-performing loans. In order to maintain their operational, liquidity, and profitability position, banks must manage these loans. This study looks into how the nation's economic circumstances, inflation, and interest rates affect non-performing loans. Time-series data analysis is used, and secondary data covering the last ten years (2008–2017) is used. The study looks at the link between the independent and dependent variables using a multivariate linear regression model. Non-performing loans are the dependent variable, whereas interest rates, inflation, and the nation's economic status (as indicated by GDP) are the independent factors. The study found that the non-performing loans of Pakistani commercial banks are significantly influenced by all three variables. On the other hand, there is an inverse relationship between inflation, GDP, and NPL, whereas there is a direct association between interest rates and NPL. The study's findings will assist Pakistan's banking industry in lowering the percentage of non-performing loans.

Keywords: Macroeconomic factors, Non-Performing loans, Privatization, Credit Risk, Interest rate, Inflation, Economic Condition of country (GDP), Liquidity, Time series analysis.

1. INTRODUCTION

Banking is one of the most noteworthy sectors in terms of the contribution in the overall economic growth of any state. It works for the effective mobilization of capital. Any sort of

financial panic can distort the whole structure of the economy. This is a reason due to which policymakers are eager to the soundness and steadiness of this sector.

The total risk of the banks is influenced by multiple factors both internal and external. Sometimes systematic and sometimes non-systematic factors disturb the healthy flow of funds between financial intermediaries and profitable investment areas.

One of the significant risks for financial institutions is credit risk because their business entails lending activity. Credit risk is about an inability of the borrower to make payments on time and there are multiple variables through which it can be forecasted. Non-Performing Loan (NPL) ratio is one of those variables and it can easily be used for measuring the financial soundness of the banking system. NPLs definition varies from country to country. Basel Accord II defines non-performing loans as those that remains unpaid for more than 90 days.

NPLs are classified in to following categories: substandard, doubtful, and loss (Muneeb and Atiya, 2013). According to revised Prudential Regulations of Corporate/Commercial Banking, a loan is regarded as a substandard if its principal and interest remains unpaid for more than 90 days or more from the due date. However, if a debt remains overdue by 180 days or more form the due date. Lastly, if the principal and interest payment remains unpaid for a year or more than it is a loss (Prudential Regulations for Corporate/Commercial Banking, 2015)

Past studies reflects that the global financial crisis resulted in a sharp rise in non-performing loans almost with in every European country. This rise is due to the weak credit worthiness of the borrowers as a result of an economic downfall. Thus, it has been identified that credit risk is a function of both micro and macroeconomic factors. Deteriorated macroeconomic environment is allied with debt service problems, indicated in to rising NPLs.

During growing phase of the economy both customers and firms has a sound capability for the repayment of debt which ultimately reduces the level of NPLs (Castro, 2013). During growth phase of the economy cycle risk increases as there is a strong growth of credit and any inequalities in that time period will become visible during the recessionary period (Bonfim, 2009). During good time period both borrowers and lenders are overoptimistic about investment proposals and their capability to reimburse and recover their principal and associated interest charges. As a result of this banks grant liberal credit policies with lax credit standards. Thus, due to this the risk of intermediation increases for the banks during the recessionary phase of an economy cycle and the ratio of NPLs as well.

This study is basically associated with investigating the impact of several macroeconomic variables on NPLs for the development of Pakistani banking sector. There is one dependent variable that is NPL and three explanatory variables which includes Gross Domestic Product

(GDP), Inflation, and Interest rate. In this regard, we use the multiple linear regression model to find out the significance of impact on dependent variable. Moreover, model of correlation coefficient has also been deployed in this study to identify whether the relationship between independent and dependent variable is positive/negative or they are having no relationship.

Problem Statement:
To find out the impact of macroeconomic indicators (Inflation, Interest rate, GDP) on non-performing loans in Pakistan.

Hypotheses of Study:
A statement that proposes a relationship between two or more variables is called a hypothesis In this study, each independent variable has an alternate hypothesis.

Interest Rate:
H1: There is a positive relationship between interest rate and NPL.
H2: There is a significant impact of interest rate on NPL.

Inflation:
H3: There is a positive relationship between inflation rate and NPL.
H4: There is a significant impact of inflation rate on NPL.

Gross Domestic Product:
H5: There is a negative relationship between GDP and NPL.
H6: There is a significant impact of GDP on NPL.

2. LITERATURE REVIEW

The most important factor for the rise in non-performing loans is the capability of the banks in assessing loan applications. Credit risk is usually measured through default probability, loss given default and exposure at default. In their study Kiran et al (2017) identified the reasons behind non-performing loans and its effects on banking industry. Time series data has been taken from year 2000 to 2016 which has been tested by using multiple regression model & correlation coefficient. Independent variables include GDP, interest rate and in vigilant lending to agriculture sector whereas dependent variable is NPL. The outcome of this research shows that there is no significant relationship between interest rate, GDP and weak lending to agriculture sector with NPL but there is a significant relationship of credit appraisal with NPL.

Washeka & Asif (2016) studies the relationship between macroeconomic factors and non-performing loans. They have gathered data from 10 scheduled commercial banks of Bangladesh listed in stock exchange of Bangladesh and compared with other SAARC countries. They have

incorporated multiple independent variables which include real interest rate, public debt, GDP and inflation rate and Non-performing assets as a dependent variable. By using multiple regression and correlation matrix analysis they found that only public debt has significant impact on non-performing assets. Furthermore, poor health of economy and lack of governance of economy and over all banking sector led towards the huge pile up of non-performing loans. It has been suggested that government should take initiatives and policies to regulate the banking sector more strictly to prevent from non-performing assets.

In an effort to ascertain the causes of non-performing loans in Lithuania, Ricardas (2014) carried out research. Secondary data was gathered by the researcher from a number of sources, including the Department of Enterprise Bankruptcy Management, Statistics Lithuania, Bank of Lithuania, World Bank, and Lithuanian Ministry of Finance. The study took into account a number of variables for analysis, including GDP, exports, employee pay, household final consumption expenditures, unemployment rate, number of bankrupt enterprises, and government spending. To reach a conclusion, the study also contrasted secondary data from industrialised European economies. The final outcome demonstrated how the Basel III Agreement stressed how crucial it is to take a nation's economic circumstances into account when evaluating the credit risk of loan applicants. The study's findings can be valuable for banks as it revealed the main links between macroeconomics and non-performing loans.Munib & Atiya (2013) carried out the study on Impact of Macroeconomic forces on non-performing loans of commercial banks in Pakistan by combining different macroeconomic variables which includes inflation, GDP, interest rates, exchange rate and money supply. This study is comprised on secondary data taken from State bank of Pakistan and international financial statistics. It incorporated 36 Pakistani commercial banks and time periods covers from January 2002-December 2011 on quarterly basis. This study included various statistical tools to determine the long & short run relationship. In order to evaluate the cause & effect relationship they used Granger causality test within the sample. This study revealed that the non-performing loans occurred due to exchange rate and inflation. Furthermore, non-performing loans disturbs the bank's profitability and liquidity due to non-repayment. Since, e bank has to manage its asset and liabilities equally and non-repayment of loan would reduce the liquidity due to its mandatory provisioning by regulatory authorities.

Similarly, Muhammad Farhan et al (2012) conducted a research on economic determinants of non-performing loans. This study is based on primary data by using structured questionnaire and has been analyzed by different statistical test like Pearson correlation coefficient and regression analysis. This study incorporates 201 bankers who were especially from loan providing & approving department. This study combined one dependent variable, non-performing loans, with a number of independent factors, such as the unemployment rate, interest rate, inflation, energy crisis, GDP growth rate, and exchange rate. The study's findings indicate that, while GDP growth has a significant negative relationship with the non-performing loans of the Pakistani banking

sector, unemployment, interest rates, inflation, the energy crisis, and exchange rates have a significant positive relationship with these non-performing loans.

Kasturi (2012) examined the relationship between high interest rates and non-performing assets of bank. She made comparison between the NPLs and discount rate of Indian banking industry by incorporating time series data from 2007-2012 and used multi linear regression and correlation coefficient model. She concluded that rising interest rates results in expensive loans available by commercial banks which reduce the payment capacity of the borrowers and resulted in increased non-performing loans.

The above mentioned literature review confirms that macroeconomic factors are significant elements of debtors' credit risk. It necessitates the further analysis to establish the relation between macroeconomic variables and NPLs in Pakistan.

3. METHODOLOGY

Linear Regression is a statistical tool used to establish the relationship between a scalar dependent variable and one or more explanatory variables, represented as X. In case there is only one explanatory variable, it is referred to as a simple linear regression model. However, if more than one independent variable is involved, the process is known as multiple linear regression. For this study, multiple linear regression model and correlation coefficient have been used, with SPSS being the tool of choice.

The present study involves an analysis of macroeconomic and banking annual data spanning from 1998 to 2017, covering a period of 20 years. The dependent variable in this paper is NPL, while the explanatory variables include interest rate, inflation, and Gross Domestic Product (GDP) growth rate. The study utilizes time series analysis to examine the relationship between these variables.

Sources of Data

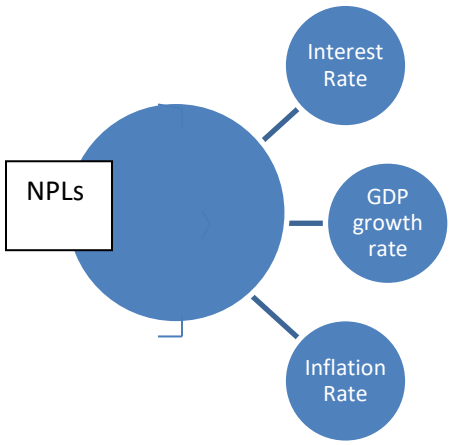
The annual data for interest rate has been collected from State Bank of Pakistan. Moreover, the data for inflation and GDP growth rate has been taken from the website of International Monetary Fund (IMF). Finally, the data for dependent variable that is NPL has been collected from World Bank.

After considering the aforementioned details the equation for multiple linear regression model will be:

$$y_i = a_0 + a_1 \times interest\ rate + a_2 \times inflation\ rate + a_3 \times GDP\ growth\ rate$$

Finally, correlation matrix has also been used to identify the magnitude and direction of relationship between independent and dependent variables.

Research Framework:



RESULTS& DISCUSSION

Table: 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.819[a]	.671	.609	3.2203009

a. Predictors: (Constant), GDP, Inflation, Interest rate
Source: Author's analysis in SPSS according to the data collected from SBP, IMF & World Bank.

Table: 2

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	337.854	3	112.618	10.860	.000[a]
	Residual	165.925	16	10.370		
	Total	503.779	19			

a. Predictors: (Constant), GDP, Inflation, Interest rate
b. Dependent Variable: NPL
Source: Author's analysis in SPSS according to the data collected from SBP, IMF & World Bank.

Table: 3

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.123	4.469		3.384	.004
	Interestrate	.986	.313	.616	3.146	.006
	Inflation	-.840	.205	-.692	-4.094	.001
	GDP	-1.104	.487	-.397	-2.265	.038

a. Dependent Variable: NPL

Source: Author's analysis in SPSS according to the data collected from SBP, IMF & World Bank.

The results of multiple linear regression indicated that all the three independent variables (interest rate, inflation, and GDP) are having significant impact on NPL as their p values are less than 0.05.

Table: 4
Correlations

		Inflation	NPL
Inflation	Pearson Correlation	1	-.240
	Sig. (2-tailed)		.309
	N	20	20
NPL	Pearson Correlation	-.240	1
	Sig. (2-tailed)	.309	
	N	20	20

Source: Author's analysis in SPSS according to the data collected from SBP, IMF & World Bank.

The correlation coefficient between Inflation and NPL is negative. It means if inflation increases by 1 point there will be an impact of 0.240 on NPL but that impact will be in the opposite direction.

Table: 5
Correlations

		GDP	NPL
GDP	Pearson Correlation	1	-.530*
	Sig. (2-tailed)		.016
	N	20	20
NPL	Pearson Correlation	-.530*	1

	Sig. (2-tailed)	.016	
	N	20	20

*. Correlation is significant at the 0.05 level (2-tailed).
Source: Author's analysis in SPSS according to the data collected from SBP, IMF & World Bank.

The analysis of estimation in the research period suggested that the correlation coefficient between GDP and NPL is also negative. It means if GDP increases by 1 point there will be a decrease of 0.530 on NPLs. In other words, there is an indirect relationship between GDP and NPL.

Table: 6
Correlations

		Interestrate	NPL
Interestrate	Pearson Correlation	1	.478*
	Sig. (2-tailed)		.033
	N	20	20
NPL	Pearson Correlation	.478*	1
	Sig. (2-tailed)	.033	
	N	20	20

*. Correlation is significant at the 0.05 level (2-tailed).
Source: Author's analysis in SPSS according to the data collected from SBP, IMF & World Bank.

Moreover, the empirical results provide evidence that correlation coefficient between Interest rate and NPL is positive and it shows that if interest rate increases by 1 unit there will be a raise of 0.478 units in NPLs. So there is a direct relationship between both variables.

Hypothesis	**Acceptance/Rejection**
There is a positive relationship between interest rate and NPL.	**Accepted**
There is a significant impact of interest rate on NPL.	**Accepted**
There is a positive relationship between inflation rate and NPL.	**Rejected**
There is a significant impact of inflation rate on NPL.	**Accepted**

There is a negative relationship between GDP and NPL.	**Accepted**
There is a significant impact of GDP on NPL.	**Accepted**

CONCLUSION & RECOMMENDATIONS

The need of examining credit risk in light of the macroeconomic environment was brought to light by previous years' economic crises. This study examines how Pakistan's non-performing loans are affected by macroeconomic variables, including GDP, interest rates, and inflation. The ratio of NPLs can be used to assess the efficiency of the banking industry. Based on actual data, it appears that every macroeconomic component under consideration has a notable effect on non-performing loans (NPLs). Furthermore, there is a negative correlation between GDP, NPL, and inflation. Lastly, there is a positive correlation between interest rates and NPLs.

The study's conclusions have implications for policy; structural interventions are necessary to keep the banking system and the economy stable. That is the reason the State Bank of Pakistan issues Prudential Regulations for risk management. Future research on the influence on non-performing loans (NPLs) should take into account additional macroeconomic aspects. It is also possible to take into account some bank-specific factors that are influencing NPLs, such as performance and efficiency metrics.

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