Determinants of Credit Risk: A Study of Pakistan's Banking Sector

Mr. Farooq Ahmed* & Dr. Arshad Hassan[⊥]

Abstract

The significant problem faced by banking sector during the global financial crises was of critical importance and measurement of credit risk. After August 2007, the environment of world trade has worsened. Banking sector faced many risks as a result of dynamics and rapid changes in global financial landscape. The risk exposure in banking sector has also increased due to market flexibility, changes in socio-economic pattern and foreign exchange business. These developments and innovations create various types of risks in banking sector. Credit risk is one of major risks faced by the banking sector. This study examines the bank specific, banking industry specific and macroeconomic determinants of credit risk. For the analysis of unbalance panel data Random Effect Model has been used and for 21 banks, 15 years' annually data is analysed in this study. Results of this study indicate that bank ownership has negative and insignificant relationship with credit risk. Efficiency of management has negative and significant relationship with credit risk in CR1 models but insignificant relationship in CR2 models. Financial sector development has positive and significant impact on credit risk in CR1 models but insignificant impact in CR2 models. Competition and GDP growth rate variables have negative and insignificant impact on credit risk in CR1 models and positive and significant in CR2 models. Inflation rate has positive and significant relationship with credit risk in both CR1 and CR2 models.

* The author holds degree of M.Phil. Economics & Finance from Pakistan Institute of Development Economics (PIDE), Islamabad.

⊥ Dean Faculty of Management Sciences, Capital University of Science and Technology (CUST) Islamabad

Keywords

Credit risk, Bank specific factors, Industry specific factors, Macro-economics' determinants, Panel data techniques, Pakistan.

Introduction

In recent years, public authorities have spent much attention on the stability of financial institutions. One important lesson observed from recent financial crises is that financial institution should spend more attention on managing the risks of financial institutions. In modern economy, to facilitate economic transactions, an efficient and stable financial system is necessary. A strong, efficient and stable financial system does not only decrease uncertainties, but it also leads to economic efficiency by efficient usage of resources. In every aspect of its operation, a business faces a lot of uncertainties. The most important function of financial institutions is to manage the financial risks which include credit risk, interest rate risk, liquidity risk and foreign exchange rate risk. Credit risk is dangerous and fundamental risk in banking sector. Most of the banks put a lot of effort to mitigate credit risk and try to maintain of portfolio (Rosman and Razak, 2008).

When there is uncertainty that bank borrower or counterparty will fail to meet its debt obligation according to agreed terms, it refers to credit risk. According to Campbel et al. (1993) credit risk is the uncertainty of loss if debtor does not make payment at time. It is the most dangerous risk as compared to other risks in banking sectors and it directly threatens the solvency of financial institutions.

Credit risk is the most significant area of risk management. Effective credit risk management is necessary in order to minimize credit losses (Santomero, 1997). This risk is influenced by change in political status, change in economic policies and also change in goal of leading the lending policies (Altman and Saunder, 1997). It is very difficult to examine these factors which influence credit risk due to few years' data availability regarding micro economic variables of credit risk. Identifications of these factors are objective of this study.

To minimize the lender`s credit risk, the lenders perform the credit check on borrower like appropriate insurance, security and any asset or

guarantee of any person. When there is high risk then the lender will charge higher interest rate (Poudel, 2013). The lenders use various methods to analyse and manage the credit risk. According to Bodla and Verma (2009) companies establish separate departments only to analyse the financial strength of their valuable customers. This department also advises on method risk avoiding and transferring credit risk. Many lenders apply their own models and rank their customers according to their risk exposure and then employ their own strategies. And then lenders offer their products according to their customers' risk. Some products demand collateral of an asset that will be pledged to the loan. Huge funds are invested by the banks in credit risk modelling. Mostly, banks and lending institutions also use credit scoring model to grant credit to their customers. This model includes qualitative and quantitative sections' various aspects of the risk like operating expenses, asset quality, leverage, management expertise and liquidity ratios etc. When information is received by credit scoring, then this is reviewed by credit officers and committee, and then lenders provide funds according to terms and conditions (Sahajwala and Van den Bergh, 2000).

Wilson (1998) proposed a multi factorial model for the measurement of credit risk which is helpful for getting the idea about default probabilities and rating of credit risk migration probabilities for different industry sector and for each individual country. Credit portfolio view states that credit risk and uncertainty of obligor default rating migration depend on the economy state. When economy is not performing well then probability of default increases and when economy is performing good the probability of default of companies decreases (Belkin et al., 1998). When there is slow economic growth then it causes to more time credit rating migrations and vice versa.

Any bank cannot maintain its business activities if a bank neglects its credit functioning (Osayeme, 2000). In developing countries, the health of financial system relates to the health of the economy (King & Levine, 1993). In banking sector, credit risk management is very important and considered as a main item of loan process. In banking system, non-performing loans increase mostly due to poor loan process,

absence of collateral and inadequate process of loan granting. These things have negative impact on banks' performance.

Although there are many studies conducted to investigate the impact of bank specific variables and micro and macro-economic variables on the credit risk (Abdullah et al. 2012; Ahmed and Ariff, 2007; Ali and Ghauri, 2013; Aver, 2008; Buch et al., 2010; Bucur and Dragomirescu, 2014; Castro, 2013; Diaconasu et al. 2014; Fredrick, 2012; Godbillon-Camus and Godlewski, 2005; Musyoki and Kadubo, 2011; Poudel, 2013; Washigton, 2014). However, to the best of our knowledge, not a single study has been conducted to investigate the combine impact of bank specific, industry specific and macroeconomics determinants on credit risk. This study, therefore, is conducted to explore the combine impact of bank specific, industry specific and macroeconomics variables on credit risk. Especially in Pakistan, this study is carried out to explore said relationship. We also explore the impact of bank specific factors on the credit risk of Pakistan`s banking sector, and also discuss the macro-economic determinants of credit risk of banking sector in Pakistan.

Methodology

The main objective of this study is to investigate the determinants of credit risk. Therefore, this study has set of empirical models that are based on theoretical background and set of econometric techniques to estimate these models. First section discusses the empirical background for bank specific, banking industry specific and macroeconomics determinants of credit risk. Second discusses the methodologies of panel data.

Bank Specific and Industry Specific Determinants

A number of prominent studies have been conducted on bank specific and industry specific determinants of credit risk, for example Abdullah et al. (2012), Kolapo et al. (2012) and Musyoki and Kadubo (2011) provided different arrays of models in which various variables are considered as important determinants of credit risk. This study analyses model of Garr (2013) to investigate the relationship with credit risk. This study includes both macro and microeconomic factors which affect the

credit risk. The below model expresses that credit risk as a function of bank specific, industry specific and macro-economic variables:

$$CRit = \alpha i + \sum \varphi j X^{B} jit + \sum \Psi j X^{I} jit + \sum \Upsilon j X^{M} jit + \varepsilon it.$$

In this model CR represents the credit risk which is measured by two ratios (i) Net interest income to total assets which is reported as CR1 (ii) Total advances to total assets which is reported as CR2; X^{B} represents the bank specific characteristics, X^{I} represents the industry level variables and X^{M} represents the macro-economic determinants; j represents the explanatory variables, i is the number of banks and t represents the time period; αi represent the observed heterogeneity which is cross section variant and εit represent error term.

The important thing to be noted is that theoretical literature gives more attention to the relationship between efficiency of management rather than size of bank, number of branches and loan growth ratio etc. According to these points efficiency of management, bank ownership, competition and financial sector development are used as an independent variable in this study. In literature different variables have been used like net interest margin, value of one firm, asset quality, loan loss provision and market power index etc.

Hussain and Hassan (2006) reported contradiction between theory and empirical evidence that also assist more emphasis on empirical evidence and have priority over theory. Therefore, in this study Garr (2013) model is specified as following:

$$Yit = \beta 1 + \beta 2X2it + \beta 3X3it + \beta 4X4it + \beta 5X5it + Uit.$$

Here, Y = Credit risk (Net Interest Income/Total Assets); X2 = Bank Ownership; X3= Efficiency of Management; X4 = Financial Sector Development; X5 = Competition; Uit = Error Term.

Macro-Economic Determinants

In the field of macroeconomics determinants, many studies are published that discuss the impact of various macroeconomic variables on credit risk (Bucur and Dragomirescu, 2014; Diaconaşu et al., 2014; Onaolapo, 2012; Poudel. 2013; Washigton, 2014; Yusuf and Sabri,

2014). Keeping in view the conceptualization of above studies the following regression model is examined in this study:

$$Y = \lambda 0 + \lambda 1X1it + \lambda_2 X2it + \lambda_3 X3it + Uit.$$

Here, Y = Credit risk (Total Advances/Total Assets); X1= GDP growth rate; X2= Inflation Rate; X3= Treasury Bills Rate; Uit = Error Term.

Econometric Model

This study considers seven (07) explanatory variables which vary across the group (cross sectional). For this type of analysis, panel data methodology is used. Panel data proposes more effective information by combining time series and cross-sectional observations. Panel data also gives more degree of freedom, more variability and less multicollinearity among variables. Panel data gives more comprehensive empirical results and analysis as compared to time series and cross-sectional data.

Fixed Effect Model

Fixed effect methodology has constant slope but intercept vary across the cross section over the time or both. In this type model, there is no significant time effect and there is significant cross-sectional effect like country effect. This model is called fixed effect model:

$$Yit = \beta 1i + \beta 2X2it + \beta 3X3it + \beta 4X4it + \beta 5X5it + \beta_6 X6it + \beta 7X7it + \beta 8X8it + Uit.$$

The subscript i with intercept shows that the intercept vary across the cross sectional, in this study 21 cross sectional banking sector of Pakistan, it may be due to the reason of unique features of each bank like management style and credit policies. Due to the different intercepts we introduce the dummy like:

$$Yit = \alpha 1 + \alpha_2 D2i + \alpha 3D3i + \ldots\ldots\ldots\ldots\ldots + \alpha 21D21i + \beta 2X2it + \beta 3X3it + \beta 4X4it + \beta 5X5it + \beta 6X6it + \beta 7X7it + \beta 8X8it + Uit.$$

Where D2i = 1 if observation belongs to Bank_2 (Bank Alfalah) otherwise zero. There is same interpretation of remaining dummies with all other banks included in this study analysis. We have 21 different banks (cross sectional) but we introduce 20 dummies to avoid dummy variable trap. So, there is no dummy for Bank_1 (ABL bank); α_1

represent intercept of Bank_1 (ABL bank) and we use it for comparison with other banks. We can freely choose any bank for the comparison. Sometimes this model is called Least Square Dummy Variable Model.

In fixed effect model, slope is constant and we can also vary intercepts over the time. In such type model there is no significant country (group) effect. The error term of this model may auto correlate with its time lagged effect. In this case our variables may be similar across the cross sectional (country). For the time effect for t period we introduce t-1 dummies in the equation:

$$Yit = \lambda 1+\lambda 2D2006+\ldots.+\lambda 10D2014+\beta 2X2it+\beta 3X3it+\beta 4X4it+\beta 5X5it+\beta 6X6it+\beta 7X7it+\beta 8X8it+Uit.$$

There is another type of fixed effect model in which slope is constant and intercept vary across the cross sectional as well as time:

$$Yit=\alpha 1+\alpha 2D2i+\alpha 3D3i+\ldots\ldots\ldots\ldots.+\alpha 21D21i+\lambda 1+\lambda 2D2006+\ldots\ldots\ldots..+\lambda 10D2014+\beta 2X2it+\beta 3X3it+\beta 4X4it+\beta 5X5it+\beta 6X6it+\beta 7X7it+\beta 8X8it+Uit.$$

There is another fixed effect model in which there are different intercepts and slopes. In this case intercept and slope both are according to the cross sectional. For the formulation of this model we include not only cross sectional (countries) dummies but also their interactions regarding time varying covariates. Another type of fixed effect model is in which both intercepts and slopes are according to the cross sectional and time. This model includes i-1 cross sectional dummies and t-1 time dummies, under consideration of dummies and interaction among them. This model may be not analysed when there are enough variables.

The Random Effect Model

According to the Prof. William H. Green the random effect model is a regression with random constant term:

$$Yit = \beta 1i+\beta 2X2it+\beta 3X3it+\beta 4X4it+\beta 5X5it+\beta 6X6it+\beta 7X7it+\beta 8X8it+\grave{\omega}it,$$

where, $\grave{\omega}it = Ɛi + Uit$.

We assume $\beta 1i$ is random with mean value of β_1, instead of treating $\beta 1i$as a fixed and intercept of each group (country) as a $\beta 1i=\beta 1+Ɛi$, where, $Ɛi$ = random error with zero mean and variance $\sigma Ɛ$.

Model Estimation

We estimate the model that covered the problem affecting them. By ordinary least square we estimate model which have constant coefficient with homogenous residuals and normally distributed. On the dependent variable there is no Groupwise or other heteroskedasticity as well as we can use OLS for fixed effect (Sayrs, 1989). Error should be homoscedastic and independent for the proper implication of OLS. These conditions are rarely fulfilled to expect the OLS (Davidson and MacKinnon, 1993).

The estimator Feasible Generalized Least Square (FGLS or EGLS) is filled with heteroskedastic model; with OLS we cannot estimate the fixed effect model with group wise heteroskedasticity. If the autocorrelation plagues the error and sample size is too large, then we use FGLS.

Choosing Between Fixed Effect and Random Effect Estimators

If time series is larger than cross sectional units then FEM is batter. Housman test is classical test which tells us either fixed effect is batter or random effect model. The important research question is whether there is significant correlation between regressors and the unobserved cross sectional specific random effect. If there exists such correlation, then FEM is a batter choice. To check such correlation, we compare the correlation matrix of regression as least square dummy variable with those which are in random effect model. The null hypothesis of this test is that there is no correlation. If the difference between the covariance matrixes of two models is statistically non-significant, then correlation will statistically insignificant of the random effect with regressors.

Housman Test

For the estimation of panel data, FEM and REM are two important techniques. Housman test is well reputed test to choose the best model between FEM and REM. This test was given by Housman in 1998.

The Housman test of statistics tend to the chi-square (χ^2) in the above equation. We estimate the both equations to accomplish the Housman test then compare the both models and its statistics with chi-

square (χ^2). This test provides guideline to select the model between FEM and REM.

Data and Variables Construction

The research design explains the relationship between explanatory variables and dependent variables (Donald, 2006). According to (Cooper et al., 2006) purpose of specific study is gained by focusing the researchers' prospective through the research design.

In this study Random Effect Model Technique has been used. The selection of appropriate method enables the researchers to analyse their objective tentatively and increase the validity and reliability of the results. This study covers and explains the impact of various explanatory variables on dependent variable.

Population

Population is the set of people, events, services, household or group of things that are being investigated (Ngechu, 2006). According to Mugenda & Mugenda (2003), population is also called census because everyone has equal chance to be selected in final sample. The population of this study is all commercial and Islamic banks of Pakistan.

Sample Design

In selection of sample, stratified and judgmental random sampling design is used based on judgment of the researchers that is best fitted criterion of the research. The study uses data of 21 commercial banks for the period of 2005-2016. The time period that is chosen under this study is enough to answer the research question and is reliable for the study.

Data Collection

In order to analyse research objective, this research uses secondary data on yearly basis. Secondary data includes annuals reports, published material, public data and information from other sources. According to Cooper et al., (2006), secondary data is more useful in quantitative technique to evaluate reports, records, government opinion and government documents etc. The data is collected from Handbook of

State Bank of Pakistan, KSE website, annual report of commercial banks and other sources.

Variables Construction

Quantifying Bank Credit Risk

To identify a good measure of credit risk is a big challenge for the empirical model. In theoretical debate, the term credit risk means expected or unexpected losses to a bank, where expected losses mean anticipated losses for a particular time period, and the unexpected losses mean dispersion from average or degree of uncertainty (Borio et al., 2001). In econometric modelling there are many measures of credit risk such as KMV portfolio approach which quantify credit risk for portfolio management. There are many proxies which are used in literature for the measurement of credit risk. In this study the following proxies are used for the measurement of credit risk:

Credit Risk = Net Interest Income/Total Assets (This Proxy is reported as a CR1 in this study).

Credit Risk = Total Advances/Total Assets (This Proxy is reported as a CR2 in this study).

Data regarding this ratio is taken from annual statement of each bank. The time period covered under this study is 2005 to 2014. Due to missing values there is unbalance panel data.

Bank Specific Variables

Two bank specific variables are used in this study. One is bank ownership and second variable is efficiency of management. Bank ownership is binary variable; this study assumes values 1 for locally owned banks and 0 values for foreign owned banks. There is expectation that foreign owned banks lead to lower credit risk because foreign banks have many incentives from government like tax facility etc.

Efficiency of management is used as an independent variable in this study. This variable is measured by the ratio operating expenses to total income. Annual data for this variable is captured from annual reports of the banks. It is expected that there is negative relationship between credit

risk and efficiency of management because efficiency of management leads to lower operating expenses which positively affects the profitability of banks and as a result credit risk will be decreased.

Bank Industry Specific Variables

In this study two bank industry specific variables are used, which include competition and financial sector development. Anginer et al., (2013) and Demirgüç-Kunt and Huizinga (1998) believe that competition is good for the banking sector; more competition motivates the bank to diversify the risk.

The indicator of industrial competition Hirschman-Herfindahl Index (HHI) is used in this study. The competition is measured by the sum of square of all firms' market shares in the industry j for the year t; each bank's market share is the ratio of total assets (ta) the ith bank to the total assets of the industry (T.A),

$$HHI_t = \sum_{t=1}^{n_{jt}} S^2_{it} = \sum_{t=1}^{n_{jt}} \left[\frac{ta_{it}}{TA_t} \right]^2$$

Financial sector development is another important variable which is used in this study as a determinant of credit risk. This variable is measured by ratio Bank total assets/GDP. Tennat and Folawew (2009) indicated that overall financial sector development is very important to mitigate the credit risk. In this study the hypothesis is that there is negative relationship between financial sector development and credit risk.

Macro-economic Variables

This study also includes macro-economic variables which capture the impact of macroeconomic policies on banking. To captures the macro-policy environment this study uses three variables: GDP growth rate, inflation rate, and treasury bills rate.

GDP growth rate is a good measure of economic growth. The increasing GDP growth rate is positive signal for the economy. Rising GDP growth rate means increase in productivity and as a result increase in purchasing power of individuals, therefore, paying power of loans also

increases. Therefore, there should be negative relationship between GDP growth rate and credit risk.

Inflation is also important variable that is examined in this study to capture the impact of macroeconomic variables on the credit risk. When inflation rate is increased then people prefer to fulfil their basic needs instead of paying cost of their loan. It is expected that there should be positive relationship between inflation and credit risk.

Treasury bills rate is the indicator of the interest rate policy which is mostly perused by the government and treasury bills are used by commercial banks as a benchmark. When there is a lower interest rate it will lead to lower payment to business sector. Treasury bills in Pakistan are classified on the maturity period like 90 days, 180 days and 360 days. In this research 360 days treasury bills rate are used to test the impact on credit risk.

Table 1) Summary of Variables and Measurement

Variables	Description/ Proxy	Expected Effect	Research Support	Data Source
Bank ownership	1 for locally owned, 0 for foreign owned	Foreign owned will have lower credit risk	Demirguc-Kunt and Huizinga (1998); Garcia-Herrero (2006); Bashir (2001)	Annuals Reports of Banks
Efficiency of Management	Operating Expenses/T. Income	Negative	Fernandez de Guevara (2009); Al-Smadi (2009)	Annuals Reports of Banks
Competition	Total assets of i^{th} bank/Industry total assets	Negative	Rose and Hudgins (2008); Anginer (2012)	Annuals Reports of Banks
Financial Sector Development	Bank total assets/GDP	Negative	Ngugi (2001); Tennat and Folawewo (2008)	Annuals Reports of Banks, World Bank
GDP	GDP growth rate is a good measure of economic growth	Negative	Jimenez and Saurina (2006); Ramlall (2009)	SBP Website

Inflation	Inflation rate	Positive	Ngugi (2001)	SBP Website
T. Bills Rate	360 Days T. Bills rate	Negative/ Positive	Ngugi (2001)	SBP Website

Estimating Technique

To analyse the relationship between dependent and explanatory variables, the concept of panel data is used which is based on assumption that we allow cross sectional heterogeneity and not desire to calculate it. This study also assumes that there is zero correlation between independent variable X and cross-sectional Heterogeneity:

Covariance (Xi, λi) = 0

$Yit=\alpha 1+ \alpha_2 X2it+ \alpha 3X3it+Uit$ (Model 1).

Here, Yit = Credit Risk (Net Interest Income/Total Assets); α1 = the intercept of the model; X1 = Bank ownership; X2 = Efficiency of management; U = Error Term,

$Yit=\alpha 1+\alpha 2X2it+\alpha 3X3it+Uit$ (Model 2).

Here, Yit = Credit Risk (Total Advances/Total Assets); α1= the intercept of the model; X1= Financial Development; X2 = Competition; Uit= Error Term.

$Yit = \alpha 1+ \alpha_2 X2it + \alpha 3X3it + Uit$ (Model 3).

Here, Yit = Credit Risk (Net Interest Income/Total Assets); α1 = the intercept of the model; X1 = GDP growth rate; X2 = Inflation rate; U = Error Term.

$Yit = \alpha 1+ \alpha 2 X2it + \alpha 3X3it + \alpha 4X4it+\alpha 5X5it+ Uit$ (Model 4).

Here, Yit = Credit Risk (Net Interest Income/Total Assets); α1 = the intercept of the model.

X2 = Bank ownership; X3 = Efficiency of Management; X4 = Financial Sector Development.

X5 = Competition; U = Error Term.

$Yit = \alpha1 + \alpha2\ X2it + \alpha3X3it + \alpha4X4it + \alpha5X5it + Uit$ (Model 5).

Here, Yit = Credit Risk (Net Interest Income/Total Assets); α1 = the intercept of the model; X2 = Bank ownership; X3 = Efficiency of Management; X4 = GDP growth rate; X5 = Inflation rate; U = Error Term.

$Yit = \alpha1 + \alpha_2X2it + \alpha3X3it + \alpha4X4it + \alpha5X5it + Uit$ (Model 6).

Here, Yit = Credit Risk (Net Interest Income/Total Assets); α1 = the intercept of the model; X2 = Competition; X3 = Financial Sector Development; X4 = GDP growth rate; X5 = Inflation rate; U = Error Term.

$Yit = \alpha1 + \alpha2X2it + \alpha3X3it + \alpha4X4it + \alpha5X5it + \alpha6X6it + \alpha7X7it + Uit$ (Model 7) .

Here, Yit = Credit Risk (Net Interest Income/Total Assets); α1 = the intercept of the model; X2 = Bank Ownership; X3 = Efficiency of Management; X4 = Financial Sector Development; X5 = Competition; X6 = GDP growth rate; X7 = Inflation rate; U = Error Term.

In all above models, the dependent variable (credit risk) is measured by ratio of net interest income to total assets which is reported as CR1 in this study. Next models are similar to these models, but dependent variable credit risk is measured by different ratio total advances to total assets (CR2). These models are reported as model 8, 9, 10, 11, 12, 13 and 14 in this study.

Panel Data Modelling has been used in this study and further Random Effect Model is used which is based on assumption that we allow cross sectional heterogeneity and not desire to calculate it and assume correlation is zero between independent variable Cross-Sectional Heterogeneity.

$$\text{Covariance}(Xi, \lambda i) = 0$$

Empirical Results

The present study investigates the answers of three important research questions (i) what are bank specific determinants of credit risk?

(ii) is there any relationship between industry specific determinants and credit risk? (iii) what are macroeconomics determinants of credit risk? The novelty of this study is that this study uses a variety of determinants of credit risk.

Descriptive Statistics

To describe the basic characteristics of variables, several descriptive statistics have been used in this study. Table 5.1 shows the basic descriptive of data containing means, median, standard deviation, coefficient of variation, skewness, kurtosis and Jarque-Bera.

In this study two measures of central tendency have been used: mean and median. CR1, CR2 and GDP growth rate have almost same mean and median. All other variables, efficiency of management (Effi. Mngt), financial sector development (Fin. Sec. Dev.), competition (Comp), inflation rate and treasury bills rate have positive skewed because mean is greater than median, as shown in Table 2.

Spread of variables is measured by the coefficient of variation, which is defined as a standard deviation divided by mean. In this study competition variable has least variation while other variables efficiency of management, financial sector development GDP and inflation rate have high volatility in the data.

Table 2) Descriptive Statistics

	CR1	**CR2**	**Bank Owner**	**Effi. Mngt**	**Fin. Sec. Dev**	**Comp**	**GDP**	**Inflation**	**T. Bills rate**
Mean	0.03	0.45	0.80	0.70	0.01	0.091	0.03	0.10	0.10
Median	0.03	0.46	1.00	0.51	0.01	0.08	0.03	0.09	0.09
Max	0.07	0.70	1.00	3.69	0.07	0.10	0.07	0.20	0.14
Min	-0.01	0.13	0.00	0.19	0.00	0.085	0.01	0.07	0.08
St. Dev.	0.01	0.11	0.39	0.55	0.01	0.006	0.01	0.03	0.01
Coef. Of Variation	0.04	0.26	0.48	0.78	0.96	0.006	0.46	0.36	0.18
Skew	-0.15	-1.02	-1.57	2.41	1.33	1.40	0.53	1.19	0.68
Kurtosis	3.42	5.37	3.48	10.02	3.96	4.27	2.44	3.54	1.83
Jarqua. B	2.54	85.84	89.04	636.03	70.65	83.43	12.63	52.68	28.15

Prob.	0.27	0.00	0.00	0.00	0.00	0.00	0.001	0.00	0.00
Obs.	210	210	210	210	210	210	210	210	210

All variables have almost expected sign of coefficients with credit risk (CR1, CR2). The correlations between macroeconomics variables are very high but it is not alarming signal because these variables are same for every cross section (banks) in panel data. In this study treasury bills rate variable is dropped for analysis due to high multicollinearity with macroeconomic determinants.

Table 3) Correlation Analysis of Variables

	CR1	**CR2**	**Bank Owner**	**Effi. Mngt**	**Fin. Sec. Dev**	**Comp**	**GDP**	**Inflation**	**T. Bills rate**
CR1	1								
CR2	0.24	1							
Bank Owner	-0.02	-0.01	1						
Effi. Mngt	-0.54	-0.09	-0.09	1					
Fin. Sec. Dev	0.51	0.20	0.12	-0.38	1				
Comp	-0.15	0.10	0.00	-0.11	0.00	1			
GDP	-0.20	-0.06	0.00	-0.16	0.02	0.74	1		
Inflation	0.16	0.21	0.00	0.12	-0.01	-0.10	-0.71	1	
T. Bills rate	0.18	0.17	0.00	0.13	-0.03	-0.37	-0.84	0.92	1

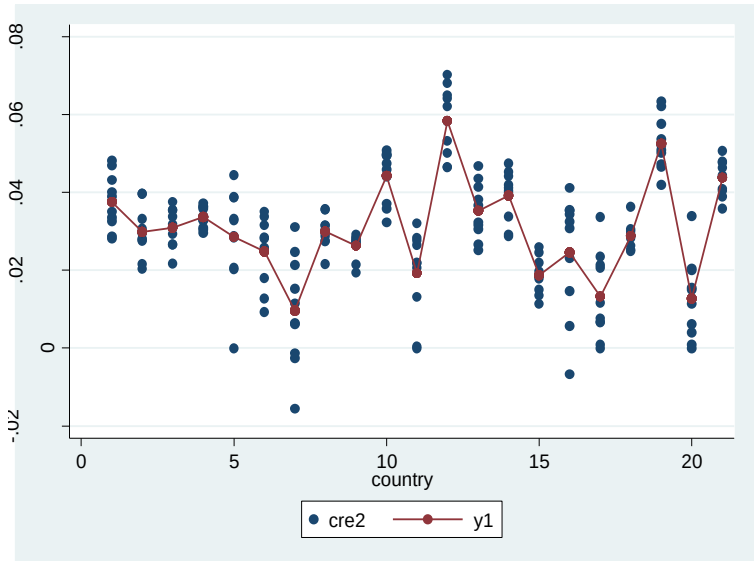
Banking Level, Industry Level and Macro Economics Determinants of Credit Risk

In this study Panel data has been used; all methodologies of penal are dependent on Cross Sectional Heterogeneity which means on average every cross section (bank) is different from the other. In Pakistan some banks are mature like HBL, MCB, UBL, ABL and NBP etc. and some banks are at initial stage or growing stage like Soneri Bank, Silk Bank and Summit Bank etc. Therefore, analysis of cross-sectional heterogeneity is important before going to the methodologies of panel data.

The graph 1 is presenting the cross-sectional heterogeneity analysis over the group (Cross sections). The line is showing mean value of credit

risk and dots show the credit risk of every bank. Ups and down movement of line shows that there exists cross sectional heterogeneity. Therefore, the methodology of this study is based on Random Effect Methodology with assumption that there exists Cross Sectional Heterogeneity and we do not desire it. If line will be straight horizontally, then there exists no cross-sectional heterogeneity. So, as a result, on average every bank is different from the other. Now Cross-Sectional Heterogeneity is checked over the time. There is possibility that every bank may differ over the time.

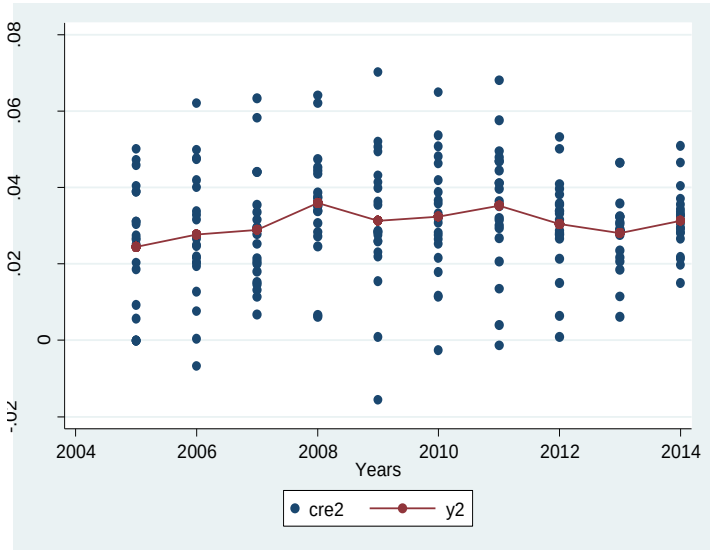
Graph No 1. Cross Sectional Heterogeneity of CR1



Represents the Credit Risk of each Bank

Represents the Average Credit Risk of each bank

Graph 2) Cross Sectional Heterogeneity Over the Time



Represents the Credit Risk of each year

Represents the Average Credit Risk of each year

The above graph is showing that on average mean value of credit risk almost does not deviate from track. This graph shows there exists cross sectional heterogeneity over the years but at very minor level.

In literature review, the studies mentioned that a plethora of research presents an inclusive result about determinants of credit risk. Different studies show different results about the credit risk`s determinants. However, among the researchers there is disagreement on the empirical results of the credit risk. Abdullah et al. (2012) indicated positive and insignificant relationship between bank level variables and credit risk. Moreover, Das and Ghos (2007) indicated that bank level determinants significantly affect credit risk and macroeconomic variables are highly correlated with credit risk. This study explores a broad set of variables for credit risk.

To accomplish this task in this study, credit risk is taken as dependent variable which is measured by the ratio Net Interest Income to Total Assets (CR1). On the independent side, this study includes bank ownership, efficiency of management, financial sector development, competition, GDP growth rate and inflation rate. T. Bills rate is dropped

in analysis due to problem of multicollinearity. This study used Random Effect Model proposed by Housman test.

Table 4) Statistical Results of Random Effect

Results of Random Effect							
Credit Risk CR1							
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Constant	0.03120***	0.02917***	0.03054***	0.0509***	0.04252***	0.05764***	0.04546***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.000)
Bank Ownership	-0.00264	NA	NA	-0.002134	-0.00212	NA	-0.00221
	(0.645)			(0.501)	(0.754)		(0.578)
Effi. MGT	-0.0201***	NA	NA	-0.0112***	-0.02104***	NA	-0.01235***
	(0.000)			(0.000)	(0.000)		(0.000)
Fin. Sec. Dev	NA	0.1203**	NA	0.16250*	NA	0.2763***	0.2073**
		(0.031)		(0.052)		(0.001)	(0.031)
Competition	NA	-0.2117**	NA	-0.3618***	NA	-0.2976	-0.21451
		(0.019)		(0.003)		(0.255)	(0.102)
GDPGR	NA	NA	-0.0688**	NA	-0.08251***	0.07624	0.05129
			(0.061)		(0.007)	(0.381)	(0.711)
Inflation Rate	NA	NA	0.04182	NA	0.03183***	0.07951**	0.06581**
			(0.131)		(0.007)	(0.051)	(0.013)
R^2	0.46	0.31	0.21	0.40	0.39	0.25	0.63
F_ State	51.33	31.41	9.44	20.21	31.25	16.36	28.41
Note	*,**,*** represents the 10% 5% 1% level of significance respectively.						

According to Demirgüç-Kunt and Huizinga (1998), in developing countries foreign banks have higher profit margin as compared to locally owned banks. Garcia-Herrero (2006) indicates that foreign banks use better production technology that increases their profitability and further reduces their credit risk. Foreign banks also enjoy benefits of supported tax policy. On the other hand, profitability of foreign banks may decrease due to information disadvantage and lack of peoples' trust. Dietrich &

Wanzenried (2011) reported that foreign banks are profitable in Switzerland as compared to Swiss owned banks.

The results of this study indicate that in Pakistan, foreign banks have more credit risk as compared to locally owned banks. In Pakistan people may have less trust on foreign banks regarding their service facilities. This result supports the argument of Dietrich and Wanzenried (2009) and is inconsistent with arguments of Demirguc-Kunt and Huizinga (1998) and Garcia-Herrero (2006).

More efficient banks have more profit then they are able to maximize the net interest income. When management is efficient then it plays a good role in reducing expenses and efficient use of deposits otherwise it becomes dangerous for the banking sector. Molyneux and Thorton (1992) found the positive relationship between profitability and efficiency that leads to lower credit risk. Ramlall (2009) observed that, when there is higher efficiency level in the bank then it leads to the higher profit level that reduces credit risk.

Results of this study indicate that efficiency of management has significant relationship with credit risk in all models. Model 1 has coefficient 0.0201 that is statistically significant which implies that there will be 0.0201 units decrease in credit risk by increase of 1 unit in efficiency of management. Fedrick (2012), Ahmed and Ariff (2007), Mwaurah (2013) and Ali and Ghauri (2013) also reported that efficiency of management significantly affects the credit risk. The negative sign with coefficient shows that management is able to evaluate the capacity of borrower. This variable's result is inconsistent with Das and Ghosh (2007).

Different researchers think that financial sector development directly impacts the credit risk. Different researchers measure it by different proxies. The ratio which is used in this study is prepared by Tennant & Folawewo (2009). This ratio captures overall development of financial sector. After incorporating financial sector development variable in the regression, the results are presented in the Table 4. Financial sector development variable has positive sign and is significant in all models. The positive sign implies that credit risk may increase by financial sector development. This means that credit risk increases by

innovations and developments in the financial sector. More especially credit risk may increase by 0.1203 units by increasing 1 unit of financial sector development in model 1 and 0.2763 in model 6.

Jimenez et al., (2006) indicate that strong competition among financial institutions eliminates the margin as, on both loan and deposits, interest approaches to interbank rate. Rose and Hudgins (2008) indicate that for banking sector, competition is good signal, and more competition forces the banks to observe more diversified risk, and competition also makes the banking sector less brittle to shocks. In this study competition has negative relationship with credit risk in all models but it is statistically significant in model 2 and 4 and insignificant in model 6 and 7. The sign of coefficient indicates that credit risk may decrease with increasing competition in banking sector. This means that competition is good for financial health. The coefficient of competition indicates that credit risk may decrease 0.2117 units in model 2 and 0.3618 units in model 4 by increasing 1 unit of credit risk.

In literature, GDP growth rate is used for the measurement of total economic growth. Changing in investment, consumption, government spending and net export are reflected in GDP. Growth of any economy is also affected by demand and supply of loan and deposits. Different studies use different proxies for economic growth. Acaravci and Claim (2013) used real GDP as a measurement of economic growth. Riaz & Mehar (2013) used GDP growth rate and logarithm of nominal GDP are used by (Davydenko, 2010). In this study growth of economy is measured by GDP growth rate.

According to theoretical review there should be negative relationship between GDP growth rate and credit risk. When economy grows then living standard and paying ability of people also improves then automatically credit risk is reduced. According to Roman and Danuletiu (2013), Davydenko (2010), Roman and Curak et al. (2012) and Said and Tumin (2011), the economic growth has positive influence on profitability of banking sector and it negatively affects the credit risk. On the other hand, some studies reported that economic growth has positive relationship with credit risk since interest rate competition increases in

high economic growth environment, then as a result credit risk increases. This argument is supported by Ameur et al. (2013) and Francis (2013).

In this study GDP growth rate significantly affects the credit risk (Table 4) in model 3 and 5, while insignificantly affects in model 6 and 7. The coefficients of GDP growth rate indicate that credit risk decreases 0.0688 units and 0.08251 by increasing 1 unit of GDP growth rate in model 3 and 5. This result is consistent with previous studies (Castro, 2012; Das and Ghosh, 2007; Diaconasu et al., 2014; Mwaurah, 2013; Ramlall, 2009; Washigton, 2014). However, these results were inconsistent in previous findings (Ameur and Mhiri, 2013; Francis, 2013; Poudel, 2013; Yusuf and Sabri, 2014).

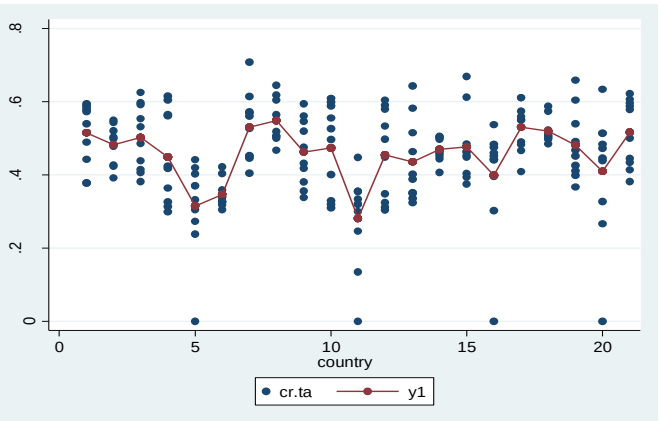
Different studies have different arguments about inflation rate. Some researchers argue that inflation is positively related to credit risk and some argue that it is negatively related to the credit risk. According to some researchers positive or negative impact of inflation depends upon either inflation is fully predicted by management of bank or not. The most widely used proxy of inflation is consumer price index (CPI). Researchers believe that when inflation is predicted by management then interest rate adjusts according to the inflation, so as a result it positively affects the profitability of banking sector and minimizes the credit risk. This argument is supported by different studies (Bacur and Dragomirescu, 2014; Gul et al., 2011; Mwaurah, 2013; Poudel, 2013; Tan and Floros, 2014; Washigton, 2014; Yusuf and Sabri, 2014). In contrast, some researchers identify negative relationship between inflation and profitability that leads to increase in credit risk. This unfavourable situation occurs when inflation is not perfectly predicted by bank management which reflects in cost of banks. In high inflation environment, individuals mostly prefer to fulfil their basic needs instead of paying interest of loan. This environment is preferred by various researches (Ameur and Mhiri, 2013; Muda et al., 2013); Tariq et al., 2014).

This study shows that inflation rate positively and significantly affects the credit risk in model 5, 6 and 7, which indicates predicting power of Pakistan's banking sector about inflation is weak and they cannot adjust their costs according to inflation. This study shows that in

Pakistan people may prefer to fulfil their basic needs instead of fulfiling their debt obligation, in highly inflation environment. This point relates to negatively with profitability of banking sector. The coefficient 0.03183, 0.07951 and 0.06581 indicate that credit risk increases 0.03183, 0.07951 and 0.06581 units by increasing 1 unit of inflation rate. These result are consistent with findings of Bashir (2001); Bikker and Hu, (2002), Poudel (2013) and Bucur and Dragomirescu, (2014) whereas inconsistent with different previous studies Muda et al., (2013) and Tariq et al., (2014).

Above section first checks the Cross-Sectional Heterogeneity of models then takes decision about the estimation techniques. It checks Cross Sectional Heterogeneity over the cross section (Banks) then over the time period.

Graph 3) Cross Sectional Heterogeneity Over the Cross Sections of CR2

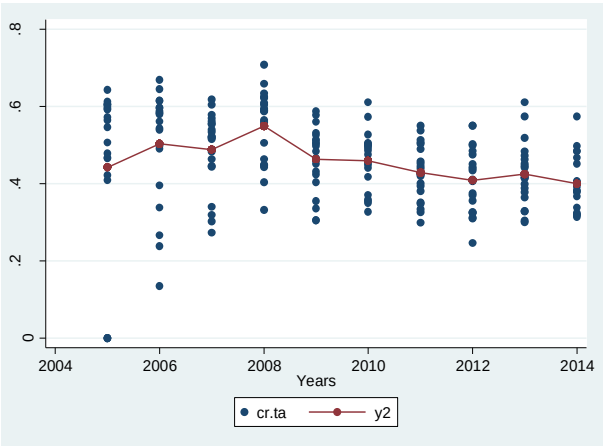


Represents the Credit Risk of each bank

Represents the Average Credit Risk of each bank

The above graph shows that there exists very high-level cross-sectional heterogeneity in model. This means that on average every bank is clearly different from each other.

Graph No 4: Cross Section Heterogeneity Over the Time



Represents the Credit Risk of each year

Represents the Average Credit Risk of year

The above graph shows that there exists cross sectional heterogeneity over the time but at minor level because red line minorly deviates from the track.

The estimate technique of this model is based on same assumption considered in CR1 model that we allow cross sectional heterogeneity and do not desire to calculate it over the cross sections (banks) because our analysis is not at minor level. This study uses Random Effect Model proposed by Housman test.

Table 5) Statistical Results of Random Effect

Results of Random Effect Model							
Credit Risk CR2							
Variables	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Constant	0.3962***	-0.06753	0.2973***	-0.1142	0.2141***	-0.00791	-0.02962
	(0.000)	(0.418)	(0.000)	(0.361)	(0.000)	(0.841)	(0.712)
Bank Ownership	-0.00721	NkA	NA	-0.00866	-0.00831	NA	-0.02031
	(0.739)			(0.871)	(0.631)		(0.682)

Effi. MGT	-0.01931	NA	NA	-0.00802	-0.01251	NA	-0.01641
	(0.491)			(0.752)	(0.471)		(0.652)
Fin. Sec. Dev	NA	0.4172	NA	0.3061	NA	0.6124	0.4891
		(0.689)		(0.437)		(0.784)	(0.643)
Competition	NA	4.7658***	NA	5.2467***	NA	4.8735	1.9987
		(0.000)		(0.000)		(0.567)	(0.563)
GDPGR	NA	NA	4.1546***	NA	5.2837***	2.9867	3.3484
			(0.000)		(0.000)	(0.367)	(0.577)
Inflation Rate	NA	NA	2.7628***	NA	1.9828***	3.8769***	2.2912***
			(0.000)		(0.000)	(0.007)	(0.002)
R2	0.11	0.20	0.29	0.18	0.31	0.0200	0.35
F-State	1.90	25.23	41.27	22.42	29.99	5.67	17.19
Note	*,**,*** represents the 10% 5% 1% level of significance respectively.						

The results of above table are obtained by different proxy of credit risk that is total advances to total assets. Independent variables are same of previous models. The results indicate that according to bank ownership variable, foreign banks have more credit risk as compared to locally owned banks. The coefficients are insignificant of this variable in all models.

Efficiency of management leads to lower credit risk in all models. The coefficients of efficiency of management are insignificant in all models. Financial sector development variable leads to more credit risk. The coefficients of this variable are insignificant in all models. In previous models in which credit risk is measured by CR1 ratio, coefficients of financial sector development were significant in all models. Competition has positive relationship with credit risk that contradicts in previous models. The coefficient 4.7658 indicates that credit risk will increase by increasing 1 unit of credit risk in model 9 and 5.2467 units in model 11.

GDP growth rate variable has different result as compared to CR1's models. GDP growth rate has positive relationship with credit risk and coefficients are also significant in model 10 and 12. The coefficient 4.1546 and 5.2837 indicate that credit risk will increase 4.1546 and

5.2837 units by increasing 1 unit of credit risk in model 10 and 12 respectively. Inflation rate determinant has similar result to previous models. Inflation rate has positive relationship with credit risk. The coefficients are significant and indicate that credit risk will increase 2.7628, 1.9828, 3.8769 and 2.2912 units by increasing 1 unit of credit risk in model 10, 12, 13 and 14 respectively.

Conclusion and Future Prospects

Banking theories show that banking sector creates liquidity and transforms the credit risk. By reducing the overall risk exposure, any bank can achieve strategic position in global market. Poor risk management system may undermine their potential contribution. For the adequate management of resources, it is necessary for any bank to identify and manage risk and also improve and develop risk management techniques.

The main determinants included in this study are bank ownership, efficiency of management, financial sector development, competition, GDP growth rate and inflation rate. In Pakistan all banks are different from each other in sense of age, size and capitalization. The results of data analysis indicate that bank ownership has negative and insignificant impact on credit risk, either credit risk measured by CR1 or CR2. Efficiency of management has negative and significant relationship with credit risk in CR1 models but insignificant relationship in CR2 models. Means efficient management is able to evaluate borrower's paying capacity. Financial sector development has positive and significant impact on credit risk in CR1 models and positive but insignificant in CR2 models. Competition also has negative and significant relationship with credit risk in model 2 and 4, but positive and significant in model 9 and 11. This indicates that competition is good in credit risk environment and good for financial health in case of credit risk measured by CR1 ratio. GDP growth has negative and significant relationship with credit risk in CR1 models 3 and 5 which indicates that economic growth makes an individual and business sector to fulfil their debt obligation properly. GDP growth rate also has positive and significant impact on credit risk in CR2 models 10 and 12. There is positive and significant relationship between inflation and credit risk in each model, which gives clue that in

Pakistan banking sector cannot adjust their cost with inflation rate very efficiently.

Reference

Abdullah, A., Khan, A. Q., & Nazir, N. (2012). A comparative study of credit risk management: a Case study of domestic and foreign banks in Pakistan. Academic Research International, 3(1), 371.

Acaravci, S. K., & Çalim, A. E. (2013). Turkish banking sector's profitability factors. International Journal of Economics and Financial Issues, 3(1), 27-41.

Ahmed, N. H., & Ariff, M. (2007). Multi-Country Study of Bank Credit Determinants. International Journal of Banking and Finance, 5(1), 200-208.

Ali, A., & Ghauri, S. P. (2013). Global crisis and credit risk management by banks: A comparative study of banks in Pakistan. International Journal of Business and Economics Research, 2(6), 158-168.

Altman, E. I., & Saunders, A. (1997). Credit risk measurement: Developments over the last 20 years. Journal of banking & finance, 21(11-12), 1721-1742.

Ameur, I. G. B., & Mhiri, S. M. (2013). Explanatory factors of bank performance evidence from Tunisia. International Journal, 2(1), 1-11.

Anginer, D., Demirgüç-Kunt, A., & Zhu, M. (2013). How does bank competition affect systemic stability? Journal of Financial Intermediation, Forthcoming.

Arora, S. (2013). Credit Risk Analysis in Indian Commercial Banks-An Empirical Investigation. Asia-Pacific Finance and Accounting Review, 1(2), 25.

Aver, B. (2008). An empirical analysis of credit risk factors of the Slovenian banking system. Managing Global Transitions, 6(3), 317.

Bashir, A. H. M. (2001). Assessing the performance of Islamic banks: Some evidence from the Middle East. *Topics in Middle Eastern and North African Economies*, 3.

Belkin, B., Suchower, S., & Forest, L. (1998). The effect of systematic credit risk on loan portfolio value-at-risk and loan pricing. CreditMetrics Monitor, 17-28.

Bikker, J. A., & Hu, H. (2002). Cyclical patterns in profits, provisioning and lending of banks and procyclicality of the new Basel capital requirements. Banca Nazionale del Lavoro Quarterly Review, 55(221), 143.

Bodla, B. S., & Verma, R. (2009). Earning Quality of Scheduled Commercial Banks in India: Bank-wise and Sector-wise analysis. Prajnan, 37(4), 257-283.

Borio, C., Furfine, C., & Lowe, P. (2001). Procyclicality of the financial system and financial stability: issues and policy options. bis Papers, 1, 1-57.

Buch, C. M., Eickmeier, S., & Prieto, E. (2010). Macroeconomic Factors and Micro-Level Bank Risk (No. 3194). CESifo Group Munich.

Bucur, I. A., & Dragomirescu, S. E. (2014). The influence of macroeconomic conditions on credit risk: Case of Romanian banking system. Studies and Scientific Researches. Economics Edition, (19).

Campbell, J. Y. (1993). Intertemporal asset pricing without consumption data. American Economic Review 83(3): 487-512.

Castro, V. (2013). Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI. Economic Modelling, 31, 672-683.

Cooper, D. R., Schindler, P. S., & Sun, J. (2006). Business research methods.

Curak, M., Poposki, K., & Pepur, S. (2012). Profitability determinants of the Macedonian banking sector in changing environment. Procedia-Social and Behavioral Sciences, 44, 406-416.

Das, A., & Ghosh, S. (2007). Determinants of credit risk in Indian state-owned banks: An empirical investigation. ECONOMIC ISSUES-STOKE ON TRENT-, 12(2), 27.

Davydenko, A. (2010). Determinants of bank profitability in Ukraine. Undergraduate Economic Review, 7(1), 2.

Demirgüç-Kunt, A., & Huizinga, H. (1998). Determinants of commercial bank interest margins and profitability. World Bank Policy Research Working Paper, 1900.

Diaconaşu, D., Popescu, M., & Socoliuc, O. (2014). Macroeconomic Determinants of Non-Performing Loans in Emerging Markets: Evidence from Central and Eastern Europe. Paper presented at the International Conference "Monetary, Banking And Financial Issues In Central And Eastern EU Member Countries: How Can Central And Eastern EU Members Overcome The Current Economic Crisis.

Dietrich, A., & Wanzenried, G. (2009, April). What determines the profitability of commercial banks? New evidence from Switzerland. In 12th conference of the Swiss society for financial market researches, Geneva (pp. 2-39).

Dietrich, A., & Wanzenried, G. (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. Journal of International Financial Markets, Institutions and Money, 21(3), 307-327.

Donald, C. (2006). *Synthesizing Research; A guide for Literature Reviews* (3rd edn) Sage: Thousand Oaks

Francis, M. E. (2013). Determinants of commercial bank profitability in Sub-Saharan Africa. International journal of economics and finance, 5(9), 134-147.

Frederick, I. O. (2012). Labor and Banking Sector Reforms in Nigeria. European Scientific Journal, 8(9).

Fredrick, O. (2012). The impact of credit risk management on financial performance of commercial banks in Kenya. DBA Africa Management Review, 3(1), 22-37.

Fun Ho, C. S., & Yusoff, N. I. (2009). A Preliminary Study on Credit Risk Management Strategies of Selected Financial Institution in Malaysia. Jurnal Pengurusan, 28.

Gakure, R., Ngugi, J. K., Ndwiga, P. M., & Waithaka, S. M. (2012). Effect 0f Credit Risk Management Techniques 0n The Performance 0f Unsecured Bank Loans Employed Commercial Banks In Kenya. International Journal of Business and Social Research, 2(4), 221-236.

Garcia-Herrero, A. (2006). What Explains the Low Profitability of Chinese Banks? Working Paper No.30. The American University of Paris. Published and Sponsored by the Trustee Fund for Advancement of Scholarship (TFAS).

Garr, D. K. (2013). Determinants of credit risk in the banking industry of Ghana. Developing Country Studies, 3(11), 64-77

Godbillon-Camus, B., & Godlewski, C. J. (2005). Credit risk management in banks: hard information, soft information and manipulation. Soft Information and Manipulation (December 2005).

Gul, S., Irshad, F., & Zaman, K. (2011). Factors affecting bank profitability in Pakistan. The Romanian Economic Journal, 39(14), 61-89.

Hassan, K. M., & Hussain, M. E. (2006). Basel II and Bank Credit Risk: Evidence from the Emerging Markets. Networks Financial Institute Working Paper, (2006-WP), 10.

Jimenez, G., Salas, V., & Saurina, J. (2006). Determinants of collateral. Journal of financial economics, 81(2), 255-281.

King, R. G., & Levine, R. (1993). Finance, entrepreneurship and growth. Journal of monetary economics, 32(3), 513-542.

Kolapo, T. F., Ayeni, R. K., & Oke, M. O. (2012). CREDIT RISK AND COMMERCIAL BANKS'PERFORMANCE IN NIGERIA: A PANEL MODEL APPROACH. Australian Journal of Business and Management Research, 2(2), 31.

MEGEID, N. S. A. (2013). The impact of effective credit risk management on commercial banks liquidity performance: Case of Egypt. International Journal of Accounting and Financial Management Research (IJAFMR), 1(3), 13-32.

Molyneux, A., & Thorton, G. (1992). Determinants of profitability in Turkish banking sector. International Research Jkournal of Finance and Economics, 3(2), 55-86.

Muda, M., Shaharuddin, A., & Embaya, A. (2013). Comparative analysis of profitability determinants of domestic and foreign islamic banks in malaysia. International Journal of Economics and Financial Issues, 3(3), 559.

Mugenda, O. & Mugenda AG (2003). Research Methods, Qualitative and Quantitative Approaches.

Musyoki, D., & Kadubo, A. S. (2011). The impact of credit risk management on the financial performance of Banks in Kenya for the period 2000–2006. Int. J. Bus. Public Manage, 2(2), 72-80.

Mwaura, K. (2007). The failure of Corporate Governance in State owned Enterprises and the need for restructured governance in fully and partially privatized enterprises: The case of Kenya. Fordham Int'l LJ, 31, 34.

Mwaurah, I. (2013). The Determinants of Credit Risk in Commercial Banks in Kenya (Master of Science in Finance Degree). University of Nairobi.

Ngechu, M. (2006). Understanding the research process and methods: An introduct. University of Nairobi press, Nairobi, Kenya.

Onaolapo, A. (2012). Analysis Of Credit Risk Management Efficiency In Nigeria Commercial Banking Sector,(2004-2009). Far East Journal of Marketing and Management, 2(4), 39-52.

Osayeme, R. (2000). Practice of Banking. Lagos: F & A publisher Ltd, Lagos.

Pestova, A., & Mamonov, M. (2013). Macroeconomic and bank-specific determinants of credit risk: Evidence from Russia: EERC Research Network, Russia and CIS.

Poudel, R. P. S. (2013). Macroeconomic Determinants of credit risk in nepalese banking industry. Paper presented at the Proceedings of 21st International Business Research Conference.

Ramlall, I. (2009). Bank-specific, industry-specific and macroeconomic determinants of profitability in Taiwanese banking system: under panel data estimation. International Research Journal of Finance and Economics, 34(2), 1450-2887.

Riaz, S., & Mehar, A. (2013). The impact of Bank Specific and Macroeconomic Indicators on the Profitability of Commercial banks. Romanian Economic Journal. Volume (Year), 16, 91-110.

Roman, A., & Danuletiu, A. E. (2013). An empirical analysis of the determinants of bank profitability in Romania. Annales Universitatis Apulensis: Series Oeconomica, 15(2), 580.

Rose, P.S. and Hudgins, S. (2008), Bank Management and Financial Services, McGaw-Jill Irwin, New York, NY, p. 172.

Rosman, A. S., & Abdul Razak, S. J. (2008). Persepsi pelajar institusi pengajian tinggi di Malaysia terhadap wasiat. *Jurnal Pengurusan Jawhar*, 142-161.

Sahajwala, R., & Van den Bergh, P. (2000). Supervisory risk assessment and early warning systems. Basle Committee on Banking Supervision.

Said, R. M., & Tumin, M. H. (2011). Performance and financial ratios of commercial banks in Malaysia and China. International Review of Business Research Papers, 7(2), 157-169.

Samad, A. (2012). Credit risk determinants of bank failure: Evidence from US bank failure. International Business Research, 5(9), 10.

Santomero, A. M. (1997). Commercial bank risk management: an analysis of the process. Journal of Financial Services Research, 12(2), 83-115.

Sayrs, L. W. (1989). Trade and conflict revisited: Do politics matter? International Interactions, 15(2), 155-175.

Tan, Y., & Floros, C. (2014). Risk, profitability, and competition: evidence from the Chinese banking industry. The Journal of Developing Areas, 303-319.

Tariq, W., Usman, M., Mir, H. Z., Aman, I., & Ali, I. (2014). Determinants of commercial banks profitability: Empirical evidence from Pakistan. International Journal of Accounting and Financial Reporting, 4(2), 1-22.

Tennant, D., & Folawewo, A. (2009). Macroeconomic and market determinants of interest rate spreads in low-and middle-income countries. Applied Financial Economics, 19(6), 489-507.

Uwuigbe, U., Uwuigbe, O. R., & Oyewo, B. Credit Management and Bank Performance of Listed Banks in Nigeria. Journal of Economics and Sustainable Development.

Verma, K. K., & Tiwari, P. (2009). Customer Perception about Service Quality of Indian Banking Industry-An Empirical Investigation in Uttarakhand State (India). Review of Professional Management, 7(2), 53-61.

Vogiazas, S. D., & Nikolaidou, E. (2011). Credit risk determinants in the Bulgarian banking system and the Greek twin crises. Paper presented at the MIBES International conference.

Washington, G. K. (2014). Effects of macroeconomic variables on credit risk in the Kenyan banking system. International Journal of Business and Commerce, 3(9), 1-26.

Washington, G. K. (2014). EFFECTS OF MACROECONOMIC VARIABLES ON CREDIT RISK IN THE KENYAN BANKING SYSTEM. International Journal of Business and Commerce, 3(9), 1.

Wilson, T. C. (1998). Portfolio credit risk. Economic Policy Review, 4(3).

Yusuf, M. B. M., & Sabri, B. (2014). Islamic Credit Risk Management in Murabahah Financing-The Study of Islamic Banking in Malaysia. Australian Journal of Basic and Applied Sciences, 8(6), 318-323.

Zribi, N., & Boujelbène, Y. (2011). The factors influencing bank credit risk: The case of Tunisia. Journal of Accounting and Taxation, 3(4), 70.