



Determinants of Non-performing Loans: A Comparative Study of Pakistan, India, and Bangladesh

Muhammad Waqas

Corresponding author: Department of Management Science, Capital University of Science and Technology, Islamabad, Pakistan

Nudrat Fatima

Department of Management Science, Capital University of Science and Technology, Islamabad, Pakistan

Aryan Khan

Department of Management Science, Capital University of Science and Technology, Islamabad, Pakistan

Muhammad Arif

Dr., Assistant Professor, Department of Management Science, Govt. College of Management Sciences, Swabi, Pakistan

Abstract

The aim of the empirical study is to investigate credit risk determinants in banking sectors across three kinds of South Asian economies. An accumulated sample of 105 unbalanced panel data of financial firms over the period of 2000-2015, by applying General Method of Moment (GMM) estimation techniques one-step at the difference in order to identify factors influencing credit risk. This study is inspired by two broad categories of explanatory variables which are bank-specific and macroeconomic. Bank-specific factors influencing unsystematic risk, while macroeconomic factors promoting systematic risk. The study uses a proxy of non-performing loans for credit risk in banking sectors of Pakistan, India, and Bangladesh. The empirical results have been found aligned with theoretical arguments and literature as expected. In comparison, NPLs in Pakistan is greater than India and Bangladesh, while India has the lowest ratio of non-performing loans. The study documents that bank-specific factors (inefficiency, profitability, capital ratio and leverage) have a significant contribution towards credit risk. Further, the study also finds a significant impact of macroeconomic variables on non-performing loans. While, the result in the case of Bangladesh predicts contradictions that have no significant effect on non-performing loans at various levels. The overall results indicate that credit risk is not influenced by only external factors but also affect by internal factors like bad management and skimming etc.

Keywords: *Non-performing loans, Credit Risk, Bank-specific, Macroeconomic, and Dynamic Panel Data*

JEL Classification: *G21, C23*

Introduction

In a recent financial crisis, it has been found that recession in economy and deterioration in transactions is caused by the insolvency of the financial sector. In the contemporary world, banks and financial institutions are the backbone of the economy and its vital role cannot be ignored. However, banks having to face some problems because of poor restriction from regulatory authorities, lack of quality management and moral hazards. Therefore, the financial instability of banks arises, which leads to decrease economic growth. Economic crisis has been increased the impact of problematic loans and deteriorated revenue of banks (Baselga-Pascual & Orden-Olasagasti, 2015). Non-performing loans, which are a problematic fact for banks, and defined as those loans who payment are due more than one year and having no repayment is known as non-performing loans (NPLs). Dimitros, Helen and Mike (2016), reported that loans past due more than 90 days are called NPLs. Further, they reported that Euro-area non-performing loans (NPLs) are enhanced stress over banks financial position to restrict the role of intermediation. The credit risk of banking sector can be measured through various factors like capital ratio, management inefficiency, loan loss provision and non-performing loans.

Literature has been argued that financial instability and default risk usually is influenced by external (i.e. macroeconomic variables) and internal (i.e. bank-specific variable) factors. The problematic loans reduce firm's strength and growth, which in turns develop financial instability. It is an important fact for regulatory bodies to identify factors that affect credit risk in order to maintain stability (Chaibi & Ftiti, 2015). Similarly, Amuakwa-Mensah and Boakye-Adjei (2014) reported that small banks should focus on internal factors when they lend to eliminate the chances of default; while in case of large banks needs to concentrate external factors because they are engaged in foreign trade and the fact of exchange rate and floating lending rate may occur problem in repayment of debts. This study measures credit risk based on non-performing loans. Non-performing loans to total (gross) loan are used as a proxy for credit risk in the banking industry. Bohachova (2007) suggested that excessive risk taking becomes solvency of the banks jeopardized which entails that financial strength weaken. The financial crisis deteriorates financial stability and growth in terms of expansion and products (various bank accounts and services to customers) as well (Beck, Jakubik, & Piloju, 2013; Fofack, 2005).

However, in emerging economies, the most influential side is the banking sector because banks providing the role of intermediary for trade and business transactions etc. The study aims in various dimensions. First, it provides a thorough investigation of the financial stability of an economy that is based on analysis of banking sector that how much an economy stabilizes financially. Second, to find factors influencing a deterioration of revenue and increases banks failures. The third is to explore the dominant indicators of problematic loans in the banking industry. Fourth, it provides a comparative analysis of South Asian economies that would explain which factors are overwhelmed to affect banks failure and decline growth of the economy. It also provides a guideline in the academic and professional side that how to manage risk whether dynamics in the external environment and affects management policy; while internal changes and take the utmost decision to rectify performance and efficiency for financially distress firms in order to minimize default risk. The structure of the paper is as follows; the first section consists of introduction and significant of the study, Second section is the discussion about theoretical arguments and literature review. The third section, explains data description and methodology, a measure of variables and statistical techniques. The fourth section, results of empirical findings and discussion, following section, the conclusion of the study in summarizing the results, policy implications, and future suggestion.

Literature Review

Bank-Specific Factors

Bank-Specific characteristics indicate an increase in profitability based on effective decisions making and adequately allocation of capital funds. On the optimistic side these factors management behavior, skimping, policies, regulations and internal framework develop banking sector goodwill and maximize shareholders value. Chaibi et al. (2015) used 5 years unbalanced data by applying dynamic panel data model in two broad economies which are French and Germany. They reported that two types of results in

this regards, French economy are based on market characteristics while Germany is called bank-based economy in elucidatory point of view bank-based economy strongly impact by firm level factors. Further, they suggest banks-specific variables having a significant impact on the credit risk of the bank, the regulatory bodies should concentrate on default risk, performance management, and estimation to identify financial instability and problems loans. Andriani and Wiryono (2015) conducted an empirical investigation regarding Indonesian banking sector by using 10 years 69 commercial banks annual financial data during 2002 to 2013. They document that microeconomic variables relationship influence level of unsystematic risk. Further reported that bank-specific factors like ownership structure, skimping can lead to high level of credit risk in the banking sector. Tehulu and Olana (2014), an empirical investigation by applying balance panel data GLS econometric technique sample during 2001 to 2007. They report internal factors having a significant impact on non-performing loans. Abid et al. (2014) were using dynamic panel econometric model during 2003-2012 on Tunisian banks, the empirical study focus on the potential effect of microeconomics and macroeconomics variables on non-performing loans. They argued that bank-specific characteristics indicate the measurement of efficiency and foreseeable uncertain events. Similarly, numerous studies reported performance reduction and inefficiency are internal factors, which lead to problematic loans (Louzis et al. 2012; Gonzalez-Hermosillo et al. 1997).

Macroeconomic Factors

Macroeconomics factors are defined as those characteristics which tell us about non-controlling failures faced by banks due changes occur in them. Chaibi et al. (2015) documented in their study that the economy, which based on macroeconomic factors having a strong impact on the financial environment, where business units involve in monetary activities which are dealt by the financial firms. Poudel (2013) reported in his study during 2001-2011 using panel regression analysis to show that macroeconomic variables having no significant relationship to the credit risk of the bank. Castro (2012) documents in empirical investigation external factors having strongly affect and enhance the cause of default risk. Nkusu (2011) investigated a sample of 26 advanced economies for the periods between 1998 and 2009 and reported macro-financial environment confirmed such decline in banking sector due to a high level of default failures. Festić, Kavkler and Repina (2011) proposed in their study that economies having boost exports result in an increase earnings along with default risk and that have a direct impact on the financial stability of bank sector. Fainstein and Novikov (2011) argued that macroeconomic predictors having great influence on the non-performing loans. They conclude that actively operating in the dynamic economy has also faced greater competition. Washington (2014) discuss the regulatory bodies play an important role in the projection country-level fluctuation adhere banks and other financial framework to set forth changes in operations. Bonfim et al. (2009) concluded that time-effect controls characteristics having an important contribution to credit risk. Further, suggest that economic growth strongly attached by credit growth along with excessive risk taking. Aver (2008) argued in their study during 1995 to 2002 in Slovenian banking system, identified that macroeconomic indicators have a vital impact on the level of default risk. They further report credit risk is highly influenced by an increase in interest rate while reducing the number of employees because of increase in the value of the stock index. Bohachova (2007) deduced that financial intermediary implements efforts to mitigate risk which is different across countries. Banks move to enhance capital ratio in boom period; on the dark side of the economy, which is growing to slump them, deterioration occurs in risky assets. Fofack (2005) stated in an empirical investigation using Granger-Causality with pseudo panel econometric analysis signify the presence of GPD, interest rate, and inflation is a particularly positive relation with default risk. Further, suggest an increase in Non-performing loans (credit risk) which in turn reduce economic trade. Zaib et al. (2014) proposed in their study the behavior of emerging markets in a period of 2003-2011 with a panel econometric analysis and decision on the basis of fixed effect. They suggest that deterioration in GDP the management and policy makers require extending credit. Therefore, a continuous downturn in economic growth leads to high level of credit risk. Louzis et al. (2012) forecasted stress testing from regulatory authorities might indicate a threshold of financial instability at the point of GDP shock and increase in unemployment rate.

Non-Performing Loans

A non-performing loan is defined by Festic et al. (2011) that amount of past due loan which cannot pay off as per agreed term. Non-performing loans are amounts that lenders unable to recover from the defaulters. While defaulter is the person of the firm who unable to pay the debt. It is classified loans consist of sub-standard, doubtful debts and bad debt/losses. Non-performing loans are used as a proxy for the measurement of the credit risk of the banking sector in the country. The inherent feature is relatively come from financial sector; state-owned institutions and private firms that had a large amount of credit risk (Festic et al. 2011). The burden of non-performing loans is inherited because of idiosyncratic-level and country-level fundamentals. Idiosyncratic-level factors are measured through financial position and statement of comprehensive income. While country-level factors are measured via various market indicators. Firm-level characteristics are management inefficiency, lack of experience, bad management hypothesis, diversification, risk attitude and moral hazards, while country-level characteristics are GDP growth, a proxy of consumer price index i.e. inflation, real interest rate, real effective exchange rate and unemployment burdens in the country.

Development of Hypotheses

In view of the above literature and empirical studies, the following set of hypotheses is developed where only alternative hypotheses are listed. The null hypotheses can be derived as per usual manner, where no relationship is expected between the dependent and independent variables.

H₁: There is a positive and significant relationship between INEF and NPLs.

H₂: There is a negative and significant relationship between SK and NPLs.

H₃: There is a negative and insignificant relationship between NII and NPLs.

H₄: There is a negative and significant relationship between ROE and NPLs.

H₅: There is a positive and significant relationship between PCP and NPLs.

H₆: There is a positive and significant relationship between LR and NPLs.

H₇: There is a negative and significant relationship between CR and NPLs.

H₈: There is a negative and significant relationship between BS and NPLs.

H₉: There is a negative and significant relationship between GDPG and NPLs.

H₁₀: There is a negative and significant relationship between INF and NPLs.

H₁₁: There is a positive and significant relationship between RIR and NPLs.

H₁₂: There is a positive and significant relationship between ER and NPLs

H₁₃: There is a positive and significant relationship between UR and NPLs.

Research Methodology

The study is using annual data for 16 years sample starting from 2000 to 2015, to explore determinants of the credit risk in banking sectors. The empirical study uses the cumulative figure of explained and explanatory variables. Where non-performing loans are the explained variable, while explanatory variables are classified; bank-specific and macroeconomic factors. Bank-specific variables are Inefficiency, Non-interest income, Profitability, Leverage, Capital Ratio, Bank Size. While macroeconomic variables are GDP growth, Inflation Rate, Real Interest Rate, Real Effective Exchange Rate and Unemployment Rate. The population of the study includes 40 listed financial firms of the Pakistan Stock Exchange, 38 listed financial firms of the Bombay Stock Exchange and 27 listed financial firms of the Dhaka Stock Exchange. The sources for data regarding bank-specific variables are collected from "Balance Sheet Analysis 2006-2014",

2000-2005 and 2015 annual report of the financial firms listed at Pakistan Stock Exchange. The data regarding bank-specific variables of India and Bangladesh financial firms are collected from 2000-2015 annual reports of individual firm listed at Bombay Stock Exchange and Dhaka Stock Exchange respectively. While Macroeconomic variables data are collected from the database of International Financial Statistics (IFS), World Bank Database.

Variable Specification

Table 1 represents a measurement of explained and explanatory variables along with the expected sign and interaction in light of empirical evidence and theoretical framework.

Table 1: List of Variables

Variable	Definition	Expected Sign
Dependent Variable		
Non-Performing Loans	Ratio of non-performing loans to total (gross) loans	
Independent Variables		
Bank-Specific Variables		
Inefficiency	Ratio of operating expense to operating Income	+/-
Non-Interest Income	Ratio of Non-Interest Income to Total Income	-
Profitability	ROE= Net Income to Total Equity	+/-
Leverage	Total Debt to Total Assets	+
Capital Ratio	Total Equity to Total Assets	-
Bank Size	Natural Logarithm of Total assets	-
Macroeconomic Variables		
GDP growth	Year to Year growth in real GDP in percentage terms	-
Inflation	Inflation rate in percentage terms	+/-
Interest Rate	Real Interest Rate, difference between Long-term debt rate and Inflation in percentage terms	+
Exchange Rate	Real effective exchange rate in percentage terms	+/- -
Unemployment Rate	Unemployment rate in percentage terms	+

Inefficiency

Inefficiency defined as to total operating expense is divided by total operating income for the period. Inefficiency is used to identify bad management I hypothesis, unethical practices and skimming in corporate failures. Corporate failures are categorically determined by using a ratio of inefficiency (operating expense) to operating income. Similarly, Abid et al. (2014) defined inefficiency is the symbol of bad management and skimming; which means that corporate managers are overconfident about their all types of non-performing loans. They further reported that bad management is the poor management control over operating expenses and high level of inefficiency, which leads to increase bank's probability of default failures. Chaibi et al. (2015), in their empirical findings also confirm that an inefficiency is significant and positively correlated with non-performing loans. They conclude that due to bad management control there is an increase in NPL. Louzis et al. (2012) the empirical study has found a positive and significant

relationship between inefficiency and NPL. Such positive relationship confirms bad management I hypothesis, policy to operating cost of inefficiency. They further suggest that it is quantitatively bad management practices impact on all types of NPLs which is leading to default risk. Tehulu et al. (2014) also reported that operating inefficiency has a positive and significant impact on non-performing loans. This positive impact entails that management lack of quality work and cannot manage risk profile regarding current and potential customers. In addition, an increase in the cost of inefficiency is the increase of over skimming rather than bad quality management which is lead to the probability of default.

Non-Interest Income

Non-interest income is also called non-traditional income. Non-interest income is defined as the income earned which are other than interest-bearing cost or not interest earned by banks and financial firms like commission fees, dividend income from investment etc. Non-interest income is measured by the ratio of non-interest income to total income during the year. Numerous empirical studies have used NII (non-interest income) as a proxy for diversification in relation to the credit risk of the banking sector (Chaibi et al. 2015; Louzis et al. 2012). These studies found statistically insignificant and negative relationship with NPLs. The coefficient of negative non-interest income predict the dark sides of not experiences. Consequently, banks face chances of default risk. Other several empirical studies reported that banks are willing to increase risk due to not properly manage non-traditional income. However, reported that naive managers having a lack of experience can increase bank's uncertainty.

Profitability

Profitability is defined as return on investment and is measured by the net income to total shareholder's equity for the period. Profitability or Performance (ROE) is used as a proxy of quality of management II hypothesis (Chaibi et al.2015; Louzis et al. 2012). They document in their study that profitability is a negative relation with NPLs. Further, suggest this negative association is the sign of bad management. Similarly, Abid et al. (2014) found a negatively and statistically significant association of performance and NPLs and suggested that bad management policies and procedures regarding the allocation of loan lead to default risk. Louzis et al. (2012) found that ROE is a negative and significant relation with consumers' loans but such variable has statistically insignificant and negatively correlated with business loans. So that relationship has confirmed the indicator of bad management II hypothesis. It may effect management quality in view that reflects on the efficiency of consumers' loans, credit ratings which are based on advanced quantitative models. The same results also document numerous empirical studies that there is a negative and significant relation between ROE and NPLs. (Jiménez & Saurina, 2004). Gonzalez-Hermosillo et al. (1997) reported in their empirical investigation that high level of performance could improve banks structure and enhance capital by means of increasing economic value.

Leverage

Leverage basically entails how much firms collateralize their assets by adopting outside funds. These funds are those having repayment (interest and principal amount) as negotiated terms and conditions. Leverage predicts optimal capital structure which tells that firms have proportionately owner's capital and rest of debt holders' funds. Leverage is measured by ratio of total debt to total assets or ratio of total debt to total equity. Here we use book value information so the ratio is considered for analysis is a total debt to total assets. Leverage of the banking industry also has a significant impact on the credit risk. There is positively and significant correlation between Leverage and NPLs (Chaibi et al. 2015). They suggest that debt to assets is a factor of NPL in favor of "Too Big to Fail" significant impact on bank's risk. Further, it is reported that larger the total debt to total assets ratio higher should be the profit of bank against impaired loads. While in their empirical study, history of French economy entails that leverage has no significant influence on risk formation. Similarly, Louzis et al. (2012) also documented TBTF effect to size and increases the level of NPLs. This positive impact has occurred only up to the certain threshold of 20%, 10%, and 5% level. On the basis of such thresholds, leverage having no significant impact on Non-performing loans. In short, larger the bank structure there is no varying TBTF effect on NPLs. While smaller the bank and limited resources they tend to get outsiders funds to collateralize productive assets.

Capital Ratio

Bank risk-attitude is the solvency or capital ratio is measured by total equity to total assets. Those banks which are having low capital ratio face the problem of the high probability of failures. Capital ratio is the fact about the decision-making of banks management, predicts face of moral hazard hypothesis (Abid et al. 2014). They documented a negative and statistically significant relationship between capital ratio and non-performing loans. Further reported that policy and decision-making authority having low capital, face moral hazards of high incentives by occurring high portfolio risk which is leading to enhance the probability of default in the banking sector of Tunisian. Louzis et al. (2012) reported that solvency ratio has a negative and significant explanatory power of all types of non-performing loans (NPLs). They proposed that the capital ratio does not support the Greek banking system. Because limited and small market sized for managers creates disincentives and short-term reputation issues. Further, suggest a high level of NPLs due to moral hazards tend to minimize decision-makers incentives. Similarly Berger et al. (1997) empirical investigation suggests on average behavior thinly capitalized banks take to enhance the risk of the portfolio which in turns increase the level of problematic loans. Further, they reported for the low capitalized banks one percent decrease of standard deviation in capital ratio leads to a cumulative increase in problem loans. They conclude a thin owner's capital in banks will enhance the portfolio risk.

Bank Size

Bank size is measured by taking the natural logarithm of total assets. The Size of bank basically considers in the analysis for the fact of diversification. Diversification is the allocating of resources in a way that minimizes exposure to risk towards assets. Empirical studies use log of total assets as a proxy for diversification, (Louzis et al. 2012) They conclude the bank size as a proxy natural logarithm of total assets to predict the diversification. An increase in the bank size is the countertendency of the level of risk. They reported that size has no significant impact on the problem loans; further elaborated that size cannot fully capture diversification or there may be countertendencies to the level of risk-taking from enhancing size. Which means that large resources allocating firms having a higher risk than small once. Dietrich et al. (2014) estimate size taking as a dummy variable in their empirical investigation but having no evidence in a relation of Size and NPLs. Salas et al. (2002) also reported, there is a negative relationship between size and bank credit risk. They further suggest the negative sign of this relationship shows less concentrated portfolio. On the contrary, view of others empirical studies have found the positive and statistically significant correlation between Size and NPLs (Chaibi et al. 2015; Abid et al. 2014). Further, these empirical studies reported that size hypothesis may not be clearly accepted.

GDP Growth

GDP growth is defined as the annual percentage growth rate of GDP at market prices based on constant local currency. GDP growth rate in negative and significant correlated with NPLs. Which means NPLs is adversely affected by deterioration in economic growth (Louzis et al. 2012). Chaibi et al. (2015) reported that there is a negative and significant relation between GDP growth and NPLs. They proposed that the ratio negatively impacts on economic growth of the countries. Further documented that the overall impact of GDP growth is stronger for French default failures which indicate that dependence on French banks to repay the loans amount with the different time frame. Similarly, Zaib et al. (2014) reported that GDP inversely affects NPLs ratio that one percent increase in GDP would result in a decrease in NPLs. Further, they reported that foreign banks keep a view on such dynamism in GDP to control over bad loans. They conclude that a decrease may occur in GDP growth then the financial firm must be set goals regarding non-performing loans policy. Salas et al. (2002) documented GDP growth is negatively correlated with credit risk. Further, it is proposed that sudden impact of GDP growth has strongly affect banks loans quality. They conclude that frictions in economic factor are quickly remitted to issue in problematic loans. Washington (2014) conducted an empirical investigation in Kenyan banking sector by using OLS regression and Error Correction Model for the long-run and short-run relation between non-performing loans and macroeconomic factors taking a sample of 1990-2013. They found that GDP growth has a significant and negative relationship with NPLs. This negative relation plausible result and show an increasing GDP lead to a decrease in default risk. Bonfim et al. (2009) documented the hypothesis of GDP

growth a tendency of economic growth leads towards excessive risk-taking, which confirms that an increase in non-performing loans is due to downwards movement in the economy. They concluded that the GDP growth progressively impacts on default probability; when the credit risk is reached at peak level and the GDP cycle is a trough in turns negatively correlate between these variables. Beck et al. (2013) found that there is a negative relationship between GDP growth and non-performing loans. Further, it is proposed that a rise in GDP leads to a decrease in NPLs ratio. While they reported that lagged GDP growth has a significant and positive impact on NPLs ratio. Further, they proposed that a bank assets quality gradually decreases with a lag in a positive relation of growth because of loose credits traditions followed in demand periods. Castro (2012) found that GDP growth is negatively associated with credit risk. They reported that an increase in GDP growth significantly declines non-performing loans ratio. They conclude that an economic growth deteriorate would result in an increase in default risk.

Inflation

Inflation is defined as a general increase in the price of goods and services continuously. Inflation is measured by the consumer price index reflects the annual percentage change in the cost to the average consumers acquiring a basket of goods and services that may be fixed or changed at specified intervals. Castro (2012) suggested in his empirical investigation that inflation not only erodes the exact value of the loans amount but it has also impact on borrowers' earnings. Chaibi et al. (2015) found the inflation rate is negative and significantly correlated with NPLs. They explain that a higher inflation rate weakening borrower's ability to get debt and reduce earnings. Further reported that inflation has no significant relation in French economy banking sector. Similarly, Poudel (2013) found that a negative and statistically significant relation of inflation with NPLs. They conclude high inflation rate banks not willing to lend long-term debt, but they intend to lend in the assured sector of the economy. So the managers too are scrupulous about lending process and financial firms to be selective in nature of high-quality debt holders to reduce default chances. Mehmood, Younas, and Ahmed (2013) reported that inflation has positively correlated with NPLs. Further, it is suggested that one unit change in the inflation may lead to increase NPLs by 2.59.

Real Interest Rate

The interest rate is defined as the lending rate adjusted for inflation as measured by the GDP deflator. Louzis et al. (2012) found that lending rate is a positive and significant impact on NPLs. They suggest bank can easily refinance consumer loans during booms period and also renegotiate debt term and pay off with the corporate world. Similarly, Washington (2014) found interest rate has a positive and significant relationship with default risk. They explore an increase in interest rate lead to increase the NPLs because financial institutions engage most likely in trading at floating rate. So, borrowers inconveniently repay the loan amount. Castro (2012) documents lending rate is positively and marginally significant relationship with NPLs. Hence, loans terms are negotiated for the long run and bank willing to take advantage of nominal rate. Beck et al. (2013) found in their empirical study that interest rate has a positive and statistically significant relationship with NPLs. Bonfim et al. (2009) interest rate have positively correlated with cyclical component of overdue credit. The fact about such strong relationship is seen and proposed hypothesis that an increase in interest rate lead to increase in default risk. Further, they reported that a sizable enhancement in borrowing rates is the sign of high debt services, which may put pressure on the highly geared firm. Poudel (2013) also found that interest rate is positively correlated with non-performing loans. Abid et al. (2014) suggested that a positive impact of interest rates on default failures is sensitive to the rate and most commonly households debt are negotiated at floating rate. The assumption of significant relation confirms that interest rate has a vital impact on non-performing loans. Khemraj and Pasha (2009) also found a significant contemporaneous relation between interest rate and problematic loans. Further, they documented that banks increase its finance cost it may result in an immediate enhancing in the ratio of non-performing loans.

Exchange Rate

The real effective exchange rate is defined as the nominal effective exchange rate divided by a price deflator or index of costs. The exchange rate is a positively correlated determinant of credit risk (Chaibi et al. 2015). They explore in their study in two parallel economies that an increase in exchange rate leads to expensive local products and in turn, decreases the exporting capability of firms and reciprocally affect debt services. Castro (2012) reported a positive and statistically significant relationship between exchange rate and credit risk. Further, suggest that a relative increase in currency value of the county predicts the fact in products prices. Amuakwa-Menah et al. (2015) suggested that real effective exchange rate assessment is to measure the financial stability of banking sector. Khemraj et al. (2009) reported that there is positive co-movement between real effective exchange rate and non-performing loans. They suggest that global competitiveness minimum indication effect on NPLs whenever economic deterioration is compared during prescribe time frame. On the Contrary, several empirical studies reported that there is a negative and statistically significant relation between exchange rate and problematic loans (Washington, 2014; Poudel, 2013). Further reported that deteriorate competitiveness of export-oriented firms and unfavorable impact on the strength to serve loans. These findings deduce that most borrowings are held in local currency so there is no linkage between local currency and the US dollar, which in result has no impact on the NPLs.

Unemployment Rate

Unemployment refers to the share of the labor force that is without work but available for and seeking employment. Numerous studies have been seen an Increase in unemployment in two-way. First, at the consumer level increase in the unemployment rate (UR) would decrease cash flows. Second, at the idiosyncratic level, an increase in UR would lead to reducing production and utilization of goods and services. Therefore, as the level of unemployment increases then the level of defaulter also increases and vice versa. Chaibi et al. (2015) reported that when unemployment rate increases there is significant changes occur in non-performing loans in both market-based and bank-based economies. Further, they document that German banking sector willing to allow debt service to private-sector because of highly trained and skilled labor to avoid chances of default. Angela et al. (2015) reported in an empirical study that the unemployment is significant and positively correlated with non-performing loans. They document that high level of unemployment rate leads to greater the ratio of non-performing loans because of the economic shortfall and low ability to pay off loan amount. Klein (2013) documented in his empirical investigation that higher unemployment rate in a country would lead to larger the default risk. Further, it has been reported that macroeconomic factors validate the sign of significant impact on credit risk.

Model and Method Specification

Generalized Method of Moments (GMM) are also called dynamic panel data model, is developed by Arellano and Bond, (1991), Arellano and Bover, (1995), and Blundell and Bond, (1998). Following are the recent literature in panel data studies about baseline model (Chaibi et al. 2015; Louzis et al. 2012; Salas et al. 2002). By adopting the dynamic approach in order to take in account time persistent of credit risk (NPLs) structure.

$$NPL_{it} = \alpha + \beta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$NPL_{it} = \alpha + \beta M_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$NPL_{it} = \alpha + \gamma NPL_{i,t-1} + \beta X_{i,t} + v_i + \varepsilon_{i,t} \quad (3)$$

Whereas i and t are the subscript of cross-sectional and time-series of the panel sample respectively. While α is a constant, β is $K \times 1$ vector of coefficient, $X_{i,t}$ is $1 \times K$ a vector of bank-specific variables, $M_{i,t}$ is $1 \times K$ a vector of macroeconomic variables, $\gamma NPL_{i,t-1}$ is a lagged dependent variable, v_i are the unobserved individual effects and ε_{it} is the error term. GMM is the most efficient than traditional panel data model

because there are econometric biases arise in pooled-OLS, fixed and random effects. Therefore, these biases can be eliminated through on the use of dynamic panel model by differencing in variables.

$$\Delta NPL_{it} = \gamma \Delta NPL_{i,t-1} + \beta \Delta X_{i,t} + \Delta \varepsilon_{i,t} \quad (4)$$

By the differencing, individual effects have been eliminated and new bias is introduced $\Delta \varepsilon_{i,t}$ error term is correlated with lagged dependent variable $NPL_{i,t-1}$. So, the error term ($\varepsilon_{i,t}$) in (Eq-2) is not serially correlated with independent variables are weakly exogenous. Hence, empirical studies proposed further two-moment conditions:

$$E [NPL_{i,t-s} (\Delta \varepsilon_{i,t})] = 0 \quad \text{for } t = 3, \dots, T; \quad s \geq 2 \quad (5)$$

$$E [X_{i,t-s} (\Delta \varepsilon_{i,t})] = 0 \quad \text{for } t = 3, \dots, T; \quad s \geq 2 \quad (6)$$

In the above two proposed moments, first step GMM estimation produces to be explanatory variables and homoscedastic in both cross-sectional and time dimension. Second step estimation, the residuals that are come from the first step is utilized in order to construct a consistent variance-covariance matrix of the moment conditions (Chaibi et al. 2015; Louzis et al. 2012). However, there is also some potential bias and imprecision correlated with difference estimator. So, to avoid such bias, further moment conditions are imposed which are:

$$E [(\Delta NPL_{i,t-1}(\gamma_i + \varepsilon_{i,t}))] = 0 \quad (7)$$

$$E [(\Delta X_{i,t-1}(\gamma_i + \varepsilon_{i,t}))] = 0 \quad (8)$$

Due to some econometric bias is being arisen with conventional panel data techniques i.e. pooled-OLS, fixed effect and random effect. On the develop of $NPL_{i,t-1}$ is correlated with unobserved individual effects v_i . Therefore, these biases can be removed through many estimation techniques like instrumental variables and structural equation modeling (Chaibi et al., 2015).

Table 2: Panel Unit Roots test

Variables	Pakistan		India		Bangladesh	
	Levin, Lin & Chu		Levin, Lin & Chu		Levin, Lin & Chu	
	Statistics	P-Value	Statistics	P-Value	Statistics	P-Value
NPLs	-6.3721	0.0000	-4.9275	0.0000	-3.3168	0.0005
INEF	-13.3118	0.0000	-6.4054	0.0000	-5.3335	0.0000
NII	-6.7941	0.0000	-4.9839	0.0000	-19.9099	0.0000
ROE	-4.6374	0.0000	-7.6636	0.0000	-24.7916	0.0000
LEV	-8.6999	0.0000	-21.7365	0.0000	-4.4008	0.0000
CR	-5.1902	0.0000	-21.7192	0.0000	-4.3461	0.0000
BS	-3.0959	0.0010	-13.2639	0.0000	-6.0745	0.0000
GDPG	-22.5553	0.0000	-32.3879	0.0000	-30.4747	0.0000
INF	-13.2698	0.0000	-13.1910	0.0000	-10.0871	0.0000
RIR	-2.5126	0.0060	-10.3857	0.0000	-3.6674	0.0001
ER	-9.0260	0.0000	-13.5756	0.0000	-84.0696	0.0000
UR	-2.2435	0.0124	-5.9408	0.0000	-20.6512	0.0000

Note: Non-Performing Loans (NPLs), Inefficiency (INEF), Non-interest Income (NII), Return on Equity (ROE), Leverage (LEV), Capital Ratio (CR), Bank Size (BS), GDP growth (GDPG), Inflation (INF), Real Interest Rate (RIR), Exchange Rate (ER) and Unemployment Rate (UR)

Results and Discussions

This section pertains to the discussion and empirical results of the study. Non-performing loans determinants in the banking sector of Pakistan, India, and Bangladesh. First, we represent in table 3

summary statistics of the explained and explanatory variables. Statistics for Pakistan, India, and Bangladesh are calculated for a given variables across all firms of the designated economy and over the entire sample period. Non-performing loans were used in the study as a proxy for credit risk of the banking sector. The value of descriptive statistics consists of mean, standard deviation, maximum and minimum values by column-wise for each country. The mean value of NPLs shows across countries are 13.1% in Pakistan, 2.9% in India and 6.8% in Bangladesh along with standard deviation 13.9%, 2.1% and 7.9% respectively. The finding predicts that Pakistan has a higher default risk than India and Bangladesh. While the results of Bangladesh are also predicting higher risk than India. In the case of India which has a comparatively low risk, predicts and riskless economy. According to Chaibi et al. (2015), it was concluded that French has a risk 5.82% which is a market-based economy and Germany has low risk than French i.e. 4.36%. With respect to bank-specific variables, the statistics for bad management hypothesis I, shows 2.647 and 0.453 in the market-based economy, while 0.488 in the bank-based economy. The results show that Pakistani banking sector tends to inefficiency over operating income and lack of supervision on the naïve policy regarding operating expenses. The diversification hypothesis i.e. non-interest income has 17.3% in Pakistan, 13.2% in India and 29.4% in Bangladesh. Bangladesh is comparatively more beneficial rest of two countries in the accumulation of traditional income. The bad management hypothesis II i.e. profitability (return on equity) also confirms that injustice and lack of experience and poor management control over assets and shy policy structure cannot allocate sources of funds to get higher returns, the summary statistic of profitability in market-based economy lower than bank-based economy i.e. 1 % in Pakistan, 12.7% in India and 12.6% Bangladesh. India banking sector is averagely more profitable than Pakistan and Bangladesh. Too-big-to-fail hypothesis, i.e. leverage Pakistani banking firms having averagely financed its resources 79.6% from outside funds while India and Bangladesh having 93.1% and 91.3% respectively. The moral hazard hypothesis that is capital ratio predicts 20.2%, 6.9% and 8.7% subsequently. In comparison, macroeconomic variables statistic summary predicts that GDP growth has 6%, 7.4%, and 6.1%. GDP growth of the India is comparatively larger than rest of two economies because of more resources and production capacity. Inflation that increases in the general price level of goods and services, in Pakistan has 7.5%, India 8.5%, Bangladesh 7.4%. Interest rates averagely along with standard deviation are 7.2%, 4.6%, and 6.5% respectively. The average exchange rates against one dollar in each economy are 85.65 rupees, 53.69 rupees and 75.03 takas for Pakistan, India, and Bangladesh. The ratio of unemployment in the economy has averagely predicted that 4.4%, 3.9% and 4.5% in Pakistan, India, and Bangladesh respectively.

Table 4 represents GMM estimation with regressors of bank-specific, which shows particular influence of bank-specific and macroeconomic factors for Pakistan, India and Bangladesh respectively. The GMM estimation coefficient and probability value are reported in column wise to a particular country. In the result, the Sargan statistic (p -value) and the order which is not serial correlation (p -value) represent to each country estimated values.

Table 3: Descriptive Statistics

Variable	Pakistan					India					Bangladesh				
	Obs.	Mean	Std. Dev.	Max	Min	Obs.	Mean	Std. Dev.	Max	Min	Obs.	Mean	Std. Dev.	Max	Min
Bank-Specific															
NPLs	357	0.131	0.139	1.000	0.000	322	0.029	0.021	0.150	0.001	209	0.068	0.079	0.572	0.0002
INEF	357	2.635	36.744	694.291	-8.711	322	0.488	0.111	1.151	0.182	209	0.453	0.135	1.683	0.245
NII	357	0.173	0.111	0.781	-0.430	322	0.132	0.065	0.542	0.048	209	0.294	0.076	0.544	0.146
ROE	357	0.011	0.858	2.347	-14.743	322	0.127	0.074	0.283	-0.519	209	0.126	0.253	0.388	-2.741
LEV	357	0.796	0.216	0.984	0.011	322	0.931	0.023	0.956	0.870	209	0.913	0.050	0.982	0.519
CR	357	0.202	0.228	1.147	-0.031	322	0.069	0.023	0.130	0.044	209	0.087	0.050	0.481	0.018
BS	357	18.021	1.893	21.520	11.614	322	20.442	1.323	22.690	16.222	209	25.428	0.824	27.658	23.438
Macroeconomic															
GDPG	357	0.060	0.008	0.071	0.038	322	0.074	0.014	0.096	0.040	209	0.061	0.005	0.071	0.038
INF	357	0.075	0.015	0.107	0.054	322	0.085	0.028	0.150	0.032	209	0.074	0.015	0.107	0.033
RIR	357	0.072	0.021	0.117	0.045	322	0.046	0.021	0.079	0.006	209	0.065	0.015	0.117	0.045
ER	357	85.653	16.889	105.678	57.215	322	53.692	8.521	66.326	39.415	209	75.033	5.518	81.853	57.900
UR	357	0.044	0.003	0.050	0.034	322	0.039	0.005	0.050	0.035	209	0.045	0.002	0.050	0.034

Table 4: GMM Estimation with Bank-Specific and Macroeconomic Factors

Variables	Model 1			Model 2			Model 3		
	Pakistan	India	Bangladesh	Pakistan	India	Bangladesh	Pakistan	India	Bangladesh
NPLs(-1)	0.454*** (3.507)	0.174** (1.746)	0.392** (2.346)	0.642*** (12.64)	0.439*** (3.773)	0.856** (1.612)	0.481*** (4.860)	0.237** (2.119)	0.375** (2.037)
INEF	0.000*** (0.959)	-0.003*** (-0.273)	0.211*** (3.901)				0.000* (1.891)	-0.006** (-0.509)	0.214*** (4.002)
NII	-0.013 (-0.175)	0.096 (1.507)	0.128** (2.226)				-0.031 (-0.485)	0.105 (1.291)	0.132** (2.281)
ROE	-0.004*** (-1.074)	-0.195*** (-8.240)	-0.060*** (-3.953)				-0.006** (-1.136)	-0.199*** (-9.194)	-0.064*** (-3.840)
LEV	0.428** (1.994)	4.947 (1.093)	2.613 (0.797)				0.313* (1.804)	10.239* (1.875)	2.458 (0.723)
CR	0.003 (0.046)	-4.874** (-1.076)	-2.505** (-0.780)				-0.026 (-0.478)	-9.981* (-1.827)	-2.588** (-0.772)
BS	-0.032* (-1.221)	-0.010** (-1.371)	0.020* (1.786)				-0.058** (-2.014)	-9.981** (-1.984)	-0.055** (-1.986)
GDPG				-3.400** (-2.473)	0.137 (0.759)	1.841 (0.728)	-4.249*** (-3.059)	0.121 (0.959)	1.713 (1.502)
INF				0.601 (-2.991)	-0.090 (-0.742)	-1.160 (-0.888)	0.915 (0.803)	-0.007 (-0.095)	-0.703 (-0.974)
RIR				5.497*** (2.991)	0.089 (0.302)	-1.057 (-0.311)	4.134*** (3.187)	0.028 (0.125)	0.498 (0.267)
ER				-0.002** (-2.127)	0.001** (1.164)	0.002 (0.420)	-0.001*** (-0.746)	0.002* (1.649)	-0.004 (-0.923)
UR				8.206** (2.276)	0.213 (0.285)	-6.488 (-0.131)	0.601** (0.169)	2.390* (1.812)	3.587 (0.145)
Sargan test	[0.0009]	[0.0000]	[0.0000]	[0.0107]	[0.0000]	[0.0000]	[0.0037]	[0.0000]	[0.0000]
AR(1)*	-4.756 (0.000)	-2.175 (0.030)	-0.240 (0.004)	-6.206 (0.000)	-2.732 (0.006)	-0.195 (0.018)	-6.030 (0.000)	-1.964 (0.050)	-0.226 (0.006)
AR(2)**	-0.240 (0.810)	0.010 (0.992)	-0.133 (0.102)	0.215 (0.830)	-0.264 (0.792)	-0.089 (0.278)	0.514 (0.607)	-0.009 (0.993)	-0.128 (0.115)

Note: t-statistics are reported in parenthesis, while p -value for Sargan statistic is reported in brackets which is not correlated with error term. Serial correlation, m-statistic and (p -value) i.e. AR (1)* and AR (2) ** are also reported respectively. ***Imply significant p -value < 1%, **Significant p -value < 5%, *Significant p -value < 10%

According to table 4 at the bottom Sargan statistic and serial correlation confirm the soundness and validity of the individual lag one-step General Method of Moments (GMM) coefficient estimations. In GMM estimations, Sargan test p -value for Pakistan, India, and Bangladesh are designated along with no serial correlation. Therefore, results are retained to the GMM one-step at difference estimation.

The estimation findings of models are reported in table 4, where most of the estimated correlation coefficients have symbols of compatible along with literature and theoretical framework. First, the study has been taken lag of dependent variable at the right side of the equation in order to the persistence of credit risk and captures the possible impact of omitted independent variables. The study finds that lag of non-performing loans is statistically significant and positively correlated in all three kinds of economy. This result is consistent with the empirical findings of Chaibi et al., (2015). They argued that lag of NPLs are likely to enhance whenever financial firms have risen provisions against it during the year before write-offs.

The inefficiency is positive and statistically significant associated with non-performing loans for Pakistan and Bangladesh. The result confirms and accepted the high-cost inefficiency existence. This result is consistent with empirical investigation of Louzis et al. 2012; Abid et al. 2014 and Chaibi et al. 2015. The result indicates the "bad management hypothesis I" practices leads to growth in problematic loans. Consequently, growth in NPLs for the market-based economy is not due to bad quality of management. In the case of India, which denotes that is less cost inefficiency but slightly the skimping, meaning that such economy banks are overconfident about underwriting.

Bank diversification hypothesis is proxy by using the non-interest income to capture diversification. The results indicate that diversification hypothesis is negatively correlated and statistically insignificant for Pakistan. Diversification hypothesis confirms that South Asian economy can recover loan losses from other sources. The results for rest of two economies are contradictory because of a positive relationship. Such findings indicate that these economies can bitterly manage funds and get benefits from it. While the empirical studies documented that non-interest income cannot fully capture process of diversification.

Management performance and "bad management hypothesis II" results predict negative and statistically significant relation with non-performing loans, such indication fulfills the expected sign of the "bad management hypothesis II" for Pakistan, India, and Bangladesh. This result is consistent with Louzis et al. (2012); Chaibi et al. (2015). These studies argued that procyclical credit policy hypothesis is rejected while the cost of inefficiency and quality of management hypothesis accepted that growth in non-performing loans is also caused by bad management hypotheses.

Empirical results regarding "Too-big-to-fail" impact on total assets of the banks, has a positive and statistically significant association with non-performing loans. This explains that leverage tends to enhance problematic loans and failures. The result is consistent with empirical investigation of Louzis et al. (2012) and Chaibi et al. (2015). They reported that larger the debt proportion to bank size higher should be the return on assets or equity of problematic loans. In the case of Bangladesh, the result is insignificant and positively correlated with the dependent variable. As Louzis et al. (2012) documented that leverage is only positive and significant coefficient to non-performing loans up to certain level of threshold i.e. 20%, 10% and 5% only. Beyond of such threshold, leverage is insignificantly associated with banks failure because larger banks have no differential impact of Too-big-to-fail on credit risk.

Moral hazard hypothesis results indicate the statistically significant impact on non-performing loans. This result is consistent with the empirical findings of Berger et al. (1997), they document that narrow capitalized banks intend to enhance portfolio risk by the result higher the problematic loans. But the capital ratio positive relationship with non-performing loans suggested that there are strong forces from regulatory authorities and market pressure to that banks restructure the capital ratio. While in the case of Pakistan moral hazard does not find support in favor of non-performing loans. The moral hazard for Pakistani firms has negatively correlated with non-performing loans. This result is consistent with the empirical findings of Louzis et al. (2012) and Abid et al. (2014). They suggested that moral hazard hypothesis is because of low capital ratio leads to higher the capacity of non-performing loans.

Bank size is proxy by taking the natural logarithm of total assets, the result shows a negative relationship between size and non-performing loans as expected. This finding is consistent with Dietrich et al. (2014), Salas et al. (2002) and Louzis et al. (2012). These studies suggested that size permit for large diversification opportunities and less portfolio concentration is reason backed by negative influence on non-performing loans.

GMM estimation results regarding macroeconomic variables. The empirical study finds in Pakistan that GDP growth has negatively and statistically significant with non-performing loans. This finding is consistent with empirical investigation of Chaibi et al. (2015), Louzis et al. (2012), Salas et al. (2002), Zaib et al. (2014) and Washington (2014). These empirical studies argued that an increase in GDP growth lead to deteriorating problematic loans. While deterioration occurs in economic cycle would a result of increasing bank failures. Because there has been an intervention of uncontrollable factors which may lead to growth in default probability. As a result, an economic slowdown increases, borrowers unable to repay debt burden along with borrowing costs. While the findings regarding India and Bangladesh are contradictory and not aligned with the theoretical arguments.

The estimation result of inflation rate is also statistically insignificant and negatively associated with non-performing loans in India and Bangladesh. Which entails that higher inflation in these countries then borrowers having no ability to payoffs their debt liabilities. This result is consistent with the findings of Chaibi et al. (2015). They reported that growth in inflation deteriorates payoff capacity of borrowers to debt service providers. While the study has found no significant impact of inflation in Pakistan with the non-performing loan. This finding also consistent with Castro (2012). Similarly, Chaibi et al. (2015) also confirm the same result for French banking system, as reported that inflation is not a significant influence on non-performing loans. Further argued that inflation unfavorable impact on outstanding debt, it cannot be considered vital factor.

The study considers real interest rate for analysis in to check the impact of non-performing loans. According to results, the real interest rate has a positive and statistically significant impact on non-performing loan in Pakistan. The result for rest of economies is contrary to theoretical arguments because as per empirical studies interest rate has a positive and significant effect on bank failures which indicates that an increase in the interest rate leads to growth in non-performing loans vice versa.

The coefficient of the real effective exchange rate is positive in India and negative in Pakistan; statistically significant association with non-performing loans. The results have been found as expected on the basis of theoretical supports and empirical investigations. The non-performing loans are affected by an increase occur in the real effective exchange rate. Further, the suggestion is that mostly of exports and imports fund allocation have been a significant effect on problematic loans, because of flexibility in currency exchange rate. Suppose, one dollar decrease occurs in importer currency and has borrowed fund to meet the economic transaction, due to such currency devaluation he/she pays more than agreed amount. The result is consistent with findings of Amuakwa-Menah et al. (2015), Khemraj et al. (200), Castro (2012) and Chaibi et al. (2015). These studies suggest that exchange rate fluctuation and weaken competitiveness adversely affect borrower's ability to pay debt liabilities. While the findings regarding Bangladesh are not aligned with the theoretical discussion.

The empirical results of unemployment rate indicate that is positive and significant correlated with non-performing loans. The findings as per previous studies suggest that as the unemployment increases, the non-performing loans ratio rises. The empirical results of the study confirm the relationship between unemployment rate and non-performing loan in two big economies. The empirical studies Chaibi et al. (2015), Klein et al. (2013) and Angela et al. (2015). These studies reported that one percentile increase in unemployment leads to 0.13% to 0.34% increases in ratio non-performing loans. Therefore, deterioration in revenue and economic shortfalls, borrowers unable to payoffs their debt burden and banks face failures to recover funds.

Conclusions

The aim of the study is to investigate non-performing loans determinants which reflect credit risk in banking sectors across three kinds of economy i.e. Pakistan, India, and Bangladesh. While numerous empirical studies have been conducted in Western countries and central Europe, but findings cannot be generalized and may not necessarily have any applications in the context of South Asian countries due to the absence of a robust legal system and limited efficiency of the capital market. Furthermore, they have been restricted to a limited cross-section or single category of factors. This study broadly conducts empirical investigation 11 classified factors are bank-specific and macroeconomic variables. The important aspect and contribution of the study are to conduct a comparative analysis of Pakistan, India, and Bangladesh.

In the study, we use dynamic panel data estimation techniques over the period of 2000-2015, an unbalanced panel data to examine the credit risk in banking sectors for South Asian countries. The study finds that Pakistani banking sector has more risk than rest of two economies, while India has a low ratio of default failure. The study conducts two types of factors macroeconomic and bank-specific. Macroeconomic variable elucidates systematic risk, while bank-specific variables entail about unsystematic risk. The empirical findings regarding macroeconomic factors; GDP growth, Real Interest rate, Real Effective Exchange rate and Unemployment have been found under the construct of theoretical development and their impact on non-performing loans. While the bank-specific variables cost of inefficiency, Skimping, profitability, leverage and diversification hypothesis empirical results have been aligned with the expected sign and meet criteria of theoretical arguments. The empirical findings of Bangladesh regarding macroeconomic factors have not been aligned with the literature. So the study needs to find out more determinants of non-performing loans that have a strong and significant contribution towards problematic loans.

Overall findings of the study indicate that default failures in banking sectors across the country not only because of external factors. But there are internal bad management policies, lack of experience, steady and weak decision-making power, centralize managerial control, bad luck and moral hazards and the like deteriorate performance and increasing loans losses.

Results of the empirical study have found a vital contribution from both bank-specific and macroeconomic variables. Results indicate that overall bank-specific variables i.e. bad management practices, moral hazards and diversification hypotheses are internal factors which are the reasons of problematic loans. Because there are also skimping existence in relation to allocating bank funds by personal means of societal values which in results play the role of failure and cannot be recovered within official terms and conditions. Therefore, internal factors which are controllable to avoid default failures. In addition, the study suggests implication for policy maker and regulatory authority to reduce stress testing exercises and take adequate control against non-performing loans. Furthermore, regulatory bodies should be more concentrate on banks managerial practices, performance and risk management techniques to make safeguard against problematic loans and failures in order to maintain financial stability in the economy.

While results regarding macroeconomic variables which have a strong impact on loan losses, like GDP as economic policy deteriorate there is an increase in problematic loans. Similarly, the burden of unemployment also has a significant contribution towards banks failures, because the issue arises at the time of repaying of liability, the borrower does not have an ability to pay-off. Hence, decision-making authority needs to have an adequate macroeconomic policy and cycle to diversify the systematic risk.

The study is conducted to a limited sample of, only three South Asian countries i.e. Pakistan, India and Bangladesh. Furthermore, such empirical findings cannot be generalized to all Asian emerging economies, because each country has own market structure, financial policies, and reporting procedure. In addition, those banks and financial firms data have been collected which are available and accessible. Therefore, the study is limited to unbalanced panel data.

Future suggestions and recommendation of the study is to analyze credit risk determinants in banking sectors through others macroeconomic variables i.e. Sovereign debt, Foreign Direct Investment, and Money supply. In addition, there are others internal factors i.e. Loan loss provision, Spread, Earnings

volatility the like, which influences default failures also important to be considered in future. Furthermore, there is also various credit risk estimation techniques to be incorporated in future research like structural equation modeling, two stage least square, and Moody's KMV model, in order to find bank's failures.

References

- Abid, L., Ouertani, M.N. and Zouari-Ghorbel, S. (2014). Macroeconomic and bank-specific determinants of household's non-performing loans in Tunisia: A dynamic panel data. *Procedia Economics and Finance*, 13:58-68. DOI:10.1016/S2212-5671(14)00430-4
- Ahmad, N.H. and Ariff, M. (2007). A multi-country study of bank credit risk determinants.
- Allen, F. and Santomero, A.M. (1997). The theory of financial intermediation. *Journal of Banking & Finance*, 21(11):1461-1485. DOI:10.1016/S0378-4266(97)00032-0
- Amuakwa-Mensah, F. and Boakye-Adjei, A. (2014). Determinants of now-performing loans in Ghana banking industry. *International Journal of Computational Economics and Econometrics*, 5(1), pp.35-54. DOI: 10.1504/IJCEE.2015.066207
- Anagnostopoulou, S.C. and Drakos, K. (2016). Bank loan terms and conditions: Is there a macro effect?. *Research in International Business and Finance*, 37, pp.269-282. DOI: 10.1016/j.ribaf.2015.11.012
- Andriani, V. and Wiryono, S.K. (2015). Bank-specific determinants of credit risk: empirical evidence from Indonesian banking industry. *International Journal of Technical Research and Applications*, 21, 1-4.
- Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, 58(2), pp.277-297. DOI: 10.2307/2297968
- Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, 68(1), pp.29-51. DOI: 10.1016/0304-4076(94)01642-D
- Aver, B. (2008). An empirical analysis of credit risk factors of the Slovenian banking system. *Managing Global Transitions*, 6(3):317.
- Baselga-Pascual, L. and del Orden Olasagasti, O. (2015). Revenue Diversification and Asset Quality of Eurozone Banks. *Social Science Research Network*. DOI: 10.2139/ssrn.2687965
- Beck, R., Jakubik, P., and Pilot, A. (2013). Non-performing loans: What matters in addition to the economic cycle? *ECB Working Paper*. 1515
- Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, 87(1), pp.115-143. DOI: 10.1016/S0304-4076(98)00009-8
- Bohachova, O. (2008). *The impact of macroeconomic factors on risks in the banking sector: a cross-country empirical assessment* (No. 44). IAW-Diskussionspapiere.
- Bonfim, D. (2009). Credit risk drivers: Evaluating the contribution of firm-level information and of macroeconomic dynamics. *Journal of Banking & Finance*, 33(2), pp.281-299. DOI: 10.1016/j.jbankfin.2008.08.006
- Castro, V. (2013). Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI. *Economic Modelling*, 31, pp.672-683. DOI: 10.1016/j.econmod.2013.01.027
- Chaibi, H. and Ftiti, Z. (2015). Credit risk determinants: Evidence from a cross-country study. *Research in international business and finance*, 33, pp.1-16. DOI: 10.1016/j.ribaf.2014.06.001
- Dimitrios, A., Helen, L. and Mike, T. (2016). Determinants of non-performing loans: Evidence from Euro-area countries. *Finance Research Letters*, 18, pp.116-119. DOI: 10.1016/j.frl.2016.04.008

- Fainstein, G. and Novikov, I. (2011). The comparative analysis of credit risk determinants in the banking sector of the Baltic States. *Review of Economics & Finance*, 1(3):.20-45.
- Festić, M., Kavkler, A. and Repina, S. (2011). The macroeconomic sources of systemic risk in the banking sectors of five new EU member states. *Journal of Banking & Finance*, 35(2), pp.310-322. DOI: 10.1016/j.jbankfin.2010.08.007
- Fofack, H. (2005). Nonperforming loans in Sub-Saharan Africa: causal analysis and macroeconomic implications. *World Bank Policy Research Working Paper*, (3769).
- González-Hermosillo, B., Pazarbaşıoğlu, C. and Billings, R. (1997). Determinants of banking system fragility: A case study of Mexico. *Staff Papers*, 44(3), pp.295-314. DOI: 10.2307/3867561
- Jiménez, G. and Saurina, J. (2004). Collateral, type of lender and relationship banking as determinants of credit risk. *Journal of banking & Finance*, 28(9), pp.2191-2212. DOI: 10.1016/j.jbankfin.2003.09.002
- Klein, N. (2013). Non-performing loans in CESEE: Determinants and impact on macroeconomic performance. IMF Working Paper. *WP13/72*
- Louzis, D.P., Vouldis, A.T. and Metaxas, V.L. (2012). Macroeconomic and bank-specific determinants of non- performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking & Finance*, 36(4), pp.1012-1027. DOI: 10.1016/j.jbankfin.2011.10.012
- Nkusu, M. (2011). Nonperforming loans and macrofinancial vulnerabilities in advanced economies. *IMF Working Papers*, 1-27.
- Poudel, R.P.S. (2013). Macroeconomic Determinants of credit risk in nepalese banking industry. In *Proceedings of 21st International Business Research Conference* (pp. 10-11).
- Rahman, M.M., Uddin, K.M.K. and Moudud-Ul-Huq, S. (2015). Factors Affecting the Risk-taking Behavior of Commercial Banks in Bangladesh. *Applied Finance and Accounting*, 1(2), pp.96-106. DOI: 10.11114/afa.v1i2.850
- Roman, A. and Bilan, I. (2015). An Empirical Analysis Of The Macroeconomic Determinants Of Non-Performing Loans In Eu28 Banking Sector. *Revista Economică*, 67(2).
- Salas, V. and Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research*, 22(3), pp.203-224. DOI: 10.1023/A:1019781109676
- Tarron, K. and Sukrishnalall, P. (2009). The determinants of non-performing loans: an econometric case study of Guyana. *MPRA Paper*.
- Tehulu, T.A. and Olana, D.R., (2014). Bank-specific determinants of credit risk: Empirical evidence from Ethiopian banks. *Research journal of finance and accounting*, 5(7):80-85.
- 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.
- Zaib, A., Farid, F. and Khan, M.K. (2014). Macroeconomic and bank-specific determinants of non-performing loans in the banking sector in Pakistan. *International Journal of Information, Business and Management*, 6(2):53.