

A COMPARATIVE STUDY OF CREDIT RISK MANAGEMENT: A CASE STUDY OF DOMESTIC AND FOREIGN BANKS IN PAKISTAN

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ABSTRACT

The paper evaluates firm's level aspects which have more influence on the Credit risk managing of domestic and foreign banks in Pakistan. Secondary data for the period of 2001 to 2010 is used, taken from various data sources. Augmented Dickey Fuller test is used for checking stationary, while for long run relationship Johansson's Co integration test is used. Linear regression model is used for coefficients analysis with OLS techniques. The result of R^2 shows that the model is best fit for both Domestic and Foreign banks. Bank size have positive and significant relationship with credit risk in domestic banks and positive and insignificant in foreign banks. Liquid assets and credit risk have positive and insignificant relationship in domestic banks and negative and significant in foreign banks. Based on the findings of the study it is recommended that credit risk may be minimize if (i) size of the banks maintain with a specify limit and (ii) increase liquidity of the banks.

Keywords: Risk management, Credit risk, domestic banks, foreign banks, Pakistan

INTRODUCTION

A lot of uncertainties are face by the businesses in every aspect of their operations. No doubt banking sector is facing the different types of risks like financials and non-financial risk in the current changeable and unstable environment. These risks may possibly make threats for continued existence and achievement of the banks.

The role of banking sector is very important in the economic and financial development of a country as this sector constitute one of the most fundamental parts of the any country's economy. Over the 64 years of period there come many changes in the banking sector of Pakistan the number of commercial banks with more branch solidity and the fast technological alteration and enlarged competition has added stress on banks to increase its performance. At present 6 Islamic banks, 9 investment banks, 6 foreign banks and 24 conventional banks are operating in enormously competitive environment and this sector has appreciably enhanced its progress, most of foreign banks start up their business in this area.

Credit Risk is the chance of loss due to the default of creditor's bank. Appropriate credit risk management system is the requirement of all banks, adjusting all complication of their credit portfolio. Origination's loan system has importance so there is need for suitable analysis of borrower's creditworthiness.

Al-Tamimi and Al-Mazrooei (2007) investigated the UAE national and foreign banks with a sample of 17 banks. The data was collected through questionnaires and Pearson correlation and ordinary least square regression were used to test the data. The results indicated that these banks are more capable in managing risk and also found that there is a major differentiation between the UAE national and foreign banks in observing of risk assessment and analysis and in risk examine and controlling.

Ali et al (2011) concentrated on commercial banks of Pakistan with a sample of 28 banks from the time period of 2006 to 2009. The data was collected through secondary sources Pearson correlation was used to find the relationship between variables. Linear regression was used to find the coefficients. Their results showed that the bank size has positive and significant association with credit risk and operational risk. Operating efficiency, non-performing loans ratio and operational risk have significant and negative association with, showing that the main fragment of operational risk is

extraordinary lending of loans and continuous operating expense. There seems positive link among liquid, credit risk and operational risk. Gearing ratio relationship with operational risk is significant and negative whereas it is inappropriate effect on the credit risk.

Ahmed et al (2011) studied the Islamic banks of Pakistan with a sample of 6 Islamic banks for the time period of 2006 to 2009. The data was collected through secondary sources. Pearson correlation was used to find the relationship between variables and linear regression was used to find the coefficients. The results indicated that size of bank has directly associated with credit and liquidity risk, while its association with operational risk is found to be negative and statistically irrelevant. The asset management creates a positive link with liquidity and operational risk. The gearing ratio and Non-Performing Loans ratio have a negative and significant association with both liquidity and operational risk while these have directly linked with credit risk. The relationship of capital adequacy with credit risk and operational risk is significant and negative, while it has positive association with liquidity risk.

Demirovic and Thomas (2007) concentrated on the measurement of credit risk in United Kingdom. Data was collected from a sample of whole UK listed corporations over the period of 1990 to 2002. Regression analysis was used to find the coefficient and the results found that, for measuring of credit risk size of firm is important factor all other factors remain the same or not as much of credit risky.

Ho and Yusoff (2009) focused on credit risk management in Malaysia financial institutions. The sample of this study was 15 (both domestic and foreign financial) organizations and the data was collected through questionnaires. The results concluded that diversification of loan services risk improvement and employees' job improvement and training are the important practices executed by financial organizations.

Brown and Wang (2002) studied on the credit risk in Australia and the time period included in this study was from January 1986 to August 1993 and weekly bond data was collected from first Interstate bank corporations. The results showed the arrangement of hedging duration and credit spread. Hedging option reduces interest and credit risk effectively and significantly as well as the credit risk of a sub investment grade bond portfolio. The study further showed that hedging integrated approach to interest rate risk and credit risk is the best choice for securities subject to default risk. The study focus on the credit risk management in the financial sector as it is more responsive sector in the economy and banks play the key role in financial sector so, banks should just need to manage risk at the firm level due to the main source of finance provider.

OBJECTIVES

The present study visualize with the following objectives:

1. To identify the variables that affect credit risk in domestic banks in Pakistan.
2. To analyze the variables which affect credit risk in foreign banks in Pakistan.

MATERIALS AND METHODS

To attain the above mentioned research objectives, we used a sample of 10 banks. Data was collected from the bank's annual reports over the period 2001-2010. Financial data from these annual reports was used to calculate and to evaluate the credit risk management of domestic and foreign banks in Pakistan. Augmented Dickey Fuller test is used to test the stationary of the data Johansson's Co integration test is used to find the long term relationship. The following Linear Regression model is use for analysis with OLS techniques.

$$\text{Credit Risk} = \beta_0 + \beta_1 \text{LNA} + \beta_2 \text{D/E} + \beta_3 \text{IAR} + \beta_4 \text{ROE} + \beta_5 \text{LA} + \varepsilon$$

Where Credit Risk (CR) = Total Debt/Total Assets, Bank Size = Logarithm of Total Assets, Debt to equity ratio (D/E) = Total company debt/equity, Investment to Asset Ratio = Investment/Total Asset, Return on Equity (ROE) = EACS/Total Equity and Liquid Assets (LA) = Total Loans/ Total Deposits

RESULTS AND DISCUSSION**Results of Augmented Dickey Fuller test***Domestic Banks***Table 1: Results of Augmented Dickey Fuller test (Intercept)**

Variables	t-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Results
Credit Risk	-4.611266	-3.5682	-2.9215	-2.5983	I(0)
Bank Size	-7.870350	-3.5713	-2.9228	-2.5990	I(1)
Debt to equity ratio	-4.483613	-3.5682	-2.9215	-2.5983	I(0)
Investment to Assets ratio	-4.300792	-3.5682	-2.9215	-2.5983	I(0)
ROE	-9.395016	-3.5713	-2.9228	-2.5990	I(1)
Liquid Assets	-9.993944	-3.5713	-2.9228	-2.5990	I(1)

Augmented Dickey Fuller test with intercept has been applied to test the stationary status of the data using E-views software. Credit risk, Debt to Equity ratio and Investment to Total Assets are stationary at level with lag zero, while Bank Size, Return on Equity and Liquid Assets are found stationary at first difference with lag zero, t-statistic values of all variables are greater than their critical values therefore we can reject H_0 . It means that all the variables do not have a unit root problem and all the variables are stationary at 1%, 5% and 10% significant level.

Table 2: Results of Augmented Dickey Fuller test (Trend and Intercept)

Variables	t-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Results
Credit Risk	-4.557724	-4.1540	-3.5025	-3.1804	I(0)
Bank Size	-7.805063	-4.1540	-3.5025	-3.1804	I(1)
Debt to equity ratio	-4.452838	-4.1540	-3.5025	-3.1804	I(0)
Investment to Assets ratio	-4.466201	-4.1540	-3.5025	-3.1804	I(0)
ROE	-4.408016	-4.1678	-3.5025	-3.1804	I(1)
Liquid Assets	-4.554013	-4.1540	-3.5025	-3.1804	I(0)

Augmented Dickey Fuller test with trend and intercept has been applied to test the stationarity of the data. Credit risk, Debt to Equity ratio, Investment to Total Assets and Liquid Assets are stationary at level with lag zero, while Bank Size is found stationary at first difference with lag zero and Return on Equity is found stationary at first difference with lag two, t-statistic values of all variables are greater than their critical values therefore we can reject H_0 . It means that all the variables do not have a unit root problem and all the variables are stationary at 1%, 5% and 10% significant level.

*Foreign Banks***Table 3: Results of Augmented Dickey Fuller test (Intercept)**

Variables	t-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Results
Credit Risk	-7.925837	-3.5713	-2.9228	-2.5990	I(1)
Bank Size	-8.448631	-3.5713	-2.9228	-2.5990	I(1)
Debt to equity ratio	-8.211985	-3.5713	-2.9228	-2.5990	I(1)
Investment to Assets ratio	-4.286060	-3.5682	-2.9215	-2.5983	I(0)
ROE	-3.764415	-3.5682	-2.9215	-2.5983	I(0)
Liquid Assets	-9.514072	-3.5713	-2.9228	-2.5990	I(1)

Augmented Dickey Fuller test with intercept has been applied to test the stationary status of the data using E-views software. Credit risk, Debt to Equity ratio, Bank Size, and Liquid Assets are stationary at first difference with lag zero, while Return on Equity and Investment to Total Assets are found stationary at level with lag zero, t-statistic values of all variables are greater than their critical values therefore we can reject H_0 . It means that all the variables do not have a unit root problem and all the variables are stationary at 1%, 5% and 10% significant level.

Table 4: Results of Augmented Dickey Fuller test (Trend and Intercept)

Variables	t-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Results
Credit Risk	-7.842709	-4.1584	-3.5045	-3.1816	I(1)
Bank Size	-8.378490	-4.1584	-3.5045	-3.1816	I(1)
Debt to equity ratio	-8.127467	-4.1584	-3.5045	-3.1816	I(1)
Investment to Assets ratio	-4.824136	-4.1584	-3.5045	-3.1816	I(0)
ROE	-4.211930	-4.1584	-3.5045	-3.1816	I(0)
Liquid Assets	-9.410339	-4.1584	-3.5045	-3.1816	I(1)

Augmented Dickey Fuller test with trend and intercept has been applied to test the stationary status of the data using E-views software. Credit risk, Debt to Equity ratio, Bank Size, and Liquid Assets are stationary at first difference with lag zero, while Return on Equity and Investment to Total Assets are found stationary at level with lag zero, t-statistic values of all variables are greater than their critical values therefore we can reject H_0 . It means that all the variables do not have a unit root problem and all the variables are stationary at 1%, 5% and 10% significant level.

Johanson's Co-integration Test**Table 5: Domestic Banks**

Variables	Eigen value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
Credit Risk	0.669815	150.6724	124.24	133.57	At most None **
Debt to equity ratio	0.429582	97.48347	94.15	103.18	At most 1 *
Investment to Assets ratio	0.427056	70.53693	68.52	76.07	At most 2 *
Liquid Assets	0.335910	43.80246	47.21	54.46	At most 3
ROE	0.144516	13.16593	15.41	20.04	At most 4
Bank Size	0.111483	5.673691	3.76	6.65	At most 5

*(**) denotes rejection of the hypothesis at 5 % (1%) significance level
L.R. test indicates 3 co-integrating equation(s) at 5% significance level

Johansen's co-integration test will explain whether there is any effect between dependent variable and independent variables in long-term period. The above results of Johansen's co-integration test shows that Credit Risk has co-integration because its likelihood ratio is greater than the critical values at 5% and 1% significance level. So we can reject the null hypothesis H_0 that can explain there is no co-integration between dependent and independent variables and accept alternative hypothesis H_1 that can explain there is a co-integration between dependent and independent variables.

Table 6: Foreign Banks

Variables	Eigen value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
Credit Risk	0.632648	130.7568	124.24	133.57	At most None *
Debt to equity ratio	0.497764	82.68788	94.15	103.18	At most 1
Investment to Assets ratio	0.319481	49.63099	68.52	76.07	At most 2
Liquid Assets	0.247850	31.15580	47.21	54.46	At most 3
ROE	0.090205	7.270422	15.41	20.04	At most 4
Bank Size	0.055341	2.732721	3.76	6.65	At most 5

*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 1 co-integrating equation(s) at 5% significance level

Johansen's co-integration test will explain whether there is any effect between dependent variable and independent variables in long-term period. The above results of Johansen's co-integration test shows that only Credit Risk has co-integration because its likelihood ratio is greater than the critical values at 5%. So we can reject the null hypothesis H_0 that can explain there is no co-integration between dependent and independent variables and accept alternative hypothesis H_1 that can explain there is a co-integration between dependent and independent variables.

REGRESSION ANALYSIS**Domestic Banks**

$$\text{Credit Risk} = 0.406 + 0.0130 \text{ LNA} + 0.0964 \text{ D/E} + 0.000002 \text{ IAR} + 0.000367 \text{ ROE} + 0.052 \text{ LA}$$

Table 7: Regression Results of Domestic Banks

Predictor	Coefficient	Standard Deviation	T	P
Constant	0.4063	0.1217	3.34	0.002
Bank Size	0.013026	0.006303	2.07	0.045
Debt to equity ratio	0.09638	0.01007	9.57	0.000
Investment to Assets ratio	0.00000206	0.00000141	1.46	0.150
ROE	0.0003672	0.0007570	0.49	0.630
Liquid Assets	0.0515	0.1002	0.51	0.610

R Square (Adjusted) = 76.0%, F = 32.08, P = 0.000, Durbin-Watson statistic = 1.80

The value of Probability F-statistic in this model is 0.000 which represents that the model is good fitted and highly significant. The value of R-square (adjusted) shows that nearly 76% change in the dependent variable is due to the variables under study while the 24% is due to other those variables that are not included in this study. The Investment to Assets ratio, ROE and Liquid Assets are found to have positive but insignificant relationship with credit risk while bank size and debt to equity ratio have found to be positive and significant relationship with credit risk at 5% and 1% respectively. The value of Durbin-Watson statistic is 1.80 means that there is a positive autocorrelation between the variables.

Foreign Banks

$$\text{Credit Risk} = 0.493 + 0.00201 \text{ LNA} + 0.166 \text{ D/E} + 0.0385 \text{ IAR} + 0.00170 \text{ ROE} - 0.0520 \text{ LA}$$

Table 8: Regression Results of Foreign Banks

Predictor	Coefficient	Standard Deviation	T	P
Constant	0.4934	0.1293	3.82	0.000
Bank Size	0.002012	0.008144	0.25	0.806
Debt to equity ratio	0.165919	0.006988	23.74	0.000
Investment to Assets ratio	0.03850	0.07385	0.52	0.605
ROE	0.001699	0.001224	1.39	0.172
Liquid Assets	-0.05199	0.01913	-2.72	0.009

R Square (Adjusted) = 96.0%, F = 236.39, P = 0.000, Durbin-Watson statistic = 0.71

The value of Probability F-statistic in this model is 0.000 which represents that the model is good fitted and highly significant. The value of R-square (adjusted) shows that nearly 96% change in the dependent variable is due to the variables under study while the 4% is due to other those variables that are not included in this study. The Investment to Assets ratio, ROE and bank size found to have positive but insignificant relationship with credit risk while Liquid Assets have negative and significant relationship with credit risk at 1% and debt to equity ratio have positive and significant relationship with credit risk at 1%. The value of Durbin-Watson statistic is 0.71 means that there is a weak positive autocorrelation between the variables.

CONCLUSION

This study observes the credit risk management by taking comparative study between Domestic and Foreign banks in Pakistan. The study found that the relationship of bank size with credit risk is positive and significant in domestic banks and positive and insignificant in foreign banks. The relationship of debt to equity ratio with credit risk is positive and significant both in domestic and foreign banks. The results further show that the relationship of investment to assets ratio with credit risk is positive and insignificant both in domestic and foreign banks. The relationship of Return on equity with credit risk is positive and insignificant both in domestic and foreign banks. The relationship of liquid assets with credit risk is positive and insignificant in domestic banks and negative and significant in foreign banks. Based on the findings of the study it is recommended that credit risk may be minimize by controlling size of the banks and by increasing liquidity of the banks.

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