What Determines risk? Evidence from Banking Sector of Pakistan

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Abstract:
If a financial organization flops it can impose an externality nationwide as a whole. A bank's financial health is a matter of considerable interest to both depositors and investors. Augmented globalization along with deregulation of financial organizations has not only given rise to competition, but it has also amplified the need for powerful policies to manage risk for the industry. Global financial crisis made these requirements more critical. Being cautious of elements which might direct to failure of banking organization defiantly support in future for evading losses by introducing preemptive initiatives in order to minimize damage caused by risk. This research study explores the association amongst level of total risk which a banking organization may have to consider due to variants in a typical economic situation and accounting indicators of banks by using data sample from 2006 to 2013. In this analysis, size of bank, financial leverage, liquidity, loan to asset ratio, growth in real GDP, supply of money and spread of interest rates all seem to be statistically significant with total risk faced by bank. However, the ratio of loan losses remained statistically insignificant. This study stresses the insertion of macroeconomic factor as a probable determining factor for total risk.

Key Words: Total Risk, GDP, Money Supply, Interest Rate Spread, Size, Liquidity

1. Introduction and Motivation of the Study

The banking paradigm has been so drastically modified that we can't even admit it. That is due to financial-market transformations. Other explanation of this revolutionary change in the banking sector may lie in the internationalization of trade markets. This transition is also driven by economic stresses which is exacerbated owing to developments in technology and liberalization mutually (Schaeck & Cihák, 2014). The banks accept those obstacles warmly. The banks are dealing with this interesting new condition by quickly entering into new grounds. Globalization has assisted in providing easy connection to banks towards a wide range of funds. In addition to this, the diversity in various financial instruments has permitted financial institutions to acquire multiple sources of funds more quickly (Afzal & Mirza, 2012). This situation provided the banks with a new prospect to plamovel services. Considering normal business of banks which was collecting deposits along with handing loans, it can be verified quickly that now it is just a part of banking operations and probably the least profitable. Fees and international trading of various financial instruments is the primary origin of profit for a bank at present. Better allocation of various assets of banks has become possible due to financial innovation in the financial markets. Particularly due to incorporating new concepts like bond purchases or bond swaps 1. Securitization helps to accomplish this by retaining multiple assets such as insurance, mortgage, car finances and credit on facilities of export i.e. banks sponsor for marketable securities.

The requirements due to prudential capital have played significant foundation of inspiration for modernization. Such criteria have directed to extensive variety of innovative "off-balance sheet" practices. Typically such devices require a high degree of scientific complexity that cannot be interpreted unless they are by specialists. Such dynamics also contribute to difficulties in the assessment, monitoring and management of risk of these instruments.

Currently, analysts are apprehensive that the innovation in finance, particularly due to the development of practices that are considered as “off-balance-sheet activities,” might impose consolidated risk to a banking organization and may impose an enlarged uncertainty to the financial system. This principle is particularly true

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1 A security in which cash flows are exchanged between two parties is called swap. It is a derivative security (Cont, 2006).

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whilst considering the danger of currency and interest rate. This was boosted by the globalization of financial markets as demonstrated with the dispersion of financial crises and its effects from Thailand in the 1990s and from the United States in 2008 (Gatev, Schuermann, & Strahan, 2007). In the light of above mentioned reasons scenario arose due to multiple factors like financial innovations, globalization etc. there is a need to get aware of elements which effect smooth activity in an economy as a whole and in a banking organization individually thus this study aims to identify the determinants of total risk in banking sector of Pakistan.

1.1 Introduction to Banking Industry in Pakistan

At the end of year 2013 banking industry of Pakistan had total number of thirty eight banks classified into 4 sets:

- Public Sector Banks
- Private Sector Banks
- Specialized Banks
- Foreign Banks

1.1.6 Total Assets in banking industry

By June 2013 all the Scheduled Banks' total assets erected at 10,678 million Rs. As chart shows, Pakistan banking sector assets are constantly growing. Between fiscal year 2011 and 2012 a slight decreasing trend is emerging. But in 2013 the same was raised by double pace again. This represents the growing tendency in the opportunities of investment which banks have at their disposal primarily cos of globalization.
Globalization offers banks the ability to reach international markets. This raises the Bank’s total risk level in multi-dimensions. Business expansion certainly adds serious outcomes to the banks’ overall risk level. These risks can include the foreign exchange risks or the challenges related to the specific economy.

### 1.1.7 Deposits in Banking Industry

At the end of 2013 the collective volume of demand deposits along with time deposits amounted to 8,452 billion Rs.

Deposits are still the primary savings choice for every bank. Banks typically manage funds from various types of time deposits and demand deposits at a fixed rate or floating rate and allocate credits in multiple categories for specific periods, depending on fixed rates or floating rates. The difference of price amongst the lending rate and deposit rate is the bank’s earnings. Best handled spreads in which larger return will be given to the bank’s shareholders. Rising increase in bank assets shows increased shareholder trust in the banking sector. This multiplies banks’ duty to be mindful of potential risk sources such that stockholders’ trust cannot in any case be eroded.
1.1.8 An overview of Financial Performance in banking industry

The volume of the Banking sector's balance sheet extended in 2013. Banking sector gross assets rose from 9.9 trillion Rs. as of 2012 to 10.7 trillion Rs. as of 2013. This represents a total surge of 7.8%. In 2013, profit before tax was reduced by 7.9 per cent compared with profit before tax in 2012. We can check an increase trend in size of the bank as it is measured by total assets of the bank. Empirical evidence shows that the larger banks have the increased capacity to absorb risk as compared to smaller banks but at the same time they are more prone to face risk due to larger extent of diversification.

1.1.8.1 Shareholder’s Equity Analysis

Banking industry’s equity has seen an escalation of 46.0 billion Rs. or a 5.5% increase in 2013. This also illustrates Shareholders' rising trust. To maintain this confidence level banks have to maintain their risk levels. If banks would not be able to maintain their persistent levels of risk they will face shortage of funds available thus leading to lower profitability by low investments.

1.1.8.2 A review of Advances
Bank-extended advances rose to Rs 4.6 trillion in 2013. It marks a 7.5 per cent increase from 2012. Another optimistic statistic is the decrease in NPLs from 603 billion Rs. in 2012 to 596 billion Rs. in 2013. This illustrates strong corporate governance of banks. NPLs are 12.9% less from advances in 2013, compared to 14.0% in 2012. The improvement in regulations toward NPLs also demonstrates adherence to the prudential regulations of SBP by the banks. NPLs are always a source of increased total risk levels by increasing the default risk. Regulatory authorities are usually interested in decreasing the levels of NPLs by strict regulations.

1.1.8.3 An overview of Operational Efficiency and Profitability

Performance of the banking industry for 2013 saw a decline of approximately 7.9 percent in earnings prior to tax when it hit 166.9 billion Rs. in 2013, when compared to the amount of earning before tax recorded in 2012 that is 181.2 billion Rs. in 2013. Similar declining trend is witnessed in earnings after tax. It has been reduced to 115.3 billion Rs. in 2013 in comparison to earnings after tax of approx. 121.1 billion Rs. of 2012. This reflects a 4.8% decline.

Noting the efficiency ratio’s activity i.e., returns on assets (ROA)&returns on equity (ROE), that was noticed that ROE establishes a decreasing trend from 14.6% in 2012 to 13.1% in 2013. ROA has also condensed from 1.2% in 2012 to 1.1% in 2013.
It's quite obvious that Pakistan's banking system is trying to strengthen with each day. The primary cause against it may be due to fierce competition which functioned as a primary motive for banks to change. Banking organizations are currently not only striving to attain cost efficiencies but along with it they are becoming proactive in exploring valuable, non-traditional investment prospects. This ensued a complex environment for the financial industry which enhanced a requirement of a system of risk management which should be integrated in all sense. To identify risks which a banking organization might face an integrated system of risk management is required. This also acts as a framework for this work into the detection of potential risk determinants related to the banking industry overall.

2. Literature Review

Risk is of major concern to all financial institutions, as it has the capacity to complement normal course of business organizations. We are aware of the fact that banks are in a market that is focused on taking risk. Also if a banking organization cannot participate in practices that might place undue risk on it. Around the same time, bank does not bear exceptional risks because they may be passed on to various other participants of the economy (Al-Jarrah, 2012). Considering banks as a major source of finance (Bessis, 2011) describes that banking risks are the risks characterized as hostile influences on the viability of several distinguishing sources of uncertainty. According to (Rose & Hudgins, 2014) Bank risk is the ambiguity that is supposed to be associated with some event. Measurement of risk needs to take the basis of the improbability and the extent of its possible opposite effect on profitability. The kinds of risks that each corporation encounters depend on the scope and form of commercial operations the enterprise carries out. The amount of overall change in yield of a security considered the total risk of that particular security. This overall volatility is the uncertainty mix due to unsystematic sources, and the volatility due to systemic sources. Advocates of modern financial theory assert that the issue to be addressed by stockholders is a systemic risk only. While the supporters of strategic management philosophy argue that the most critical factor to be handled for the management of total risk is unsystematic risk (Lubatkin & O'Neill, 1987).

2.1. Systematic Risk

According to Obstfeld and Rogoff (2009), there is currently no specific concept of the systemic risk. One thing is to describe this as the possibility of a difficult structural incident. An occurrence that has the potential to affect the amount of systemically important intermediaries or transactions that can be linked to each other. One can trigger this occurrence by an exogenous shock. This can be idiosyncratic if it's small in nature, or if it's common it can be systemic. It means that shock might be coming from outside the financial system. Alternatively, this very same incident may emerge endogenously from inside the financial system or within the
2.2. NonSystematic Risk

(Tang & Shum, 2003) says that investors are typically paid not only to compensate for beta risk but for unsystematic risk as well. They proved this argument as the investors who intend to invest globally typically do not spend their money in a portfolio of investment which is recognized as a diverse portfolio. The risk element which can be identified as a non-systematic risk component is connected to the company-specific variables. Thus the effect of these non-systematic sources of risk will be dependent on the composition of the capital structure of companies (Al-Jarrah, 2012). (Lubatkin & O'Neill, 1987) identified sources of systematic risk as changes due to technology, walkouts, a condition where a plant of production is out on fire, liquidation and the expiration of the tenure of a manager who is influential. The intensity of unsystematic risk can be accomplished by the use of diversification (Bettis & Hall, 1982). From the overall risk faced by the organization approx. 70% to 80% portion is with unsystematic risk and usually it depends upon how efficiently organization has managed its diversification. (Lubatkin & O'Neill, 1987).

2.3 Risk Management

(Rejda, 2005) considers that managing risk is a systematic procedure. Which initiates after the identification and evaluation of the risk of loss that may be confronted by a firm or by a person in individual capacity. After that it continues by selection and implementation of most appropriate procedure which is helpful in treating loss exposure. To this Rejda model of three steps, (Bessis, 2011) incorporated the methods required for assessing and managing risk. Conferring to (Rejda, 2005) management of risk can be categorized into these three steps: 1: Risk Identification 2: Measuring Risk 3: Managing Risk

2.4 Management of Risk in banking industry

Risk management for the financial industry is the most critical compared with other areas of the economy. Financial organizations play significant position together with each country's economy and the global economic system since they can be counted as a plurality of all the world's leading organizations (Carey, 2001). Asian banks are the major sources of funds in Asia (Chang, 2004). The effect of financial complications on the balance sheet of a banking organization would be greater where banks serve as major source of financing as compared to nations having financially developed markets (Agusman, Monroe, Gasbarro, & Zumwalt, 2008). According to (Mulcahy, 2003) The key task of risk management is not only to reduce the negative effects, but rather to increase the effect of positive metrics. This can be achieved by speculation that leads the risk management to second important aspect. That is the integrated risk management approach. For the management of risk in banking, an integrated framework considering all risk factors is therefore needed. (Valsamakis, Du Toit, & Vivian, 1992) considers to ensure that all risks are handled satisfactorily; risk assessment systems within an enterprise need to be comprehensive and all-inclusive.

2.4.1 Managing risk: An assimilated approach

The key aim of bank executives is to make optimal use of the assets of the company to raise the amount of projected earnings, while taking into account their variability or volatility i.e. risk. (DeLoach & Andersen, 2000) considers that In order to be effective, risk management must be combined with the organization's business planning and the organization's strategic management. They claimed that modern approach to financial management, in which aggregate inclusion of assets in several marketplaces which are disseminated geographically, is typically explained by an exclusive value on stake criteria, which results from estimates of co-variation in ROA. This stimulates a requisite for an additional integrated attitude towards risk management. (Funston, 2004) reveals that about 80 per cent of businesses with the largest rates of loss in recent years have
been demolished by a number of intertwined threats, thus demonstrating the need for a risk management tool that reaches outside company borders and the associated risk divisions. (Rosenberg & Schuermann, 2006) defines goal of the Integrated Risk Management Strategy is to measure risk and then mitigate risk and manage available resources across bank operations. This includes a slant for the Bank to incur specific types of risks. It should be remembered here that an adaptive risk management strategy certainly will not imply a centralized risk management structure. The primary goal of the Integrated risk management strategy is exclusively to assure that almost all aspects of material risks are properly considered and assessed by the organization.

2.5 Dimensions of risk in banking industry

Bankers fear several risks, such as market risk, credit risk, interest rate risk, liquidity risk, solvency risk and earnings risk (Rose & Hudgins, 2014).

For banking organization if a factor has the ability to affect the entire banking sector one may consider it as a market risk. These can be such factors as economic downturns (Salkeld, 2011). In contrast the considerations related to the particular bank will be listed as firm unique. The causes of such factors are financial risk faced by the firm and business risk faced by the firm (Salkeld, 2011).

2.5.1 Determinants of Firm Specific Risk in Banks

A bank’s failure or its success is measured through its performance. While assessing the factors that function as a rationale for US bank failures (Samad & Glenn, 2012) uncovered ROA a significant component to point out the failure of banking organizations in 2009. This catastrophe of banking organization in financial performance of bank shows financial risk. (Amin, Sanusi, Kusairi, & Abdallah, 2014). According to the claim of (Peng, Wang, Kou, & Shi, 2011) Financial risk is defined as the likelihood of profit trailing is based on the bank's financial characteristics (Tafri, Hamid, Meera, & Omar, 2009) reflects that financial risk contains credit risk, liquidity risk, interest rate risk and exchange rate risk. All these factors add in the instability of financial performance.

2.5.2 The Macro determinants of Risk in Banks

Many researchers' opinions show that banks' downfall or excellence is also determined by some factors at macro level, such as interest rates in real terms and inflation. Many researchers have revealed a positive relation of inflation rates on profitability. (Aburime, 2008; Athanasoglou, Brissimis, & Delis, 2008; Tabari, Ahmadi, & Emami, 2013; Vejzagic & Zarafat, 2014). The research done by (Rachdi, 2013) expressed an inverse relationship. The researcher considered that an inverse relationship occurs between inflation rates, ROA & ROE prior to the financial crisis of 2008 but this relationship became negative with ROA after the financial crisis. The relationship later to financial crisis remained positive by ROE. Moreover, interest risk a macroeconomic element also affects performance of banking organizations. Though, (Ramlall, 2009) in a research study led on Taiwanese banking firms established an opposite association of interest rate in real with bank’s profitability. (Soto, González, Ballester, & Ferrer, 2009) ponders that there exists a positive but insignificant relationship between capital of the bank and interest rate risks.

Research reveals GDP growth as an important factor of financial risk. (Das & Ghosh, 2007) after using panel data analysis technique to find the determining elements of credit risk for banking organizations which are based in economies that are emerging. Their outcomes suggest that GDP growth critically impact problem loans. They determined that problem loans can be condensed by GDP growth. (Castro, 2013) in a research study based on Greece banking system i.e. for Ireland, Portugal, Spain and Italy cascading the time period from 1997 to 2011 using panel data technique for analysis established that growth in GDP occasioned in a reduced amount of credit risk.

2.6 Determinants of total risk

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The state and financial companies spend huge sums of money in the banking organizations. The bulk of the prior studies have attempted to recognize the key sources of risk i.e. market risk & overall risk from accounting data. Whereas maximum number of research studies recognized beta for measuring market risk and used standard deviation of accounting returns i.e. ROA and ROE for measuring total risk. (Agusman et al., 2008; Jahankhani & Lyng, 1979; Lee & Brewer, 1985; Mansur, Zangeneh, & Zitz, 1993; Pettway, 1976). When considering risk & financial performance, we can review that both microeconomic and macroeconomic variables are responsive. Macroeconomic elements may include interest rate in real terms, growth in GDP, market capitalization, inflation & items associated with off balance sheet activities (Amin et al., 2014).

Bank management's actions have the potential to greatly affect the risk levels. These decisions are most commonly expressed in the banks' financial statements and enable ratios based on accounting data a potential proxy for those decisions (Jahankhani & Lyng, 1979; Lee & Brewer, 1985).

Banks in Japanese economy were studied for the elements of total risk by (Elyasiani & Mansur, 2005). They used the information of 52 banks as sample covering time period 1986 to 1996. To assess market rate factors, foreign exchange rate and interest rate a multi-factor GARCH model was used. For evaluating the relation between accounting ratios and market elements of risk OLS & ridge regression techniques were incorporated. This study revealed that accounting ratios can be used to explain foreign exchange risk & market risk. Explicitly the outcomes extracted by the study described that when market beta model was used as a coefficients for loan loss reserves, deposits made by customers, expenses irrelevant to interest, resources of banks which are used for managing accounts maintained by customers, cash in hand item and cash that is due all found to have a significant relation with total risk. Results also added that nontraditional source of income affect beta in same direction while foreign exchange based assets affect beta in inverse direction. (Agusman et al., 2008) assessed numerous banks from the emerging countries of Asia. Their sample size comprised of 46 banks and time period was from the year 1998 to 2003. Their results concluded that total risk is statistically significant to ratio of reserves to loan loss to the loans & stdROA. Furthermore this study also concluded that firm specific risk is statistically significant to reserves for loan loss to total loans and total loans to total assets. They considered firm specific risk for banking organizations more important for emerging economies. (Jarvela, Kozyra, & Potter, 2009) found that market measure of risk can be evaluated using accounting risk measures. They studied 222 companies who were trading publicly using random sampling. They used accounting ratios for determining accounting based risk measures risk and beta for market based risk measures.

Literature shows that while assessing the causes of overall risk for economy the banking firms were not considered a viable origin of risk (Salkeld, 2011). Rendering to (Agusman et al., 2008) the usage of accounting measures of risk as a potential basis of total risk only may be adhesive.

3 Methodology

On the basis of all the analytical literature, a general conclusion can be made that the fluctuations in the economy as calculated by macroeconomic measures are substantially related to overall risk, in addition to the decisions taken by management, which are seen in the financial statement’s data of accounting ratios.

The model being used to test this hypothesis is:

\[
\text{STDROA} = \beta_0 - \beta_1 \text{Size} - \beta_2 \text{Equity/Asset} + \beta_3 \text{Loan Loss} - \beta_4 \text{Liquidity} - \beta_5 \text{Loan/Asset} + \beta_6 \text{GDP Growth} + \beta_7 \text{M2 Growth} + \beta_8 \text{Interest Rate Gap} + \epsilon_i
\]

To test the above regression model data is gathered from the secondary sources of data, well issued by the regulatory body from 2006 to 2013. Variable definition along with their appropriate signs is elaborated in table

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which is present in appendixes. For purpose of this analysis Panel Data robust regression is performed under two different models i.e. the base model and the fixed effect model.

3.1 Development of hypothesis

Banks acts as the central forum for every business activity that provides the financial intermediation services through the procedure of lending. Loans are included in most significant banking functions. Repayment of such loans would have a strong effect on bank liquidity. Around the same time, the bank's earnings are also significantly influenced by the management's decisions regarding investment and by the country's economic situation. When the volatility of both of these indicators arises then all these factors will drive the bank to losses and thereby raise the overall amount of risk that will impact the bank internally and economy overall. Thus it is very important to recognize the factors which determine total risk to take corrective measures to avoid any crisis. Following hypothesis has been formulated within the framework of the aforementioned broad objective.

**H1: The size of bank negatively effects total risk.**

**H2: Bank’s equity to asset ratio relates negatively to total risk.**

**H3: Liquidity is significantly related with total risk.**

**H4: Loan to Asset ratio associates positively to total risk.**

**H5: Loan Loss maintains a positive relation with total risk.**

**H6: M2 Growth has a significant relation to total risk.**

**H7: GDP growth has an inverse relation with total risk.**

**H8: Greater gap between interest rates relates positively with total risk.**

4. Empirical Findings

Empirical analysis has been used to find and elaborate the findings of above mentioned model. For the purpose of analysis Skewness/ Kurtosis test for checking the Normality of data has been used. The results of test depict zero skewness & zero kurtosis excluding for M2G variable. On the other hand skewness for variable IRG is also not “0”. Breusech-Pagan/ Cook-Weisberg test has been used to check heteroscedasticity. Less than 0.5 values for chi2 shows nonexistence of heteroscedasticity. These results of these tests are presented in appendix.

In order to check which the suitability of fixed or random effect model in this study Hausman test is used. Results support to test the model using fixed effects model. Test results are presented in appendix. The primary model used for estimation has ignored the firm and time fixed impacts of sample data. Robust regression has been used to find the results which are least biased.

4.1 Table 6: The Base Model

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<th>stdroaCoef.</th>
<th>Std.Err.</th>
<th>t.</th>
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<th>95% conf. interval</th>
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<td>lar</td>
<td>.0073336</td>
<td>.0017069</td>
<td>4.30</td>
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Independent variables in base model are regressed alongside total risk measured as STDROA without the inclusion of any time fixed effects or firm fixed effects variables following the technique used by (Agusman et al., 2008). The status of each hypothesis acceptance or rejection is elaborated as follows:

4.1.1 Hypothesis: 1

**H1:** The size of bank negatively affects total risk.

The coefficient for the size has a statistically significant relationship with total risk but in inverse direction. The results demonstrate larger banks i.e. the banks which have higher volume in total asset will face lower level total risk in comparison to banks which are smaller in size i.e. having low volume in total assets. These results witnessed the anticipated inverse relation amongst size of bank and total risk of the bank as is evidenced by (Olibe, Michello, & Thorne, 2008; Salkeld, 2011).

4.1.2 Hypothesis: 2

**H2:** Bank’s equity to asset ratio relates negatively to total risk.

Results revealed that equity to asset ratio maintains a significant negative relationship with total risk as was anticipated. This association shows that firms face less level of losses which uses firm’s equity as a source of fund for its operations thus face low level of total risk. This is quite rational because a amount of capital managed from different sources of equity funds is not so much expensive in comparison to the substitutes available e.g. borrowed capital. Because extra cost in lieu of interest expense usually is related with liability. Banks enjoy financial flexibility when they arrange funds from equity sources. Moreover, banks are sound financially when they arrange funds from capital sources as they do not require any interest expenses to pay. (Al-Qaisi, 2011; Samad & Glenn, 2012).

4.1.3 Hypothesis: 3

**H3:** Liquidity is significantly related with total risk

Total risk maintains a positive relationship with liquidity ratio. Bank maintaining higher amount of liquidity can expect lower level of risk because it facilitates a superior level of financial flexibility. Higher level of financial flexibility helps banks to overcome unexpected losses. Though estimated results recommend that opposite relation is right in real sense as excess amount of liquidity surged level of total risk faced by banks in reality. Excess amount of liquidity exhibit inefficient use of capital in excess. Therefore, this is not unexpected that high amount of liquidity has a positive association with total risk agreeing with the results of (Jensen, 1999); (Altunbas, Carbo, Gardener, & Molyneux, 2007).

4.1.4 Hypothesis: 4

**H4:** Loan to Asset ratio associates positively to total risk.

Results witness to support this hypothesis. Loans are usually not called liquid assets, and banks with a greater percentage of reserves invest in the form of loans have a higher degree of risk because these funds cannot be used for unforeseen risks in the near run supporting the results driven by (Hong & Sarkar, 2007; Kim, Gu, & Mattila, 2002; Olibe et al., 2008).
4.1.5. Hypothesis: 5

**H5:** Loan Loss maintains a positive relation with total risk

Allowances for loan loss ratio maintain an inverse relationship with total risk. But this relationship is insignificant. The results are different due to different economic situations faced by different countries.

4.1.6. Hypothesis: 6

**H6:** M2 Growth has a significant relation to total risk.

The effect of growth in the variable money supply on total risk was difficult to anticipate. The results reveal an inverse relation of money supply with total risk. It's suggested that the monetary system’s rise in money supply decreases the chance of perceived illiquidity. This also increases banks capacity to invest more funds which in turns results in increased level of profits, thus enabling banks to handle unexpected abnormalities (Zhang, 2009).

4.1.7. Hypothesis: 7

**H7:** GDP growth has an inverse relation with total risk.

Results support to accept this hypothesis. RealGDP is considered an indicator of cyclical movement in economy thus it seems that decrease in the value of realGDP leads to higher level of total risk faced by banks. Similarly in situations of economic soundness banks face lower level of risk (Babihuga, 2007; Festiæ & Bekő, 2008; Quagliariello, 2008).

4.1.8. Hypothesis: 8

**H8:** Greater gap between interest rates relates positively with total risk.

Results reveal to accept this hypothesis i.e. gap of interest rates is positively related to total risk faced by bank. A higher spread amongst one year Tbilland interbank rate for overnight indicates an increased fear for forthcoming inflation rates. Considering risk; inflation rate is a source of risk as it lowers money’s buying capacity. This is the causelongterm investors claim for increased premiums to adjust inflation. Increased inflation premiums will reward these investors for inflated prices in economy (Jusufi, 2012; Salkeld, 2011).

4.2. Model: 2 Fixed Effects for firms

To check the fixed effects of the firm Model 2 is used. Variable ID is depicting individual bank of sample

Table 7: Model 2

| Variable | Coef. | Std. Err. | t | P>|t| | 95% Conf. Interval |
|----------|-------|-----------|---|------|------------------|
| size     | .0014836 | .0000478 | 31.02 | 0.000 | .0013894 - .0015779 |
| ear      | .0001109 | .0000936 | 1.18  | 0.237 | -.0000735 - .0002953 |
The estimation results of firm fixed effects models support the results of the base model, however the results have been improved for macroeconomic variants. The direction of relations is also changes. Only interest rate spread maintains a negative relationship.

5. Conclusion

This study used thirty five banks covering a time span of eight years for sample data. The empirical study identifies changes in macroeconomic situation as a possible determinant of risk in banking sector of Pakistan. GDP growth, level of money supply and spread amongst return on one year Tbills and Pakistan’s overnight rate are related significantly to the level of total risk faced by bank.

Accounting ratios e.g. size of bank, loan to asset ratio, liquidity ratio, equity to asset ratio, growth in GDP real, growth in supply of money and spread of interest rate all seem to have a significant relation with total risk faced by banks. The bank’s size, loan to asset ratio, equity to asset ratio and liquidity ratio depicts results which were in accordance to previous research findings by (Adu-manseh, Abdullah, & Antwi, 2015; Churchill, 2013, 2014; Stiroh, 2006). However, an insignificant association exists between the loan loss ratio and total risk. The results of accounting ratios may portray dissimilar results if extensive data set is used. On the other hand researches done on European countries have been carried out in different economic and regulatory conditions. In Pakistan requirement of provisioning for loan losses and for non-performing loans’ categorization headed for losses also furnishes the issue of liquidity that is linked with NPLs and then towards loan losses. Thus tightening the probabilities of sudden issue of liquidity, aroused cause of loan losses may be the reason for insignificant relationship.

6. Future research recommendations

The objectivity of this topic can be enhanced by inclusion of assessing impacts of merger & acquisition on total risk’s level faced by banks.

References


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APPENDIX

Table 1: Financial sector of Pakistan

Source: State Bank of Pakistan

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<th>Banking Sector of Pakistan</th>
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<tr>
<td><strong>Banks (38)</strong></td>
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<tr>
<td><strong>Public Sector Banks (5)</strong></td>
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<tr>
<td>1 First Women Bank Limited</td>
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<tr>
<td>2 National Bank of Pakistan</td>
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<td>3 Sindh Bank Ltd</td>
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<td>4 The Bank of Khyber</td>
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<td>5 The Bank of Punjab</td>
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<td><strong>Specialized Banks (4)</strong></td>
</tr>
<tr>
<td>1 Industrial Development Bank of Pakistan</td>
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<tr>
<td>2 SME Bank Ltd.</td>
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<tr>
<td>3 The Punjab Provincial Coop. Bank Ltd.</td>
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<td>4 ZaraiTaraqiati Bank Ltd. (ZTBL)</td>
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<tr>
<td><strong>Foreign Banks (7)</strong></td>
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<tr>
<td>1 Barclays Bank PLC</td>
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<td>2 Citi Bank N.A</td>
</tr>
<tr>
<td>3 Deutsche Bank AG</td>
</tr>
<tr>
<td>4 HSBC Bank Middle East Ltd.</td>
</tr>
<tr>
<td>5 HSBC Bank Oman S.A.O.G.</td>
</tr>
<tr>
<td>6 Industrial &amp; Commercial Bank of China Limited</td>
</tr>
<tr>
<td>7 The Bank of Tokyo-Mitsubishi-UFJ, Ltd.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>19 Standard Chartered Bank (Pakistan) Ltd.</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Table 2: Variable Definitions and Expected Signs

<table>
<thead>
<tr>
<th>Variable</th>
<th>Formula</th>
<th>Definition</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Log of total Assets</td>
<td>Accounts for the size of a bank.</td>
<td>-</td>
</tr>
<tr>
<td>Equity Asset</td>
<td>Total Share Holder equity/Total Assets</td>
<td>Recognizes the percentage of assets that shareholders give</td>
<td>-</td>
</tr>
<tr>
<td>Loan Loss</td>
<td>Allowance for Loan Losses / Gross Loans</td>
<td>The percentage of advances a bank does not believe to recover</td>
<td>+</td>
</tr>
<tr>
<td>Liquidity</td>
<td>Cash from banks/total asset</td>
<td>A measure of a bank's capacity to bear unpredicted variations in its asset and liability accounts</td>
<td>+/-</td>
</tr>
<tr>
<td>Loan Asset</td>
<td>Gross Loans / Total Assets</td>
<td>The proportion of total assets which are held in loans unsettled</td>
<td>+</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>GDP of the current year/ GDP of the previous year</td>
<td>Yearly growth in GDP</td>
<td>-</td>
</tr>
<tr>
<td>M2 Growth</td>
<td>Money Supply of the Current year / MoneySupply of the Previous Year</td>
<td>The Yearly growth in Money Supply (M2)</td>
<td>+/-</td>
</tr>
<tr>
<td>Interest Rate Spread</td>
<td>Yield on 01 year treasury Bill – Interbank overnight Rate</td>
<td>Measures the interest rate spread between the 01 year Treasury and the interbank overnight Rate</td>
<td>+</td>
</tr>
<tr>
<td>SDROA</td>
<td>The standard deviation of return on Asset</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Skewness/Kurtosis tests for Normality

<table>
<thead>
<tr>
<th>Variables</th>
<th>Obs</th>
<th>(Skewness)</th>
<th>Pr (Kurtosis)</th>
<th>joint Adj chi2 (2)</th>
<th>Prob&gt;chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>size</td>
<td>280</td>
<td>0.0000</td>
<td>0.0000</td>
<td>.</td>
<td>0.0000</td>
</tr>
<tr>
<td>ear</td>
<td>280</td>
<td>0.0000</td>
<td>0.0000</td>
<td>.</td>
<td>0.0000</td>
</tr>
<tr>
<td>lr</td>
<td>280</td>
<td>0.0000</td>
<td>0.0000</td>
<td>.</td>
<td>0.0000</td>
</tr>
<tr>
<td>lar</td>
<td>280</td>
<td>0.0000</td>
<td>0.0000</td>
<td>.</td>
<td>0.0000</td>
</tr>
<tr>
<td>lir</td>
<td>280</td>
<td>0.0000</td>
<td>0.0000</td>
<td>.</td>
<td>0.0000</td>
</tr>
<tr>
<td>m2g</td>
<td>280</td>
<td>0.0323</td>
<td>0.9281</td>
<td>4.62</td>
<td>0.0994</td>
</tr>
<tr>
<td>irg</td>
<td>280</td>
<td>0.5336</td>
<td>0.0000</td>
<td>56.53</td>
<td>0.0000</td>
</tr>
<tr>
<td>rgdp</td>
<td>280</td>
<td>0.0000</td>
<td>0.0000</td>
<td>.</td>
<td>0.0000</td>
</tr>
<tr>
<td>stdroa</td>
<td>280</td>
<td>0.0000</td>
<td>0.0000</td>
<td>.</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Table 4: Breusech-Pagan/ Cook-Weisberg Test for Heteroskedasticity

<table>
<thead>
<tr>
<th>Ho : Constant Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables: fitted values of Stdroa</td>
</tr>
<tr>
<td>Chi2(1)</td>
</tr>
<tr>
<td>Prob&gt;chi2</td>
</tr>
</tbody>
</table>
Table 5: Hausman Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient Fixed</th>
<th>Co-efficient Random</th>
<th>(b-B) Difference</th>
<th>sqrt(diag(V_b-V_B)) S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>size</td>
<td>0.0014836</td>
<td>0.00147</td>
<td>0.000136</td>
<td></td>
</tr>
<tr>
<td>ear</td>
<td>0.0011009</td>
<td>-0.0002247</td>
<td>0.0003355</td>
<td></td>
</tr>
<tr>
<td>lr</td>
<td>0.0019056</td>
<td>0.0017708</td>
<td>0.0001348</td>
<td></td>
</tr>
<tr>
<td>lar</td>
<td>0.0003002</td>
<td>0.0003008</td>
<td>-6.30e-07</td>
<td></td>
</tr>
<tr>
<td>lir</td>
<td>9.86e-06</td>
<td>9.39e-06</td>
<td>4.65e-07</td>
<td></td>
</tr>
<tr>
<td>m2g</td>
<td>0.0018691</td>
<td>0.0020355</td>
<td>-0.0001664</td>
<td></td>
</tr>
<tr>
<td>irg</td>
<td>-0.0001012</td>
<td>-0.0001022</td>
<td>9.98e-07</td>
<td></td>
</tr>
<tr>
<td>rgdp</td>
<td>0.0004252</td>
<td>0.000442</td>
<td>-0.000167</td>
<td></td>
</tr>
</tbody>
</table>

b=Consistent under Ho and Ha; obtained from xtreg
B= inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: differences in coefficients not systematic

Chi2(8) = (b-B)'[ ((V_b-V_B) \times (-1)) (b-B) ]
= -0.40  chi2<0==modal fitted on these data fails to meet the asymptotic assumptions of Hausman test;