INVESTIGATING THE FACTORS AFFECTING RISK MANAGEMENT EFFICIENCY OF COMMERCIAL BANKS

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Abstract

As a bank's risk profile continually evolves, it leads to losses and a bank's capital base and profitability drive the banking sector's capacity to absorb risks. The proper functioning of this system depends on the proper use of resources collected and this requires accurate assessment of hazards and risks, and recognition methods to deal with the risks that lie ahead. Due to this issue, this study focuses on factors affecting the efficiency of risk management in the Pakistani banking industry. For empirical findings, Panel regression analysis has been employed taking a stratum of time series data and cross-sectional variants of macro and bank-specific factors for the period covering 2009 to 2013. Empirical results show a positive relationship between the liquidity, profitability, operating efficiency, merger and economic growth with capital adequacy ratio while the asset portfolio risk and inflation rates have the opposite effect.

Keywords: Risk management efficiency, capital adequacy, Basel accord, credit risk.

JEL Classification: G21

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Introduction

The role of an intermediary that commercial banks play between borrowers and lenders is significant for the progress of a stable and healthy economy. If the banking system utilizes its collected sources in an appropriate way, it will make a positive contribution to the economic development. However, for this to happen, a bank must ensure that hazards and risk are accurately assessed and in order to deal with the potential risks, recognition methods are devised.

As per Ozturk (2007) risk management is a process through which managers satisfy their needs of risk taking. This need is met through the identification of key risks, attainment of understandable, operational, consistent risk measures, selecting which risks to increase and which one to reduce and the way it has to be carried out. Moreover, in order to satisfy the need of taking risks, managers have to establish procedures so that they can monitor the position of the resulting risk. This means that risk management calls for the assessment of dangers associated with a specific position by measuring its magnitude and mitigating such exposures in a way that the institutional goals of the banking firm are not deterred (Awojobi.et al, 2011).

From a regulatory perspective, the amount of regulatory reserve capital that a bank must hold is determined by the size and risk of a bank’s assets. Risk management refrain banks from the insolvency situation. Therefore, in banks, risk management’s efficiency is used to indicate the solvency level. As per Saunders and Cornett (2006) insolvency is distinguished by severe capital depletion and long-drawn-out liquidity issues. In such a situation, there could be two outcomes of the insolvency. First, liquidity forces insolvency to take place. This happens at times of bankruptcy, when the bank is unable to meet the short term obligations and is compelled to liquidate part of its assets below their market worth. Second, insolvency also takes place when there is an inadequacy of capital. In this situation, the
bank has to close its business as its liability becomes greater than its assets (Awojobi et al, 2011). According to Aremu et al. (2010) mostly the bank management emphasizes on the short-term objective of profitability, and in the process, they do not give importance to risk management and ignore the quality of assets that has a better influence on the sustainability of the financial institution in the long run.

In 1988, Basel I capital accord was proposed by the Basel committee on banking supervision. The focus of the accord was to introduce an international standard that could be utilized by the regulators, when formulating regulations regarding a bank’s requirement of capital. One of the main focuses on the Basel guide was related to capital adequacy which banks must use as a cushioning mechanism when a bank’s assets are exposed to risk. When a financial institution receives higher exposure to operation and credit risk, there will be a need for its capital to augment itself in order to make sure that future operations are safeguarded in case that the risk leads to losses (Awojobi et al, 2011).

Following that, in 2004, Basel II was proposed and Pakistani banks started to follow the Standard. The limit of the capital that a bank must hold as the minimum capital requirement is expressed by this standard (Calem & Rob, 1999). In Pakistan, the tumultuous environment has posed many kinds of risks to the banking sector, including credit risk, liquidity, market, interest rate risk, foreign exchange risk etc. (Shafiq & Nasr, 2010). The State Bank of Pakistan, in compliance with basel II, has been enhancing the minimum capital requirements of the banking companies gradually. This is done in order to make the competitive ability of the banks stronger by weeding out the weak banks and by encouraging economies of scale.

In Pakistan, the prerequisite for minimum capital is Rs 10 billion, with minimum 10% capital adequacy ratio. Pakistani financial markets are among the most volatile markets of the world, filled with anonymity and escapade performances (Sadaqat et al, 2011). In terms
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of documentations of financial risk, credit risk is the most widely documented and popular as the most significant type of risk (Sackett & Shaffer, 2006). Credit risk management is only concerned with the front position of strategies related to risk management that a financial service business carries out (Fatemi & Fooladi, 2006). However, the interrelationship between risk and efficiency for banking firms has received little attention in the banking literature. There are few studies but only Berger and De Young (1997), Hughes et al. (1993, 1996) and Mester (1994a, 1994b) have examined this issue in any depth.

Objective

The main objective of this study is discovering how efficiently banks manage the risks. The risks are caused by bank-specific factors that are indicated by the various performance indices and profitability. For this study, a Panel analysis is carried out to find out the impact of macroeconomic indicators, including the rate of inflation, growth rate of GDP, and bank-specific factors related to the capital adequacy of the banks in Pakistan from 2009-2013. Components of macroeconomic, such as rate of inflation and growth rate of GDP are included in the model so as to reflect the cyclic trend of banking operations in accordance with the economic changes. The main aim of risk management in banks is to avoid potential insolvency. Therefore, carrying out risk management functions in banks efficiently indicates their solvency level.

Literature Review

Risk management is used for analyzing operational dangers related to a particular position by measuring its magnitude and mitigating such exposures in a way that the institutional goals of the banking firm are not deterred (Ozturk, 2007). In accordance with the proposition of managerial risk aversion theory, the management, acting as agents between the bank and the shareholders, will have more
incentives to minimize the bank’s default risk. This is because shareholders may have to undergo personal losses under situations when the bank becomes a defaulter. Therefore, when the risks are rising, the management will be in a position to increase the capital in order to trade off the escalating risk. A few studies have been conducted to measure the performance of banking sector in Pakistan, however, they are limited to investigate the efficiency of banks in one or on the other hand. These studies do not focus on the risk and quality factors, which explain the differences in efficiency across the banks significantly (Shabbir, 2006). In an empirical study by Heid et al. (2004), positive relationship between risk and capital were found. Shrieves and Dahl (1992) and Matejasal and Teply (2007) have mentioned that according to the theory of bankruptcy cost avoidance, the cost of bank bankruptcy is the increasing function of its bankruptcy opportunities. Hence, when there is an increase in the bankruptcy opportunities, the bank will resultantly increase its capital requirement (Lin.at al, 2013).

In a study by Ahmad et al. (2009), an unbalanced panel data was utilized to assess the essential determinants of bank capital. The study applied the capital adequacy ratio as a dependent variable, size of the bank was considered natural log of total assets and found significant correlation.

In an investigation by Al-Tamimi and Al-Mazrooei (2007), they considered a sample of 17 banks, including the UAE national and foreign banks. The results showed that these banks have the capability to manage risks in a better manner and it was also discovered that there is a major difference between foreign banks and the UAE national bank in terms of examining and controlling risks as well as observing risk assessment and analyzing it. In a study by Altunbas et al. (2000) & Fadzlan and Habibullah (2010), panel data statistics were employed to find out the influence of bank-specific variables on capital adequacy in banks and found positive correlation.
Flamini et al. (2009) found positive relationship between liquidity and capital adequacy. Ahmed et al (2011) investigated the functions of six Islamic banks, over a time period of 2006 to 2009 and applied Pearson correlation to discover the relationship between variables and applied a regression analysis find the coefficients. The results of the study showed that a bank’s size share a direct association with liquidity and credit risk, while its relation with operational risk was discovered to be statistically insignificant and negative.

Likewise, a study by Richard et al (2008) was conducted in Tanzania to understand the credit risk management system of banks in less developed countries. The study found out that in order for the bank to be successful, the environment within which the bank is operating has to be given special consideration for the management of credit risk.

Koziol and Lawrenz (2009) investigated risk failure and bankruptcy. The gist of this investigation was to discover situations when financing decisions are taken by the credit manager. The main findings of the study suggested that the dynamic endogenous financing decision should be an important self-regulation mechanism. In a study by Saunders and Wilson (2001), it was discovered that a positive relationship exists between economic cycles and capital adequacy. Bikker and Hu (2002) found bank’s efficiency is impacted by economic conditions. According to the study by Demirgüç-Kunt and Huizinga (1998), a bank’s suitability and its business cycle represented and signified a positive linear relationship. Athanasoglou et al. (2005) found out that there is a positive relationship between bank profitability and business cycles in the banking industry of Greece. Neely and Wheelock (1997) measured the cyclicity of performance of a bank with GDP per capita. Similarly, in a study, Crosse and Hamsel (1980) found that capital adequacy is a dynamic concept and it is impacted by the predominant and anticipated economic conditions of the entire economy.
These studies have indicated the effect of business-cycles on capital adequacy. A review of these studies show that in most of the cases concerning risk management of banks, macroeconomic factors are ignored, while some of the studies focused on need to assess the role played by these variables. In view of this, the present study will take the role of bank-specific factors and macroeconomic variables (cyclicality of bank operations in response to economic changes) on capital adequacy ratio in banks into consideration. This will assist in demonstrating the nexus between risk asset, capital quality and bank value (total asset).

Research Methodology

There are 34 commercial banks being operated in Pakistan excluding microfinance and specialized banks and DFIs. However, the sample of this study comprises all banks operating in Pakistan, representing private, public, foreign and Islamic banks. The yearly data of banks and macroeconomic indicators have been collected from the various publications of State bank of Pakistan and World Bank data bases over the period of 2009-2013.

Hypotheses

The study tests the following hypothesis:

H1: There is a significant impact of bank specific and macroeconomic indicators on risk management efficiency.

As aforementioned, the main objective of the present study is to discover risk management efficiency in banks which is generally determined by bank-specific factors showed by profitability as well as other performance indices. A panel analysis is carried out to observe the influence of macroeconomic indicators, rate of inflation and growth of GDP together, with bank-specific factors on bank capital adequacy in Pakistani banking industry.

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Dependent Variable

Capital Adequacy Ratio (CAR):

According to Ebhodaghe (1991) capital is used as a cushion to absorb all occurring losses following the works of Kwan and Eisenbeis (1997), Berger and Young (1997), Hitchins et al. (2001), Ojo (2008), Ahmad et al. (2009) and Greuning and Bratanovic (2003) the present study sets capital adequacy as a dependent variable (indicating risk management efficiency). In the equation regarding regression, capital adequacy ratio (CAR) acts as the dependent variable (Jacques & Nigro 1997; Ediz et al. 1998; De Bondt & Prast 2000; Rime 2001). CAR is calculated as:

Total eligible capital/ total risk weighted assets
Total risk-weighted assets are the sum of the products of the book value of each asset and their corresponding risk weights (Oluyemi, 1996; Nanon, 1999; and Mathura, 2009).

Explanatory Variables

Risk

Asset Portfolio risk is the risk which incurs losses in situations when there is a counterparty default in the settlement of liabilities towards the bank. It is calculated as risk weighted assets to total asset ratio that is utilized as a measure of counterparty exposures of banks.

Liquidity (LQR)

This factor measures the bank’s ability to quickly turn its repricable assets into cash. When the bank’s liquidity increases (high LQR), the capital ratio is positively influenced as it creates changes in the required rate of return on the share of the banks. With an increase in cash equivalents or when the proportion of funds invested in cash
increases, there should be a decline in the liquidity risk of the bank. In this manner, the liquidity premium on the required rate of return on bank shares is lowered (Angbazo, 1997). As a result, this rate may lead to a raised equity. Alternatively, this also has a positive relation with the leverage of the bank if the risk to equity holders also increases with the leverage. With a rise in the risk, the cost of equity capital also rises.

*Return on assets (ROA)*

Return on assets or ROA indicated the management’s efficiency in effectively making use of its assets to maximize profits. ROA represents the ratio of net profit to total assets. Moreover, as measured by Rivard and Thomas (1997); Saunders and Wilson (2001) it is anticipated that the relationship between profitability of a bank and capital position is positive.

*Operating Efficiency (OE)*

To determine the efficiency of risk management, operating efficiency (OE) is taken into account as a bank-specific determinant. Operating efficiency is the ratio of net operating income to operating expenses. Moreover, operating efficiency ratio’s impact on capital is anticipated to be positive, because when this ratio increases, the management can make profit in a better way.

*Merger (Dmerger)*

Keeping in view the basel accord and in pursuit of an increase in the minimum capital requirement, merger has become a new trend in the banking sector over the last decade. At times when the bank is undergoing financial troubles, a merger with a healthy bank is deemed as a probable solution. The year the merger takes place, a decrease in capital along with an increase in risk for the takeover bank is expected. Also, to capture these effects, merger dummy variable, Dmerger has
been included in the regression equations which is unity in the year in which the bank takes over another bank and zero otherwise.

**Macroeconomic Indicators:**

In this current study, the relationship between the business cycle and bank risk management will be explored. The macroeconomic determinants includes economic growth and rate of inflation.

The bank’s risk management efficiency becomes pro-cyclical due to a number of reasons. For instance, during an economic boom, banks increase their capital base through plowback profits and by increasing participation in the capital market. As against this, during periods of contraction, the bank slows down its business transactions in the money sector and increases the social cost of funding bank assets. Besides, in times of economic recession, it is a common practice to become loan defaulters. If there is a rapid increase in loan defaults, a bank’s profitability and capital position are negatively affected (Sathye et al., 2003). Nonetheless, according to Berger et al. (2004) during economic expansion, banks can come across an increasing demand for loans; however, a restrain supply is adopted to avoid possible losses caused by economic churn.

**Econometric Specification**

As it has been mentioned earlier, the data is balance panel because several banks’ data with several fixed years have been taken for the study. So Panel Regression is used to test the hypothesis. In Panel Regression, there are two types of effect to check the best modeling one is fixed effect model and other is random effect model. Both tests are used to investigate the exogeneity and endogeneity present in the given dataset. In econometrical model, a variable is endogenous when the correlation is exists between the variable and the error term. Endogeneity may come up as a result of prediction
error, it happens when there is one or more than one important variable missing in the model. In Exogeneity when one variable is not determined by other variables in the regression model, and changes comes from external sources. In other words, Exogenous variables are independent of error term and endogenous variables depends upon error term.

Hausmen test is used to study the fixed and random effect in the regression model for CAR as dependent variable. Hausmen test decided that either random effect is best for modeling or fixed effect describe the best modeling for our data. Hausmen test also check the presence of endogeneity in model. In the table of Hausman Test, Probability or Significant value is greater than 0.05 which indicates that there is Random effect or endogeneity present in given model and Random Effect test best describe the model rather than Fixed Effect Model (See Appendix B-1). Unit root Phillips perron test has been used to check non stationary data, overall p-value of PP- Fisher Chi-square test is less than 0.05, its indicates that many of the banks having greater than 0.05 value which reveal that many of the banks having non-stationary values.

**Major Findings and Discussion**

As the result of Hauman test, panel EGLS has been applied for best modeling. The results show that there is a significant effect of all independent variables on Dependent variable which is CAR. Inflation and Risk negatively impact the CAR and Merger, GDP, LQR, OE and ROA positively impact the CAR. In Pakistan Asset portfolio risk is negatively and significantly affect the bank risk management efficiency, shows that bank managers maximize profits and follow a risk-averse strategy that improve screening and monitoring of asset portfolio risk. In Pakistan the banking industry is pro-cyclical to economic cycles, inflation result shows that high inflation, equity holders usually demand for higher rate of return, In this case, capital
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Research

augmentation may become expensive. Pakistani banks have enough liquidity to pay current liabilities. The value of Adjusted R-Square is 0.62, it indicated that all independent variables explain 62% of variation of CAR. F-Statistics is not much larger concluded that the impact is not on longer term basis. For short term the model is good to predict CAR, (See Appendix A1). The following equation has been developed for the random effects model:

\[
\text{CAR}_t = \hat{\alpha} + \hat{\beta}_1 \text{DMERGER}_t + \hat{\beta}_2 \text{GDP}_t + \hat{\beta}_3 \text{INF}_t + \hat{\beta}_4 \text{LQR}_t + \hat{\beta}_5 \text{OE}_t + \hat{\beta}_6 \text{RISK}_t + \hat{\beta}_7 \text{ROA}_t + u + \epsilon
\]

\[
\text{CAR}_t = 0.1830 + (0.0914) \text{DMERGER}_t + (0.8086) \text{GDP}_t - (0.0645) \text{INF}_t + (0.40262) \text{LQR}_t + (0.05634) \text{OE}_t - (0.1511) \text{RISK}_t + (0.6121) \text{ROA}_t + u + \epsilon
\]

Conclusion & Recommendation

It is concluded that the efficiency of risk management in Pakistani banks is not solely influenced by bank-specific factors but macroeconomic variables also affect it. For the purpose of the study, a methodology involving panel regression was employed to cover both macroeconomic determinants as well as bank-specific factors. The empirical results indicated that the capital adequacy of the bank has a positive relation with liquidity, profitability as well as operating efficiency, while risk ratio is negatively associated with capital adequacy. In the light of these findings which the panel regression analysis revealed, it can be concluded that economic growth positively influences the efficiency of risk management in Pakistani banks. Moreover, there is a negative relation between inflation and bank’s capital adequacy in accordance with the previous theoretical expectation. So far in the Pakistani banking system, the solvency profile has been strengthening and it is anticipated that it will continue to strengthen further in the near future too. It is expected that a major support will come by meeting the demands of enhanced MCR by the banks. In this manner, the banking system will become more resilient towards plausible shocks. Nevertheless, in order to strengthen the
solvency further, there is a need for increased vigilance on part of the bank regarding exposure to risks. This especially pertains to situation when the bank, in pursuit of exploring higher returns and further improving the process of risk management to avoid threats from the quality of assets, is about to enter into ventures that are riskier in nature. Each of the credit institutions and the banks ought to ascertain that in order to have stable and sustainable activities, the ratio between capital and the risk of its assets is appropriate.
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Appendices

Appendix A.1. Random Effect Regression
Panel EGLS

Dependent Variable: CAR
Method: Panel EGLS (Cross-section random effects)
Sample: 2009 2013
Periods included: 5
Cross-sections included: 32
Total panel (unbalanced) observations: 129
Swamy and Arora estimator of component variances

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMERGER</td>
<td>0.091462</td>
<td>0.041560</td>
<td>2.200739</td>
<td>0.0293</td>
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<tr>
<td>GDP</td>
<td>0.808621</td>
<td>0.180384</td>
<td>4.482773</td>
<td>0.0000</td>
</tr>
<tr>
<td>INF</td>
<td>-0.064593</td>
<td>0.024687</td>
<td>-2.616513</td>
<td>0.0100</td>
</tr>
<tr>
<td>LQR</td>
<td>0.402627</td>
<td>0.027818</td>
<td>14.47352</td>
<td>0.0000</td>
</tr>
<tr>
<td>OE</td>
<td>0.056348</td>
<td>0.021807</td>
<td>2.583936</td>
<td>0.0110</td>
</tr>
<tr>
<td>RISK</td>
<td>-0.151110</td>
<td>0.020760</td>
<td>-7.278716</td>
<td>0.0000</td>
</tr>
<tr>
<td>ROA</td>
<td>0.612177</td>
<td>0.022997</td>
<td>26.62045</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>0.183032</td>
<td>0.036813</td>
<td>4.971905</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared 0.643709  Mean dependent var 0.069288
Adjusted R-squared 0.623097  S.D. dependent var 0.078495
S.E. of regression 0.046445  Sum squared resid 0.261010
F-statistic 31.22999  Durbin-Watson stat 1.717234
Prob(F-statistic) 0.0000

Appendix B.1 Hausman Tests

Redundant Fixed Effects Tests
Test cross-section fixed effects

<table>
<thead>
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<th>Effects Test</th>
<th>Statistic</th>
<th>d.f.</th>
<th>Prob.</th>
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<tr>
<td>Cross-section F</td>
<td>6.564883</td>
<td>(31,90)</td>
<td>0.0090</td>
</tr>
<tr>
<td>Cross-section Chi-square</td>
<td>152.49176</td>
<td>31</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Correlated Random Effects - Hausman Test
Test cross-section random effects

<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq. d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>4.707867</td>
<td>7</td>
<td>0.1945</td>
</tr>
</tbody>
</table>