

## Risk Management and Bank Performance in Pakistan

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### Abstract

Risk management is crucial for the existence and survival of financial services industry. The major bankruptcies of ENRON and Lehman-Brothers have raised questions about the awareness and existence of appropriate risk management procedures in banks. This study intends to analyze the various risks which affect the banking operations in Pakistan and to assess the effect of risk management on the performance of both large banking institutions and small banking institutions. This study uses capital adequacy ratio, nonperforming loans, liquidity risk, interest rate risk and operational risk as proxies for risk management. Panel data from 2005-2014 was taken from the published annual reports of commercial banks. Descriptive statistics, correlation analysis and random effect OLS regression was used to analyze the data. The analysis leads to the conclusion that better risk management system of banks leads to enhance performance. It was also concluded that capital adequacy ratio, non performing loans, interest rate risk, operational risk and liquidity risk are key drivers of profitability in large banks while nonperforming loans and capital adequacy ratio are the only drivers of profitability in small commercial banks of Pakistan.

*Keywords:* risk management, liquidity, capital adequacy, performance, commercial banks

### Introduction

Financial sector play a vital role in the development and growth of any economy. Banking sector is considered to be an important source of financing for most of the businesses. Last decade has experienced many changes in managing the banking industry because of large scale bankruptcies in the banking institutions like Lehman-Brothers and Bear Stearns. The issue of risk management has become the most important fundamental in recent years. According to Rejda (2008) risk management is a process for the identification and assessment of loss exposures encountered by a business entity and the adoption of appropriate techniques to deal with such exposures. Iqbal & Mirakhor (2011) argued that existence of a strong risk management process can help the private and public banks

to minimize exposures to risks and can enhance the competitive ability of the institution in the market. The study of Carey (2001) opened new avenues for risk management by claiming that financial risk management is compulsory for all types of financial institutions.

Banking institutions in Pakistan avoids those activities which may increase heavy losses of risk. The banks in Pakistan follow the BASEL standards for capital adequacy ratio. This standard holds that a minimum capital must be maintained as minimum capital requirements. The BASEL standards are used as a catalyst in credit decisions and postulate the efficient management of risk to make the financial institutions more competitive. Shafiq & Nasr (2010) stated that banking institutions of Pakistan has encountered large number of risks such as the liquidity risk, credit risk, market risk, foreign exchange risk, operational risk, interest rate risk and many more because of the unstable and volatile environment of the country. This may require the undertaking of studies to cover pertinent areas. This study is the first of the kind which has taken into account the different risks faced by the banks and their effects on the banks' performance using the relevant measurers. This will contribute to fill gaps in the existing literature and aid the understanding of these risks along with devising ways to cope up with them. Moreover, the results of the study will also indicate to what extent the pertinent risks affect the banks' performance which may help the banks' managers to take required steps to deal with measures of risks in order to improve the associated performance. Therefore, keeping in view the importance of risk management for banking institutions this study addresses the following research objectives.

- 1) To identify the major types of risks faced by the commercial banks in Pakistan
- 2) To determine the impact of risk management on the performance of large commercial banks and small commercial banks in Pakistan
- 3) Based on the findings of the study suggesting recommendations for the improvement of banking sector in Pakistan

### **Literature Review**

A number of studies have been conducted to determine the bank profitability. The study on the determinants of bank profitability began when Short (1979) studied the relationship between bank concentration and profit rate. Bourke (1989) extended the same study to twelve countries in North America, Europe and Australia. An effective and efficient risk management is the need of every banking institution for maximization of

their profits. Effective risk management enhances the performance of any organization. The financial crisis of last decade uncovered the short comings in the risk management practices and performance of banks by undertaking excessive risk and having too little concentration toward the consequences of risk taking and their long term effects on the bank performance (Mathghamhna, 2011). Selma, Abdelghani & Rajhi (2011) examined the risk management practices of Tunisian banks. Their study revealed that banks in Tunisia understand the importance of risk management in enhancing their performance and also their cost reduction. Saleem & Abideen (2011) studied the relationship between risk management and organizational performance. They concluded that high performance is exhibited by those institutions which are using effective risk management practices. On the other hand, Habib et al. (2014) studied the impact of operational risk management on bank performance in Pakistan. Their study concluded that risk management can enhance organizational performance while operational risk management is effective in the banking institutions of Pakistan. Oluwafemi, Adebisi, Simeon & Olawale (2013) based on a study conducted on the Nigerian banking sector also identified a significant relationship between risk management and banks' performance. The same results were documented in another study which was also undertaken on the Nigerian banking sector by Soyemi, Ogunleye & Ashogbon (2014).

Liquidity risk is an important determinant of bank profitability. Liquidity risk arises because of a bank's inability to accommodate decrease in its liabilities or to increase the asset side of the balance sheet (Athanasoglou, Brissimis & Delis, 2008). Banks usually hold more liquid assets to avoid insolvency. But higher amounts of liquid assets are associated with lower rates of return, it is therefore assumed that higher liquid assets are associated with lower amounts of profitability. Molyneux & Thornton (1992) supported this argument and found a negative relationship between bank profitability and its liquidity. Vaihekoskia (2009) confirmed that systematic liquidity risk of stock providing more return are negatively associated with the price of liquidity risk. Uddin (2009) also confirmed a negative relationship between stock returns and their liquidity position.

Cooper, Jackson & Patterson (2003) confirmed that fluctuations in credit risk bring changes in loan portfolios of banks which in return affects the bank performance. Duca & McLaughlin (1990) found that increased exposure to credit risk by banks decreases their performance. Miller &

Noulas (1997) also confirmed a negative relationship between bank's profitability and its credit risk as the more a bank is exposed to high risk loans, the probability of unpaid loans increases which ultimately decreases its profitability. Alshatti (2015) noted the significant relationship between credit risk management indicators and financial performance of Jordanian commercial banks. Gizaw, Kebede & Selvaraj (2015) conducted a study on Ethiopian banking sector and their results indicated that credit risk measures significantly impacts the banks' profitability. The same relationship was identified by Maxwell & Peter (2016) in another study undertaken by on the Nigerian banking sector.

Short (1979) provided evidence that size is associated with capital adequacy of banks and large banks are able to raise less expensive capital and produce higher rates of return as compared to small size banks. Akhavein, Berger & Humphrey (1997) confirmed a positive relationship between profitability and bank size. Reynolds & Ratanakomut (2000) contributed that capital adequacy decreases with size, large banks have lower capital adequacy ratios as compared to small banks while profitability is directly related to capital adequacy of banks. Yu (2000) found a positive relationship between capital adequacy, liquidity and profitability of banks in Taiwan.

Interest rate fluctuations are a major concern for financial markets and institutions as it affects growth and performance of the financial institutions (Madura, 1989). Falling interest rate are accompanied by recession, causing an increase in loan losses and a slower growth in loans. Saunders & Cornett (2003) concluded that interest rate shocks result in losses in the market value of assets which ultimately affects net worth. Also fall in the market value of assets and liabilities occurs when interest rate increases.

Laker (2007) argued that increasing dependence on specialized skills, technology and banking complexity has made operational risk an important risk factor as faced by banking institutions. Holmes (2003) contended that large amount of losses arises by the lack of operational risk management by banks. Wei (2006) asserted that announcement of operational losses by banks decrease their market values.

### **Research Methodology**

The objective of the present study is to ascertain the impact of risk management practices on the performance of commercial banks in Pakistan. Also a comparison between risk management and performance of large

commercial banks and small commercial banks will be made. The analysis is based on five large commercial banks and five small commercial banks. Banks having more than one thousand branches are taken as large commercial banks and banks having less than one thousand branches are taken as small commercial banks. According to the State Bank of Pakistan (SBP) statistics there are twenty seven commercial banks listed in Pakistan. Only five banks i.e. National bank of Pakistan (NBP), Habib Bank Limited (HBL), United Bank Limited (UBL), MCB Bank Limited and Allied Bank Limited (ABL) have more than one thousand branches as given in Table 1. All other twenty two commercial banks have less than one thousand branches and are termed as small commercial banks. Five small banks were selected from the remaining twenty two banks using simple random sampling. Data was collected from published annual reports of banks from 2005-2014. Large commercial banks include Habib Bank Limited (HBL), National Bank of Pakistan (NBP), United Bank Limited (UBL), MCB Bank Limited and Allied Bank Limited (ABL). Small Commercial banks include Bank Alfalah Limited (BAL), Meezan Bank Limited (MZL), The Bank of Punjab (BoP), Faysal Bank Limited (FBL) and The Bank of Khyber (BoK). Table 1 shows number of bank branches.

*Table 1. List of selected large commercial banks and small commercial banks*

| S/No | Large commercial banks | Branches | Small commercial banks | Branches |
|------|------------------------|----------|------------------------|----------|
| 1    | HBL                    | 1663     | BAL                    | 630      |
| 2    | NBP                    | 1406     | MZL                    | 551      |
| 3    | UBL                    | 1128     | BOP                    | 405      |
| 4    | MCB                    | 1247     | FBL                    | 281      |
| 5    | ABL                    | 1048     | BOK                    | 131      |

Source: *State Bank of Pakistan (SBP) website (2014)*

### **Variables Description**

Based on the literature the following variables were identified for bank performance and bank risk management proxies, the description of these variables are given in Table 2.

*Table 2. Variables description*

| S# | Variables                    | Description   | Sign |
|----|------------------------------|---|------|
| 1  | Performance (ROE)            | Measured by Net profit/Total equity                     |      |
| 2  | Capital adequacy ratio (CAR) | Measured by total Capital/Risk Weighted Assets          | +    |
| 3  | Credit Risk (NPL)            | Measured by Non performing loans/Total loans            | -    |
| 4  | Interest Rate Risk (IRR)     | Measured by Interest rate sensitive assets/Total assets | -    |

|   |                        |   |   |
|---|------------------------|---|---|
| 5 | Liquidity Risk (LTR)   | Measured by Gross loans and advances/Total deposits | – |
| 6 | Operational Risk (ORS) | Measured by Operating expenses/Operating income     | – |

### Empirical Model

The following empirical model is applied to assess the impact of risk management variables on the bank performance.

$$ROE = \beta_0 + \beta_1 CAR + \beta_2 NPL + \beta_3 IRR + \beta_4 LTR + \beta_5 ORS + \text{Error}$$

Where:

ROE = Return on equity

CAR = Capital adequacy ratio

NPL = Non performing loans

IRR = Interest rate risk

LTR = Liquidity risk

ORS = Operational risk

### Hypothesis

$H_1$  = There is a positive relationship between return on equity and capital adequacy ratio

$H_2$  = There is a negative relationship between return on equity and non performing loans

$H_3$  = There is a negative relationship between return on equity and interest rate risk

$H_4$  = There is a negative relationship between return on equity and liquidity risk

$H_5$  = There is a negative relationship between return on equity and operational risk

### Results and Data Analysis

The data obtained from the sample banks were analyzed using descriptive statistics, correlation and panel multiple regression analysis.

### Descriptive Statistics

Table 3. Descriptive statistics

| Variables | Small Banks |      |       |        | Large Banks |      |       |        |
|-----------|-------------|------|-------|--------|-------------|------|-------|--------|
|           | Min         | Max  | Mean  | SD     | Min         | Max  | Mean  | SD     |
| ROE       | .07         | 1.37 | .1980 | .24994 | .00         | .30  | .1911 | .10024 |
| CAR       | 0.01        | .307 | 0.126 | .055   | .093        | .222 | .153  | .033   |
| NPL       | .06         | .51  | .2045 | .12782 | .07         | .18  | .1153 | .03506 |
| IRR       | .09         | .99  | .9133 | .17546 | .10         | .99  | .9004 | .17116 |
| LTR       | .46         | .78  | .5912 | .10958 | .31         | .72  | .5135 | .11673 |
| ORS       | .54         | 2.06 | .7490 | .29867 | .35         | .85  | .4916 | .10334 |

Table 3 shows the comparison of ROE of small banks and large banks. The minimum ROE for small banks is 0.07 and for large banks is 0.00. This trend shows that large banks have earned zero profits while small banks have not earned zero profits or losses in the last five years of the study. The standard deviation of ROE for small banks is 0.24 and for large banks is 0.10. The trend in standard deviation shows that there are a lot of variations in the profitability of small banks than large banks in Pakistan. Capital adequacy ratio has shown a uniform position for both the large banks and small banks. The non performing loans are higher for small banks than large banks as the maximum value and standard deviation of small banks are higher than large banks. The interest rate risk, liquidity risk and operational risk are higher for small banks than large banks as the mean values and standard deviation of small banks are relatively higher than large commercial banks in Pakistan.

### Correlation Matrix

Table 4. *Correlation matrix for large banks*

| Variables | ROE    | CAR    | NPL   | IRR    | LTR   | ORS |
|-----------|--------|--------|-------|--------|-------|-----|
| ROE       | 1      |        |       |        |       |     |
| CAR       | -0.313 | 1      |       |        |       |     |
| NPL       | -0.532 | 0.350  | 1     |        |       |     |
| IRR       | 0.039  | 0.018  | 0.054 | 1      |       |     |
| LTR       | -0.346 | -0.128 | 0.059 | -0.232 | 1     |     |
| ORS       | -0.685 | -0.225 | 0.547 | 0.037  | 0.245 | 1   |

Table 5. *Correlation matrix for small banks*

| Variables | ROE    | CAR    | NPL    | IRR    | LTR   | ORS |
|-----------|--------|--------|--------|--------|-------|-----|
| ROE       | 1      |        |        |        |       |     |
| CAR       | -0.182 | 1      |        |        |       |     |
| NPL       | -0.541 | -0.427 | 1      |        |       |     |
| IRR       | -0.039 | 0.225  | -0.158 | 1      |       |     |
| LTR       | 0.107  | -0.493 | 0.157  | -0.044 | 1     |     |
| ORS       | -0.112 | -0.242 | -0.031 | -0.926 | 0.172 | 1   |

Table 4 and Table 5 show the correlation matrix for all dependent and independent variables of the study. The correlation matrix for large banks and small banks show that all the correlation coefficients of the independent variables are less than 0.80, as suggested by Gujarati (2003). Therefore there is no problem of multicollinearity for small banks as well as large banks.

### Heteroscedasticity Statistics

Breusch- Pagan/ Cook- Weisberg test for heteroscedasticity

Ho: Constant variance

Variables: fitted values of tdr

Chi2(1) = 12.22

Prob > chi2= 0.0641

The above hetro test suggests no hetroscedastisity in the data as the probability value is greater than 5%.

### Multicollinearity Statistics

*Table 6. Multicollinearity Statistics*

|     | Collinearity Statistics |                    |
|-----|-------------------------|--------------------|
|     | Tolerance               | VIF                |
| CAR | 0.862                   | 1.231 <sup>^</sup> |
| NPL | 0.731                   | 1.123              |
| IRR | 0.823                   | 1.312              |
| LTR | 0.843                   | 1.333              |
| ORS | 0.754                   | 1.243              |

Dependent Variable: ROE

Table 6 shows absence of multicollinearity among the independent variables as no individual value is great than the threshold value of 10.

### Hausman Test

The Hausman test was applied to choose between fixed effect and random effect models. The null hypothesis for Hausman test was that random effect model was preferred to fixed effect model. Hausman test reported a chi-square value of 2.014 with a p-value of 0.906 for small banks. While the chi-square value for large size banks was 0.51 with a p-value of 0.917. It shows that the chi-square value was found to be insignificant for small banks as well as for large banks. The null hypothesis was therefore failed to reject, so random effect model was recommended.

### Regression Analysis

Using ROE as dependent variable, this study considered a set of hypothesis regarding the impact of risk management practices on the performance of large commercial banks and small commercial banks in Pakistan. The return on equity was regressed on capital adequacy ratio, non performing loans, interest rate risk, liquidity risk and operational risk.

*Table 7. Regression analysis for large banks*

| Variables | Coefficients | Standard Error | T-Values | P-Values |
|-----------|--------------|----------------|----------|----------|
| Const     | .716         | .079           | 9.051    | .000     |
| CAR       | .490         | .199           | 2.468    | .023     |

|          |        |         |        |       |
|----------|--------|---------|--------|-------|
| NPL      | -1.478 | .343    | -4.304 | .000  |
| IRR      | -0.072 | 0.025   | -2.72  | 0.005 |
| LTR      | -.208  | .075    | -2.773 | .012  |
| ORS      | -.389  | .114    | -3.399 | .003  |
| R-Square | =      | 87.30 % |        |       |
| Wald Chi | =      | 57.20   |        |       |

Dependent Variable: ROE

Table 7 shows that capital adequacy ratio (CAR) has a positive significant impact on performance (ROE) of large banks as the probability value 0.00 which is less than 5%. Other risk management variables of nonperforming loans (NPL), interest rate risk (IRR), liquidity risk (LTR) and operational risk (ORS) are significantly and negatively affecting the return on equity (ROE) for large commercial banks as the probability values are less than 5%.

*Table 8. Regression analysis for small banks*

| Variables | Coefficients | Standard Error | T-Values | P-Values |
|-----------|--------------|----------------|----------|----------|
| Const     | 0.012        | 0.005          | 2.36     | 0.018    |
| CAR       | 0.01         | 0.00361        | 2.77     | 0.006    |
| NPL       | -0.011       | 0.005          | -2.38    | 0.017    |
| IRR       | -0.002       | 0.009          | -0.25    | 0.804    |
| LTR       | -0.04        | 0.161          | -0.09    | 0.928    |
| ORS       | 0.0006       | 0.0098         | 2.53     | 0.012    |
| R-Square  | =            | 47.30 %        |          |          |
| Wald Chi  | =            | 36.20          |          |          |

Dependent Variable: ROE

Table 8 shows the regression results of risk management variables on performance of small commercial banks. The capital adequacy ratio (CAR) has a significant positive impact on ROE as the probability value is 0.006 which is less than 5% significant level. The impact of nonperforming loans (NPL) on ROE is negative and significant with a probability value of 0.017. The impact of operational risk (ORS) on ROE is significant but positive with a probability value of 0.012. While there is an insignificant negative effect of interest rate risk (IRR) and liquidity risk (LTR) on ROE with probability values of 0.804 and 0.928 respectively.

### Summary for Hypotheses Testing

The following table summarizes the results of hypotheses testing:-

*Table 9. Hypotheses Testing Results*

| Hypothesis | Large Banks |          | Small Banks |          |
|------------|-------------|----------|-------------|----------|
|            | Coefficient | Decision | Coefficient | Decision |

|   | Sign |          | Sign |          |
|---|------|----------|------|----------|
| H <sub>1</sub> = There is a positive relationship between return on equity and capital adequacy ratio | +    | Accepted | +    | Accepted |
| H <sub>2</sub> = There is a negative relationship between return on equity and non performing loans   | -    | Accepted | -    | Accepted |
| H <sub>3</sub> = There is a negative relationship between return on equity and interest rate risk     | -    | Accepted | -    | Rejected |
| H <sub>4</sub> = There is a negative relationship between return on equity and liquidity risk         | -    | Accepted | -    | Rejected |
| H <sub>5</sub> = There is a negative relationship between return on equity and operational risk       | -    | Accepted | +    | Accepted |

### Conclusion

Risk management is very vital for the development and growth of banking sector. Banking sector enhances the country growth and GDP. The results found that risk management affects the bank performance significantly. Capital adequacy ratio, nonperforming loans, liquidity risk, operational risk and interest rate risk all significantly affect and determine the profitability of large commercial banks in Pakistan. Therefore large commercial banks should concentrate on quality of loans and also the loan assessment procedure. Large banks should also concentrate on their liquidity position to resist the liquidity crisis in the market. Operating expenses in the form of salary and administrative expenses should be controlled. To mitigate the shocks from interest rate risk, large banks should maintain such an amount of interest rate sensitive assets so that it can absorb the fluctuations in interest rate.

On the other hand only credit risk and capital adequacy ratio affects the performance of small commercial banks in Pakistan. Therefore small commercial banks should maintain the required capital to meet the regulatory requirements and to maintain a stable position in the market. Moreover, the small commercial banks should also focus on the quality of loans they are disbursing and concentrate on the loan assessment procedure to maintain their performance in the market.

This study may have managerial and policy implications for banks' management in national and international perspective. In the first instance,

it has supported the Basel Accord of required capital in view of the positive relationship between capital adequacy and banks' profitability. Secondly, considering the negative relation between nonperforming loans and profit level, the results of the study have also asserted the view to control the nonperforming loans which is a vital issue for banking sector considering the national and global context. And in Pakistan, this is the burning issue as in the banking history, political vested interests have been used to take loans which were later on turned into nonperforming loans. This was also among the several reasons that banks were privatized for better control.

Thirdly, as regards the negative effect of interest rate risk on profitability in case of large banks, the interest rate volatility should be given the due weightage by the central banks to better control the interest rates in relation to the banks' performance. This may be note of advice for banks' management to better anticipate the term structure of interests. The large banks should also have a due regard for liquidity risk as findings of this study support the hypothesis that this risk has negative effect on the profitability. This may require the better treasury and risk management at branch, region, and head office level. Last but not the least, the operational risk should be controlled owing to the finding of the study which indicates that this type of risk have negatively influenced the profit level. This may in turn requires the application of sound business model, control of people, processes and system to reduce exposure to operational risk along with an eye opener for central banks all over the world in general and State Bank of Pakistan (SBP) in particular to formulate and implement relevant rules and regulations for banking sector to mitigate and reduce the happening of such risk.

### **Limitations and Future Research Directions**

This study is conducted on the banking sector of Pakistan. Therefore, it covers only the risks to which the banks are exposed. In this regard, its results may enhance the banks' management understanding to better comprehend and manage the underlying risks. However, the study findings may also have implications for other sectors to explore and investigate the pertinent risks in view of enhancing the organizational performance. Due to the unavailability of data, the sample size taken was small consisted of only the selected banks. For that reason, the generalizability of findings of the study may be limited. Therefore, it is suggested that future researches may be undertaken with large sample size in order to have large scope of extensions of the results. Moreover, other sectors may be considered with the same approach to examine the effects of

risks on performance. Finally, additional proxy variables can be taken to measure different risks and to study their effects on banks' performance.

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