EXPLANATAORY POWER OF MACROECONOMIC VARIABLES, BANK SPECIFIC VARIABLES, OWNERSHIP STRUCTURE, CORRUPTION AND INFORMATION SHARING AS DETERMINANTS OF NON-PERFORMING LOANS

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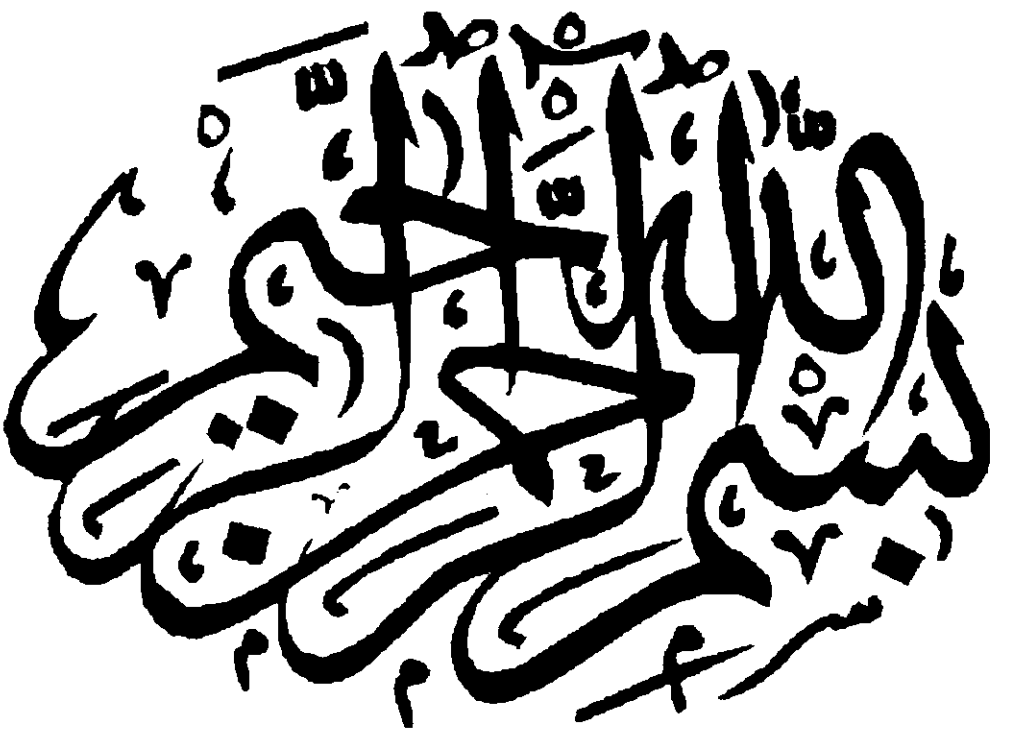

FORWARDING SHEET

The thesis entitled "Explanatory Power of Macroeconomic Variables, Bank Specific Variables, Ownership Structure, Corruption and Information Sharing as determinants of Non-Performing Loans" submitted by Mr. Fawad Ahmad in the partial fulfillment of MS degree in Management with specialization in Finance has been completed under my guidance and supervision. I am satisfied with the quality of student's work and allow him to submit the thesis for the further process as per IIU rules and regulations.

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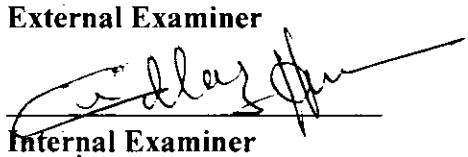

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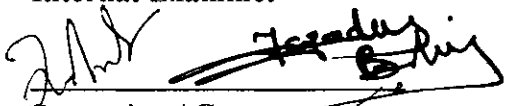

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ABSTRACT

It is widely accepted that the growth in Non-performing loans (NPLs) is associated with the inefficiency, failures of the banks and financial crisis in the developed and developing countries. In fact, existing studies have provided evidence that the rapid growth in NPLs leads to the financial crisis. Therefore whenever financial vulnerability is examined, main emphasis is placed on the levels of NPLs. The NPLs in Pakistan are increasing with an alarming rate each year; therefore the main aim of the current study is to investigate the determinants of NPLs.

The current study investigated the explanatory power of nine macroeconomic variables, corruption, information sharing, nine bank specific hypotheses and ownership structure as determinants of NPLs by using two models. The current study used 22 years time series data (1990-2011) for nine macroeconomic variables, corruption and information sharing, whereas 6 years panel data (2006-2011) was used for banks specific hypotheses and ownership structure model.

The results provided significant negative association of GDP growth, interest rate, inflation rate, exports and industrial production with NPLs; whereas CPI is significantly positively associated with NPLs. Current study found no significant impact of corruption and information sharing on NPLs. The current study proved the validity of three bank specific hypotheses (i.e. moral hazard, bad management II and procyclical credit policy) and rejected the five hypotheses (i.e. bad Management, skimping, size, soft budget constrained and deposit rate effect), whereas rejected deposits to loans ratio effect hypothesis but providing significant positive association of reserve ratio with NPLs. Furthermore results suggested the validity of traditional view that privately and foreign

owned banks (concentrated ownership) enhances the banks performance and reduces the banks riskiness (NPLs), furthermore suggested that dispersed ownership (publically owned banks) reduces bank performance and increases the bank riskiness.

The commercial banks can use the findings of current study to predict changes in the NPLs to take precautionary measures in order to prevent financial crisis. For instance, commercial bank can use the performance of economy, interest rate level, inflation, CPI, exports and industrial production while extending their lending or allocating loans. Similarly banks can improve the current management performance, expected level of NPLs and extensive lending during boom to reduce the level of NPLs. Finally, State Bank of Pakistan should consider that their supervision policies have different impact on the banks according to nature of ownership therefore it should develop separate supervision polices for public and private banks for better performance and control.

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LIST OF ABBREVATIONS

Global Financial Crisis (GFC)

Non-performing loans (NPLs)

State Bank of Pakistan (SBP)

Ordinary least square (OLS)

Vector Auto-Regression (VAR)

United States of America (USA)

Gross domestic product (GDP)

Consumer price index (CPI)

CHAPTER 1

INTRODUCTION OF THE STUDY

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INTRODUCTION OF THE STUDY

1.1 Introduction

It is widespread rule that before the recovery of global economy, the consumer and investor confidence in the markets must be restored, however this process is very slow leaving many small economies, industries and even small firms struggling to attain break even. The impact of Global Financial Crisis (GFC) and recession in developing countries was most evident in 2009. Like other Asian countries, GFC expressed its effects on the real sector of Pakistan economy. The major challenges that Pakistani economy faced during this time can be partially attributed to GFC. This partial effect was due to the decrease in the exports resulting from the recession and liquidity crunch in the global financial market, which lead to the withdrawal of foreign investment from Pakistan and depreciation of the local currency. Similarly, increase in global oil prices, energy crisis, underutilization of production facilities, high per unit cost, circular debts, decline in capital flow and growth, budget deficit and growth in corruption played important role in slowing down the recovery of economy. All these pressures on the economy and industry translated in the inability of households and firms to repay their debts, consequently resulting in the growth of Non-performing loans (NPLs). The rapid growth in NPLs poses challenges on the flexibility of banking sector to increase their provisions for NPLs. This affected the dividend payments, resulting in the decline of stock prices.

The Pakistan commercial banking sector is blamed recently by both foreign as well as local stakeholders for apparently avoiding its responsibility to provide credit to different private sectors to stimulate the country economic growth. Locally, regulatory authorities and government are realizing the fact that commercial banks should provide the leverage where it is needed (private sector). Whereas foreign credit rating agencies such as Moody's are constantly highlighting that commercial banks should not increase their loan portfolio risk by putting all their eggs in single basket i.e. investing in the government securities only.

The total NPLs stood at Rs 613 billion for all banking sector exclusive of finance development institutions, as per data provided by State bank of Pakistan (SBP) on September 30, 2011. Out of total NPLs 62 percent comes from the balance sheet of private banks; nearly 31 percent reside on the public banks balance sheet, almost 6 percent comes from the specialized banks and foreign banks are holding very minor percent of the total NPLs. The NPLs are growing continuously on quarterly basis, registering 6 percent (almost Rs 37 billion) growth in the first quarter of fiscal year 2011-12. On the other hand cash recovery for the first quarter against the NPLs reached to Rs 14 billion, with major recovery by the private banks of Rs 10.5 billion. The Net NPLs/net loans for the banking sector is 6.4 percent; the ratio is high because of the 15.1 percent ratio contribution of publically held banks and 14.7 percent ratio contribution of specialized banks. Whereas foreign owned banks and local privately held banks have net NPLs/net loans ratios of 1.3 percent and 3.8 percent, respectively.

The government of Pakistan from time to time criticizes the private banks for not providing credit to the private sector, but in reality government owns the larger share of

private banks lending. The depreciating currency of Pakistan is reducing the foreign exchange reserves, government in order to get the budgetary support rely heavily on the local bank borrowing. During the current fiscal year from July 1 to February government borrowed Rs 190 billion from the SBP, where as total borrowing of government from scheduled banks reached to a massive figure of Rs 700 billion.

About 20 percent of the private borrowing is done by the textile sector; the amount of the loans outstanding towards textile sector is Rs 555 billion in January 2012. Whereas manufacturing sector does the largest borrower in the private sector and own 51 percent of the total borrowings (Rs 1,464 billion). The persistent electricity shortfalls and gas shortages now become a consistent phenomenon; as a result the manufacturing and textile sector are made to borrow more than their usual working capital requirement. The biggest example of gas shortage effect on manufacturing sector is the world's largest single-train urea manufacturing plant which is not working because of the irregular supply of gas. The cost of this project is over $1 billion which is mainly financed by the banks. As the plant is not fully operating thus there is every possibility of defaults of loans and increase in NPLs of the banking sector. Therefore, because of such infrastructure-based uncertainty banks of Pakistan avoid lending to the private sector, as it can translate into growth in NPLs. Thus banks are only lending to the government because of the growth in demand but also to reduce the riskiness of the loan portfolio.

The further reduction of 100-200 basis points in the current market interest rates would not likely to stimulate the growth in private sector lending, because of the infrastructural issues and energy deficit problems. If the government resolves the energy problem then it

would increase the demand for the credit and will also help in the reduction of the loan portfolio risk of private banks.

The Asian financial crisis of 1997 raised various questions relating the unstable nature and risk taking tendency of Asian banks. In order to reform banking sector, Asian banks regulators proposed and implemented reform measures to ensure the stability of the banking sector. First, Asian governments discouraged the shutting down of banks by encouraging and in many cases forcing the distressed banks to merge with the safe banks (Hawkins and Turner, 1999; and Gelos and Roldos, 2004), at that time it was not confirmed that the mergers will result in the strong or weak intermediary, but it helped in improving the financial viability of the distressed banks (Hawkins and Turner, 1999). Second, few Asian governments announced bailout packages for distressed banks. These packages also enforced the banks to change their ownership structures (Hawkins and Turner, 1999). However, the government interventions to encourage mergers are much more cost-effective than bailout packages. Third, Asian governments allowed the foreign investors to own the banks in the countries in order to import best foreign banking practices, corporate governance and latest technology in the country (Choi and Dovutivate, 2004). Fourth, many Asian governments implemented the restructuring measures such as changes in corporate structure, polices, bank mangers or management. All these measures are closely related to the changing ownership structure and risk bearing tendency of banks, thus question arises here "Ownership structure has effect on bank riskiness or not?"

The banking reforms program begins immediately after 1997 and lasted till 2000. These reforms were aimed to change the ownership structure and governance of banks. The aim

of this study is to check whether ownership concentration improves or do not affect the banks riskiness by using NPLs loans as measures of riskiness. How does bank riskiness is affected by ownership structure? In corporate finance literature, no concise result is given for this question. Some studies have suggested that ownership structure increases firm riskiness while other suggests that ownership has no role in reducing firm riskiness. For instance, Berle and Means (1933) concluded that dispersed ownership reduces the decision influencing power of shareholders and control over firm management. Thus risk in the firm increases because shareholders have no power to influence the firms decision making, thus management will make only those decisions which are in their own benefits, whereas concentrated ownership results in more corporate control because of increase in firm monitoring.

The existing literature has shown that rapid growth in NPLs leads to the banking crisis (González, 1999). The GFC and recession in economy results in the growth of household and firms default rates, thus the quality of loan can be used to control and prevent the occurrence of banking crisis. The regulatory authorities can monitor the quality of loan and use it as early warning indicator to prevent the banking crisis. The aim of the current study is to investigate the determinants of NPLs by using the Pakistani banking sector data. The existing literature provides evidence relating the explanatory power of numerous variables but the current study analyzed the explanatory power of macroeconomic and bank specific variables, banks ownership structure, corruption and information sharing as determinants of NPLs.

The existing literature on the determinants of the NPLs with respect to current study can be divided into four categories. One strand of literature has analyzed the macroeconomic

variables that explain the sensitivity of NPLs (Keeton and Morries, 1987; Kalirai and Scheicher, 2002; Jimenez and Saurina, 2005; and Babouček and Jančar, 2005; Babihuga, 2007; Quagliarello, 2007; Jakubík, 2007; Marcucci and Quagliariello, 2008; and Zeman and Jurča, 2008). Second strand of literature has focused on the bank specific determinants of NPLs (Berger and DeYoung, 1997). Various studies have used both macroeconomic and bank specific variables in the same model (Bercoff, Julian and Franque, 2002; Dash and Kabra, 2010; Louzis, Vouldis, and Metaxas, 2010; and Festić, Kavkler, Repina, 2011). Third strand of literature explains the relationship between ownership structure, bank performance and bank riskiness (Laeven and Levine, 2009; Shehzad, Haan and Scholtens, 2010; and Barry, Lepetit and Tarazi, 2011). Fourth strand relates the bank's lending, firm performance and corruption with NPLs (Weill, 2011; and Goel and Hasan, 2011). The existing literature does not provide sufficient evidence relating the association between NPLs and corruption therefore current study uses bank lending and corruption relationship to develop association between corruption and NPLs. No known existing study has analyzed macroeconomic and bank specific variables, banks ownership structure, corruption and information sharing in the single study.

1.2 Objectives of the study

The existing literature has provided various determinants in the context of both developed and developing countries as determinants of NPLs. Several studies have provided the contradicting results relating association of NPLs with different variables. This study analyzed the sensitivity of NPLs to macroeconomic and bank specific variables, bank ownership structure (publicly, privately and foreign owned banks), corruption (country level and institutional level) and information sharing. The findings of current study can

be helpful to regulators for controlling the variables that have significant association with the NPLs and use them as the potential early warning indicators to take timely corrective and precautionary actions in order to prevent banking crisis in Pakistan.

The following are the main objectives of the current study

- To investigate and analyze the explanatory power of nine macroeconomic variables with respect to the NPLs.
- To test the validity of nine bank specific hypotheses with respect to the NPLs.
- To investigate and analyze the explanatory power of bank ownership structure (publicly, privately and foreign owned banks) as determinant of bank riskiness measured by NPLs.
- To investigate and analyze the explanatory power of corruption (country level and institutional level) as a determinant of NPLs.
- To investigate and analyze the explanatory power of information sharing between financial institutions, creditors and borrowers as determinant of NPLs.

1.3 Significance of the study

Despite of extensive literature on the determinants of NPLs, no known study has analyzed the explanatory power of macroeconomic and bank specific variables, banks ownership structure, corruption and information sharing in the single study. There is no known existing study that has used commercial banks data of Pakistan to analyze the sensitivity of NPLs to macroeconomic and bank specific variables, bank ownership structure, corruption and information sharing. Previously, few studies have used both macroeconomic and bank specific variables in the same model. The current study

considers both macroeconomic and bank specific variables in single study but in separate models. Furthermore few existing studies have used ownership structure as the determinant of NPLs by analyzing the ownership structure and risk appetite of firms (Laeven and Levine, 2009; and Shehzad et al., 2010). Similarly, two existing studies have investigated the association between corruption and lending of the banks (Detragiache, Tressel, and Gupta, 2008; and Weill, 2011), whereas only one existing study has empirically related the corruptions with NPLs (Goel and Hasan, 2011). Furthermore no known existing study has analyzed the impact of strength of legal rights as a determinant of NPLs.

The significance, novelty and contribution of the current study to existing literature is that

- The regulatory authorities can use the nine macroeconomic variables to predict the growth and decline in NPLs. This can help them to take precautionary measures in order to prevent banking crisis in Pakistan.
- The findings of current study can be used by the regulators to monitor the quality of loans and can use them as the potential early warning indicators to take proper actions to prevent banking crisis in Pakistan.
- SBP can develop a model by using findings of current study to monitor the stability of banking sector.
- Commercial banks can use the findings of current study to consider the impact of macroeconomic variables and bank specific variables while extending their loan portfolio.
- The SBP should develop separate supervisory policies for concentrated and dispersed ownership, as both types have different impact on bank riskiness.

- It contributes to the literature as first study that uses two indexes for the measurement of corruption and information sharing as determinant of NPLs.
- It contributes to the literature as second known empirical study to investigate the association of NPLs with corruption and first by using the Pakistani banking sector data.

1.4 Problem statement of study

González (1999) suggested that rapid growth in NPLs leads to the banking crisis. The GFC and recession in economy results in the decline in income and earnings of individuals and firms, thus leading to the growth in individuals and firms default rates. Hence the quality of loan can be used to anticipate, control and prevent the occurrence of banking crisis. The level of NPLs can be used by the regulatory authorities as early warning indicator to prevent the banking crisis. Therefore the main aim of the current study is to investigate the explanatory power of macroeconomic variables, banks specific variables, ownership structure, corruption and information sharing as determinants of NPLs by using the Pakistani banking sector data. The variables having significant impact on NPLs can be used to predict the changes in the level of NPLs.

1.5 Organization of study

The current study is organized into five chapters. Chapter 1 outlines the introduction, objectives of the study, significance of study, problem statement of study and organization of study. Chapter 2 provides the literature of the study, chapter 3 discusses the research methodology of the study, chapter 4 provides the data analysis of the study; and chapter 5 provide the discussion on conclusions of the study.

CHAPTER 2

LITERATURE REVIEW

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LITERATURE REVIEW

The literature of the current study can be divided into four part i.e. literature on macroeconomic variables as determinants of NPLs, literature on bank specific variables as determinants of NPLs, literature on ownership structure and other related variables as determinants of NPLs and literature on corruption and information sharing as determinants of NPLs. The literature relating each type of variables is discussed below.

2.1 Macroeconomic variables

In literature relationship between loan quality and macroeconomic variables has been widely discussed by connecting the boom and depression of business cycles with financial vulnerability and stability of the banking sector. It is observed that during boom growth in bank loans occurs with rapid rate and declines during the depression. This cyclic trend in credit can be explained by several factors. On the supply side, boom is characterized by stable cash flow streams of the debtors and banks, timely repayments of loans, good credit scores of borrowers, increasing credit worthiness and willingness of banks for lending to borrowers. On the other hand during depression, banks are over conscious and doubtful relating the economic conditions, future outcomes of projects, subsequently not lending to the borrowers even with economically feasible project proposals. On the demand side, during boom investors are optimistic regarding future returns and demands for more credit to invest in new projects, whereas during depression

investors are over conscious and pessimistic regarding the investment in new projects and other consumption decisions, consequently, holding back the lending decisions.

It is widely observed in existing literature that during boom NPLs are relatively low because high revenue of borrowers provides them with stable cash flows to meet the credit obligations (Quagliariello, 2007, 2008). However, in order to earn more during boom banks even start lending to low quality borrowers. Subsequently in recession the inability of low quality borrowers to repay loans results in the growth of NPLs. The main reason for the growth in NPLs is the decline in the asset prices kept as collateral during the depression, consequently, not covering the loan amount in case of default, thus increasing the banks NPLs and riskiness.

Empirical studies have confirmed the linkage between NPLs and business cycle. For instance, Marcucci and Quagliariello (2008) used the data of the Italian banking sector over the period of 1990-2004 and employed reduced-form Vector Auto-Regression (VAR) to investigate the effects of changes in business cycle on the quality of loans. They proved that NPLs follows a cyclic trend, increases during boom and declines during depression.

According to Keeton and Morries (1987) depression in local economy in conjunction with bad performance of some sectors mainly explains the changes in NPLs. Keeton and Morries (1987) used 2,470 United States of America (USA) commercial banks data over the period of 1979-85. Their results provided the fact that during boom banks tends to lend low quality borrowers and consequently have higher NPLs. They also find that larger banks with higher risk bearing ability registered higher loan losses.

After Keeton and Morries (1987), various studies reported the same results by using the USA data. For instance, Sinkey and Greenwalt (1991) used the USA commercial banks data over the period of 1984-87 and employed simple linear regression model to investigate the factors affecting the loan losses. Their results proved that both internal and external factors have significant influence in explaining loan losses. They found that internal factors such as volatile funds, excessive lending and interest rate have significant positive impact on the loan losses, confirming the findings of Keeton and Morries (1987). They further argued that country specific variables also have significant impact on the loan losses.

Later on Keeton (1999) conducted a research to investigate the influence of loan delinquencies and credit growth by using data of USA banks over the period of 1982-1996 and employed VAR model for analysis. The results showed a highly significant relationship between loan losses and credit growth. Further, Keeton argued that in few states of USA higher loan losses was mainly due to the weak credit terms and standards of banks.

The similar studies conducted in other countries provided the same results. For instance, Bercoff et al., (2002) found that both country specific macroeconomic and bank specific variables effect the NPLs. Bercoff et al., (2002) conducted study by using Argentinean banks data over the period of 1993-1996.

Sales and Saurina (2002) used Spanish banks panel data over the period of 1985-1997 and employed dynamic model to investigate the determinants of NPLs. They found that real growth in gross domestic product (GDP), bank size, market power, rapid credit

expansion and capital ratio explains fluctuations in NPLs. Jimenez and Saurina (2006) suggested that GDP growth, lenient credit terms and high real interest rates are main determinants of NPLs.

Gambera (2000) used the USA data to investigate economic development impact on the loan quality. The loan quality was regressed against unemployment, real estate loans, sector income, number of bankruptcies, agricultural loans, and car sales, commercial and industrial loans. The results proved that macroeconomic dynamics has impact on the loan quality whereas changes in macroeconomic variables and business cycles can be used to forecast future changes in loan quality.

Arpa, Giulini, and Pauer (2001) investigated the banks risk provisions association with operating income by using Austrian banks data. They employed regression analysis and found that risk provisions share in total banking sectors loans varies negatively with real interest rate and real GDP growth, whereas varies positively with real estate price inflation and consumer price index (CPI).

Blaschke and Jones (2001) used VAR methodology to investigate the transmission effect of the nominal interest rate, real GDP, the terms of trade and inflation on NPLs ratio by using USA data. They argued that growth in GDP and business cycle has influence on the banks riskiness and NPLs.

Kalirai and Scheicher (2002) investigated the credit risk dependency on the macroeconomic variables by using the data of Australian banks over the period of 1990-2001 by employing simple regression analysis. They used real GDP, CPI, industrial production, money growth, stock market indices, interest rates and other macroeconomic

variables as explanatory variables. They found that interest rates, stock market indices, industrial production and business confidence index strongly influence the loan quality.

Shu (2002) used similar model as Kalirai and Scheicher (2002) to investigate the correlation between macroeconomic variables and loan quality. They used Hong Kong data over the period of 1995-2002. They found that increase in interest rate has significant positive impact on NPLs, whereas growth in CPI, real GDP and property prices has significant negative impact on NPLs. They also suggested insignificant impact of performance of equity prices and unemployment on NPLs.

Quagliariello (2003) regressed NPLs against GDP growth rate, unemployment rate, real gross fixed investment, real gross fixed consumption, CPI, M2 growth rate and real exchange by using Italy data. The results suggested significant negative effects of growth in unemployment and decline in GDP growth rate on NPLs, whereas CPI and real exchange rate has no significant influence on NPLs.

Furthermore, Rajan and Dhal (2003) used Indian banks data and utilized panel data regression analysis to investigate the determinants of NPLs. They found that macroeconomic growth measured by real GDP growth and bank specific factor such as cost maturity, credit orientation and terms of credit has significant impact on NPLs. Fofack (2005) used pseudo panel model for sub-Saharan African counties. Fofack (2005) found that real exchange rate appreciation, economic growth, net interest margin, interbank loans and real interest rate play significant role in determining NPLs.

Babouček and Jančar (2005) used Czech banking data over the period of 1993-2004 to investigate the impact of macroeconomic development, measured by unemployment,

exports, imports, real GDP growth, CPI, credit growth rate and real effective exchange rate on the NPLs by using unrestricted VAR model. They suggested empirically positive association of NPLs with CPI and unemployment. They also concluded that appreciation of real effective exchange rate has no influence on NPLs, whereas growth in GDP declines the NPLs level.

Gerlach, Peng, and Shu (2005) employed regression analysis by using Hong Kong data and regressed NPLs against nominal interest rates, equity prices, CPI, number of bankruptcies, property prices, real GDP and the unemployment rate. The results suggested that increase in nominal interest rates and bankruptcies raises the NPLs ratio, whereas increase in economic growth, CPI and property price inflation erodes the NPLs ratio. They also concluded that deflation in economy declines the economic growth, subsequently decreasing the profitability and affecting the debt paying ability of borrowers.

Hoggarth, Sorensen, and Zicchino (2005) employed VAR model by using United Kingdom data. They investigated the association of explanatory variables i.e., output gap, real estate prices, retail prices, real exchange rate and short-term interest rates with dependent variable loans write-offs. They found that dynamics of interest rate and inflation affected indirectly loan quality and financial stability.

Podpiera (2006) conducted the empirical study to investigate the relationship between quality of regulation and supervision as measured by Basel Accord Principle and Banking performance as measured by net interest margin and NPLs by using 65 countries panel data. The results concluded that higher compliance with the Basel Accord Principles

showed positive impact on banks performance by lowering the NPLs and increasing net interest margin.

Babihuga (2007) used the data from Asian; European and Sub-Saharan African countries to investigate the linkages between financial stability indicators and macroeconomic variables. They employed regression analysis to establish the association between variables. They regressed NPLs against banking sector regulations and supervision, business cycle component of GDP, terms of trade, real lending rates, unemployment and real effective exchange rate. The results suggested that financial stability indicators (capital adequacy, profitability and assets quality) vary strongly with phases of business cycle and inflation rate and real GDP has negative impact on NPLs and capital adequacy.

Jakubík (2007) used regression analysis to investigate the impact of a set of explanatory variables: real GDP, the loan to GDP ratio, real effective exchange rates, unemployment, real interest rate and CPI on dependent variable NPLs by using Czech Republic banking sector data. The results suggested that corporate default rate is significantly determined by the growth in loan to GDP ratio and real effective exchange rate appreciation whereas in case of households, growth in interest rate and unemployment leads to decline in NPLs.

Zeman and Jurča (2008) employed multivariate regression analysis, using Slovakia banking data to investigate the dynamics in NPLs by using a set of explanatory variables: real GDP, exports, the output gap, oil prices, industrial production, M1, CPI, nominal exchange rates and nominal interest rates. They found that real GDP, the nominal interest rate and exchange rate are the most important influencing variables on the NPL

dynamics. They also concluded that decline in GDP growth is not expected to have substantial impact on the banking performance.

Männasoo and Mayes (2009) applied panel logit model by using Central Eastern European countries banking data. They used a set of explanatory variables including bank specific variables (liquidity ratio, loan to asset ratio, inverse liquidity ratio, cost-income ratio and equity to asset ratio) and macroeconomic variable (GDP growth). They found that decline in GDP growth and fluctuations in banks internal and external environments results in deterioration of banking sector performance and stability.

One of the Recent study relating determinants of NPLs is conducted by Dash and Kabra (2010), in which they used panel data over 10 years from 1999-2009 and employed regression analysis. In their study both macroeconomic and bank specific variables are used as explanatory variables (GDP growth rate, real interest rate, real effective exchange rate, inflation, loans to total assets ratio, bank size and growth in loans). They suggested that real exchange rate has significant impact on NPLs whereas remaining variables are insignificantly associated with NPLs.

Louzis et al., (2010) used dynamic panel data of Greek banking sector. Their study was aimed to investigate the impact of macroeconomic and bank specific variables on the NPLs. They selected three macroeconomic variables (unemployment, GDP and interest rate) and tested validity of seven bank specific hypotheses. They found that variables such as GDP, interest rate, unemployment have significant impact in explaining variation in NPLs.

Festić et al., (2011) conducted the most recent study to investigate the influence of macroeconomic and bank specific variables as the source of systematic risk to assess vulnerability of banking sector towards NPLs of five newly member European Union States. They used deposit to loan ratio, foreign direct investment (FDI), loan to assets ratio, exports, net foreign assets to net assets ratio, gross fixed capital to GDP, and compensation of employees relative to household demand and Basel core principle as explanatory variables. They used both panel regression fixed effect and random effect models for the analysis. The results suggested that loan to assets ratio stimulated the increase in NPLs because of the soft loans given by the banks. The gross fixed capital contributed in growth of GDP and consequently decreasing the NPLs, similarly growth in the exports and industrial production improves NPLs ratio.

Based on existing literature current study formulated nine hypotheses relating association between NPLs and nine macroeconomic variables. The hypotheses are given below

H1: The growth in GDP results in the decline of NPLs.

H2: The increase in unemployment rate results in the growth of NPLs.

H3: The increase in interest rate results in the growth of NPLs.

H4: The inflation results in the decline of NPLs.

H5: The depreciation of local currency results in the growth of NPLs.

H6: The increase in CPI results in the growth of NPLs.

H7: The increase in exports results in the decline of NPLs.

H8: The increase in industrial production results in the decline of NPLs.

H9: The increase in foreign direct investment results in the decline of NPLs

2.2 Bank specific hypotheses

Literature on bank specific variables is not that extensive, few studies have investigated the association of NPLs with bank specific factors. For instance, Berger and DeYoung (1997) used USA commercial banks data over the period of 1985-1994 and employed granger causality test to investigate the direction of causality among cost efficiency, loan quality and bank capital. They presented and empirically tested 4 hypotheses in their study. This current study used their four hypotheses and also develops other hypotheses from the existing literature.

The four bank specific hypotheses of Berger and DeYoung (1997) are given as follows

2.2.1 Bad luck hypothesis

Due to macroeconomic events such as bad performance of economy in the form decreased production level, high unemployment, failure of any sector, failure of manufacturing plant, energy crisis, unexpected events such as terrorist attacks; the economic activities in the country declines which results in the reduced earnings and profits of individuals and firms, leading to the growth in bad loans. In order to recover bad loans banks incurs extra operating costs in the form of additional monitoring expenses, attention divergence of top management, the costs of pricing, handling, and disposing off collateral, negotiations with defaulters etc, as a result the increase in bad

loans erodes banks cost efficiency in the form of increased monitoring and recovering costs.

2.2.2 Bad management hypothesis

Low cost efficiency (high cost inefficiency) signals the current bad performance of the senior managers in managing day to day activities and loan portfolio. The lower management also does not monitor and control operating expenses, which is reflected in the low cost efficiency almost immediately. Managers in such banks do not follow the standard practices of loan monitoring, controlling and underwriting. Thus as "bad managers" they have poor credit scoring, collateral evaluating and loan monitoring and controlling skills. When mangers are inefficiently managing the current banking operations then it will lead to the future growth in NPLs.

Berger and DeYoung (1997) concluded that current poor performance, poor credit evaluation and monitoring skills and wrong collateral valuation lead to the growth in future NPLs.

H10: According to bad management hypothesis "high cost inefficiency leads to the future growth in NPLs".

2.2.3 Skimping hypothesis

Resource allocated for monitoring loans and underwriting effects the cost efficiency and loan quality of the banks, higher cost efficiency leads to the growth in NPLs. In order to achieve short term profits, banks prefer lower costs but in long run it will affect the quality of loans. Therefore managers have to decide tradeoff between cost efficiency and

resource allocation for underwriting, appraising collateral, controlling and monitoring outstanding loans. Thus banks that prefer high cost efficiency dedicate less effort in ensuring quality of loans; however such banks have higher growth in NPLs during long run.

H11: According to skimping hypothesis "low cost inefficiency leads to the future growth in NPLs".

2.2.4 Moral hazard hypothesis

Banks having low capital tends to increase earnings through increase in loan portfolio riskiness by allocating funds to low quality borrowers, resulting in the future growth in NPLs. This practice of banks comes under moral hazard, because banks know that they are thinly capitalized but still increases the riskiness of loan portfolio. Thus low financial capital may leads to the future growth in NPLs.

H12: According to moral hazard hypothesis "low financial capital leads to the growth in future NPLs".

The NPLs are significantly positively associated with loan to asset ratio, implying that with the increase in loan to asset ratio banks chance of insolvency increases due to the mismanagement of assets by the banks in long run (Fofack, 2005; Ferreira, 2008; Männasoo and Mayes, 2009 and Festić et al., 2011). The mismanagement of assets refers to the extensive lending by the banks when they have excess time deposits. Thus under moral hazard it can be hypothesized that high loans to assets ratio (low financial capital) are positively associated with NPLs.

H13: According to moral hazard hypothesis "high loans to assets ratio results in the growth of NPLs".

Berger and DeYoung (1997) found bidirectional causality between NPLs and cost efficiency supporting there hypotheses of "bad management" and "bad luck". Their findings also supported the moral hazard hypothesis by suggesting unidirectional causality from financial capital to NPLs.

Podpiera and Weill (2008) extended the work of Berger and DeYoung (1997) by applying dynamic panel estimator technique, Generalized Method of Moment (GMM) by using data from Czech banks over the period of 1994-2005 to investigate the validity of bad management and bad luck hypothesis. They found strong support for bad management and partial support for bad luck hypothesis. They concluded that banking supervisory authorities should focus on the managerial performance and cost efficiency in order to reduce NPLs and enhance the financial system and banks stability. Louzis et al., (2010) investigated the impact of macroeconomics and bank specific variables as determinants of NPLs and used Greek banking sector data by employing dynamic panel estimator technique. There results supported the bad management hypothesis.

Sales and Saurina (2002) used panel data of Spanish savings and commercial banks over the period of 1985-1997. They combined both macroeconomic and bank specific factors in the same model to investigate the determinants of NPLs. They found statistically insignificant relationship between NPLs and lagged efficiency, suggesting no support for the bad management and skimping hypotheses. They further concluded that insignificant association was because of the opposing effect of bad management and skimping

behavior. They also found negative impact of bad loans to lagged solvency, confirming the moral hazard hypothesis. Furthermore they also investigated the impact of bank size on the NPLs and found that larger size banks tend to have lower NPLs, the finding of Sales and Saurina (2002) was used to formulate "size effect" hypothesis.

2.2.5 Size effect hypothesis

Size of the bank allows the diversification opportunity in lending, consequently the loans of the banks will be dispersed among different sectors and chances of NPLs will decline as compared to the concentrated loans. Therefore diversification supports the negative association between NPLs and size of the banks. Hu, Yang, and Yung (2006) used panel data over the period of 1996-1999 and found that the banks with higher government ownership are having less NPLs. They further concluded that bank size negatively affect the NPLs. Thus it can be concluded that increase in bank size reduces the future NPLs.

H14: According to size effect hypothesis "increase in bank size (share in total loans) results in the decline of NPLs".

2.2.6 Bad management II hypothesis

The existing literature has found contradictory relationship between NPLs and management performance. One possible relation is that poor performance (high cost inefficiency) increases the future NPLs which is similar to the bad management hypothesis because low cost efficiency is due to the poor manager performance. The opposite relation (positive) is also possible as given by Rajan (1994), the argument for positive relation is that managers of banks convince the potential investors and market

regarding the profitability of their lending and future prospects of the economy and financial sector and adopts lenient credit policy to increase the current earnings, which results in the current cost efficiency and future growth of NPLs. Hence, past good performance may have positive impact on the growth in future NPLs, therefore it can be concluded that current good performance of management can be positively linked with growth in NPLs. Here performance of management can be used as proxy for quality of management as in bad management hypothesis.

H15: According to bad management II "increase in current good performance increases the future NPLs".

2.2.7 Procyclical credit policy hypothesis

The existing literature has suggested that banks adopt liberal credit policy during the boom and adopt tight policy in depression (Rajan, 1994). Marcucci and Quagliariello (2008) also confirmed that NPLs follows a cyclic trend, increase during boom and decrease during depression.

Babihuga (2007) concluded that banking income cycle is significantly negatively correlated with the banking size cycle, suggesting that low income economies with low financial development have significant negative association between capital adequacy and business cycle and vice-versa. Thus the positive impact of the business cycle can be expected on the NPLs in economies with lower financial development. Furthermore Festić et al., (2011) suggested that procyclicality and high economic growth increases the credit in the country but sudden slowdown or decline in the economic growth leads to the

growth in NPLs due to inability of the borrowers to repay loans. Thus credit growth in boom results in growth of NPLs in depression.

H16: According to procyclical credit policy hypothesis "credit growth results in the growth of future NPLs".

2.2.8 Soft budget constrained hypothesis

Various studies have suggested in most of the transition economies when banks have high level of liquidity and savings, in order to utilize idle funds banks start extensive lending to households and firms (soft budget constraints) (Berglöf and Roland, 1995; Podpiera, 2006; Kiss, Nagy, and Vonnak, 2006; and Festić et al., 2011), which result in the substantial loses to the economy because extensive lending by the banks leads to the growth in lending as compared to the investments and consumptions. This leads to the counter-productiveness of the funds by increasing the liabilities as compared to the income of households and firms. The inability to repay loan by the households and enterprise raises the NPLs of the banks. Thus by using soft budget constrain it can be hypothesized that soft budget constrain can result in the growth of NPLs.

H17: Thus by using soft budget constrain it can be hypothesized that "soft budget constrain results in the future growth of NPLs".

2.2.9 Deposit rate effect hypothesis

During intensive competition banks offers a competitive deposit rates to attract funds and charge marginal costs to the borrowers. Banks offering higher deposits rates have greater share of deposits and lower interest rate spreads, whereas banks offering lower deposits

rates have small share of deposits and higher interest rate spread. Thus it can be concluded that market concentration is significantly positively associated with interest rate spread. The banks with lower capitalization and high risk increases their customers by offering higher competitive rates and have lower interest rate spread (Berger, Demirguc, Levine and Haubrich, 2004). Uhde and Heimeshoff (2009) argued that the short term increase in interest rates to deposit rates increase the banks costs of funds, resulting in the higher interest demand on loans. The growth in lending rates is positively correlated with loan defaults, thus results in growth of banks NPLs.

H18: According to deposit rate hypothesis "growth in deposit rates has positive impact on the NPLs".

2.2.10 Deposits to loans ratio effect hypothesis

The deposits to loans ratio can be used as rough estimate of profitability on the deposits or as rough estimate of banking reserve ratio or can be used to measure national savings. The growth in deposits to loans ratio can predict the decline in the NPLs ratio (De Nicolo, Geadah and Rozhkov, 2003; and Ferreira, 2008). The theoretical justification of the relation is that the growth in deposits to loans ratio means the greater increase in the deposits as compared to the loans. As the deposits of the banks are growing and loans are not, it shows that banks are risk averse and lend only to those customers who have good credit history and are able to repay the loan.

H19: Deposits to loans ratio effect hypothesis "growth in the deposits to loans ratio has negative impact on NPLs".

Hypotheses given above are not mutually exclusive, any one of the above can be occurred independently or more than one can occur at any time. In extreme condition, all the above given hypotheses can affect the banks at the same time.

2.3 Ownership structure

Banks that are publicly owned have different agency problems and challenges than those of the privately owned because of the wide separation of control and ownership. In publicly owned banks ownership is widely dispersed because of which the control of owners on the mangers is relatively weak resulting in the asymmetric of information and divergence of incentives between managers and owners (Jensen and Meckling, 1976). On the other hand private banks are mainly characterized with centralized ownership because ownership is less dispersed and owners are having larger shares and interest in the performance of banks. Furthermore in centralized ownership owners can control the working of the mangers because of the access to the internal information and influence on the decision making.

The difference between the publicly owned and privately owned banks are not only limited to the control and management but they also differs in terms of capital market access and market discipline. In case of publically owned banks risk taking ability is affected by the market discipline because it controls the risk taking behavior of banks thus when considering risk taking incentives of banks market discipline should also be considered (Flannery, 2001; and Bliss and Flannery, 2002). Market discipline is one of the main pillars of Basel II Capital Accord. The main idea behind market discipline is to enhance the bank supervision in order to reduce the risk taking incentives of publicly

owned banks and privately owned banks that mainly dependent on the debts as the primary source of funding. Public equity can be raised quickly and at lower costs as compared to the private equity. When publicly owned banks enter the market with high risk strategies, they have greater chance of raising funds as compared to their counterparts with same strategies.

According to Shleifer and Vishny (1986) the extent to which ownership is concentrated, improves the corporate control by enhancing the control and monitoring of management. In dispersed ownership no individual investor has greater stake involve in firm therefore they are not much concerned with the control and monitoring the performance of firm, whereas in concentrated firms stake of individuals or closely related group of investors are involved, the loss in value of firm will have bad effect on these investors therefore they are more concerned with the control and performance of firms.

Burket, Gromb, and Panunzi (1997) challenged the view that reduction in managerial discretion by dispersed outside ownership is always beneficial. Burket et al., (1997) suggested that the reduction in managerial discretion by dispersed outside ownership is not always beneficial, it comes with costs such as expropriation threat. They also argued that even in case of tight or concentrated outside ownership, it constitutes threat of expropriation that results in the reduction of the managerial incentives. With the reduction of managerial incentives the non-contractible investments (off-balance sheet) that mangers do for the benefits of shareholders also reduces, thus the threat of expropriation results in the reduction of firm value.

The existing literature has suggested that the risk taking ability and agency problems varies in firms with the nature of ownership. Among agency problems first issue was identified by Jensen and Meckling (1976) known as conflict of interest, which suggests the diversified shareholders are willing to take higher risks to increase their earnings whereas mangers tries to reduce risk exposures and losses, in order to save their positions and to serve their personal benefits (Jensen and Meckling, 1976; and Esty, 1998). One of the early empirical studies relating impact of ownership structure on bank risk taking incentives was conducted by Saunders, Strock, and Travlos (1990). They hypothesized that stock holder controlled banks have greater incentives to take risks as compared to the privately owned banks, there results supported the hypothesis and suggested positive relation between stockholder control and risk taking incentives. They also concluded that risk taking incentives and managerial control are negatively associated with each other. Like Saunders et al., (1990) other studies also found significant association between ownership and risk taking incentives but without any consistent agreement on the sign of relationship. Some studies found positive relationship, some suggested negative and few proved U-shaped or inverse U-shaped relationship. For instance, Sullivan and Spong (2007) concluded that the banks having mangers as their shareholders, the stock ownership of such banks are positively associated with the bank risk, which shows that under certain situations banks manger operates the banks for the benefits of their owners. Furthermore, Westman (2011) found that in non-traditional banks management ownership is positively associated with the profitability, whereas in traditional banks board ownership is positively associated with the profitability.

Four existing studies are closely related to the relationship between ownership structure and NPLs. Caprio et al., (2007) investigated the impact of both share holder protection laws and ownership structure on the bank valuation. They used the data of 244 banks of 44 countries. They find that in few countries where protection laws are strong banks have dispersed ownership, whereas in countries where protection laws are weak banks are family or government owned. Their results showed that ownership structure play vital role in governing of banks. Furthermore they find that owner value is boosted by controlling large cash flows of banks, share holder value increases because of the strong protection laws and right on the cash flow decreases the adverse affect of minority shareholders. This study distinguishes from Caprio et al., (2007) by using NPLs in place of the bank value.

Laeven and Levine (2009) conducted the first empirical study on theories relating the banks risk appetite, national bank regulations and ownership structures. Their study was based on investigating the impact of conflict between owners and managers over bank risk appetite. They find that comparative power of shareholders has positive impact on the risk taking ability of banks. They further proved that capital regulation, bank risk, restriction on bank activities and deposit insurance policies depends on the banks ownership structure. There are few differences between Laeven and Levine (2009) and current study. First, they used the ownership structure of 10% to 20% whereas this study uses dummy variable of publicly, privately and foreign owned banks as measures of ownership structure. Second, they used z-score as a proxy for risk whereas this study uses NPLs as proxy of bank riskiness. Third, they used data of 44 countries, but this study uses only the commercial banks data of Pakistan.

This study is similar to the study of Shehzad et al., (2010), who investigated the impact of ownership on bank riskiness (measured by NPLs and capital adequacy). They used 500 banks data from 50 countries over the period of 2005-2007. They find that concentration of ownership has negative impact on the NPLs and helps in reducing NPLs, whereas concentration of ownership has positive impact on the capital adequacy ratio. They further argued that at low level of supervisory control and protection rights, ownership structure has negative impact of riskiness. The current study differs from Shehzad et al., (2010) in three aspects, first, they have used the banks data from 50 countries but this study uses the data of Pakistani banks. Second, they have used NPLs and capital adequacy as measures of riskiness whereas this study uses only NPLs as riskiness measure. Third, their study used three measures of ownership concentration i.e. 10% or more, 25% or more and 50% or more, whereas this study uses dummy variables of publicly, privately and foreign owned banks as the measure of ownership concentration.

Barry et al., (2011) used detailed European commercial banks ownership data to analyze the relationship between different ownership structures of privately and publicly owned banks and level of risk and profitability. They divided the ownership structure into five categories. They proved that ownership structure significantly explains the risk differences in different categories especially in private banks. They find that as the equity stake of individual or banking institution increases the assets riskiness and decreases default risk. When non-financial institutions or institutional investors are holding the highest shares then they go for the riskiest strategies. The results showed that change in ownership for the private banks have no affect on bank risk appetite. They also find that the regulation of banking supervision authorities increases the efficiency, lowers

the NPLs and improves the quality of publicly held banks. The current study relates to Barry et al., (2011) in two aspects, first, Barry et al., (2011) have used five categories of ownership structure whereas this study uses three categories (public, private and foreign owned banks) because data is only available relating three categories. Second, like Barry et al., (2011) the current study also investigated the association between risk and ownership structure.

Based on existing literature current study formulated eight hypotheses relating association between NPLs and ownership structure and other related variables. The hypotheses are given below

H20: Public ownership results in the declined banking performance and increased NPLs.

H21: Private ownership results in the enhanced banking performance and decreased NPLs.

H22: Foreign ownership results in the enhanced banking performance and decreased NPLs.

2.4 Corruption and information sharing

The existing literature on the effects of corruption on the banks performance is limited, only few studies have investigated the impact of corruption on the banks performance. Therefore to develop theoretical background for this section literature on corruption and its impacts on the bank lending and financial institutions performance was used. Only one recent study has empirically linked the impact of corruption on NPLs (Goel and Hasan, 2011). In this section the link between NPLs and corruption is established by using

existing literature on the relationship between corruption, non-financial institutions, legal system, protection to banks, banks lending and NPLs.

The key argument relating how corruption may hamper the bank lending can be given form the La Porta et al., (1997) study, in which they presented the law and finance theory. Strong supervisory and legal institutions can increase the bank's lending by ensuring the fulfillment of loan contacts, consequently providing the banks protection against the default of debtors. The enforcement of legal contracts by the legal institutions stimulates the willingness of the banks to lend more. Because banks are ensured that incase of debtors default, banks have the legal power laid down by legal institutions to take actions in order to recover credit amount. These actions may include forcing the debtors to repay credit, disposing off collateral, and even take over of debtors businesses in case of corporate loans. Thus, the power to take action and imposition of legal contacts by the legal institutions increases the willingness to lend and reduces the riskiness of the banks. Whereas, in case of corruption in the legal institution banks are unsure regarding the imposition and fulfillment of legal contracts and recovery of credits on debtors default. Thus uncertainty regarding the recovery of credit due to corruption results in the reduction of loans by the banks and also increases in the riskiness of banks in the form of NPLs.

Existing empirical studies supported the fact that strong laws, supervision and legal institutions leads to improvement in banks financial records (reduction of loan losses) and growth in banks lending. For instance La Porta et al., (1997) used 49 countries data and showed that the capital markets of the countries are smaller that are having poor investor protection laws. In other words they concluded that poor protection laws do not provide

the banks assurance that their credit will be repaid or not, thus lending by the banks is at lower side in such countries. Because of this reason the capital markets of such countries are less developed. On the other hand the countries with well developed legal institution and laws have well developed capital markets because banks has the assurance that they will get their credit back even in case of debtors default. Thus strong laws and legal institutions contribute to the increase in lending.

Djankov et al., (2007) used 129 countries credit data over the period of 25 years, they suggested three main results; among them two are relevant to existing study. First, they proved that information sharing among the institutions and legal protection to the creditor results in the development of credit markets by enhancing the credit growth. Second, they argued that the legal protection rights for creditors are different in both poor and rich countries. In rich countries strong legal protection rights are given to the creditors and in poor countries creditors have weak or no legal protection rights. Both these results show that strong legal protection rights results in the increase in banks lending. These results also suggest that the countries with strong legal protection can have lower levels of NPLs because of the strong legal protection and strict laws and regulations by the regulatory authorities. Similarly the poor countries where legal system is not very strong like Pakistan, banks in order to earn profit may lend to the low quality borrowers which takes the advantage of weak and corrupt legal system by not repaying loan. Thus the countries with weak legal system may have lower lending and higher NPLs. Barth et al., (2009) extended the work of Djankov et al., (2007) and found that information sharing and competition play significant role in decreasing the lending corruption. They also

concluded that information sharing increases the bank competition, reduces the banks curtail and also enhances the firm competition and reduces the corruption lending.

Qian and Strahan (2007) investigated the impact of different legal and institutional protection rights on the nature of ownership and banks terms of loans. They found that strong legal protections allow the banks to lend one specific sector or specific group of debtors. Similarly, strong protections reduce the riskiness of the banks and enable them to lend for long period of time and at lower interest rates.

Above arguments are relating the corruption in the judiciary and legal institutions, whereas another form of corruption that have effect on the bank credit is corruption by the bank official in the form of bribes received from the debtors. The bribes are given to the bank officials in order to favor debtors for lending money. This fact is discussed by Levin and Satarov (2000) study; they argued that during 1990s in order to get loan Russian people used to give envelopes full of money to banks officials in order to get loans. This practice was part of Russian system at that time. Levin and Satarov (2000) also reported the criminal cases that were filled against the employees of banks during 1990s. In china during 2005, 461 similar corruption cases were registered; each case involved at least million Yuan corruption (Barth et al., 2009). The corruption by the banks official can have both positive and negative impact on the bank lending.

The negative impact on bank lending is through the increase in the amount demanded by officials for allocating credit. This amount act as a cost for the debtors, if this cost will increase consequently the borrowing will reduce. The evidence relating negative relationship is provided by the World Business Environment Survey (WBES) conducted

by World Bank. This survey used a questionnaire targeted the firms mangers to enquire whether banks mangers act as an obstacle in credit growth. Batra, Kaufmann, and Stone (2004) conducted a research based on the WBES data and observed that 20% to 30% firms other than OECD countries considers bank officials as the moderator or major obstacle in the credit growth. Similarly, Beck et al., (2006) found negative relation between corruption and bank lending and argued that corruption of banking official is minor obstacle in lending. Their study was based on the WBES data and investigated the financing obstacles determinants by using 80 countries sample. They observed that half of the surveyed firms did not find corruptions in banks as an obstacle in lending. Thus it can b concluded from their results that corruption of banking officials cannot be considered as determinant of obstacles in bank lending.

The above argument shows that corruption hampers the bank lending but corruption can also stimulate the growth of credit. The bribes by the debtors to the bank officials increases their chances of obtaining loan, thus corruption encourages banks lending.

The incentives to offer bribes increases for the borrower when banks are more risk averse. Risk aversion refers to unwillingness of banks in granting credits, as banks risk aversion increases consequently more loan applications are rejected. As a result chances to get loan through bribes increases. A theoretical evidence to support the positive relationship between lending and corruption was given by Stiglitz and Weiss (1981). They argued that adverse loan selection due to asymmetry of information between debtor and banks results into credit rationing. The credit rationing shows that debtors are willing to pay more than the credit rate, thus it provides incentive to debtor for paying bribes to get loan. In case of credit rationing banks avoids the adverse selection and grant loan to

those who can pay more. Only bad borrowers are able to pay more thus avoidance of adverse selection attracts bad borrowers. According to adverse selection mechanism, only risky borrowers have incentives to pay more and to get loans, not the safe borrowers. Thus, corruption by the banks officials might only increase the bad loans of the banks.

The positive relation between corruption and lending is supported by Levin and Satarov (2000) they observed that corruptions in banks occurs through bribes to bank officials for providing loans. Lizal and Kocenda (2001) argued that in Czech Republic corruption in lending is occur by allocating loans to the non-existent or unreasonable projects.

From an empirical point of view, only two studies are providing relation between the corruption and bank lending. First, Detragiache et al., (2008) investigated foreign bank penetration impact on the bank's lending. Their study finds negative relationship between corruption and bank lending by using corruption as control variables. Second, Weill (2011) conducted empirical study to find the impact of corruption on bank lending in Russia. Results showed that corruption decreases the bank lending in Russia. In order to find the reason of this negative relation, Weill investigated whether negative relation is due to banks risk aversion or not, but find no support regarding the banks risk aversion impact on decrease in lending. Thus Weill argued that Russian government can increase the bank lending in order to increase the growth of country by controlling the corruption in country.

The only theoretical and empirical study that uses Pakistani data to provide evidence relating the corruption, political influence and NPLs was conducted by Khwaja and Mian (2005) by using corporate loan data over the period of 1996 to 2002. They conducted

study by using data of 90,000 Pakistani firms. There study investigated the influence of politically owned firm on the lending of banks. They classified the firms as political on the basis of any of its director participation in politics or election. They find that political firms lending is 45% greater than the other firms and they have 50% more default rates then other firms. They also argued that the government owned banks are the main creditors of the political firms as compared to the private banks, as they do not come under the political pressure. They also find the influence of the political firm increases when its director is in the government or the political party they are supporting is in power. They argued that the 50% increase in NPLs of political firms is due to the loan write-off or loan defaults. As the legal institutions are weak and influenced by the politician therefore no legal institution or regulatory authority can recover the default loans. As Khwaja and Mian (2005) have proved that in case of Pakistan political influence and corruption play important role in the increase in lending and NPLs, therefore in this study NPLs is used as dependent variable.

The only empirical study that empirically investigates the association between economy corruption and NPLs is conducted by Goel and Hasan (2011). They used large sample of over 100 countries with annual data of all the variables. They used seven measures to investigate the impact of institutional corruption on NPLs. These measures are Corruption CPI, central bank autonomy, Membership of European Monetary Union, bank specific economy or not, development of financial sector, autonomous central bank or not and dummy variable for transition economy. They employed ordinary least square technique for the analysis. The results showed that more corrupt countries have high level of NPLs. The default rate are at lower level in economies that are having high growing

rates, high lending rates and are in Euro zone. Furthermore the institutional factors such as financial underdevelopment, central bank autonomy, transition economies and bank based economies has no significant influence on the NPLs.

The above three studies (Khwaja and Mian, 2005; Weill, 2011 and Goel and Hasan, 2011) are relevant to this section. The current study is similar to Goel and Hasan (2011) but differs in term of measures of corruptions. Before this study Goel and Hasan (2011) has investigated the direct relation between NPLs and corruptions by using the institution corruption measures. In this study all the explanatory variables of Goel and Hasan (2011) cannot be used because there study was aimed at cross-country analysis of corruption whereas current study considers only one country. The current study used two measures of corruption that includes the legal institutions corruption index and perception of corruption index, and one measure for information sharing. No existing study has used these three measures in single model to investigate there impact on NPLs.

Based on existing literature current study formulated three hypotheses relating association between NPLs and corruption and information sharing. The hypotheses are given below

H23: The increase in corruption at macro (country) level has positive impact on the NPLs.

H24: The strength in legal rights (reduction in corruption at banks level) results in the decline in NPLs.

H25: The high level of credit depth of information results in the decline of NPLs.

CHAPTER 3

RESEARCH METHODOLOGY

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The research methodology of current study can be divided into two parts because of the nature of data used. The current study has used time series and panel data for empirical analysis, therefore two models are used in the current study. The current study used time series data for macroeconomic variables, corruption and information sharing; therefore both are considered in the single model. Similarly panel data was used for the banks specific variables and ownership structure; and are considered in the same model. The main reason for using two models in the current study is the nature of data. For instance, macroeconomic variables, corruption and information variables are same for all the banks, therefore the panel of these variables cannot be used because of the repetition of data for each bank.

The dependent variable for the measurement of NPLs used in the current study is NPLs/total advances. The existing studies relating the determinants of NPLs have used NPLs/total advances as the dependent variable, for instance, Dash and Kabra (2010); Louzis et al., (2010) and Festić et al., (2011), current study also uses NPLs/total advances as dependent variable.

The methodology of macroeconomic variables, corruption and information sharing; and bank specific variables and ownership structure is given below

3.1 Methodology of macroeconomic variables, corruption and information sharing

3.1.1 Macroeconomic variables

The existing literature on macroeconomic variables suggests that many macroeconomic variables have strong influence on the NPLs. These macroeconomic variables are annual growth in GDP, unemployment rate, real interest rate, broad money supply, inflation rate, per capita GDP, CPI, stock price index, industrial production, credit growth, FDI, exports and real exchange rate. This research used nine macroeconomic variables: annual growth in GDP, unemployment rate, real interest rate, inflation rate, consumer price index, real exchange rate, exports, industrial production and FDI. The selection criteria of these variables are that existing empirically studies found significant positive or negative influence of these variables on the NPLs and availability of each variable data.

The existing literature has suggested the significant negative association between growth in GDP and NPLs (Sales and Saurina, 2002; Kalirai and Scheicher, 2002; Shu, 2002; Rajan and Dhal, 2003; Jimenez and Saurina, 2005; Fofack, 2005; Dash and Kabra, 2010; Louzis et al., 2010). The explanation for negative relation is that increase in growth of GDP leads to the increase in income of the individuals and firms hence their ability to repay the loans increases, as a result NPLs decreases. Conversely, with the decrease in GDP, the individuals and firms income declines, hence their ability to repay loan decreases resulting in the growth of NPLs.

Various studies have found significant positive impact of unemployment on NPLs (Babouček and Jančar, 2005; Jakubík, 2007; and Louzis et al., 2010). The explanation of

positive association is that with the increase in unemployment, labor losses their source of income and has no money to repay their loans; as a result NPLs increases. Conversely, the decline in unemployment rate results in the increase in the number of earning individuals, thus number of debtors having the money to repay the loan increases consequently NPLs declines.

The existing literature has suggested empirically significant positive association between interest rate and NPLs (Keeton and Morries, 1987; Sinkey and Greenwalt, 1991; Shu, 2002; and Louzis et al., 2010). The explanation of positive relation is that with the increase in interest rate the difference between deposits rate and lending rate increases. Only low quality borrowers show willingness to pay high interest rate, thus banks in order to earn lend more funds to the low quality borrowers. Low quality borrowers by using bribes to bank officials and other corruption practices do not repay the loan, consequently results in the growth of NPLs.

Babihuga (2007); and Dash and Kabra (2010) found negative association between inflation and NPLs and concluded that with the increase in inflation the equity value of the banks declines results in the growth of banks credit risk.

Fofack (2005) has suggested the positive association of real effective exchange rate with NPLs and concluded that the inflationary pressure and increase in real effective exchange rate contributes to the growth in NPLs.

The existing literature has suggested empirically positive association between CPI and NPLs (Shu, 2002; Kalirai and Scheicher, 2002; and Babouček and Jančar, 2005). The explanation of positive relation is that with the increase in CPI funds left with borrowers

after meeting their every day needs declines as compared to the funds left at the time of lower CPI, thus borrowers are not able to repay their loans, and consequently NPLs of the banks grows.

Borio and Lowe (2002); Babouček and Jančar (2005) and Festić et al., (2011) found negative impact of exports on the NPLs, illustrating that growth in exports results in the improvement of NPLs ratio.

Kalirai and Scheicher, (2002); Zeman and Jurča (2008) and Festić et al., (2011) concluded that industrial production is negatively related with NPLs. The explanation for the negative relation is that the increase in demand for the industrial products increases the investments in industrial sectors, which is mainly financed through lending; because of high demand firms have stable cash flows to repay loans. Thus the growth in industrial production results in the decline of NPLs.

Calvo and Mendoza (2000) and Festić et al., (2011) found positive influence of FDI on the NPLs. The justification of the positive association is that with the increase in FDI, economic activities and credit in the country increases, with the passage of time when foreign investors confidence in the economy declines or they anticipate depreciation of currency, lowering of interest rate after large inflow of money or expect financial crisis in the country, they suddenly withdraws their investments leaving banks illiquid. This also results in the slowing down the pace of economic activities in the country, which results in the inability of the borrowers to repay loans. Due to the increase in FDI, domestic lending increases more than the income of the households and firms and results in the growth of NPLs on the withdrawal of foreign investments.

The macroeconomic variables used in current study, supported literature and literature supported relation with NPLs are given in table 1.

Table 1 Macroeconomic variables, relation with NPLs, data source and supported literature

Variables	Relation with NPLs	Data source	Literature
Growth in GDP	-	World Bank	Sales and Saurina, 2002; Kalirai and Scheicher, 2002; Shu, 2002; Rajan and Dhal, 2003; Quagliariello, 2003; Jimenez and Saurina, 2005; Fofack, 2005; Babouček and Jančar, 2005; Gerlach et al, 2005; Männasoo and Mayes, 2009; Dash and Kabra, 2010; Louzis et al., 2010; Festić et al, 2011
Unemployment rate	+	World Bank	Babouček and Jančar, 2005; Jakubík, 2007; Louzis et al., 2010
Interest rate	+	World Bank	Keeton and Morries, 1987; Sinkey and Greenwalt, 1991; Shu, 2002; Gerlach et al, 2005; Jakubík, 2007; Louzis et al., 2010
Inflation	-	World Bank	Babihuga, 2007; Dash and Kabra, 2010
Real effective exchange rate	+	World Bank	Fefock, 2005
Consumer price index	+	World Bank	Shu, 2002; Kalirai and Scheicher, 2002; Babouček and Jančar, 2005;
Exports	-	World Bank	Borio and Lowe, 2002; Babouček and Jančar, 2005; and Festić et al., 2011
Industrial production	-	World Bank	Kalirai and Scheicher, 2002; Zeman and Jurča, 2008; and Festić et al., 2011
Foreign direct investment	-	World Bank	Calvo and Mendoza, 2000; and Festić et al., 2011

3.1.2 Corruption and information sharing variables

The current study used the survey conducted by Transparency International for measuring corruption in Pakistan. This survey contains many indicators that can be used to measure the level of corruption in specific country. The most important and relevant

indicators for current study is perception relating corruption. This measure is based on the interview conducted from the mangers of businesses to ask how much they pay for the bribes. The smallest value of both measure are assigned values between "0" and "10". High corruption is represented by value "0" and low or no corruption by "10". Thus countries with index value nearer to "0" are more corrupt and vice versa. The integral index for the perception of corruption is used by the existing empirical studies to measure corruption perception (Méon and Sekkat, 2005; Weill, 2011; and Goel and Hasan, 2011).

As discussed in the existing literature that strong legal and regulatory authorities supervision leads to the improvement of banks loan quality. Here a new measure for lenders and borrowers protection is used i.e. strength of legal rights index. This measure is given in the World Bank database for all the countries. This index measures the legal protection and rights relating bankruptcy and collaterals given to the lenders and borrower for facilitating the credit. This measure will help to investigate that whether increase in legal protection to the borrowers and lenders decreases the NPLs or not. This index contains value from 0 to 6, where "0" represents the low level of protection and "6" represents the high level of protection.

In the existing literature two levels of corruption is discussed i.e. corruption in the macro level and corruption at banks level. The integral index for the perception of corruption is used as macro level corruption and strength of legal rights index will be used to measure banks level corruption.

As suggested by Djankov et al., (2007) and Barth et al., (2009) that information sharing and competition play significant role in decreasing the lending corruption. Therefore this

section used Credit depth of information index to investigate the impact of information sharing on the NPLs because corruption in lending leads to the NPLs. Credit depth of information index measures the degree of information available to the customers by the private or public registries. This index contains value from 0 to 6, where "0" represents the low level of information sharing and "6" represents the high level of information sharing. The credit depth of information index measure is given in the World Bank database for all the countries.

The corruption and information sharing variables, there literature supported relation with NPLs and references are given in table 2.

Table 2 Corruption and information sharing variables, literature supported relation, data source and supported literature

Variables	Relation with NPLs	Data source	Literature
Integral index for the perception of corruption	+	Transparency International	Méon and Sekkat, 2005; Weill, 2011; and Goel and Hasan, 2011
Strength of legal rights index	-	World Bank	La Porta et al., 1997; Djankov et al., 2007
Credit depth of information index	-	World Bank	Djankov et al., 2007; Qian and Strahan, 2007; and Barth et al., 2009

3.1.3 Data and procedures

The data used for nine macroeconomic variables, corruption, information sharing and NPLs ratio is the time series data. For each variable 22 years data was collected. The data relating the NPLs ratio for Pakistani banking sector is collected from the Pakistan financial sector assessment analysis 1990-2000 and World Bank database. Similarly the data relating all nine macroeconomic variables, corruption and information sharing is also

collected form World Bank data base and Transparency International. The annual data of all variables are used over the period of 1990-2011.

The methods used in the existing literature for investigating the empirical association between NPLs and macroeconomic variables are panel regressions analysis (Dash and Kabra, 2010), dynamic panel models (Louzis et al., 2010), cross-country regressions analysis (Festić et al., 2011), correlation and VAR methodology (Hoggarth et al., 2005). Similarly, existing studies have used ordinary least square method or panel data regression analysis for investigating the association between NPLs and corruption and information sharing. For instance, Weill (2011); and Goel and Hasan (2011) has used OLS to analyze the relationship between corruption and bank lending.

Most of the existing studies have used regression model, the current study uses time series data therefore OLS was used.

In most econometric analysis before applying models variable are converted into log forms to remove heteroskedicity from the analysis and this process is known as log transformation. Whereas, Lütkepohl and Xn (2009) demonstrated that log transformation is accurate in some special cases. Here the main aim is to capture the dynamics of NPLs; thus log transformation can produce downward bias during estimation. Therefore to capture the dynamics in NPLs, variable series are first converted into differences and then expressed as percentage change. After that unit root test is conducted to check for the stationarity of the variables. The stationarity of data means that most of the time series have constant mean and variance, which results in the false regression analysis with high R-squared value and few significant relationships between variables. Therefore this

problem is solved by checking the time series for the unit root by using stationarity tests of Augmented Dickey Fuller (ADF), Dickey-Fuller GLS and Phillips-Peron (PP) unit root tests. If series are stationary at level then OLS is conducted by using the same values of the series but when series are stationary at first difference or second difference then OLS is also applied by using the first or second difference of the time series.

Before applying OLS explanatory variables are checked for the multicollinearity by using correlation matrix. The multicollinearity problem arises because of the high correlation between any explanatory variables. The multicollinearity problem makes the significant variables insignificant by increasing the p-value; the increase in p-value lowers the t-statistics value. Thus the OLS results with multicollinearity will show significant variables as insignificant variables. The multicollinearity problem is solved by dropping the high correlated variables and then regression is run after dropping highly correlated variables.

After getting results from the OLS, model is checked whether it can be used to predict the future results or the OLS model is best or not. There are certain features or characteristics of model through which it can be concluded that the model is good or not. First is the high R-squared value with maximum number of significant relation and F-statistics value with p-value less than 5%. Second, residual are not serial correlated, third, residual are not heteroskedastic but are homoskedastic and fourth, that residuals are normally distributed. When any OLS has above four features than such model is considered best model and has forecasting power to predict future changes in dependent variable. The correlation of the model can be checked with Breusch-Godfrey Serial Correlation LM

Test. The heteroskedasticity in the residual is tested with Breusch-Pagan-Godfrey test and for checking the normality of the model Jarque-Bera statistics is used with its p-value.

The macroeconomic variables, corruption and information sharing model is given below

$$NPLs_t = \beta_0 + \beta_1 GDP_t + \beta_2 UNEMP_t + \beta_3 ITR_t + \beta_4 INF_t + \beta_5 REER_t + \beta_6 CPI_t + \beta_7 EXP_t + \beta_8 IP_t + \beta_9 FDI_t + \beta_{10} IIPC_t + \beta_{11} SLRI_t + \beta_{12} CDII_t + \mu_t \text{----------} 3.1$$

Where

$NPLs_t$ is the dependent variable, banks riskiness (NPLs to gross loans ratio) in time period "t"

GDP_t is the growth in GDP in time period "t"

$UNEMP_t$ is the unemployment rate in time period "t"

ITR_t is the interest rate in time period "t"

INF_t is the inflation rate in time period "t"

$REER_t$ is the real effective exchange rate in time period "t"

CPI_t is the consumer price index in time period "t"

EXP_t is the exports in time period "t"

$IIPC_t$ is the integral index for the perception of corruption in time period "t"

$SLRI_t$ is the strength of legal rights index in time period "t"

$CDII_t$ is the Credit depth of information index in time period "t"

β_0 is the intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}$ and β_{12} are the respective co-effcient terms

"μ_t" is the error term

"t" is the time period (1990 to 2011)

3.2 Research methodology of bank specific hypotheses and ownership structure

3.2.1 Bank specific hypotheses variables

The nine bank specific hypotheses are measured with different bank specific variables. Two of the above given nine hypotheses are measured with two variables each and two hypotheses with one variable, which makes 10 bank specific variables to investigate the validity of above given nine bank specific hypotheses. The variable used to measure each bank specific hypothesis, their definition and supported literature is given in the table 3.

Table 3 Bank specific variables, definitions, hypothesis tested, relation with NPLs, data source and supported literature

Variables	Definition	Hypothesis tested	Relation with NPLs	Data source	Literature
Inefficiency	$IE_{it} = \frac{Operating\ Expenses_{it}}{Operating\ Income_{it}}$	Bad Management	+	SBP	Berger and DeYoung, 1997; Podpiera and Weill, 2008; Louzis et al, 2010
Inefficiency	$IE_{it} = \frac{Operating\ Expenses_{it}}{Operating\ Income_{it}}$	Skimping	-	SBP	Berger and DeYoung, 1997; Louzis et al, 2010
Solvency Ratio	$SR_{it} = \frac{Owned\ Capital_{it}}{Total\ Assets_{it}}$	Moral hazard	-	SBP	Berger and DeYoung, 1997; Louzis et al, 2010
Loans to Deposit Ratio	$LDR_{it} = \frac{Loan_{it}}{Deposits_{it}}$	Moral hazard	+	SBP	Fofack, 2005; Ferreira, 2008; Männasoo and Mayes, 2009; Louzis et al, 2010 and Festić et al., 2011
Market power	$MP_{it}^{h} = \frac{Loans_{it}^{h}}{Total\ loans\ of\ all\ banks}$	Size	-	SBP	Louzis et al, 2010
Return on Assets	$ROA_{it} = \frac{Profits_{it}}{Total\ Assets_{it}}$	Bad Management II	+	SBP	Rajan, 1994; Louzis et al, 2010
Return on Equity	$ROE_{it} = \frac{Profits_{it}}{Total\ Equity_{it}}$	Bad Manageme	+	SBP	Rajan, 1994; Louzis et al, 2010

		nt II			
Credit growth	$CG_{it}^{h} = \frac{Loans_{it}^{t} - Loans_{it-1}^{h}}{Loans_{it-1}^{h}}$	Procyclical credit policy	+	SBP	Rajan, 1994; Babihuga, 2007; Marcucci and Quagliariello, 2008; Louzis et al, 2010 and Festić et al., 2011
Total liabilities to income	$TLI_{it} = \frac{Total\ liabities_{it}}{Income_{it}}$	Soft budget constrained	+	SBP	Berglöf and Roland, 1995; Podpiera, 2006; Kiss et al., 2006; and Festić et al., 2011
Deposits rate	$DR_{it} = \frac{Interest\ expenses_{it}}{Total\ deposits_{it}}$	Deposit rate effect	+	SBP	Berger et al., 2004; Uhde and Heimeshoff, 2009
Reserve ratio	$RR_{it} = \frac{Non\ earning\ assets_{it}}{Total\ deposits_{it}}$	Deposits to loans ratio effect	-	SBP	De Nicolo et al., 2003; and Ferreira, 2008

3.2.2 Ownership structure variables

This study investigates the Berle and Means (1933) traditional view that concentrated ownership results in enhanced banking performance by reducing the bank riskiness against the opposite view that ownership concentration does not have impact on the bank riskiness. This study used three measures of ownership structure i.e. publicly, privately and foreign owned banks. The dummy variable is used to represent the publically, privately and foreign owned banks in the model, "0" is used to represent when bank is not publically, privately and foreign owned bank and "1" is used to represent when bank is publically, privately and foreign owned bank.

3.2.3 Data and procedures

The bank specific hypotheses model used panel data of commercial banks operating in Pakistan and for each bank 6 years data was collected. Currently there are 34 commercial banks operating in Pakistan which can be divided into three broad categories i.e., public

owned, private owned and foreign owned banks. In this study specialized banks are excluded because the main focus of current study was commercial banks, out of 34 banks 30 banks fulfilled the data requirement. The data relating the bank specific variables and dependent variable (NPLs) was collected from the State Bank of Pakistan (SBP) publication "Financial Statement analysis of the Financial Sector 2006-2009" and annual reports and financial statements of commercial banks for the year 2010 and 2011 given in SBP and respective banks website. The sample for bank specific hypotheses consists of 30 commercial banks operating in Pakistan over the period of 2006 to 2011.

The methods used in the existing studies for investigating the empirical relationship between NPLs and bank specific variables are panel regressions analysis (Dash and Kabra, 2010), co-integration analysis, cross-country regressions analysis (Festić et al., 2011) and dynamic panel models (Podpiera and Weill, 2008). It is clear from the existing literature that most of the studies have used panel regression analysis; therefore panel regression analysis was used in this section.

In most econometric analysis before applying models variable series are converted into log forms to remove heteroskedicity from the analysis and this process is known as log transformation. Whereas, Lütkepohl and Xn (2009) demonstrated that log transformation is accurate in some special cases. Here the main aim is to capture the dynamics of NPLs; thus log transformation can produce downward bias during estimation. Therefore to capture the dynamics in NPLs, variable series are first converted into differences and then expressed as percentage change. After that unit root test is conducted to check for the stationarity of the variable series. The stationarity of data means that most of the variable series have constant mean and variance values, which results in the false regression

analysis with high R-squared value and few significant relationships between variables. Therefore this problem is solved by checking the variable series for the unit root by using panel data stationarity tests of Fisher ADF and Levin, Lin & Chu unit root test. If series are stationary at level then panel regression is conducted by using the same values of the series but when series are stationary at first difference or second difference then panel regression is also applied by using the first or second difference of the time series.

Before applying panel regression explanatory variables are checked for the multicollinearity by using correlation matrix. The multicollinearity problem arises because of the high correlation between any explanatory variables. The multicollinearity problem makes the significant variables insignificant by increasing the p-value; the increase in p-value lowers the t-statistics value. Thus the panel regression results with multicollinearity will show significant variables as insignificant variables. The multicollinearity problem is solved by dropping the high correlated variable. This can be done by applying the panel regression analysis by using the variable series having multicollinearity problem, then that variable series is dropped from two highly correlated series that have high p-value. After that panel regression is again applied by dropping the variable series with high p-value among two correlated variables, the results will now provide more significant relation then before.

First the model was analyzed by using fixed effect regression analysis and then by using redundant fixed effect test the validity of fixed effect model is checked. The redundant fixed effect test compares the common effect model against the fixed effect model with the null hypothesis that there is no individual effect. If the null hypothesis is rejected than fixed effect model is preferred otherwise common effect model is used. If the null is

rejected than random effect model is run and Hausman specification test is applied to check whether random or fixed effect model provide the correct specification under the null hypothesis that individual effect are uncorrelated with other regressors in the model (Hausman, 1978). If the null hypothesis is rejected than fixed effect model is preferred over random effect model.

After getting the results of common or random or fixed effect, model is checked for its prediction ability by using certain features and characteristics. First model R-squared value with number of significant relation and F-statistics value is checked; commonly high R-squared value with maximum number of significant relations and F-statistics value with p-value less than 5% are considered best. Second, residual correlation is checked by using Durbin-Watson statistics, commonly when its value is 2 or around 2 then there is no correlation.

The bank specific variables and ownership structure model is given as

$$NPLs_{it} = \beta_0 + \beta_1 IE_{it} + \beta_2 SR_{it} + \beta_3 LDR_{it} + \beta_4 MP_{it}^{h} + \beta_5 ROA_{it} + \beta_6 ROE_{it} +$$

$$\beta_7 CG_{it}^{h} + \beta_8 TLI_{it} + \beta_9 DR_{it} + \beta_{10} RR_{it} + \beta_{11} OC_{it} + \mu_{it} \text{---------- 3.2}$$

Where

$NPLs_{it}$ is the dependent variable, banks riskiness (impaired loans to gross loans ratio) in time period "t" for cross-recessional unit "i"

IE_{it} is the inefficiency ratio in time period "t" for cross-recessional unit "i"

SR_{it} is the solvency ratio in time period "t" for cross-recessional unit "i"

LDR_{it} is the loans to deposit ratio in time period "t" for cross-recessional unit "i"

MP_{it}^{h} is the market power ratio in time period "t" for cross-recessional unit "i" as a percent of "h"

ROA_{it} is the return on assets in time period "t" for cross-recessional unit "i"

ROE_{it} is the return on equity in time period "t" for cross-recessional unit "i"

CG_{it}^{h} is the credit growth in time period "t" for cross-recessional unit "i" as a percent of "h"

TLI_{it} is the total liability to income ratio in time period "t" for cross-recessional unit "i"

$DR_{it}$is the deposits ratio in time period "t" for cross-recessional unit "i"

RR_{it} is the reserve ratio in time period "t" for cross-recessional unit "i"

OC_{it} is the ownership concentration (publically, privately and foreign owned banks) in time period "t" for cross-recessional unit "i"

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}$ and β_{11} are the respective co-effcient terms

β_0 is the intercept

"i" is the cross section units (30 banks)

"t" is the time period (2006 to 2011)

CHAPTER 4

RESULTS AND ANALYSIS

CHAPTER 4

RESULTS AND ANALYSIS

The results and analysis of current study can be divided into two parts i.e. results and analysis of macroeconomic variables, corruption and information sharing; and results and analysis of banks specific variables and ownership structure. The results and analysis are discussed below in detail.

4.1 Macroeconomic variables, corruption and information sharing

The analysis of the macroeconomic variables, corruption and information sharing started with the selection of nine macroeconomic variables (i.e. annual growth in GDP, unemployment rate, real interest rate, inflation rate, consumer price index, real exchange rate, industrial production, exports and FDI), corruption variables (i.e. Integral index for the perception of corruption and strength of legal rights index) and information sharing variable (i.e. credit depth of information index). The 12 explanatory variables and NPLs/total loans ratio are converted into differences and then expressed as percentage change. The percentage change of the variables is taken to capture the dynamics of the variables over the period of time (Lütkepohl and Xn 2009). The unit root tests are conducted to check for the stationarity of the variables, current study used ADF, Dickey-Fuller GLS and PP stationarity tests. The results of unit root tests are given in table 4, suggesting that all the variables are stationary at level. Thus OLS can be applied by using the original percentage values of the variables.

Table 4 Unit root test results of macroeconomic variables, corruption and information sharing

		ADF	ADF GLS	PP
Levels				
Intercept	NPLs/total gross loans	-8.099254*	-5.841237*	-1.912335***
	GDP growth rate	-3.580366**	-4.749650**	-10.58747**
	Unemployment rate	-9.523652*	-1.378701**	-8.756709*
	Interest rate	-4.377676*	-3.063832*	-4.378810*
	Inflation rate	-5.865505*	-5.451573*	-10.04801*
	Real effective exchange rate	-4.587981*	-4.721635*	-4.587959*
	Consumer price index	-2.304008***	-2.338316**	-2.282810***
	Exports	-2.786068***	-3.177241	-2.786068***
	Industrial production	-2.470993**	-2.534045**	-2.446495***
	Foreign direct Investment	-3.424256**	-3.492060*	-3.418294**
	Integral index for the perception of corruption	-5.790285*	-5.825873*	-7.204172*
	Strength of legal rights index	-7.340511*	-7.233426*	-13.00006*
	Credit depth of information index	-6.292283*	-6.309054*	-10.46625*
Intercept and trend	NPLs/ total gross loans	-8.099254**	-4.898758*	0.031671
	GDP growth rate	-5.723036*	-5.905481*	-13.21548*
	Unemployment rate	-8.611289*	-5.219090*	-7.961443*
	Interest rate	-3.433566**	-3.115714***	-6.008510*
	Inflation rate	-5.701065*	-5.676511*	-9.671837*
	Real effective exchange rate	-5.185743*	-5.482103*	-5.185743*
	Consumer price index	-2.241532***	-2.357089***	-2.217029***
	Exports	-2.509517*	-4.062455**	-3.827872**
	Industrial production	-2.401492***	-2.536820**	-2.375761***
	Foreign direct investment	-3.323097***	-3.518790**	-3.315950***
	Integral index for the perception of corruption	-5.716699*	-5.966743*	-13.29473*
	Strength of legal rights index	-7.181519*	-7.433761*	-10.93355*
	Credit depth of information index	-6.129957*	-6.407330*	-12.46330*

Where * represents significance level of 1%, ** represents significance level of 5% and *** represents significance level of 10%

Before applying OLS explanatory variables were checked for the multicollinearity by using correlation matrix. The multicollinearity problem arises because of the high correlation between any two explanatory variables. The multicollinearity problem makes the significant variables insignificant by increasing their p-value; the increase in p-value lowers the t-statistics value. Thus the OLS results with multicollinearity will show significant variables as insignificant variables. The multicollinearity problem is solved by dropping the high correlated variables. The correlation matrix between 12 explanatory variables is given in table 5.

Table 5 Correlation matrix of macroeconomic variables, corruption and information sharing

	GDP growth rate	Unemployment rate	Interest rate	Inflation rate	Real effective exchange rate	Consumer price index	Exports	Industrial production	Foreign direct investment	Integral index for the perception of corruption	Strength of legal rights index	Credit depth of information index
GDP growth rate	1											
Unemployment rate	-7.83E-05	1										
Interest rate	0.07071	-0.12404	1									
Inflation rate	-0.07928	0.378543	-0.02396	1								
Real effective exchange rate	0.057352	-0.02742	0.054984	0.058246	1							
Consumer price index	-0.13076	0.09137	-0.13539	0.092239	0.152516	1						

			9									
Exports	-0.2566	0.27848 1	-0.0117 4	0.1167 15	0.357253	-0.03792	1					
Industrial production	-0.07086	-0.17929	-0.0395 9	-0.2875 3	0.231251	-0.13546	0.2550 37	1				
Foreign direct investment	0.05905	-0.11418	0.1322 39	-0.1823 7	-0.17485	-0.4321	0.2299 2	0.52621 1	1			
Integral index for the perception of corruption	0.276087	-0.23101	0.1948 79	-0.2118 7	-0.04606	-0.11896	-0.2376 8	-0.16399	0.017615	1		
Strength of legal rights index	-0.28414	-0.07985	0.0520 44	0.5429 44	0.064413	0.136806	0.0972 96	-0.31198	-0.20483	-0.0215	1	
Credit depth of information index	-0.1822	-0.29345	0.1244 37	-0.1272	-0.15756	-0.2003	-0.0427 3	0.20408 1	0.199546	-0.23229	-0.00822	1

The results in table 5 suggest that there is no correlation between any of the explanatory variables; therefore all the variables can be used in further analysis.

The OLS is applied by using 12 explanatory variables; the results of OLS are given in table 6. The fitness of the model is predicted with the help of R-squared, F-statistics and

number of significant relationship between NPLs and explanatory variables. The R-squared value for the model is 0.837939, suggesting that almost 84% variance in NPLs are explained by 12 explanatory variables. The F-statistics of the model has a p-value of 0.043821, rejecting the null hypothesis and suggesting that 12 explanatory variables can influence the NPLs jointly.

Table 6 OLS results of macroeconomic variables, corruption and information sharing

Variable	Co-efficient	Standard error	t-Statistic	Probability
GDP growth rate	-0.22149	0.059763	-3.7062	0.0657
Unemployment rate	0.449258	0.330277	1.360245	0.3068
Interest rate	-0.58162	0.171515	-3.39109	0.077
Inflation rate	-0.14324	0.042484	-3.37158	0.0778
Real effective exchange rate	-1.17884	0.758582	-1.554	0.2604
Consumer price index	3.619125	0.603131	6.000567	0.0267
Exports	-1.41496	0.372612	-3.79742	0.0629
Industrial production	-2.48014	0.685834	-3.61624	0.0068
Foreign direct investment	-0.0543	0.075871	-0.71564	0.4946
Integral index for the perception of corruption	0.06904	0.07268	0.949923	0.37
Strength of legal rights index	-0.29402	0.555139	-0.52964	0.6107
Credit depth of information index	-0.066023	0.145353	0.454228	0.6617
C	0.125253	0.089762	1.395378	0.2004
R-squared	0.837939	F-statistic		3.447014
Adjusted R-squared	0.594848	Probability(F-statistic)		0.043821
		Durbin-Watson statistics		1.822541

The results in table 6 suggested that six macroeconomic variables (i.e. GDP growth, interest rate, inflation rate, CPI, exports and industrial production) has significant association with NPLs, whereas five variables (i.e. unemployment, real effective exchange rate, FDI, integral index for the perception of corruption, strength of legal rights index and credit depth of information index) are insignificantly associated with NPLs.

The table 6 shows statistically significant relationship between NPLs and growth in GDP. The results of OLS for growth in GDP are consistent with the existing studies findings and confirms the negative relationship between NPLs and growth in GDP (Sales and Saurina, 2002; Kalirai and Scheicher, 2002; Shu, 2002; Rajan and Dhal, 2003; Jimenez and Saurina, 2005; Fofack, 2005; Männasoo and Mayes, 2009; Dash and Kabra, 2010; Louzis et al., 2010; and Festić et al, 2011). The negative relation suggests that growth in GDP increases the income of individuals, resulting in the increase in debt paying ability of individuals and decline in the NPLs ratio. The results confirm the validity of H1 of current study.

The results in table 6 provide insignificant positive association of NPLs with unemployment rate, suggesting that growth in unemployment rate results in the growth of NPLs ratio. The relation is insignificant therefore unemployment rate has no significant influence in increasing unemployment rate.

The table 6 provides negative association between NPLs and interest rate. The relation between NPLs and interest rate is statistically significant, suggesting that interest rate has significant negative influence in decreasing the level of NPLs. The negative association rejects the H3 of current study. The results rejects that findings of existing studies that interest rate has significant positive impact on the NPLs (Keeton and Morries, 1987; Sinkey and Greenwalt, 1991; Shu, 2002; Gerlach et al, 2005; Jakubík, 2007; and Louzis et al., 2010). The theoretical justification for the significant negative association is that with the increase in interest rate, deposits and lending rates of the banks increases. Individuals with the funds starts savings with banks to earn on their funds and investors with the profitable business projects feel reluctant to borrow and invest in projects

whereas opposite is valid in case of decline in interest rate when individual and investors are more keen borrow for consumption and invest in risky projects. Thus savings in the economy increases and borrowing declines. Only those investors and individuals borrow, those are sure about the returns and success of their investments. Therefore, only those individuals and investor borrow that can return the principle plus interest of the bank, hence leading to the decline in borrowing and also in the NPLs level.

The other main reason for the decline in NPLs is that with the increase in interest rate existing borrowers pay back their full loans to keep their credit rating good and to get loans in future at discounted rates. As the current borrowers has to pay interest on which they received loans, which is less than the existing interest rate therefore they pay back their loans, thus NPLs declines in the economy.

The current study provides the validity of H4 by proving negative significant association between inflation and NPLs. The results suggest that with the inflation, the level of NPLs in the economy declines. The results of current study support the findings of Babihuga, (2007). The theoretical justification for the negative association is that with the inflation the equity value of the banks declines, resulting in the growth of banks riskiness. Banks in order to improve their equity value start doing extensive lending to show short run profitability and reduce their expenditures on credit evaluation, allocation, monitoring and controlling to achieve short run cost efficiency. This results in the allocation of funds to the low quality borrowers and leads to the growth in NPLs.

The current study provides insignificant negative association between NPLs and real effective exchange rate. The results rejects the H5 of study that real effective exchange

rate is positively associated by NPLs (Fefock, 2005). The results suggest that international competitiveness has negative influence on the NPLs.

The results in table 6 provide the positive significant relationship between NPLs and CPI and are consistent with the findings of existing studies (Shu, 2002; Kalirai and Scheicher, 2002 and Babouček and Jančar, 2005). The positive relation confirms the validity of H6 and suggests that with the reflation interest rate declines and money supply in the economy increases, because of which individuals and firms are more interested in investment and consumption as compared to savings, resulting in the growth of borrowing by the firms and individuals. As interest rates are low and money supply is high therefore banks in order to utilize funds do extensive lending. Banks even start lending to the low quality borrowers without investigating their current debt status or credit rating and debt repayment ability. As credit is easily available in the market, low quality borrowers borrow from many banks and defaults by using corrupt practices, resulting in the growth of NPLs

The co-efficient value for the relationship between NPLs and exports is negative. The results in table 6 suggest that the relationship is statistically significant, which is consistent with findings of Borio and Lowe (2002); Babouček and Jančar (2005) and Festić et al., (2011). The justification of the negative relation is that with the increase in exports firms have cash flows to pay back their loans. With the increase in exports economic activities in the country also increases resulting in the stable cash flows for the individuals, firms and banks, thus resulting in the decline of NPLs.

The results in table 6 suggests that industrial production is negatively associated with the NPLs and are consistent with the findings of existing studies (Kalirai and Scheicher, 2002; Zeman and Jurča 2008; and Festić et al., 2011). Thus, it can be concluded from the results that industrial production increases the earnings of the firms and individuals, resulting in the increase in debt paying ability of individuals and firms.

The current study rejects the H9 by suggesting insignificant negative association between FDI and NPLs. The negative association suggest that foreign investors whenever expects the decline in the future prospects of the economy they withdraw investments, resulting in the decline in the economic activity of the country, cash flows of businesses and inability of the individuals and businesses to repay loans.

The results in table 6 suggest that two explanatory variables of corruption and information sharing are insignificantly association with the NPLs, thus all three has no significant influence on the NPLs. The results provide positive association of NPLs with integral index for the perception of corruption, suggesting that corruption at macro level results in the growth of NPLs. This result provides the validity of H23 in terms of direction of association but the strength of association is insignificant. Thus it can be concluded that corruption at macro level has insignificant positive impact on NPLs.

The justification for the insignificant association between NPLs and integral index for the perception of corruption is the methodology used to measure integral index for the perception of corruption. The integral index for the perception of corruption measure how corrupt the public sector of the country is perceived to be. It is a combination of polls and extracts from corruption related data collected by various reputable institutions.

According to Transparency International corruption is the abuse of entrusted power for private gain by both public and private sectors. The integral index for the perception of corruption focuses on corruption which involves public officials, civil servants or politicians. The data sources used to compile the index include questions relating to the abuse of public power and focus on bribery of public officials, kickbacks in public procurement, misuse of public funds and on questions that probe the strength and effectiveness of anticorruption efforts in the public sector. The index covers both the administrative and political aspects of corruption. In producing the index, the scores of countries for the specific corruption related questions in the data sources are combined to calculate a single score for each country. The index does not contain the data collected from the banks therefore the relation between integral index for the perception of corruption and NPLs is insignificant, the more relevant corruption data related to banking sector can provide the significant association.

The justification for positive relation is that in country like Pakistan regulatory and supervisory authorities are very weak in regulating and implementing laws. Due to this borrower take advantage and do not repay loans because they know that no strong legal action will be taken against them, if legal action is taken then the legal procedures are much time taking and costly that banks usually withdraw the suits or feel reluctant to file a suit against defaulters. The other reason for the increase in NPLs is the corruption in the political system of the country. Most of the time political owned firms borrow funds from the banks and by using the political power and corrupt practices do not repay loan (Khwaja and Mian, 2005). Similarly the management of the banks also by using corrupt

practices lends money to low quality borrowers (Barth et al, 2009), which results in the increase in NPLs.

The results suggest that NPLs are insignificantly negatively associated with strength of legal rights index, thus rejects the validity of H24 in terms of Pakistani banking data. The existing studies suggest that with the increase in strength of legal rights lending in the country increases because of the assurance to the banks by the supervisory authorities that they will take all possible measures for the completion of loan contracts and repayment of default loans (La Porta et al, 1997; and Djankov et al, 2007). This shows that with the increase strength of legal rights protection NPLs declines. Thus it can be concluded that increase in strength of legal rights NPLs in the economy declines.

The table 6 provides negative but insignificant association between NPLs and credit depth of information index, suggesting the validity of H25 in terms of sign between two variables. The results of current study suggest that the information sharing relating the credit requirements and regulations between potential borrowers and banks leads to the decline in the NPLs, because it helps the banks to understand the demands and needs of the customers. Similarly it helps the borrowers to fully understand the requirements, regulations and other legal aspects of the credit contract. This results in the proper fulfillment of the credit contracts and decrease in the NPLs. On the other hand information sharing reduces the chances of banks officials' corruption (Djankov et al, 2007; and Barth et al, 2008), because potential borrowers now have all the information relating the rules and regulations of banks regarding loans. Therefore bank official cannot take any illegal step to grant loans to those who offer them money in exchange of granting loans. If bank official do any illegal act then potential borrower can report to the

bank or supervisory authority. This results in the allocation of loans to the quality borrowers and reduction of NPLs.

At the end of the analysis the residual of the model was checked for the existence of serial correlation, heteroskedasticity and normal distribution. Current study has used Breusch-Godfrey Serial Correlation LM test to check for the serial correlation in the residual, the results of the test is given in table 7.

Table 7 Breusch-Godfrey Serial Correlation LM test

Observed R-squared	2.396159	Probability Chi-Square	0.3018

In Breusch-Godfrey Serial Correlation LM test the observed R-squared value and its probability is used to either accept or reject the null hypothesis of existence of serial correlation in the residual. The results in table 7 accept the null hypothesis because the p-value is greater than 5 %, suggesting that there is no serial correlation in the residual, which is desirable for a good regression model.

Table 8 Breusch-Pagan-Godfrey test

Observed R-squared	10.86382	Probability Chi-Square	0.5406

The heteroskedasticity of the residual was checked by using Breusch-Pagan-Godfrey test. In this test observed R-squared value and its probability is used to either accept or reject the null hypothesis of no existence of heteroskedasticity or existence of homoskedasticity. The results in table 8 accepts the null hypothesis because the p-value is greater than 5 %, suggesting that there is no heteroskedasticity in the residual and residuals are homoskedasticity , which is desirable for a good regression model.

Table 9 Jarque-Bera normality test

Jarque-Bera	0.569927	Probability	0.752042

At the end residuals are checked whether they are normally distributed or not. For this purpose Jarque-Bera statistics is normally used with its p-value to either accept or reject the null hypothesis of existence of normal distribution. The Jarque-Bera statistics and its p-value is given in table 9. The results suggest that the p-value of Jarque-Bera statistics is greater than 5% thus the null hypothesis is accepted, suggesting that residuals are normally distributed.

4.2 Bank specific variables and ownership structure

The analysis of bank specific variables started with the selection of nine bank specific hypotheses, and then assigning each hypothesis with the bank specific variables as suggested by the existing literature. Literature suggested 10 bank specific variables for the nine bank specific hypotheses, out of 10 hypotheses five are assigned with one banks specific variable each whereas two hypothesis is assigned with two variables each and two hypotheses with one variable. The bank specific hypotheses and their respective bank specific variables are given in table 2. Similarly three dummy variables are used for the publically, privately and foreign owned banks.

The NPLs/total loans ratio and 10 banks specific variables are converted into differences and then expressed as percentage change. The percentage changes of the variables are taken to capture the dynamics of the variables over the period of time (Lütkepohl and Xn 2009). The panel unit root tests are conducted to check for the stationarity of the variables, current study used Fisher ADF stationarity test. The results of unit root tests are

given in table 10, suggesting that all the variables are stationary at level. Thus panel regression can be applied by using the original percentage values of the variables.

Table 10 Unit root test results of bank specific variables

		Fisher-ADF	Levin, Lin & Chu
Levels			
Intercept	NPLs/total gross loans	-4.78147*	-36.9797*
	Inefficiency	-2.06447*	-313.365*
	Solvency	-9.08764*	-510.378*
	Loans to deposits ratio	-3.05921*	-17.8655*
	Market power	-2.09951*	-410.040*
	Return on Assets	-2.67509*	8.65813*
	Return on Equity	-3.20033*	-25.2551*
	Credit growth	-4.01674*	-22.4841*
	Total liability to income	-3.52744*	-89.1631*
	Deposits rate	-11.4564*	-1256.46*
	Reserve ratio	-3.72806*	-18.4624*

Where * represents significance level of 1%

Before applying panel regression explanatory variables were checked for the multicollinearity by using correlation matrix. The multicollinearity problem arises because of the high correlation between any explanatory variables. The multicollinearity problem makes the significant variables insignificant by increasing their p-value; the increase in p-value lowers the t-statistics value. Thus the panel regression results with multicollinearity will show significant variables as insignificant variables. The multicollinearity problem is solved by dropping the high correlated variable. This can be done by applying the panel regression analysis by using the variables having multicollinearity problem, then that series is dropped from two highly correlated series that have high p-value. The correlation matrix between 10 bank specific variables is given in table 11.

Table 11 Correlation matrix of bank specific variables

	Inefficiency	Solvency	Loans to deposits ratio	Market power	Return on Assets	Return on Equity	Credit growth	Total liability to income	Deposits rate ratio	Reserve ratio
Inefficiency	1									
Solvency	0.08466	1								
Loans to deposits ratio	-0.03489	0.095229	1							
Market power	-0.09907	0.005458	0.40818	1						
Return on Assets	0.020842	0.001297	0.057426	-0.01689	1					
Return on Equity	-0.04855	-0.00765	-0.1214	-0.06909	0.123907	1				
Credit growth	0.008262	-0.00935	0.144543	0.073244	0.069309	-0.06128	1			
Total liability to income	-0.02274	-0.06599	-0.40552	-0.05847	-0.12741	-0.05393	-0.10426	1		
Deposits rate ratio	-0.04459	-0.00702	0.438456	0.390385	0.004419	-0.01126	0.009491	-0.36728	1	
Reserve ratio	-0.07949	-0.06009	0.179784	-0.08015	0.261067	-0.00048	0.021779	-0.13579	-0.03777	1

The results in table 11 suggest that there is no correlation between any of the explanatory variables. Thus all the bank specific variables can be used in the further analysis.

First the model was analyzed by using fixed effect regression analysis and then by using redundant fixed effect test the validity of random effect model is checked. The redundant fixed effect test compares the common effect model against the fixed effect model with the null hypothesis that there is no individual effect. The results of redundant fixed effect test are given in table 12.

Table 12 Redundant fixed effect test result

Effects test	Statistic	Probability
Period Chi-square	2.118753	0.7139

The results in table 12 suggest that the p-value is greater than 5% therefore the null hypothesis that there is no individual effect is accepted. Therefore the fixed effect model is not valid and common effect model can provide the valid specification of the model. The model 3.2 is applied by using common effect model and results are given in table 13.

Table 13 Common effect model results of bank specific variables and ownership structure

Variable	Coefficient	Standard error	t-Statistic	Probability
Inefficiency	-0.00073	0.000478	-1.52917	0.1285
Solvency	-0.01495	0.046937	-0.31849	0.7506
Loans to deposits ratio	0.02928	0.044253	2.20742	0.0294
Market power	0.169765	0.163093	1.040908	0.2998
Return on Assets	2.3604	0.333704	7.07333	0
Return on Equity	-0.00357	0.004923	-0.72593	0.4691
Credit growth	0.02257	0.010188	2.21489	0.0284
Total liability to income	-2.65E-05	1.96E-05	-1.35221	0.1785
Deposits rate ratio	0.369649	0.219893	1.681042	0.095
Reserve ratio	0.184231	0.085029	2.166674	0.032
Publically owned banks	0.061721	0.024853	2.483461	0.0142
Privately owned banks	-0.04249	0.019991	-2.12568	0.0353
Foreign owned banks	-0.05853	0.024869	-2.35353	0.02
C	0.120495	0.024618	4.894561	0
R-squared	0.491169	F-statistic		11.02038
Adjusted R-squared	0.4466	Probability (F-statistic)		0
Durbin-Watson stat	1.862991			

The common effect model is applied by using 13 explanatory variables; the results of common effect model are given in table 13. The fitness of the model is predicted with the help of R-squared, F-statistics and number of significant relationship between NPLs and explanatory variables. The R-squared value for the model is 49%, suggesting that almost

49% variance in NPLs are explained by all explanatory variables. The F-statistics of the model has a p-value of 0, suggesting that all explanatory can influence the NPLs jointly.

The results in table 13 provide the validity of three bank specific hypotheses (i.e. moral hazard, bad management II and procyclical credit policy,) by suggesting significant association of respective bank specific variables with NPLs and rejected the five hypotheses (i.e. bad Management, skimping, size, soft budget constrained and deposit rate effect) by providing insignificant association of respective bank specific variable with NPLs whereas rejected deposits to loans ratio effect hypothesis by providing significant positive association with NPLs.

The results given in table 13 reject the validity of both bad management hypothesis and skimping hypothesis in case of Pakistani banking sector. The results provide negative but insignificant association between the NPLs and inefficiency. Thus it can be concluded that inefficiency does not results in the growth in NPLs but the influence is insignificant.

The result of the current study is opposite to the findings of Berger and DeYoung (1997), they suggested that current bad performance (high cost inefficiency), deviation from standard loan allocation practices, wrong evaluation of collateral and lack of loan monitoring and controlling skills leads to the growth in NPLs, whereas current study suggest that NPLs are due to increase in the short term cost efficiency (skimping hypothesis) rather than the bad management practices of the bank managers. With the growth in NPLs the banks cost efficiency further declines because of increase in spending on the recovery, monitoring, selling collaterals and tracking the current loans (Podpiera and Weill, 2008; and Louzis et al., 2010).

The moral hazard hypothesis is tested by using two bank specific variables i.e. solvency ratio and loans to deposits ratio. The results reject the moral hazard hypothesis when solvency ratio is used to measure it by providing insignificant positive relation with NPLs. It can be concluded from the results that moral hazard hypothesis by using solvency ratio is not applicable in Pakistan, the NPLs of the banks does not increase due to the decrease in banks capital as compared to the lending. When moral hazard hypothesis is tested by using loans to deposits ratio then it provides significant positive association with NPLs. This suggest that the with the increase in banks lending as compared to the deposits increases the NPLs of the banks because at the time of low loans to deposits ratio banks in order to earn more start lending to the low quality borrowers and do not follow the standard loan allocation practices, which leads to the growth in NPLs (Fofack, 2005; Ferreira, 2008; Männasoo and Mayes, 2009 and Festić et al., 2011).

The results in table 13 suggest that market power is positively associated with NPLs but the association is insignificant. Thus results reject the size hypothesis in case of Pakistani banking data. This can be concluded from the positive relation that when loans share of individual bank increases in total loans of banking sector than NPLs also increases.

The bad management II hypothesis is tested by using two bank specific ratios i.e. ROA and ROE. The results in table 13 provide positive significant association between the NPLs and ROA, suggesting that ROA has significant influence on the NPLs. Thus ROA can significant change in the level of NPLs. The results reject the validity of bad management II hypothesis when ROE was used as a measure; results provide insignificant negative association between NPLs and ROE. The explanation for the

positive relation between ROA and NPLs is that in order to increase the short term earnings, banks management portray wrong picture to the investors relating the future profitability and positive return prospects. Consequently, investors start borrowing from the banks and invest in the less profitable projects. This results in the current good performance and profitability of the banks but because of the wrong forecasting, returns on the investments are not according to the investors' expectation, resulting in the inability of the investors in repayment of loans thus leading to the growth in NPLs.

The study provides the validity of procyclical credit policy hypothesis by using Pakistani banking data. The results in table 13 provide significant positive association between NPLs and credit growth. The result of current study is in consistent with the existing studies (Rajan, 1994; Babihuga, 2007; Marcucci and Quagliariello, 2008; Louzis et al, 2010 and Festić et al., 2011). The theoretical justification of the positive association is that extensive lending of the banks during the boom; they in order to earn more even lend to the low quality borrowers. As the boom ends and depressions starts low quality borrowers do not have sufficient earnings to repay loans thus leading to the growth in NPLs.

The current study rejects the soft budget constrained hypothesis by suggesting negative and insignificant association between NPLs and total liabilities to income ratio. It can be concluded that in case of Pakistani banks NPLs does not increase due to the soft budget constrained. The negative relation suggest that in order to utilize the deposits funds banks reduces their lending rates, which attracts the businesses and high quality borrowers to borrow more and invest funds in the profitable projects, resulting in the high economic activities, circulation of funds, high employment, high profits and stable cash flows. This

results in the repayment of loans on time by the individuals and businesses, thus leading to the decline in the NPLs.

The table 13 suggests the insignificant positive association between NPLs and deposits rate ratio. The result rejects the validity of deposits rate hypothesis. The justification for the positive relation is that with the increase in deposit rate, the interest spread rate and competitiveness of the banks decline, because of which deposit holders demand higher rates, in order to attract deposits banks has to pay higher rates. To pay deposit holders banks lend funds at higher rates to the low quality borrowers and by using corrupt practices low quality borrowers do not repay loans, thus results in the growth of NPLs.

The current study rejects the validity of the deposits to loans ratio effect by suggesting significant positive association between NPLs and reserve ratio. The finding of current study is opposite to the findings of De Nicolo et al., (2003); and Ferreira (2008). They concluded that increase in deposits as compared to the loans shows that banks are more concerned with the quality of loans rather than the quantity and lend only to the quality borrowers, whereas the finding of current study suggests that the banks has already lend funds to the low quality borrowers in order to utilize idle funds because of the bad management and deviation from standard loan allocation practices, wrong evaluation of collateral and lack of loan monitoring and controlling skills (bad management hypothesis) and expect that in future the borrowers will not repay loans, banks stop lending with the fear of further increase in the riskiness of loans, thus deposits to loan ratio increases because of the expected increase in the future NPLs. Thus it can be concluded that the deposits to loan ratio increases because of the current lending to the

low quality borrowers because of the bad management and stop current lending to prevent further growth in future NPLs.

The results provide three significant associations of ownership structure. The results suggest significant positive association between the NPLs and public (dispersed ownership) and significant association of NPLs with privately and foreign owned banks (concentrated ownership). The existing studies have found the positive association between NPLs and publically owned or dispersed ownership (Shleifer and Vishny, 1986; Berger et al., 2005; Iannota et al., 2007; and Nichols et al., 2009). The results of current study confirms the validity of traditional view of Berle and Means (1933) that concentrated ownership has positive impact on the efficiency and performance of the banks and with concentrated ownership control and supervision on the firm increase, resulting in the decline of firm riskiness.

The positive relation suggest that in publicly owned banks (dispersed ownership) the control of the owners on the mangers is weak, resulting in the asymmetry of information and conflict of interest between owners and managers (Jensen and Meckling, 1976), leading to the decisions that are in benefit to managers. Due to less supervision and control, mangers increase the riskiness of the loan portfolio in order to improve the short term cost efficiency. They lend money to the low quality borrowers, resulting in the growth of future NPLs. In publically owned banks level of supervision and monitoring is very weak (Shleifer and Vishny, 1986), because stake of large number of dispersed investor is involved. As the stake of individual investor is small therefore they pay less attention on the working and risk exposure of the banks.

Corruption also play important role in the growth of NPLs in the publically owned banks. In country like Pakistan regulatory and supervisory authorities are very weak in regulating and implementing laws, due to which borrowers take advantage and do not repay loans because they know that no strong legal action will be taken against them because of this the rate of NPLs in public banks are on the higher side. The other reason for the increase in NPLs is the corruption in the political system of the country. Most of the time political owned firms borrow funds from the banks and by using the political power and corrupt practices do not repay loan (Khwaja and Mian, 2005). Furthermore the management of the banks also by using corrupt practices borrows money to low quality borrowers (Barth, Lin, Lin and Song, 2009), which results in the increase in NPLs.

The results of current study support the traditional view of Berle and Means (1933) that concentrated ownership (private and foreign ownership) has positive impact on the efficiency and performance of the banks and with concentrated ownership control and supervision on the firm. The justification for the negative relation can be that in concentrated ownership control of the owners on the management is strong, thus owners can influence the risk taking decision of the management and can force the management to maintain the specific riskiness level of the loan portfolio by lending funds to the high quality borrowers (Shleifer and Vishny, 1986), resulting in the future decline of NPLs. The results of current study also confirm the traditional view of Berle and Means (1933) in case of foreign ownership that concentrated ownership has positive impact on the efficiency and performance of the banks. They further suggested that with concentrated ownership control and supervision on the firm increases, resulting in the decline of firm riskiness (Shleifer and Vishny, 1986). The increase level of supervision also leads to the

efficient utilization of bank resources and improved performance of the banks. The other main reason of the positive association of NPLs with concentrated ownership is that privately and foreign owned banks are not a\under the control of government and are influenced by political pressures and do not lend on political basis, therefore the riskiness of the loan portfolio is on the lower side in such banks. The other main reason for the negative relation between NPLs and concentrated ownership is the merit base credit policies and efficiency of the credit evolution departments of the banks; because private and foreign banks lend money to those who are in good financial position and has good credit history. The negative relation also confirms the findings of Saunders et al., (1990) that in privately and foreign owned banks managers take calculated risks due to the high supervision and monitoring, resulting in the specific level of the loan portfolio riskiness.

The correlation of the residual of the model is checked by using Durbin-Watson statistics. The general rule for the Durbin-Watson statistics is that if its value is 2 or around 2 than the residual is not serially correlated whereas if its statistics is less than 2 than the residual is positively correlated and less than 4 represents the negative correlation. The Durbin-Watson statistics for the model is given in table 13; the statistics is 1.862991 suggesting that residual is not serially correlated because statistics is around the 2.

CHAPTER 5

CONCLUSIONS OF THE STUDY

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5.1 Findings

The main aim of the current study is to investigate the determinants of NPLs by using the Pakistani banking data. The main focus of current study was to analyze the explanatory power of macroeconomic and bank specific variables, banks ownership structure, corruption and information sharing as determinants of NPLs. The main objectives of current study was to investigate and analyze the explanatory power of nine macroeconomic variables, nine bank specific hypotheses, bank ownership structure (publicly, privately and foreign owned banks), corruption (country level and inside bank) and information sharing between financial institutions, creditors and borrowers as determinant of NPLs. The current study used two models for each type of variables.

In the current study OLS is applied by using nine macroeconomic variables and three corruption and information sharing variables; results proved that six macroeconomic variables (i.e. GDP growth, interest rate, inflation rate, CPI, exports and industrial production) are significantly associated with NPLs, whereas six variables (i.e. unemployment, real effective exchange rate, FDI, integral index for the perception of corruption, strength of legal right index and credit depth of information) are insignificantly associated with NPLs. This suggests that six macroeconomic variables have significant influence in affecting the level of NPLs whereas three macroeconomic variables have no impact on NPLs. The study proved significant negative association of

GDP growth, interest rate, inflation rate, exports and industrial production with NPLs; whereas CPI is significantly positively associated with NPLs. The macroeconomic variables model fulfills the features of good regression model. The model has high R-squared value of 84%, six out of 12 variables are significant and can explain changes in NPLs jointly, residuals are not serially correlated, residuals are homoskedasticity and residuals are normally distributed.

The significant negative relation between growth in GDP and NPLs suggest that increase in economic growth results in the increase debt paying ability of individuals and firms because of the greater economic activities and earnings of the individuals and firms, consequently resulting in the decline of NPLs. The significant negative association between interest rate and NPLs suggest that because of the high interest rate only those borrower and investors borrow from the banks that have the ability to pay back their loans form future income and earnings of the projects. Similarly, banks also lend only to those individuals and investors that have good credit rating and can pay back the principle and interest. Furthermore, the negative relation between inflation and NPLs suggests that with the inflation the equity value of the banks declines, resulting in the growth of banks riskiness. Banks in order to improve their equity value show short term profitability by extensive lending and cost efficiency by reducing their expenses on loan allocation, monitoring and controlling, which leads to the growth in NPLs.

The positive association of CPI with NPLs suggests that with the reflation, interest rate declines and money supply in the economy increases. The investors and individuals prefer to consume and investment as compared to savings and withholding their investments. Furthermore availability of funds at low rates stimulates individuals and

investors to borrow for consumption and investment. The banks also do extensive lending during the low interest rate time. As the interest rate increases in the economy, the low quality borrowers (both individuals and investors) have no income and profit to pay back there loans and defaults leading to the growth in NPLs. The negative association of exports with NPLs suggests that with the increase in exports, economic activities in the economy increases, resulting in the income growth of individuals and profits of investors. Thus individuals and investors have the funds to repay the loans, resulting in the decline of NPLs. The negative association of industrial production suggests that increase in industrial production increases the earnings of the firms and individuals, resulting in the increase in debt paying ability of individuals and firms.

The results provided no significant association of two indices of corruption and one index of information sharing with NPLs. The results suggested insignificant positive and negative relation of both measures of corruption with NPLs, suggesting that corruption at macro level has positive impact, whereas at firm level has negative impact on the NPLs but its impact is insignificant. Furthermore results provided negative association between information sharing and NPLs, suggesting that with the increase in information relating loans, the level of NPLs can be decreased but the association is insignificant.

Thus it can be concluded that six macroeconomic variables (i.e. GDP growth, interest rate, inflation rate, CPI, exports and industrial production) can be used to predict the movement in NPLs because of their significant association, whereas three macroeconomic variables (i.e. unemployment, real effective exchange rate and FDI), corruption and information sharing cannot be used to predict the movement of NPLs.

The current study used common effect model to investigate the validity of nine banks specific hypotheses by using 10 bank specific variables and ownership structure. The results provided the validity of three bank specific hypotheses (i.e. moral hazard, bad management II and procyclical credit policy) and rejected the five hypotheses (i.e. bad Management, skimping, size, soft budget constrained and deposit rate effect) whereas rejected deposits to loans ratio effect hypothesis but provided its significant association with NPLs.

The results suggest the validity of moral hazard hypothesis when tested by using loans to deposits ratio. This suggest that with the growth in deposits banks start extensive lending, which leads to the increase in bank lending as compared to deposits and also increases the riskiness of loan portfolio by allocating funds to the low quality borrowers, which in future leads to the growth in NPLs. Similarly results confirm the validity of bad management II hypothesis when ROA was used as a measure. This shows that management of the bank in order to show short term profitability depict wrong picture to the investors relating the future profitability and positive return prospects of the economy and force them to investment in less profitable projects. Consequently, investors start borrowing and because of the wrong forecasting during economic downturn investors do not earn, resulting in their inability of repayment thus leading to the growth in NPLs.

The study provides the validity of procyclical credit policy hypothesis and suggest that extensive lending of the banks during the boom, they in order to earn more even lend to the low quality borrowers. As the boom ends and depressions starts low quality borrowers do not have sufficient earnings to repay loans thus leading to the growth in NPLs.

The current study rejects the validity of the deposits to loans ratio effect by suggesting significant positive association between NPLs and reserve ratio. The results suggest that banks has already lend funds to the low quality borrowers and to reduce the riskiness of the loan portfolio they have stop lending, because of which their deposits to loan ratio increases. Thus current increase in ratio is because of the anticipation of future increase in NPLs.

The current study used three dummy variables for ownership structure. The results provided two significant associations of privately owned and foreign owned banks with NPLs. The current study investigated the Berle and Means (1933) traditional view that concentrated ownership results in enhanced banking performance by reducing the bank riskiness against the opposite view that ownership concentration does not have impact on the bank riskiness. The results provided the validity of Berle and Means (1933) traditional view in terms of privately owned and foreign owned banks (concentrated ownership), that it enhances the bank performance and efficiency and reduces the bank riskiness (NPLs).

The negative association between NPLs and publically owned banks suggests that in privately owned and foreign owned banks supervision and monitoring of the owners over the management is strong, furthermore management show cost efficiency efficient utilization of resources and improved performance, efficient and effective credit process and no political pressures leads to the improved efficiency and performance of banks, which results in the decline of NPLs.

5.2 Policy related implications

The findings of the macroeconomic variables have policy related implications for the commercial banks. The commercial banks can use the findings of macroeconomic model to predict changes in the NPLs to take precautionary measures to prevent any financial crisis (González, 1999). The commercial bank can use the performance of economy, interest rate level, inflation rate, CPI, exports and industrial production while extending their lending or allocating loans. The commercial banks can look for the growth in economy while extending their loans or at the time of extensive lending because during the downturn of economy the level of NPLs can increase. The commercial banks should do regular loans supervision and review of the interest rate charged on the loans because with the increase in real interest rate lending of the banks declines. In order to prevent any bad loan banks should strictly follow standard procedures of credit allocation and lend only to good credit history borrowers in order to prevent NPLs. Furthermore, banks do extensive lending during reflation to utilize the funds but lend also to the low quality borrowers, who defaults when interest increases. Thus banks should not go for extensive lending during reflation in order to prevent the future NPLs; further more banks should follow credit allocation process during allocations of funds. Finally, banks can lend to the investors during the high exports because of the high economic activities, industrial production and earnings of the individuals but should not lend at the time of low or no exports and low industrial production time period. The SBP should develop a framework which can include the macroeconomic variables such as GDP growth, real interest rate, inflation, CPI, exports and industrial production to monitor the stability and soundness of the banking sector.

The government can also play important role in improving the level of NPLs in the economy by influencing the macroeconomic variables. For instance, governments can overcome the current energy crisis by starting new power projects to provide regular and low cost power supply and natural gas to the industry, which will result in the increased production, low level of unemployment, economic activities in the economy and high exports. In order to increase the exports of the country government can provide incentives to the manufacturer by developing basic infrastructure, reducing taxes, providing low cost loans and can help exporters in exploring new international markets. The government can increase the economic activities, employment rate, production level and exports by doing special agreements with the neighboring countries for free trade. Recently government has done the free trade agreement with India relating some specific products.

The current study suggested no impact of corruption and information sharing on the NPLs, but as suggested by the literature corruption has significant impact on the NPLs. Thus SBP and commercial banks can reduce the level of NPLs by following the rules and regulation of credit allocation, supervision and monitoring of loans. The corrupt practices are most common in public banks, therefore as suggested above SBP of Pakistan should develop separate supervision policy for publically owned banks.

Based on the findings of current study, commercial banks of Pakistan should pay attention to several bank specific factors in order to reduce the level of NPLs. First by using findings of moral hazard hypothesis banks should not do extensive lending in order to utilize their deposits, because it will lead to the increased riskiness of the loan portfolio and growth in loans to deposits ratio. Thus before lending banks should consider their

loans to deposits ratio and riskiness of their loan portfolio. The commercial banks it self or SBP can set a specific level of loans to deposits ratio, below which banks are not allowed to lend.

Second, the results suggest that the increase level of NPLs is not due to the cost inefficiency of the management (bad management hypothesis) and not because of the decrease spending on the credit allocation, evaluation and monitoring process (skimping hypothesis) but due to the wrong forecasting and current bad performance of management by encouraging borrowers to borrow and invest in high risky projects by predicting exaggerated future earning and performance of the economy (bad management hypothesis II). Thus banks should consider the riskiness level of their loan portfolio before lending to high risky projects and to low quality borrowers and should provide the accurate information relating the future performance of economy and proposed projects because the probability of high risk project failure is high and leads to the growth in NPLs.

Third, according to the procyclical credit policy hypothesis, banks should not go for extensive lending in boom and should follow the standard rules and procedures of credit allocation to allocate loans only to the high quality borrowers. The banks can reduce the riskiness of their loan portfolio and can reduce the level of NPLs in the depression. Fourth, the significant negative association between deposit rate ratio and NPLs can be used by commercial banks to control the level of NPLs. The increased in deposits rate leads to the growth in NPLs, but as the results of deposits rate effect hypothesis suggest that NPLs can be controlled by lending only to those potential borrowers who have good credit history and ability to pay high interest payment. Thus banks can reduce the level of

NPLs during the time of high interest rate by allocating loans only to the high quality borrowers. Finally the positive association between reserve ratio and NPLs can be use by the banks when they already have lend funds to the low quality borrowers and predict that borrowers will default than banks should stop lending in order to control the level of NPLs by restricting the NPLs only to the existing borrowers.

The finding of the ownership structure and other related variables models also have implications for the policy makers. First, SBP should consider that their supervision policies have different impact on the banks according to their nature of ownership, for instance publically owned banks are less in control of their owners as compared to the private owned banks, and therefore SBP can develop supervision policies according to ownership structure. Second, the current study provide the validity of Berle and Means (1933) in terms of dispersed ownership thus public banks performance can be improved by the constant supervision of the owners and SBP. Third, SBP should take measure to strictly supervise the credit allocation process and make sure its proper implementation in the public owned banks.

5.3 Future research

The model 3.1 has used nine macroeconomic variables to investigate their impact on NPLs, whereas future studies can use other macroeconomic variables to investigate the NPLs behavior. Few of the variables that can be used in the future studies are gross fixed capital formation (Borio and Lowe, 2002); net foreign currency assets (De Nicolo, Geadah, Rozhkov, 2003; and Festić et al., 2011); real estate prices (Arpa et al., 2001; and Gerlach et al., 2005); growth in investment and consumption (Quagliariello, 2003);

growth in M2 (Quagliariello, 2003), imports (Babouček and Jančar, 2005); output gap (Hoggarth et al., 2005; and Zeman and Jurča, 2008); and loan to GDP ratio (Jakubík, 2007). The results of such studies will be beneficial for the policy makers, because it can help to anticipate any adverse effect of each variable on the level of NPLs. The finding of current study and future studies can be helpful in predicting and controlling banking crisis in the country (González, 1999). Furthermore, current study provides the impact of each variable on the NPLs, but does not provide any evidence relating the impact of each variable during banking crisis. Thus future studies can investigate the impact of each variable during the crisis period on NPLs.

The current study used OLS to test the macroeconomic variables, corruption and information sharing; future studies can use the dynamic or advance models to overcome the data related problems and to get more accurate results. This study used data of Pakistan only, therefore the findings of current study are not applicable in other countries; future studies can use the data of other developing or developed countries or panel of developing and developed countries (Festić et al., 2011) to investigate the determinants of NPLs. This will facilitate the use of advance panel data models and will provide more detailed, more applicable results on other countries and accurate information relating the impact of macroeconomic variables on NPLs (Louzis et al., 2010; and Festić et al., 2011).

The banks specific model only test the validity of nine bank specific hypotheses, future studies can use other bank specific variables to check their impact on NPLs. The current study used the 6 year banking data of Pakistan; future study can use the banking data of more than 6 years of Pakistan or any other single developing or developed country to test the validity of bank specific hypotheses. The current study can be repeated by using the

panel data of banks from the sample of developing and developed countries (Festić et al., 2011). As this study has only used the static panel data model, therefore future study can use other advanced techniques such as fully modified OLS or two step least square method (Festić et al., 2011) and dynamic panel data techniques such as GMM (Louzis et al., 2010).

The ownership structure and other related model used only one measure of bank riskiness i.e. NPLs, Shehzad et al., 2010 used two variables as measure of bank riskiness (i.e. NPLs and capital adequacy). The future study in Pakistan and other developing countries can be conducted by using two or more measures of bank riskiness. Shehzad et al., 2010 in their study has used the percentage of ownership as measure for ownership structure i.e. 10% or more, 25% or more and 50% or more, whereas current study used dummy variables for the publically, privately and foreign owned banks. Thus future study can used more accurate data on the ownership structure or can further divide the ownership into more categories as done by the Barry et al., (2011). The ownership structure and other related model can also be applied by using the panel data of banks from the sample of developing and developed countries (Shehzad et al., 2011; and Barry et al., 2011). As this study has only used the static panel data model, therefore future study can use other advanced techniques such as Fully Modified OLS or Two Step Least Square method and dynamic panel data techniques such as GMM.

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