

Research on Bank Performance In Relation To Bank-Specific and Macro Variables

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Abstract: Banking industry remains a topic of interest as it contributes to the overall economy of any country. This study has been conducted to check the impact of bank-specific and macro level variables on the bank profitability. We use sample of Pakistani Banks listed in Pakistan Stock Exchange for the Period of 2007 to 2013 with 161 observations. In our study we take comparison between 3 models i.e. Pooled Effect model, Fixed Effect Model and Random Effect Model and also take three dependent variables. Result concluded that internal factors have significant impact on profitability of bank, however, the study fails to find such significant relationship between macro level indicators and bank profitability in Pakistani environment.

Keywords: Bank's profitability, credit risk, GDP, Inflation,

1. Introduction

Considering the current competitive world of business, banking sector plays a vital role in the economic development of the countries. A strong and healthy banking sector is an indicator of better economic health of the country. Same as any other commercial organization, bank have no different objective of profit and wealth maximization by acting as a middle agent between borrowers and lenders. Loans and advances are decisive for asset holding and contribute a major share of operating revenue. Banking sector performance and profitability is also interrelated with financial markets as Sharma and Mani (2012) reported that the banking sector development have an impact on the financial markets and vice versa.

Banking sector in Pakistan is growing with a rapid speed and after the financial crises struck the world it is quite vital to further investigate market-specific variables as determinants of bank performance (Sultan, Ali, & Saeed, 2013). This study aims to investigate the determinant of bank profitability in Pakistan. The study has been extended to include the bank-specific variable as well as the macro-economic variables in order to check their impact on the bank profitability.

2. Literature

The extensive literature on the subject area is an evidence of its importance. Many researchers have tried to investigate different factors as indicator and determinant of the banking sector performance and profitability of the country. Ali, Akhtar, and Ahmed (2011) has reported positive affect of bank-specific variables like size, efficiency, asset management and portfolio composition on bank profitability but a negative effect on capital and credit risk while investigating 22 banks of Pakistan for a period of 2006-2009.

Another research, for Saudi and Jordanian banks on a data set of 2005-2011, posits a positive relationship of profitability of banks with internal factor for Saudi banks while the result is found to be negative for Jordanian banks (Almazari, 2014). His conclusions reveal that there is a difference in determinants of bank profitability between Saudi Arabian and Jordanian market.

Considering, liquidity risk and credit risk as a determinant of bank performance and profitability, Imbierowicz and Rauch (2014) conducted a research for the data set from 1988-2010. They used liquidity proxy variables and concluded that LR and CR have direct relationship. Our result shows that both risk types do not have an economically significant reciprocal simultaneous or time-lagged relationship.

Banking industry crises in the past few decades remained a topic of interest for the researchers. In the same scenario, banking industry of Switzerland have been targeted for the crises period from 2006-2010 and by applying the GMM model, the study concluded that higher average loan growth has a positive effect on bank profitability while the high funding cost has a reverse effect (Dietrich & Wanzenried, 2011).

Another research in the same area is conducted by Kolapo, Ayeni, and Oke (2012) as the examined the credit risk with respect to profitability of the banks in Nigerian market. The study was designed to examine the bank's profitability determinants with a data for 11 years starting from 2000-12 and found that there is a

significant and positive impact on the profitability of Banks in Nigeria with a proposal to enhance the administration and capacity in credit analysis. Later, the same positive and significant relationship is described by Kurawa and Garba (2014) between credit risk management and bank profitability. Afiriyie and Akotey (2013) also posit the same while explaining the credit risk management with respect to rural bank's profitability in Ghana with a concluding remarks that the rural banks extend the loan facility on higher rate of interest due to which the loans are converted into NPLs.

The study conducted by Louzis, Vouldis, and Metaxas (2012) has further explored the subject by including macro-economic variables in relation to bank profitability and explicitly defining non-performing loans as determinant of bank profitability. They posit that the mortgage loans have lowest NPLs which means the loans and advances against better collateral are better. Furthermore, they express a significant effect of macro-economic variables on the level of Non-Performing loans. The banking industry is majorly relying on the loans and advance for its assets in balance sheet which contribute to its profitability. Therefore, a high rate of NPL will result in poor performance of the banks.

3. Methodology

This section of the paper illustrate the methodology adoption for the research in order to achieve our research objectives.

3.1 Data

In order to achieve our objectives of the study we have collected a data of 23 commercial bank in Pakistan from their official websites. Total number of banks listed in Pakistan Stock Exchange PSE are 26 and the rest of the banks are dropped from our sample as their data was unavailable for the study period. The data is gathered from their published annual reports as per law of SECP.

3.1.1 Dependent Variables

Return on Assets: Return on Assets is mainly operational efficiency indicator as it explains the management quality of the banks with respect to bank's assets and net profit. The mathematical formula to calculate ROA is as follow:

$$ROA = \text{Net Income} / \text{Average_Total_Assets} \quad (1)$$

The above stated definition is quite common and widely used by the researchers (Erina & Lace, 2013).

Return on Equity: Another most common proxy used to evaluate the performance and profitability of the commercial organization is Return on Equity (ROE). As the banks are not different from conventional profit maximization firms so the same performance indicators are used by researchers to investigate different research questions.

ROE is ratio of bank's net income to its shareholder's equity and determines whether the employed share capital is generating good income for the firm or not. The mathematic calculation is described in equation (2) which is consistent with Erina and Lace (2013).

$$ROE = \text{Net Income} / \text{Shareholder's_Equity} \quad (2)$$

Net Profit Margin: The next measure taken to evaluate the bank's performance is Net Profit Margin (NIM). NIM is the ratio between net income and markup income of the bank and express the way of earning with the explanation of segregation between markup income and net income. We have used the same definition to calculate this variable for our study as used by Francis (2013). The mathematical form is given in equation number (3).

$$NIM = \text{Net Income} / \text{Markup_Income} \quad (3)$$

3.1.2 Independent Variables

Liquidity: Liquidity of the firm is taken as our first independent variable for this study. Liquidity of the firm explains that how quickly a firm can convert its assets in cash. This represents the liquidity position of the firm in order to fulfil its current liabilities. For this research, we have used the same definition and calculation

method for Liquidity of the firm as explained by Almazari (2014), Ogboi and Unuafe (2013), Kurawa and Garba (2014) and Kolapo et al. (2012). Equation form of the calculations is as follow:

$$Liquidity = Liquid_Assets / Deposits + Borrowings \quad (4)$$

Credit Risk: The other independent variable taken for research is credit risk of the banking firm. This indicates that how risky is the given loans & advances. As loans & advances are quite vital in generating the profits for the banking industry so this ratio is worth to add in the model while explaining the profitability and performance of the bank. The following method is adopted to calculate the ratio:

$$Credit\ Risk = Provision_Against_Loans\&\ Advances / Interest_Income \quad (5)$$

The above stated definition and calculation for the said variable is consistent with Imbierowicz and Rauch (2014), Kolapo et al. (2012), Francis (2013) and (Sufian & Chong, 2008).

Capital Strength: It is evident that well capitalized firms are better position to generate more profitability. The researcher in past have used Capital strength as a determinant of firm performance (Ali et al., 2011; Dietrich & Wanzenried, 2011; Mashharawi & Al-Zu'bi, 2010; Muda, Shaharuddin, & Embaya, 2013; Ramadan, Kilani, & Kaddumi, 2011) which enlighten the importance of this variable to be included in our model of study as we are targeting the same question of performance indicators. We have used the same calculation method as of above stated authors which is as follows:

$$Capital\ Strength = Equity / Total_Assets \quad (6)$$

GDP Growth: This research is aimed to include both bank-specific and macro-economic variables as determinants of bank performance therefore, we include our first variable as GDP Growth. GDP defines the financial stability of the country and if include its growth rate then we can explain how a country is growing financially. It is an indicator of the countries productivity and consumption and calculated on annual basis. Before this study, same variable is used by Louzis et al. (2012), Sharma and Mani (2012) and Mashharawi and Al-Zu'bi (2010) while explaining its effect on the performance of banking industry of respective countries. The definition brings us to the following mathematical form of calculation:

$$GDP = C + G + I + NX \quad (7)$$

Inflation: Inflation rate of any country is an indication of rate of change in the level of prices of services and goods in that particular country over the year. If the inflation rate is high then the purchasing power of the country population will decrease which is an economically proven fact. Government of the country always remains focused in order to maintain a balance in such ratio to stable the economy with the help of monetary policies. Inflation also effect the actual performance and profitability of the firms commencing their businesses in respective countries therefore, the banks are also affected with the change in inflation rate of the country. This variable is included in the research in order to examine its impact on the performance of the banks in Pakistan.

Interest Rate: Interest rate is defined as the interest charges on borrowed money from lender on principal amount. Interest rate is usually calculated based on annual, semi-annual or quarter basis. There are two forms of interest rate calculation. One is the simple interest rate while the other is compound interest rate and the formulae for both are given below:

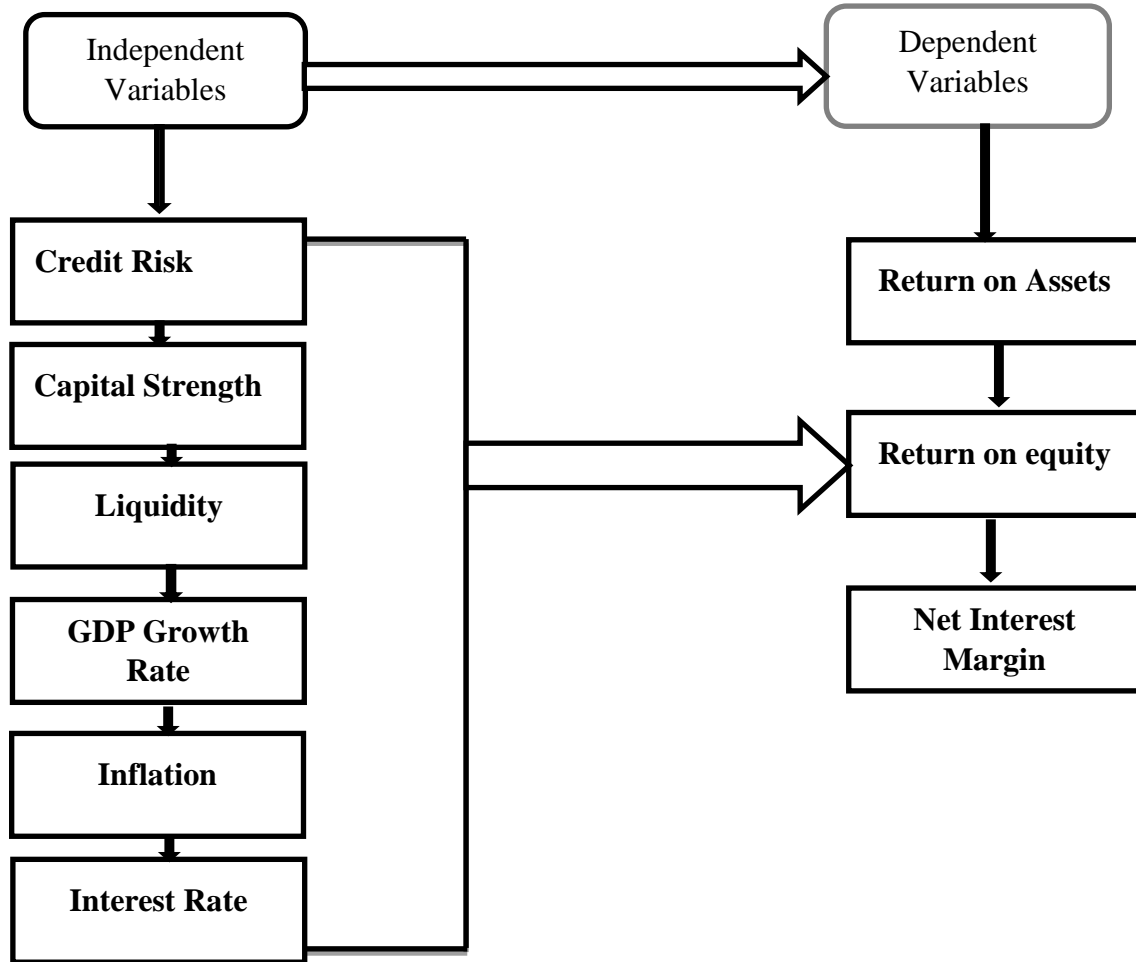
$$Simple\ Interest = P (Principal\ amount) \times I (annual\ interest\ rate) \times N (No.\ of\ Years) \quad (7)$$

$$Compound\ Interest = P (Principal\ amount) \times [(1 + I (annual\ interest\ rate)N (months)) - 1] \quad (8)$$

3.2 Theoretical Framework

This study is conducted on Pakistani banking industry in order to investigate the effect of different bank-specific and macro-economic variables on the performance and profitability of banks. We have included credit risk, capital strength and liquidity as bank-specific independent variables whereas GDP growth, Inflation rate and interest rate are the macro-economic indicators which serve as independent variables in our model as well. We have taken three measures of bank performance and profitability as dependent variables in our research model i.e. Return on Assets, Return on Equity and Net interest margin. The graphical representation of our theoretical framework is given below:

Theoretical Framework



3.2.1 Pooled Regression Model

Pooled regression model is typically used for time series and cross sectional data. This approach is normally used when group data to be pooled are comparatively similar or homogenous.

3.2.2 Fixed Effect Model

This model basically measures the differences in intercepts for each group. The approach is also called "Least Squares Dummy Variable" method for this purpose. This is actually an OLS model with dummy variables to control for constant variance across groups, assuming coefficients, group differences, and for independent variables.

3.2.3 Random Effect Model

This method influences the differences in the variances of error term to model groups together.

3.2.4 Design of Empirical Model

$$ROA_{it} = \alpha_{it} + \beta_1 CR_{it} + \beta_2 CS_{it} + \beta_3 GDPGR_{it} + \beta_4 INF_{it} + \beta_5 IR_{it} + \beta_6 LIQ_{it} + e_{it}$$

$$ROE_{it} = \alpha_{it} + \beta_1 CR_{it} + \beta_2 CS_{it} + \beta_3 GDPGR_{it} + \beta_4 INF_{it} + \beta_5 IR_{it} + \beta_6 LIQ_{it} + e_{it}$$

$$NIM_{it} = \alpha_{it} + \beta_1 CR_{it} + \beta_2 CS_{it} + \beta_3 GDPGR_{it} + \beta_4 INF_{it} + \beta_5 IR_{it} + \beta_6 LIQ_{it} + e_{it}$$

Where i = the no. of banks and period t = 2007, 2008,, 2013.
 e = residual error.

4. Result and Discussions

In this chapter we discuss result and discussion of Descriptive Statistics, and comparison between regression models and also Hausman test results. Hausman (1978) Test applies on data which is used to check that fixed and random effect model is appropriate or not for our data.

4.1 Descriptive Statistics

Descriptive statistics gives a useful summary of security returns when performing analytical analysis and empirical analysis, as they provide a historical account of return behavior. Although past information is beneficial in any analysis, one should always consider the expectations of future events.

Table I Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
ROA	160	-0.00038	0.041197	-0.405848	0.153114
ROE	160	-0.01093	1.293935	-14.74267	3.667429
NIM	160	-0.08802	6.522565	-50.22327	57.57458
CR	160	0.741452	3.947417	-3.019183	37.55602
CS	160	0.173700	0.704739	-0.030771	8.844550
GDPGR	161	3.598571	1.146249	1.600000	5.700000
INF	161	12.18571	4.033359	7.600000	20.30000
IR	161	2.332857	4.864723	-4.480000	10.00000
LIQ	161	4.487823	12.59922	0.106387	106.8379

The table gives result in an average ratio of 12.33 with standard deviation 12.59. After excluding the outlier min value is -50.22 and max value is 57.57. As Table 1 indicates that liquidity and net interest margin present higher standard deviation with 12.59 and 6.52 respectively as compare to other variables, which shows that these two variables have more significant variance instead of other variables.

4.2 Independent Variables Correlations

Correlation is a measure of relationship among two variables. With correlation we indicates that either relationship is positive or negative and also check it out that relationship is significant or insignificant. Result indicates that credit risk has positive relationship with inflation rate and negative with others, it has significant as well as strong relationship with capital strength, GDP growth rate, liquidity and hardly with inflation and insignificant with others.

Table III Independent Variables Correlations

	CR	CS	GDPGR	INF	IR	LIQ
CR	1.00000					
CS	-0.04047	1.00000				
GDPGR	-0.04568	-0.53024	1.00000			
INF	0.09909	0.01225	-0.84851	1.00000		
IR	-0.11307	-0.02217	-0.07054	-0.30408	1.00000	
LIQ	-0.01793	0.00272	0.04821	4.07E-06	-0.11009	1.00000

Capital Strength has positive but weak relationship with inflation and liquidity & negative with others, it has significant as well as strong relationship with inflation, liquidity and interest rate and insignificant with others.

There is a positively significant and also strong relationship among GDP growth rate and liquidity and negatively insignificant as well as week association with others. Inflation rate has negative and insignificant relationship with interest rate and positive insignificant with remaining variables. Interest rate has negative and insignificant relationship with liquidity.

4.3 Regression Models Comparison

By applying Pooled Regression Model with ROA only capital strength has positive and significant relationship at 5 % and also only credit risk has negative and significant relationship at 10%. These two independent variables have week impact on ROA. Others have insignificant relationship with ROA. With ROE and NIM only 1 variable (CR) has negatively significant relationship at 5 % (0.05) and others have insignificant some have positive and some have negative relationship among them.

Pool Regression Model	Random Effect Model	Fixed Effect Model
Dependent Variables	Dependent Variables	Dependent Variables

	ROA	ROE	NIM	ROA	ROE	NIM	ROA	ROE	NIM
LIQ	-0.0002	- 0.0017	0.00621	-0.00021	-0.0017	0.00581	-6.39E-0	-0.00178	0.00581
	(0.384)	(0.749)	(0.881)	(0.2933)	(0.7537)	(0.8915)	(0.8241)	(0.7537)	(0.8915)
CS	0.01085	- 0.0425	-0.0126	0.01096	-0.0425	-0.01264	0.01332	-0.04250	-0.01264
	(0.019)*	(0.671)	(0.986)	(0.0033)*	(0.6764)	(0.9867)	(0.0010)*	(0.6764)	(0.9867)
CR	-0.0015	- 0.2417	-0.2204	-0.00155	-0.2417	-0.22017	-0.0010	-0.24176	-0.22017
	(0.055)**	(0.000)*	(0.100)**	(0.0194)*	(0.000)*	(0.10)**	(0.1489)	(0.0000)*	(0.10)**
INF	0.00054	0.0091	-0.1711	0.00051	0.00918	-0.17124	0.00016	0.00918	-0.17124
	(0.796)	(0.840)	(0.615)	(0.7555)	(0.8431)	(0.6184)	(0.9193)	(0.8431)	(0.6184)
GDPG R	0.00420	0.639	-0.3848	0.00407	0.06396	-0.38524	0.00196	0.06396	-0.38524
	(0.554)	(0.678)	(0.738)	(0.4706)	(0.6839)	(0.7406)	(0.7285)	(0.6839)	(0.7406)
IR	-0.00018	0.0143	-0.1294	-0.00018	0.01436	-0.1295	-0.0001	0.01436	-0.12952
	(0.843)	(0.473)	(0.387)	(0.8040)	(0.4811)	(0.3912)	(0.834)	(0.4811)	(0.3912)

Table III Regression Models Comparison

*, **Indicate significance level at 5 %, & 10 % respectively. In parenthesis are the prob. Value.

From overall findings through Pooled Effect model we have been concluded that Credit Risk has significant impact on Banks Profitability and with ROA only Capital Strength has negative but significant relationship.

By using Random effect Model we find that with ROA, has positive and negative but significant relationship with capital strength and credit risk respectively. And with remaining variables some have positive and some have negative relationship. With ROE and NIM credit risk has negative but significant relationship.

By Implementing Fixed effect Model result indicate that, With ROA as only credit risk has positive and significant relationship which shows that it has strong impact on banks profitability.

4.4 Hausman (1987) Test Comparison

It tells us either fixed effect model is best or appropriate or random effect model is best. We can find through probability value if probability value is less than 0.05 then we select fixed effect model and reject random effect model and vice versa.

Table IV Hausman test comparison

Ind. Var.	ROA	ROE	NIM
CR	-0.001049	-0.246519	-0.214183
	(0.1489)	(0.0000)***	(0.1528)
CS	0.013323	-0.033529	-0.010926
	(0.0010)***	(0.7611)	(0.9893)

LIQ	-6.39E-05 (0.8241)	0.0000653 (0.9349)	-0.009313 (0.8752)
IR	-0.000152 (0.8364)	0.014595 (0.4758)	-0.133617 (0.3784)
INF	0.000169 (0.9193)	0.008668 (0.8520)	-0.173480 (0.6144)
GDPGR	0.001964 (0.7285)	0.056664 (0.7189)	-0.390436 (0.7378)

*, ** Indicate significance level at 5 %, & 10 % respectively. In parenthesis are the prob. Value.

Hausman test concluded that capital strength has positive and significant association with ROA and remaining variables have insignificant relationship. Credit risk has negative but significant association among ROE and others have insignificant relationship with ROE and also with NIM.

5. Conclusion

Banking sector plays a vital role in the development of economy in every country. Profitability of commercial banks is basis for diversification, product innovation and efficiency of the commercial banks (Hempell, 2002). Many researchers have studied this subject in the past (Sultan et al., 2013; Sultan, Javed, Bhutta, & Qing, 2016). The objective of this study is to identify which factors have impact on Banks profitability. The necessary data is collected from secondary source. Demirgüç-Kunt and Huizinga (2000) studied on bank profitability and summarized that internal and external determinants effect on banks profitability.

In internal factors liquidity, credit risk, and capital strength included, on the other hand in external factors or determinants GDP growth rate, inflation and interest rate included. Result concluded that internal factors have large proportion on profitability of bank; however external factors have also an impact on the performance. We use sample of 23 Pakistani Banks listed in KSE for the Period of 2007 to 2013 with 161 observations. In our study we take comparison between 3 models i.e. Pooled Effect model, Fixed Effect Model and Random Effect Model and also take three dependent variables. The empirical results on the effect of banks profitability in Pakistan in our sample submit the following conclusions. From comparison between three models, we concluded that capital strength has positive and significant relationship with ROA only in all Models. And has negative and insignificant association with ROE and NIM in all Models which are applied in this study. Credit risk has negative association with ROA and NIM it has significant in pooled Effect Model.

In Random effect Model credit risk has negative and significant relationship with ROA, ROE and NIM. In Fixed Effect Model credit risk has insignificant association with ROA and significant with ROE and NIM.

We concluded from this study that bank specific factors i.e. credit risk and capital strength has impact on bank's profitability and other variables have not impact on bank's profitability.

5.1 Policy Implication

Investors, Government, policy maker and shareholder's used this study to examine the banks specific and macro-economic factors impact on bank's profitability or not.

5.2 Future Directions

We find the impact of bank specific and macro-economic factors on banks profitability. Further studies have been conducted on this topic and check the impact macro-economic and banks specific factors on banks profitability by using data and on an area of cross sectional countries, South Asian and also on Developing countries.

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