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Factors Affecting Total Risk in Banking Sector of Pakistan: Empirical Evidence from Panel Data Analysis

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ARTICLE DETAILS	ABSTRACT
History: Accepted 29 April 2021 Available Online June 2021	<p><i>If a financial organization flops, it can impose an externality nationwide as a whole. 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. Being cautious of elements which might direct to failure of banking organization support in future for evading losses by introducing preemptive initiatives to minimize damage caused by risk. This study analyzes the factors affecting total risk in banking sector of Pakistan using sample data from 2006 to 2013. The results revealed that the 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.</i></p>
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JEL Classification: D81, D89, E51	
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1. Introduction

The banking paradigm has been so drastically modified that we cannot 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 are dealing with this interesting new condition by quickly entering 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). 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 swaps¹. 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. 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 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.

2. 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

2.1 Total Assets in Banking Industry

By June 2013, total assets of banking industry erected at 10,678 million Rs. It can be observed that assets of the banking sector are growing. This represents the growing tendency in the opportunities of investment which banks have at their disposal primarily cos of globalization.

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

Figure 2: Pakistan's banking industry growth

2.2 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.

Figure3: Analysing Deposits in Pakistan's Banking industry

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. 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.

Figure 4: year wise Comparison of banking industry's total Assets to deposits

2.3 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.

2.3.1 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.

Figure 5: Analysis of Balance Sheet of Banking industry of Pakistan

2.3.2 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.

Figure 6: Volume of Advances in banking industry of Pakistan

It is 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 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.

3. 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 (Al-Jarrah, 2012). Considering banks as a major source of finance (Bessis, 2011) describes banking risks are the risks characterized by maintaining antagonistic impacts on the viability of several distinguishing causes of uncertainty. While (Rose & Hudgins, 2014) considers that bank risk is an ambiguity that is supposed to be linked to some certain events. When measuring risk, an importance should be given to consider it form the basis of improbability along with its extent on the potential opposite effect on profitability of the firm. The kinds of risks that each corporation encounters depend on the scope and form of commercial operations the enterprise carries out. Overall volatility is the uncertainty mix caused by unsystematic causes, along with volatility on the part of systemic factors. Advocates of modern financial theory assert that problem needed 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).

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.

Tang & Shum (2003) recommends, investors are typically paid not only to compensate for risk measured as beta, but they are also compensated against unsystematic risk. Researchers argued that 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.

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

Risk management for the financial industry is 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 serves 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 which leads the risk management to second important aspect termed as 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) consider ensuring that all risks are handled satisfactorily; risk assessment systems within an enterprise need to be comprehensive and all-inclusive. 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 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) define goal of the Integrated Risk Management Strategy is to measure risk and then mitigate risk and manage available resources across bank operations. Hence, 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.

Bankers fear several types of risks which may include credit risk, liquidity risk, interest rate risk, solvency risk, market risks and earnings risks (Rose & Hudgins, 2014). For banking organization if a factor can 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 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).

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 which occurred in the year 2009. Catastrophe of banking organization in financial performance of bank shows financial risk (Amin, Sanusi, Kusairi, & Abdallah, 2014). Similarly, (Peng, Wang, Kou, & Shi, 2011) defined financial risk the likelihood of profit trailing is based on the bank's economic and 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.

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 a positive 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 performance of the bank. (Soto, González, Ballester, & Ferrer, 2009) ponders that no relationship exists between capital of the bank and interest rate risks.

Research reveals GDP growth as an important factor of financial risk. Das & Ghosh (2007) suggested 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 cascading the time from 1997 to 2011 using panel data technique for analysis established that growth in GDP occasioned in a reduced amount of credit risk.

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 & Lynge, 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).

Managerial decisions depicted in accounting statement have the potential to greatly affect the risk levels. (Jahankhani & Lynge, 1979; Lee & Brewer, 1985). To investigate the determinants of total risk in Japanese banking system (Elyasiani & Mansur, 2005) 52 banks were studied from 1986 to 1996. For assessing 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. Results revealed that accounting ratios better explains foreign exchange risk and market risk. Outcomes also indicated 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 46 Asian banks from 1998 to 2003. Their results concluded that total risk is statistically significant to ratio of reserves for loan loss to total loans & std. ROA. Moreover, firm specific risk is found 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) studied 222 companies based random sampling. Accounting ratios were used 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.

4. Methodology

On the basis of empirical literature, it can be hypothesized that fluctuations in the economic system substantially contribute in overall risk, along with the accounting outcomes of managerial decisions. Following statistical model has been used to test the proposed hypothesis:

$$\text{STD ROA} = \beta_0 - \beta_1 \text{ Size} - \beta_2 \text{ Equity / Asset} + \beta_3 \text{ Loan Losses} - \beta_4 \text{ Liquidity} + \beta_5 \text{ Loan / Asset} + \beta_6 \text{ GDP Growth} + \beta_7 \text{ M2 Growth} + \beta_8 \text{ Interest Rate Gap} + \epsilon_i$$

To test above regression model, data is gathered from the secondary sources, well issued by the regulatory body from 2006 to 2013. Variable definition along with their appropriate signs is elaborated in table 1. Panel Data robust regression is performed under two different models of estimation i.e., pooled OLS and the fixed effect model as indicated by Hausman specification test where χ^2 is equal to 0.002. Moreover, Breusch-Pagan/ Cook-Weisberg Test for Heteroskedasticity indicate the presence of heteroskedasticity. Hence, robust standard errors have been used.

Table 1: List of Variables, Definitions and Expected Signs

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

5. Development of hypothesis

Loans are included in most significant banking functions. Repayment of such loans would have a strong effect on bank liquidity. Moreover, earnings of banks are affected by managerial decisions and economic condition. Risk increases when the volatility in these indicators arises and this will impact the bank internally and economy overall. Thus, it is very important to recognize the factors which determine total risk in banking sector to take corrective measures and to avoid any crisis. Following hypothesis has been formulated within the framework of the 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 impacts total risk significant positively.

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.

6. Empirical Findings and Results

Table 2 presents the regression results estimated using pooled OLS and fixed effects method of estimation. In the second column of the table independent variables are regressed alongside total risk measured as STDROA following the technique used by (Agusman et al., 2008). While, in the third column estimation results for fixed effects method of estimation has been presented. Results has been discussed as follows:

The coefficient for the size has a statistically significant relationship with total risk but in inverse direction. The results demonstrate larger banks face lower-level total risk in comparison to banks which are smaller in size. The inverse relation amongst size of bank and total risk of the bank confirm the findings of (Olibe, Michello, & Thorne, 2008; Salkeld, 2011). The relation remained significant when model is estimated using fixed effects method of estimation however, the direction of relation changed to positive indicating that when the size of bank increases it result in increased level of total risk.

Results revealed that equity to asset ratio is significant and negatively related to total risk in banking sector of Pakistan. This association shows that firms face less level of loss 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 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). Significant relation has been observed when model is estimated using fixed effects.

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 recommends that opposite relation is right in real sense as excess amount of liquidity surges level of total risk faced by banks. Excess amount of liquidity exhibits 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).

Results witness to support this hypothesis. Loans are usually not called liquid assets, and banks with a greater percentage of reserves invested in loans have a higher degree of total risk because such funds are not available for unforeseen circumstances. The positive relation confirms the findings of (Hong & Sarkar, 2007; Kim, Gu, & Mattila, 2002; Olibe et al., 2008).

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

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

Results support to accept this hypothesis. Real GDP is considered an indicator of cyclical movement in economy thus it seems that decrease in the value of real GDP 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 & Bekö, 2008; Quagliariello, 2008).

The 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 T bill and 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 cause long term investors claim for increased premiums to adjust inflation. Increased inflammation premiums will reward these investors for inflated prices in economy(Jusufo, 2012; Salkeld, 2011).

Table 2: Estimates of Regression

The dependent variable is standard deviation of ROA while Size=bank size, EAR= equity to asset ratio, LR=liquidity ratio, LAR=loan to asset ratio, LLR=loan loss ratio, M2G= growth in money supply, IRG= interest rate gap and RGDP= growth in real GDP are the independent variables.

Variables	Pooled OLS	Fixed Effects
C	0.212*** (0.138)	0.034*** (0.001)
<i>Size_{it}</i>	-0.023*** (0.002)	0.001*** (0.001)
<i>EAR_{it}</i>	-0.206*** (0.001)	0.021 (0.001)
<i>LR_{it}</i>	0.125*** (0.007)	0.021** (0.001)
<i>LAR_{it}</i>	0.007*** (0.002)	0.010*** (0.010)
<i>LLR_{it}</i>	0.010 (0.010)	0.010 (0.020)
<i>M2G_{it}</i>	-0.057 (0.036)	0.002** (0.010)
<i>IRG_{it}</i>	0.003** (0.001)	-0.010*** (0.010)
<i>RGDP_{it}</i>	-0.007 (0.005)	0.010*** (0.020)
R ²	0.8074	0.1019
F Statistics	3965.160	124.180
Prob.	0.000	0.000
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

The results indicate that the estimation results of firm fixed effects models supports the results of pooled OLS method, however the results have been improved for macroeconomic variants. Change in direction of relations has also been observed when model is estimated using fixed effects method of estimation. Only interest rate spread maintains a negative relationship when fixed effects method has been used.

7. 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 T bills 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, research works done in 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 loss also furnishes the issue of liquidity that is linked with NPLs which further leads towards loan losses. Thus, tightening the probabilities of sudden issue of liquidity, arising due to loan losses. Hence, provision for loan loss account maintained by the banks may be the reason for insignificant relationship.

The objectivity of this topic can be enhanced by inclusion of assessing impacts of merger & acquisition on total risk's level faced by banks. Moreover, accessing total risk in comparison of Islamic and conventional banks will surely add into literature for total risk.

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