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The Impact of GDP, Inflation, Exchange Rate, Unemployment and Tax Rate on the Non Performing Loans of Banks: Evidence From Pakistani Commercial Banks

ABSTRACT

One of the important determinants of the banking sector performance are the loans advanced for the purpose of profit. Thus, banks take loans and repayment as a yardstick. Specifically, banks take a serious note of its repayments and those loans, which either default or declared as Non-Performing Loan (NPL). Many factors play an important role in the repayment of loan advances as well as those that are declared as NPLs. Such factors include but are not limited to regulatory and institutional environment, bank-based micro

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economic indicators and macroeconomic determinants. Thus, the main purpose of this paper is to assess the macroeconomic factors such as GDP growth rate, exchange rate, inflation, unemployment and tax rate as determinants of NPL. Secondary data of NPL is taken from the respective banks' annual reports and the macroeconomic data from the World Bank for the period 2006-2016. Using a panel data, both Uni-variate and Bi-Variate analyses are used to investigate the relationship of NPL with these macroeconomic variables. The results show that GDP growth rate, exchange rate, tax rate, inflation, and unemployment effect NPL in a respectively different manner. The study conclude that macroeconomic activities of a particular country are important indicators of a sound financial institutional system.

Keywords: *Macroeconomic Factors, Non Performing Loans (NPL), Fixed Effect and Random Effect Least Square Regression Analysis Techniques*

Introduction

Financial institutions play the role of a back bone in an economy. Every sound economic system posess a strong financial system that has got the ability to absorb the financial crises (Dash & Kobra, 2012**)**. The Central bank or the State bank of each country has the key role to play in this regard to prepare the financial institutions for such financial jolts. The economic sustainability of the economy largely depends upon the sound banking system.

In sound economies it is the responsibility of the central banks to develop regulations and policies regarding the operational activities within a country. At the same time it is the responsibility of the banks to follow and implement those regulations and policies in their banks and report to state bank accordingly (Fofack, 2005). All the commercial

banks mostly adopt the basic rules by receiving money from the customers in shape of deposit and then disburse it to the customers in shape of advances, credit or loans. At the same time the banks give a certain percentage on the deposit to the depositors while receive profit on the advances disbursed to the creditors. Earning spread is a term that is being used as the difference between the borrower's rate and depositor's rate. The earning spread is the actual earnings of the banks. At times creditor fail to repay the advances along with its credit rate. This failure is being reported in the annual reports as Non Performing Loan (NPL). The higher the level of NPL rises the weaker will the banks' ability to maintain a balance between the deposit and advances ratio and it may lead to bankruptcy. Thus it has a strong effect on the financial system of an economy (Saba, Kouser & Azeem, 2012). That's why NPL should be considered as tool to measure the sustainability of the banking system within an economy (Nkusu, 2011).

There is no single way to measure or report the NPL levels in banks annual reports, it varies from region to region. Basel Committee (2001) defines NPL as the advances or loans that are not being paid for ninety days and more.

Banks performance can be badly damaged by the increasing level of NPLs (DeYoung & Whalen, 1994). In USA the increasing level of NPLs in banks caused the financial crises (Sinkey & Greewalt, 1991). Fofack (2005) argues that in African countries the main source of economic crises was the rising levels of NPL. Both the developing and developed countries showed that NPLs has an adverse effect on the financial sector of a country. Dash and Kobra (2012**)** checks the relationship between macroeconomic variables and NPLs. There results showed that the high risk banks had greater chance towards defaulted loans.

In Pakistan same problem exists, the State bank of Pakistan (SBP) has been trying hard in terms of keeping NPL limits within control but for the last 25 years the NPLs figure has not fallen below double digit (SBP, 2016). If we give a look

at the NPL levels in Pakistan the average level is 14.87% from 1995 till 2016. Currently Pakistan has been 24th in terms of high levels of NPL countries (SBP, 2016).

Keeton and Morris (1987) were the pioneers, who investigated the relationship between the macro-economic variables and banks' loan-quality. Their sample range contained over 2400 commercial U.S. banks between 1979 and 1985, and the study had nexuses the bank loan losses with the macro-economic variables of the respective country. Pesola (2005) investigating the banking vulnerabilities in Northern-Europe, validated the connection between the macro level factors and debt insolvencies. Now the question arises that do macroeconomic variables have also the same effect on Pakistani banks performance in shape of NPLs?

Research Question

The impact of macroeconomic factors on NPLs in commercial banks of Pakistan.

Review of Literature

NPL definition varies from country to country. NPLs are the bad loans that are due to be paid for 90 days or more (IMF, 2005). The State bank of Pakistan (2010) has also classified loans that are overdue for a specific period into different categories. The basic categories are three, i.e Substandard, doubtful and loss. If the loan installment is due by ninety days or more and is not being repaid will be termed as substandard loan. 25% provisioning will be done on the outstanding loan and will be termed as NPL. If the installment is overdue by 180 days or more will be termed as doubtful. 50% provision will be done on the outstanding loans. If the installment is overdue by one year or more their it will be

termed as loss and 100% provisioning will be done to the outstanding loan (SBP, 2016).

Keeton and Morris (1987) are being considered as the pioneer in terms of establishment of relationship between the NPLs and macroeconomic factors of the country. They also concluded that one main reason behind high NPL levels are the bad position of the macroeconomic condition of the country. It was also being observed and analyzed that NPLs are not the direct contributor to the economy but it has an indirect effect of the whole economy (Drees & Pazrbasioglu, 1998). Now if remedial and timely measures are not being taken it may lead to financial crises in the economy.

Adebola, Wan Yousaff and Dahalan (2011) are of the view that a country owning macroeconomic factors has an impact on the financial performance of the banking sector.

Initially the macro-economic variables will be elucidated, that might have an influence on the Non-Performing-loans and the macro-economic variables tend to yearly change in GDP, unemployment rate, Real exchange rate, Tax rate and Inflation rate. Although, the extant of Literature that had investigated the relationship between macroeconomic variables and NPL, and the findings had established only theoretical models rather than giving an empirical evidence.

A negative relation exists between NPL and growth in GDP (Jimenez and Saurina, 2009). It is obvious that the growth in the income level of the people within an economy increases loan repayment capacity of the borrower. That at the end reduces the level of NPL in the banking sector of that economy (Khemraj and Pasha, 2009).

Khemraj and Pasha (2009) had analyzed the relationship between the inflation rate and the NPL's strength, they founded that a direct relationship exists between them. Although, on the contrary, Nkusu (2011) carried out a study and founded that the natural connection between non-performing loan and inflation rate can either be direct or inverse. Rationally, the increasing inflation rate will cause increase in the borrowers' incomes while the physical value

of the credit will mitigate, thus the raising inflation rate will enhance the borrowers credit paying ability.

Jimenez and Saurina (2005) had investigated the Spanish banking area and the data range was from 1984 to 2003, and they founded that a surge in NPLs is caused by the slow GDP growth, immense real interest charges and the expanded credit environment due to the easy credit conditions. Nkusu (2011) carried out a study and founded that the natural connection between non-performing loan and inflation rate can either be direct or inverse. A positive relationship exist between NPL and unemployment in an economy of the country (Gambera, 2000). But on the other hand theoretical back ground of this relationship shows that a negative relationship exists between NPL and unemployment. If a person has availed loan from a bank and that person is an employed person. Suddenly he/she losses his/her job then how he/she will repay that loan so in that case NPL increases. In the same way if a business unit has availed loan facility from a bank and suddenly unemployment has hit the economy of the country this may reduce the demand level in that country because of the low purchasing power of the people then the repayment capacity of the borrower will be reduced. That at the end induces increase in the level of NPL in the country (Louzis, Vouldis and Metaxas, 2012).

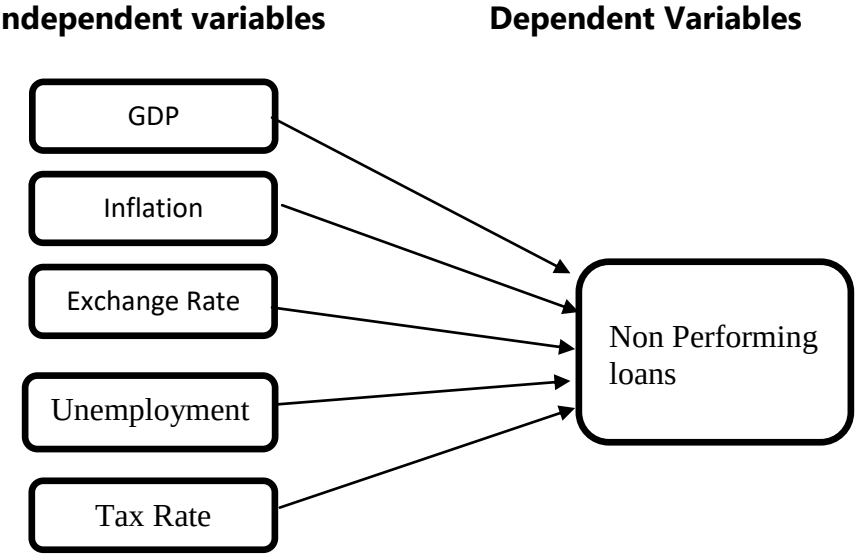
Different researchers are of different views about the relation of exchange rate with NPL. Khemraj and Pasha (2009) are of the view that a positive relation exists between NPL and Real effective exchange rate. An increase in the exchange rate may effect the loan payment capacity of the borrower (Fofack, 2005) or on the other hand those borrowers who borrow loan in foreign currency then increase in exchange rate will have a positive relation.

Interest is the sole income of banks from which the depositor's rate, tax and other expenses are paid. Now, the banks strategically shift the tax expenses in their credit portfolios to the corporate sector or cleverly reduces the depositor's rate (Albertazzi & Gambacorta, 2006). Hence, the

banks have the system of shifting the tax expenses to its debtors by increasing loan service charges (Khan *et al*., 2011). Similarly, the banks with greater liabilities deducting taxes are because of the immense mark-up charges. Specifically, there was no purposeful investigation for establishing the natural connection between the tax rate and NPL's but logically higher tax rate will increase non-performing loans because the higher tax rate will deprive the borrowers of cash and rationally will affect his loan servicing capability.

Theoretical framework:

Based on the above literature reviews, the following theoretical framework is developed that shows the relationship between dependent and independent variables.



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In this theoretical framework non performing loan is the dependent variable while GDP, inflation, Exchange rate, Unemployment and Tax rate are the independent variables

that has an influence on Dependent variable either positive or negative.

Data and Methodology

Data

The main purpose of this investigation is to get impact of GDP, inflation, exchange rate, unemployment and tax rate on NPLs. The selected sample time period is from 2006 to 2016. Total of 20 sample banks were selected based on the criteria their operation started before 2006 and had not merged till 2016, so that homogeneity can be created in the data set.

Methodology

Since this investigation was spawned to examine the association between the non-performing loans and macroeconomic elements, a rational analysis is carried by following the deductive approach. A Deductive-analysis mechanically causes the laws or principles to generalize specific instance and the underlying study is pure-objective in nature. Thus, quantitative-study technique is used to analyze the outcome on the recognized causers of non-performing loans.

Variables Used

Based on the above discussion the following variables are being used mentioned in Table 1.

Table 1. Variables Description

Variables	Definition	Sources
Non Performing Loan (NPL)	Non performing loans to total loans	Banks Annual Reports
GDP Growth Rate	Annual percentage growth rate of GDP at market prices based on constant local currency.	World Bank Database
Inflation Rate	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	World Bank Database
Exchange Rate	Real effective exchange rate is the nominal effective exchange rate divided by a price deflator or index of costs.	World Bank Database
Unemployment Rate	Unemployment refers to the share of the labor force and educated force that is without work but available for and seeking employment.	World Bank Database
Tax Rate	Total tax rate measures the amount of taxes and mandatory contributions payable by business after accounting for allowable deductions and exemptions as a share of commercial profits.	World Bank Database

Empirical Model

In order to assess the macroeconomic impact on the NPL the following model is used.

$$NPL_{it} = \alpha + \beta_1 GDP\_GRRATE_t + \beta_2 INFLAT_t + \beta_3 REER_t + \beta_4 UNEMPL_t + + \beta_5 TAXRATE_t + \in_{it}$$

Where:
NPL=Non Performing Loan
GDP_GRRATE= GDP Growth rate
INFLAT= Inflation Rate
REER=Real Exchange Rate
UNEMPL=Unemployment Rate
TAXRATE= TAX RATE

Results and Data Analysis

The section 3.3.1 will represent the descriptive statistics, section 3.3.2 will explain the correlation matrix, while section 3.3.3 will explain the panel least square regression models.

Descriptive Statistics

Table 2. Descriptive Matrix for Banks

Variables	Obs	Mean	Std. Dev.	Min	Max	SKEWNESS	KURTOSIS
NPL	220	10.15641	8.487209	0	51.56	1.81	2.78
GDP_GRRATE	220	1.275404	0.4400327	0.4741774	1.82092	-0.667	2.1
INFLATION RATE	220	10.6516	6.29547	1.810757	20.66652	0.429	1.766
EXCHNAGE RATE	220	4.645083	0.0823222	4.548642	4.808195	0.869	2.55
TAXRATE	220	3.578871	0.1163566	3.453157	3.781914	0.72	1.949
UNEMPLOYMENT RATE	220	1.738585	0.0691478	1.60543	1.83098	-0.65	2.28

The table 2. Both dependent and independent variables are present. A total of 220 observations have been used for both dependent and independent variables. NPL has the minimum value of zero while the maximum limit was fifty. The standard deviation is 8.48. GDP growth rate minimum value is 0.4741 and the highest value is 1.820 while the standard deviation is 0.44 while the mean value is 1.275. Inflation rate lowest figure is 1.81 while highest is 20.66 and S.D is 6.295 which is a little high. Exchange rate mean value is 4.645, lower figure is 4.54 while higher figure is 4.808 while S.D is 0.0823 which is very low while mean value is 4.645. Tax rate lowest figure is 3.45 while higher figure is 3.781, So S.D is lower in value that is 0.11635 and mean value is 3.57. Unemployment rate lowest figure is 1.605 while highest figure is 1.83 and S.D is very low that is 0.0691. The mean value of Unemployment is 1.7385.

Correlation Matrix

Table 3: Correlation Matrix for Banks

Variables	NPL	GDP_ GRRATE	INFLAT	REER	UNEMPL	TAXRATE
Non Performing Loan (NPL)	1					
GDP_GRRATE	-0.1317	1				
INFLAT	-0.0645	-0.3513	1			
REER	0.1124	0.5335	-0.6885	1		
UNEMPL	0.1474	0.3401	0.3199	-0.2972	1	
TAXRATE	0.1531	0.4787	-0.0942	0.4528	-0.4808	1

The table 3 represents the correlation among the dependent and independent variables. As it can be seen in the table above that all the relationships among the independent variables must be less than 0.80 level (Gujarati, 2003).

Heteroscedasticity Statistics:

White's test for Ho: homoscedasticity against Ha: unrestricted heteroscedasticity

chi2(10) = 7.87
Prob > chi2 = 0.6413

White test was conducted to check for the heterogeneity problem. The above test clearly suggests that our regression does not have heterogeneity problem as the results show that the value is much higher than the level of significance in terms of probability level.

Multicollinearity Statistics:

Table 4: Multicollinearity Statistics

Variables	VIF
GDP_GRRATE	2.44
INFLAT	2.23
REER	3.36
UNEMPL	1.59
TAXRATE	1.84

Variance Inflation Factor (VIF) Test was conducted in order to check for the Multicollinearity in our results. As O'Brien (2007) argues that threshold value for the multicollinearity limit is between 0.05<VIF<5. So in that regard all the above variables remain in the required limits.

Regression Results

As our data is panel data, so for panel data analysis fixed and random effect least square regression technique is being used.

Fixed Affect Panel Least Square:

Table5. Fixed Affect Panel Least Square

Dependent Variable		Non-performing Loans (%)		
	Variables Name	Label	Coefficient	p-values
MACRECONOMIC FACTORS	GDP Growth Rate	GDP_GRRATE	-4.397848	0.01
	Inflation Rate	INFLAT	0.14966	0.048
	Exchange Rate	REER	34.591	0.003
	Tax Rate	UNEMPL	45.3797	0.00
	Unemployment Rate	TAXRATE	11.7243	0.056
	Number of Observations			220
	Prob > F			0
	R-squared			0.242
	Adj R-squared			0.1

The above table shows the regression relation between dependent and its independent variables, NPL is being regressed by GDP growth rate, Inflation rate, Real Exchange Rate, Unemployment and Tax rate to find out its impact using Fixed Effect Panel Least Square Method.

The R-square value is 18.82%. GDP growth rate has a negative relation with NPL but it is statistically significant. Inflation rate has a positive relation with NPL, it is also statistically significant and at level 5%. Real Exchange Rate has also a positive relation with NPL and it is statistically significant at level 5%. Unemployment Rate has positive and Tax Rate has also a positive relation with NPL and both are statistically significant at 5% and 10% respectively.

Random effect Panel Least Square

Dependent Variable		Non-performing Loans (%)		
	Variables Name	Label	Coefficient	p-values
MACRECONOMIC FACTORS	GDP Growth Rate	GDP_GRRATE	-4.4	0.009
	Inflation Rate	INFLAT	0.15	0.046
	Exchange Rate	REER	34.6	0.003
	Tax Rate	UNEMPL	45.38	0.00
	Unemployment Rate	TAXRATE	11.8	0.055
	Number of Observations			220
	Prob > F			0
	R-squared			0.242
	Adj R-squared			0.1

The R-square value is 17.70%. GDP Growth Rate has a negative relation with NPL but it is statistically significant. Inflation Rate has a positive relation with NPL, it is also statistically significant. Real Exchange Rate has also a positive relation with NPL and it is statistically significant at level 5%. Unemployment has positive and Tax rate has also a positive

relation with NPL and both are statistically significant at 10% and 5% respectively.

Hausman Test

Table 7: Hausman Test

chi2	=1.45
Prob>chi2	= 0.9841

In order to select between the fixed effect and random effect least square regression as which will be more suitable regarding our analysis. The insignificant probability value of 0.9841 clearly suggests that we fail to reject that the Random effect as the suitable method of panel data regression analysis technique.

Conclusion

Now the above results show a clear replication with the literature as NPL has a significant negative relation with GDP Growth rate, means that with the rise of the GDP growth rate, the borrower's ability to repay the loan will be increased. Inflation rate has got the significant impact on the NPL as concluded by our results. The high inflation rate decreases the borrower's ability to repay. It is responsibility of the country to keep the GDP growth rate and inflation rate in check as it greatly influence the abilities of the borrower to repay the loans. If the NPL level gets rise because of these variables it can lead to financial crises that can damage the economic growth of the country badly.

Exchange rate can be used as a measuring tool for the position of import and export within a country. The higher the exports the more exchange rate will be received and the country will be in better position not to buy foreign currency

for payment of the imports. In this process exchange rate is considered as the tool to check the levels of the exports and imports. The exchange rate has a positive relation with NPL. The higher the level of exchange rate the higher will be the level of NPL.

The global financial crises in 2008 has been triggered mostly because of the crises in mortgage banking (Makri, 2015). The reason was the rise of the unemployment levels in USA, most of the mortgage holders got unemployed because of that they were unable to repay the mortgage installments. In our analysis a positive significant relation was established in the unemployment rate and NPLs levels in Pakistan. A positive relation was analyzed between the Tax rate and NPL ratio. The higher the level of the tax rate the lesser will the ability of the borrower to repay the loans.

At the end, we may conclude that the government and the State Bank of Pakistan have to play their roles in order to keep the Levels of NPL within control, A strong role should be played to keep the GDP growth rate on rise while at the same time keep the Inflation rate, Exchange rate, Unemployment rate and tax rate low. So that a sustainable financial and economic growth can be achieved by the country.

Future Research

The following areas may be looked at for the future research.

- Corporate governance should be checked in terms of its impact of NPLs.
- Institutional factors should also be taken into consideration as it may also contribute to the changing nature of NPLs.
- Time span can be increased to see its long term impact and its influence by different variables.

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