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Default Risk Management and Macroeconomic factors are crucial for effective financial performance of commercial banks in Pakistan

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Abstract

Default risk management is one of the most important and crucial risks faced by the commercial banks, particularity in Pakistan. Similarly, macroeconomic factors also affect the financial performance of commercial banks. This study is going to find out the impact of both default risk and macroeconomic factors on the financial performance of commercial banks. This study is quantitative in nature and deductive approach is being used. Data has been taken from the financial statements issued by State banks of Pakistan of 16 commercial banks operating in Pakistan. Dependent variable is return on equity and Independent variables are non-performing loan ratio, loan loss provision ratio, loan to deposit ratio, capital adequacy ratio, while inflation, interest rate and GDP and size have been taken as control variables. All independent and Control variables are showing significant impact except inflation and interest rate. It can be concluded that default risk management, GDP and size do affect the financial performance of commercial banks in Pakistan.

Keywords: NPLR, LTDR, CAR and LLPT

Introduction

Financial institutions play vital role in the economic development of the country. Especially, commercial banks are considered as the backbone of the financial system. Commercial banks play an important role in the development of economy by providing financial services to individuals and different organizations. Credit

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facility provided by the commercial banks allow the business men to grow and expand their businesses.

Healthy and sound banking system contributes a lot in the economic development of the country. Soundness of banking sectors depends on the effectiveness of risk management system. Financial stability of any nation depends on the effective and sound working of banking industry over the sustainable period of time. (Oke et al 2012). Effective and sound banking system reflects the health of financial sector of the country. Frequent failures in the banking sector negatively affect the development of economy. (Abhiman and Saibal, 2007). Banks are more exposed towards risks and face various types of financial and non-financial risks. Therefore, it is necessary to have effective risk management system in place and performance of banks heavily depends on the effective risk management system. In today's business world risk is a reality and no one can close his or her eyes towards risk. Lending and risk of default go along with each other side by side. Lending is the foremost function of every commercial bank. It is the main source of interest income. Dasah, et. al, (2012). Advances or granting credit is the biggest source of income for all then commercial banks. Hosna et. al, (2009), Bashir, (2000). Banks are very much concerned about the threats and challenges of credit risk. In order to avoid or reduce credit risk there is a need to have effective risk management system. In effective risk management system, risk management practices are followed to tackle the problem of risk.

- **Credit Risk and its Importance**

In simple words, Credit risk means risk of default by the borrower. There is a possibility that amount given by the bank in the form of lending is not returned by the borrower or not recovered by the lender due to any reason whatsoever. According to Nawaz et al. (2013). In today's dynamic business world, risk management has become the integral part of effective management practices. Risk management is the systematic way to identify, analyze, assess and monitoring of risk with the prime objective of mitigating the risk. Banks and financial institutions are more exposed towards the phenomenon of risk because of their nature and complexity of business conditions. The failure towards the risk management badly affects the performance of financial institutions and increase in bad debts become hurdle in the way of achieving strategic objectives. In the worse scenario, lack or absence of effective risk management may result disasters and drag the business into irrecoverable situation. Similarly, credit risk management allows the banks to

become more watchful towards the risk of default by the borrowers. Effective credit risk management not only reduce the rate of default of loans but also improves the profitability of the banks.

Risk is associated with the lending and every bank wants to avoid the risk of default by the borrower. In the absence of effective credit risk management, there are high chances of risk of defaults and ultimately it affects the profitability and consequently affect the share prices of banks. Frequent failures in the banking sector negatively affect the development of economy. (Abhiman and Saibal, 2007). Therefore, it is necessary to have effective risk management system in place to tackle the problem of default risk. Financial stability of any nation depends on the effective and sound working of banking industry over the sustainable period of time. (Oke et al 2012). This study will focus on the relationship between credit risk management and profitability and will attempt to confirm or disprove the statements given by the different authors.

Review of the Literature

- **Theoretical Foundation of Study**
  - **Credit Risk Theory**

Credit risk is the risk of default by the borrower. This risk does not arise only from borrower. Sometime banks become insolvent and unable to return amount taken form depositors. Proper measures are taken by the banks to avoid risk of defaults. Sometime this risk is transferred to third party or insurance company. The higher the risk the higher the rate of interest. (Owojori, Akintoye & Adidu, (2011).

  - **Credit Risk and Credit Risk Management**

In past studies and literature, credit risk has been discussed or defined in different ways. According to Fredrick (2012) and Kaaya and Pastory (2013) credit risk is the inability of borrower to pay his or her dues on time according to the terms and conditions specified by the banks.

Nawaz et al. (2013) discussed that credit risk is the failure form the part of that person who has borrowed money from the banks and unable to pay it off on time. Extending credit is the foremost function of every commercial bank but there is one big problem which is associated with the advances or extending credits is credit risk. Banks are exposed toward credit risk due to credit facility provided by the bank.

(Srivastava, 2010:507). Most significant and critical risk faced by the commercial banks is credit risk. Performance and survival of banks depend on the effective identification, measurement and mitigation of risk. (Afriye and Akotey, 2010; Oke, et al 2012).
Most crucial risk among all risks is credit risk and it comprises of three risks, default risk, exposure risk and recovery risk. (Hosna, et al 2009). Credit risk is the risk which arises due to nonpayment of borrowed amount by the borrower or obligator in term of loan or any other line of credit. Basel Accord (2006).

Credit risk management is required to mitigate the risk associated with lending. Risk management includes identification, analysis, measurement, monitoring and mitigation of risk. (Kaaya and Pastory, 2013; Musyoki and Kadubo, 2012; Nawaz et al, 2013).

Credit risk management is a systematic and planned activity that tackles the problem of risk by using administrative resources and applying different strategies to monitor and control the risk. Process of identifying, analyzing and controlling the risk is credit risk management. (Poudel, 2012). Prior studies (Nawaz et al., 2012; Musyoki & Kadubo, 2012; Poudel, 2012) suggest that NPL ratio and LA ratio are the most important ratios to know the level of credit risk. NPL ratio is used to understand the quality of assets and it is also used to know the credit extension policy of banks. Achou and Tenguh (2008) found in their study which was conducted that credit risk can be analyzed and managed by the commercial banks efficiently. They took the data of five years from 2001 to 2005 from Qatar Central Bank. Results of the study indicated that there was a significant relationship between credit risk management and performance of the banks. In this study, NPL/ TL ratio was used to measure the credit risk and this ratio had negative association with the performance or profitability of the banks. ROA and ROE were used to measure the profitability of the banks. Banks are more exposed towards high risk loans. As the unpaid loans or NPL increase, they badly affect the returns of the banks. Higher the unpaid loan, lower the returns of the banks. (Miller and Noulas, 1997; Kolapo et al., 2012). Joseph, Edson, Manuere, Clifford, and Michael (2012) conducted a questionnaire-based study and questionnaires were distributed to the 30 representatives of CBZ bank. The main purpose of this study was to know and analyze the reasons of non-performing loans. They found in their study that NPLs are negatively associated with the performance of the banks. It was further discovered that profitability of the banks is badly affected by NPLs. Badar and Javid

(2013) found in their study that NPLs badly affect the liquidity and profitability of the banks. If default rate increases, it requires large amount for provision of defaults and it consequently affect the profitability of the banks. Poudel (2012) conducted a study by taking data form 31 banks from year 2001 to 2011. Independent variables of this study were default rate and capital adequacy ratio and according to this study both the ratios had negative impact on the profitability of the banks. This study further revealed that default rate was the main influencer and had significant negative impact on the profitability of the banks. Boahene et al. (2012) conducted study in Ghana and found that NPLs and capital adequacy ratio had signification impact on the profitability of the banks. In this study fixed effect model was used and it was revealed from the results that both the ration has significant negative impact on the profitability of the firm. Aemir & Rafisa (2014) conduced study in Ethiopia and collected the data from the year 2007 to 2011 from the commercial banks of Ethiopia. In this study results revealed that capital adequacy ratio and operating efficiency had positive relationship with the profitability of the banks. In this study, penal data was used for analysis of data. (KOLAPO, T. Funso et-al, 2012) conducted a study and used three variables for the measurement of risk. These variables included NPL total loans, Total loans to Total deposits ratio and Loan loss provision to Total Loans. For this study five commercial banks were selected and penal data was used and each bank was considered as cross section.

(OGBOI, Charles, 2013) conducted study on the topic of credit risk management and financial performance of banks. This study also used Loan Deposit ratio, NPL, Loan loss provision and CAR and ROA for analysis purpose. This study was based on the penal data and results revealed that NPL and CAR had positive impact on the profitability of the banks and Loan Deposit ratio and loan loss provision had negative impact on the profitability of the firm. Tahir, (2014) conducted a study in Pakistan and found the same result that loan loss provision has opposite relationship between loan loss provision and return on assets. Tahir, S., Ahmad, F., & Aziz, B, (2014) conducted study in Pakistan and analyzed the impact of risk management variables on the financial; performance of the banks. Results of the study revealed that loan loss provision had negative impact on the financial performance of the banks. In this study, ROE and ROA were used for the measurement of profitability. According to this study LLP decline the profit and affect negatively on the financial soundness of the banks. Dhanuskodi Rengasamy (2014) conducted a study and found that Loan to Deposit ratio had negative but insignificant relationship with the return on asset ratio. Das, A. and T. V.

- **Interest Rate, Inflation, GDP, Size and their impact on the Profitability of the banks**

There are several macroeconomic factors which also affect the profitability of banks. These factors represent the macroeconomic environment such as inflation, interest rate, GDP, cyclical output and other variables that represent the characteristics of market. (Athanasoglou et al, 2005). Revell (1979) analyzed the impact of inflation on the profitability of banks. He found that inflation only affects profitability in a situation, where it hits wages and operating costs and these expenses also increase as faster as inflation. Saunders & Cornett (2003) discussed in their study that sudden change in the interest rates resulted losses in the market value of assets and it ultimately affects the performance of banks. According to Kosmidou and Pasiouras (2005) and Hassan and Bashir (2003) GDP does affect the profitability of financial sector of the country.

❖ **Research Hypothesis**

Ho: There is no relationship between LLPR and profitability of banks.
Ho: There is no relationship between LTDR and profitability of banks.
Ho: There is no relationship between CAR and profitability of banks.
Ho: There is no relationship between SZ and profitability of banks.
Ho: There is no relationship between INF and profitability of banks.
Ho: There is no relationship between IR and profitability of banks.
Ho: There is no relationship between GDP and profitability of banks.

Methodology

This part consists of methodological approach, research strategy to be used, and method of data collection, sample size, stochastic model, test to be applied and definitions of different variables involved in the study.

❖ **Methodological Approach**

This research study is based on the deductive approach. Deductive approach starts from theory and ends on hypothesis testing and finally results are analyzed and conclusion is drawn. Deductive approach is normally used in quantitative studies. This approach shows the relationship between theory and variables involved in the study. (Bryman & Bell, 2011). In this study relationship between credit risk management and profitability will be analyzed.

- **Research Strategy**

Nature of this study is quantitative. This study is based on quantitative or numerical data. The main objective of this study is to test the hypothesis and generalization of results.

- **Research Philosophy**

Post positivism will be used in this study. In post positivism, hypothesizes are accepted or rejected. Similarly, in this particular study hypothesizes will accepted or rejected.

- **Data Collection**

In this study secondary data will be used for analysis. In secondary date, penal date will be used. Data will be taken from the website of State Bank of Pakistan.

- **Study Period and Sample Size**

In this study, data will be collected from year 2014 to 2023. 16 private sector commercial banks have been selected for data collection and analysis purpose.

- **Research Method/ Tests to be applied**

Baskin (1989) and Hussainey et al. (2011) methodology will be followed in this particular study. OLSR (Ordinary least square regression) will be used to find regression and their coefficients on penal data. Beside regression and their coefficients, descriptive statistics, correlation analysis and stationary tests will be conducted. Moreover, random effect or fixed effect model will also be used. Finally, Residual testing will also be done through correlogram and other tests.

- **Operationalization of Variables**
  - **Independent variables**

Independent variables of this study are, Non-performing loan ration (NPLR), Loan loss provision ratio (LLPR), Loan Deposits ratio (LDR) and Capital Adequacy ratio (CAR)

  - **Control variables**

Control variables of this study are size, Inflation, interest rate and GDP

  - **Dependent variables**

Dependent variable of this study is ROE.

- **Stochastic Model**

The stochastic model under study is as follows:
$ROE_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 LTDR_{it} + \beta_4 CAR_{it} + \beta_5 SZ_{it} + \beta_6 INF_{it} + \beta_7 IR_{it} + \beta_6 GDP_{it} + \varepsilon_{it}$

Discussion on Results

❖ Introduction

In this chapter of the study, results and finding would be interpreted or explained by keeping in view the objectives of the study in mind. This chapter has five parts. In the first part of the chapter, descriptive statistics will be discussed. In the second part, it will be found that whether data is stationary or not. In the third part, simple regression, Housman test, random or fixed effect model will be used. In the fourth part, diagnostic tests of residual will be conducted and final part would reflect the conclusion of results. It is mentioned in the part of methodology that this study is being conducted to know the impact of macroeconomic factors and credit risk management on the profitability of commercial banks. For analysis purpose, 16 private commercial banks have been selected. Dependent variables of this study is Return on equity (ROE). On the other hand, independent variables of this study are capital adequacy ratio (CAR), non-performing loan ratio (NPLR) and loan loss provision ratio (LLPR). This study has three control variables which also affect the profitability of banks such as inflation (INF), interest rate (IR) and gross domestic product (GDP)

❖ Descriptive Statistics

Table 1 Summary Statistics

VARIABALS	NPLR	LLPR	LTDR	CAR	SZ	ROE	INF	IR	GDP
Mean	0.12	0.09	0.67	0.16	11.42	0.07	9.40	10.63	3.73
Median	0.10	0.08	0.67	0.13	11.49	0.14	8.20	11.00	3.90
Maximum	0.40	0.34	1.14	0.57	12.40	0.37	20.80	14.00	6.00

Minimum	0.00	0.00	0.34	0.01	10.22	-1.23	2.90	6.30	2.00
Std. Dev.	0.08	0.06	0.17	0.09	0.47	0.25	4.71	2.58	1.14
Skewness	1.36	1.31	0.38	2.64	-0.51	-2.97	1.06	-0.27	0.13
Kurtosis	5.23	5.20	2.64	10.99	2.90	13.04	3.97	1.85	2.74
Observations	160	160	160	160	160	160	160	160	160

Note: Whereas, NPLR is non-performing loan ratio, LLPR is loan loss provision ratio, LTDR is the loan to deposit ratio, CAR is capital adequacy ratio, SZ is size, ROE is return on equity, INF is inflation, IR is interest rate and GDP is gross domestic product.

Above Table is indicating the maximum, minimum, average values, Standard deviation of all dependent and independent variables.

- **Stationary Test**

Table 2 Unit Root Test: Test of data stationary: Levin, Lin & Chu *

Independent Variables	Statistic	Probability Value	Stationary
NPLR	-4.68123	0.000	At Level
LLPR	-8.03716	0.000	At Level
LTDR	-4.38866	0.000	At Level
CAR	-5.57826	0.000	At Level
Control Variables			
SZ	-3.0894	0.001	At Level
INF	-38.495	0.000	At First Difference
IR	-8.74777	0.0002	At First Difference
GDP	-8.00938	0.0351	At Log
Dependent Variable			

ROE	-2.7656	0.0028	At Level

Note: Whereas, NPLR is non-performing loan ratio, LLPR is loan loss provision ratio, LTDR is the loan to deposit ratio, CAR is capital adequacy ratio, SZ is size, ROE is return on equity, INF is inflation, IR is interest rate and GDP is gross domestic product.

Hypothesis of unit root test is that data is non-stationary, if data has unit root and probability or significant value is above .05. Contrary to the previous statement, data is stationary, if it has not unit root or probability or significant value is less than .05. Above table indicates that NPLR, LLPR, LTDR, CAR, SZ, are stationary at level because their probability values or p values are less than .05 and IR and IN are stationary at first difference because their probability values or significant values are less than .05 at first difference and GDP is stationary at log because its probability value is less than .05 at log.

- **Estimation through Stochastic Model**

$$ROEit = \beta_0 + \beta_1 NPLRit + \beta_2 LLPRit + \beta_3 LTDRit + \beta_4 CARit + \beta_5 SZit + \beta_6 INFit + \beta_7 IRit + \beta_6 GDPit + \varepsilon it$$

As specified in the objectives of research mentioned in the first chapter, an author is interested to know the impact of independent variables (NPLR, LLPR, LTDR, CAR) and control variables (SZ, INF, IR, GDP) on the dependent variable (ROE). In order to achieve the specified objective, a stochastic model based on regression has been developed or formed and it is also mentioned above. This model will be used to identify the impact of independent and control variables on the dependent variable. As discussed in the third chapter that this study is based on penal data that is why OLS regression model has been formed or developed.

- **Comparison of Fixed and Random Effect Models through Hausman Test**

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.

Cross-section random	0.000000	8	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

❖ Random Effect Model Results and Hypothesis Testing

Dependent Variable: ROE

Method: Panel EGLS (Cross-section random effects)

Date: 01/22/24 Time: 14:24

Sample (adjusted): 2014 2023

Periods included: 9

Cross-sections included: 16

Total panel (balanced) observations: 144

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.010889	0.590974	-5.094789	0.0000
NPLR	-1.043469	0.349034	-2.989594	0.0033
LLPR	-1.201360	0.540226	-2.223809	0.0278
LTDR	0.256781	0.118973	2.158312	0.0327
CAR	0.781664	0.205323	3.806999	0.0002
SZ	0.246086	0.046696	5.269934	0.0000
DINF	0.001958	0.003094	0.632754	0.5280
DIR	0.006599	0.008035	0.821267	0.4129

LGDP	0.175927	0.060301	2.917490	0.0041

Effects Specification

	S.D.	Rho
Cross-section random	0.039039	0.0658
Idiosyncratic random	0.147074	0.9342

Weighted Statistics

R-squared	0.543027	Mean dependent var	0.054362
Adjusted R-squared	0.515947	S.D. dependent var	0.215284
S.E. of regression	0.149782	Sum squared resid	3.028661
F-statistic	20.05277	Durbin-Watson stat	1.877089
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.608757	Mean dependent var	0.069492
Sum squared resid	3.211644	Durbin-Watson stat	1.770143

Above table is portraying the results of fixed affect model. In this study, dependent variable is ROE, while independent variables are NPLR, LLPR, LTDR, CAR and SZ, INF, IR and GDP are control variables. In this study, hypotheses are tested at 5 percent significant level.

Note: Whereas, NPLR is non-performing loan ratio, LLPR is loan loss provision ratio, LTDR is the loan to deposit ratio, CAR is capital adequacy ratio, SZ is size, ROE is

return on equity, INF is inflation, IR is interest rate and GDP is gross domestic product.

H_{01}: NPLR has no significant impact on the profitability of banks.

H_1: NPLR has significant impact on the profitability of banks.

According to the above table which is showing the results of random effect model, significant value or P value of NPLR is 0.0033 which is less than .05. It means that NPLR has significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be accepted and alternative hypothesis will be accepted.

H_{01}: LLPR has no significant impact on the profitability of banks.

H_1: LLPR has significant impact on the profitability of banks.

According to the above table which is showing the results of random effect model, significant value or P value of LLPR is 0.0278 which is less than .05. It means that LLPR has significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be accepted and alternative hypothesis will be accepted.

H_{01}: LTDR has no significant impact on the profitability of banks.

H_1: LTDR has significant impact on the profitability of banks.

According to the above table which is showing the results of random effect model, significant value or P value of LLPR is 0.0327 which is less than .05. It means that LTDR has significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be accepted and alternative hypothesis will be accepted.

H_{01}: CAR has no significant impact on the profitability of banks.

H_1: CAR has significant impact on the profitability of banks.

According to the above table which is showing the results of random effect model, significant value or P value of CAR is 0.0002 which is less than .05. It means that CAR has significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be accepted and alternative hypothesis will be accepted.

H_{01}: SZ has no significant impact on the profitability of banks.

H_1: SZ has significant impact on the profitability of banks.

According to the above table which is showing the results of random effect model, significant value or P value of CAR is 0.0000 which is less than .05. It means that SZ has significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be accepted and alternative hypothesis will be accepted.

H_{01}: INF has no significant impact on the profitability of banks.

H_1: INF has significant impact on the profitability of banks.

According to the above table which is showing the results of random effect model, significant value or P value of INF is 0.5280 which is more than .05. It means that INF has no significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be rejected and alternative hypothesis will become falls.

H_{01}: IR has no significant impact on the profitability of banks.

H_1: IR has significant impact on the profitability of banks.

According to the above table which is showing the results of fixed effect model, significant value or P value of IR is 0.4129 which is more than .05. It means that IR

has no significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be rejected and alternative hypothesis will become falls.

H_{01}: GDP has no significant impact on the profitability of banks.

H_1: GDP has significant impact on the profitability of banks.

According to the above table which is showing the results of fixed effect model, significant value or P value of GDP is 0.000 which is less than .05. It means that GDP has significant impact on the profitability of commercial banks. Therefore, we can conclude that null hypothesis will not be accepted and alternative hypothesis will be accepted.

- **Model Specification**

Table 5

Effect Specification			
Cross-sections Random Effect			
R-squared	0.543027	Mean dependent var	0.054362
Adjusted R-squared	0.515947	S.D. dependent var	0.215284
S.E. of regression	0.149782	Sum squared resid	3.028661
F-statistic	20.05277	Durbin-Watson stat	1.877089
Prob(F-statistic)	0.0000		

R^2 gives an idea that how much explanation model is giving about the phenomenon under study. According to the above table, R^2 is 54.3%, it means that profitability of commercial banks which is the dependent variable is 54.3% being explained by the

independent variables (CAR, LLPR, and NPLR) and control variables. (SZ, INF, IR, GDP).

Statisticians use R square to judge or know the usefulness of stochastic model. Is model useful for prediction or not? In this study, R square is 54.3%. This result indicates that R square is at higher side, it means mode is fit and useful for prediction. Durbin-Watson's value is 1.877. It means that there is no problem of auto correlation. It is further confirmed by the value of F statistic which is 68 and p value or (F statistic) is 0.0000. If F-statistic is more than 4 and p value is lower than .05, it means model is quite appropriate for prediction.

- **Diagnosis Testing of Residual**

Finally, diagnostic testing of residual is done to make sure that results are more robust and valid and it is the requirement of multiple regression technique.

- **Correlogram of Resid**

Date: 01/19/21 Time: 12:04
Sample: 2011 2020
Included observations: 144

Autocorrelation	Partial Correlation	AC		PAC	Q-Stat	Prob
.|* |	.|* |	1	0.145	0.145	3.0821	0.079
.|. |	.|. |	2	0.065	0.045	3.714	0.156
.|. |	*|. |	3	-0.053	-0.07	4.1277	0.248
.|. |	.|. |	4	-0.025	-0.011	4.2206	0.377
.|. |	.|. |	5	-0.061	-0.05	4.7796	0.443

.|. |	.|. |	6	0.048	0.064	5.1313	0.527
.|. |	.|. |	7	0.036	0.026	5.3333	0.619
.|. |	.|. |	8	0.005	-0.018	5.3365	0.721

Correlogram is used for diagnostic testing of residual. It tells us about the problem of auto correlation and partial auto correlation. Above table indicates that there is no problem of partial auto correlation and auto correlation because all the probability values are more than .05.

- **VIF**

$$VIF = \frac{1}{1 - \text{Adjusted R square}}$$

$$VIF = \frac{1}{1 - .51594}$$

VIF = 2.026

Value of VIF is 2.026. Result is very encouraging and showing that there is no problem of multicollinearity in the data. If value is less than 5, it means there is no problem of multicollinearity and results are robust and valid.

- **Serial (AUTO CORRELATION) Correlation**

If data is affected or influenced by its own historical data or results, this situation depicts the problem of serial auto correlation and problem of serial auto correlation is alarming and it leads or makes the results spurious. Therefore, it is necessary that there should not be any problem of serial auto correlation. If data is free from the problem of auto correlation it leads the results towards robustness. As shown in the

table 6, where the value of Durbon Watson is 1.87, which is nearer to 2. It means there is no problem of auto correlation and predication from the model under study are valid and robust.

- **Summary of Results**

In this chapter, penal data was analyzed in detail and different tests were applied for analysis purpose. Descriptive statics were found to know the maximum, minimum and mean values. Beside this, standard deviation was also calculated about every individual variable. After that data was checked that either it is stationary or not. Unit root test was applied for checking stationary of data and in this regard Levin, Lin & Chu test was applied on every variable involved in this study. After converting the non-stationary data into stationary data, Hausman test was applied to know that whether fixed effect model would be used or random effect model. Housman test guided that random effect model is more appropriate for prediction. After that diagnostic rests of residual were conducted. Correlogram was used to know that whether results are free from the problem of auto correlation and serial correlation. Probability values are more than .05, it means there is no problem of auto correlation and it was further confirmed through Durbon Watson test, the result of Durbon Watson was 1.87 which is nearer to 2, it means there is no problem of auto correlation. R square of model is 54.3 % and VIF was calculated to check the problem of multicollinearity and result of VIF is less than 5, it means there is no problem of multicollinearity.

Conclusion

This study has been conducted to know the impact of credit risk management and macroeconomic factors on the profitability of private commercial banks of Pakistan. In this study dependent variable was ROE and independent variables were NPLR, LLPR, LTDR and CAR and there were four control variables such as SZ, INF, IR and GDP. Results of the study reveals that all variables are showing significant impact

on the profitability of the bank except two variables which are inflation and interest rate. On the basis of these finding, we can easily conclude that credit risk management is very import and does affect the financial performance of the banks. Beside this, macroeconomic factors also affect the profitability of banks.

Future Directions

- In this study, only private commercial banks have been taken into the consideration, in future public sector banks can also be taken into the consideration.
- Islamic banks are not taken into the consideration, in future Islamic banks can also be taken into the consideration.
- In future, some other control variables can also be taken like growth, leverages etc. that also the profitability of banks.
- In this study, only credit risk has been studied, in future other risks like liquidity risk, operational risk, and market risk can also be assessed or analyzed.
- On risk management practices, survey-based research can also be conducted to know the importance given by the top management toward this vital issue.
- Mixed methodology can also be used in future studies.

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