

# **CHAPTER - I**

## **INTRODUCTION**

### **1.1. Background of the Study**

In the modern world, bank has been an integral part of human life. Banks today are the largest financial institutions around the world with branches and subsidiaries throughout everyone's life. There are plenty of differentiations between types of banks and much of the differentiation rests on the features of the services and products offering. For instance, commercial banks hold deposits, bundling them together as loans, and operating payment mechanism, etc.

Commercial banking in virtually all countries has been subject to a great deal of regulations (Hull, 2012). One of the regulations is the minimum capital commercial banks and that must keep absorbing loss of unexpected things happen. This kind of capital requirement is in particular conducted by Basel Committee which aims to enhance the key supervisory issue and improve the quality of banking supervision ([www.bis.org](http://www.bis.org), 2014).

This had attracted the attention of Basel committee and the capital adequacy soon became the main focus .of its activities. In December 1987, the capital measurement system called 'Basel Accord or Basel-I' was approved by the G-10 governors and came into effect in 1988 that mainly focused on credit risk and called for a minimum capital ratio of capital to risk-weighted assets of 8% to be implemented by the end of 1992. In January 1996, an amendment of Basel I was issued with incorporation of a capital requirement for the market risks. So they released a new capital adequacy framework called 'Basel-II' in 2004. However, the 2007 financial crisis made the Basel Committee that realized that Basel-II seems not enough in the complicated financial markets. The banking sector had entered the crisis with too much leverage and inadequate liquidity buffers. These defects were accompanied by poor governance and risk management as well as inappropriate structures. The combination of these factors manifest in the mispricing of credit, liquidity risk and excess credit growth ([www.bis.org](http://www.bis.org), 2014).

Therefore, a new standard Basel-III was published in December 2010 and will be fully effective by the end of 2019. It strengthened the Basel-II framework and made some innovations, including tightened definition of capital requirement for leverage ratio and counter cyclical buffer, the capital for liquidity risk and counterparty credit risk as the capital for liquidity risk and counterparty credit risk as the derivatives had gained their population in 20<sup>th</sup> century.

Credit risk is one of significant risks of banks by the nature of their activities. Through effective management of credit risk exposure banks not only support the viability and profitability of their own business but also contributed to systematic stability and to an efficient allocation of capital in the economy (Rime, 2001). The default of a small number of customers may result in very large loss for the banks (Gestel&Baesens, 2008). It has been identified by Basel Committee as main source of risk in the early stage of Basel Accord. Credit risk is a risk of borrower default, which happens when the counterpart fails to pay on time.

Basel Committee identified main source of credit risk at early stage. If a borrower with high credit quality has deteriorated profile, it can also cause credit risk loss to banks. Bank invests in debt of those customers. The price of debt sold might be lower than the price as the bank bought debt. This makes a net loss of banks. However, the loss from the default of bank does not have to be great. It depends on the percentage of recover from obligors and total exposure on risk.

There will be many reasons for credit default. Mostly, the obligor is in financial stress situation due to debt service with legal dispute and technical defaults generated by the flaw in information system and thereby facing a bankruptcy. Credit risk can also be a risk of loss on credit derivative market. It can be credit migration such as downgrade in credit rating. Generally, the loss for the bank does not have to be high. The loss of default relies on the percentage that one can recover from the defaulted counterpart and the total exposure to the counterpart. The recovery may depend on the presence of collateral and guarantees (Gestel&Baesens, 2008).Credit risk situation of a bank can be exacerbated by inadequate institutional capacity, inefficient credit guidelines, inefficient board of directors, low capital adequacy ratios and liquidity, compulsory quota lending as a result

of government interference and lack of proper supervision by the central bank. Therefore, efficient risk management is crucial and valuable for banks to improve the performance and reduce the damage caused by risks (Afriyie&Akotey, 2012).

Credit risk is a major risk that banks are exposed to during the normal course of lending and credit underwriting. For most banks, loans are the largest and most obvious source of credit risk. However, other sources of credit risk exist throughout the activities of a bank, including the banking book and trading book, and both on and off balance sheet. The credit review assessment of capital adequacy, at a minimum cover risk rating systems, portfolio analysis, large exposures and risk concentrations. Internal risk ratings are an important tool in monitoring credit risk and supporting the identification and measurement of risk from all credit exposures, and are interrogated into overall analysis of credit risk and capital adequacy (Sharma, 2014). Credit risk management in financial institutions has become crucial for the survival and growth of these institutions. It is a structured approach of uncertainty management through risk assessment, development of strategies to manage it and mitigation of risk using managerial resources. The strategies of credit risk management involves transferring risk to other parties, avoiding risks, reducing the negative influence of risk and accepting some or all of the consequences of a particular risk (Afriyie&Akotey, 2012).

Credit risk is to be managed in various ways. The most important method is the appropriate selection of the counterparts and products. And good risk assessment model and qualified credit officers are key requirements for selection strategy. For counterparts with higher default risk, banks may need more collateral to reduce risk. And the pricing of product should be in line with the estimated risk. Secondly, limitation rule of credit risk management restricts the exposure of bank to a given counterpart. It avoids the situation that one loss or limited number of losses endangers the bank's solvency. Bank's determinants on how much credit a counterpart with a given risk profile can take need to be limited. Thirdly, the allocation process of banks provides a good diversification of the risks across different borrowers of different types, industry, and geographies. As a result, diversification strategy spreads the credit risk thus avoids a concentration on credit risk problems. Last but not least, banks can also buy credit protection in forms of guarantees

through credit derivative products. By the protection, the credit quality of guaranteed assets has been enhanced. These techniques are translated in the daily organization by written procedures and policies which determine how counterparts are selected, risk profile loans are granted and above which level an expert evaluation is required (Gestel&Baesens, 2008).

Basel Committee on Banking Supervision (BCBS) is related to credit risk mitigation to the reduction of credit risk it proposes to permit bank choice between two broad methodologies for calculating their capital requirements for credit risk. First being the measure of credit risk in a standardized manner, the alternative methodology is the subject to the explicit approval of the bank's supervisors that would allow banks to use their internal rating systems and another by taking collateral, obtaining credit derivatives or guarantees, or taking an affecting position subject to a netting guarantee.

The strength of banking industry is and safety of banking system is depending on the profitability and capital adequacy of bank (Saunders and Cornett, 2006). Profitability is a parameter which shows management approach and competitive position of bank in market-based banking.

Profitability is an indicator of banks' capacity to carry risk and/or their capital. It indicated banks' competitiveness and measures the quality of management. The determinants of commercial banks' profitability can be concluded into two categories like internal determinants (control of management) and external determinants (beyond the control of management). The internal determinants reflect upon banks' decision and policy concerning sources, uses of funds management, capital and liquidity management, and expenses management (Guru et al., 1993). The study would mainly focus on the analysis of internal determinants because the purpose of this research is to test the impact of credit risk management to firm's profitability. ROE and ROA are commonly used as indicators of the profitability and financial performance.

## **1.2. Statement of Problems**

Credit risk plays an important role on financial performance of banks since large chunk of banks' revenue accrues from loans from which interest margin is derived. Based on the

information, the study realizes that it is of great interest to study the role between credit risk management and profitability of commercial banks. The factors that lead to the topic are that research in Nepal, as a complicated and unstable financial market that have been not completely developed till now. And there is significant loan default in commercial banks are seen which created the problem of collapse in Nepalese Banking Sector. A few banks collapsed because of the mismanagement of credit risk and some bank underwent to losses due to it and some went for mergers. In order to acquire the knowledge of role of credit risk management and profitability of commercial banks, the following are the research questions are developed:

- a) What is the trend of non-performing loan ratio and capital adequacy ratio of commercial banks of Nepal?
- b) What is the role of return on equity and return on assets with capital adequacy ratio, and non-performing loan ratio?
- c) What is the situation of stability between capital adequacy ratio and non-performing loan ratio as credit risk indicators, and return on equity and return on assets as profitability ratio overtime?

### **1.3. Objectives of Study**

The objective of this study is to identify the role of credit risk management on the profitability of commercial bank of Nepal. For this following specific objectives are identified

- a) To analyze the trend of capital adequacy ratio and non-performing loan ratio.
- b) To access the role of credit risk indicators (CAR and NPLR) on profitability indicators (ROE and ROA).
- c) To test the stability between credit risk indicators and profitability indicators.

### **1.4. Hypothesis of Study**

- a) There is a significant role of CAR and NPLR on ROE.
- b) There is a significant correlation between ROA with CAR and NPLR.
- c) The relationship between ROE with CAR and NPLR is stable overtime.
- d) The relationship between ROA with CAR and NPLR is stable overtime.

## **1.5. Justification of Study**

Banking development and its strength plays an important role on the stability and growth of the economy. The stability of bank depends on the capital adequacy and profitability. Profitability could be measured via two ways that relation to sales and investment. Gross profit margin and net profit margin are used to calculate profitability in relation to sales. Similarly, return on equity and return on assets are used to measure profitability in relation to investment (Van Horne & Wachowicz, 2008). Both return on equity and return on assets require net profits that are the basic factors of the study.

The study will be helpful to the government, national planners, policy makers, central bank, and banking and financial institutions, researchers, teachers, students those who are interested to know about it. From the practical aspect, the study provides a guideline for bank managers, investors and bank supervisors as well. Bank managers could pay more attention to improve the performance of the bank by managing the credit risk properly. Bank thus can better arrange and allocate their resources regarding the position of credit risks. Besides, private investors can have a more comprehensive outlook of how profitability will be affected. Last but not the least, bank supervisor will be provided more evidence for the impact of credit risk management and to investigate or impose further regulations.

## **1.6. Limitations of Study**

The study has following limitations.

- a) Only 17 commercial banks of Nepal are undertaken as sample.
- b) Only the data from 2004-2015 have been used in the study.
- c) Capital adequacy ratio and non-performing loan ratio have been taken as credit risk indicators as defined by BCBS.
- d) Return on assets and return on equity have been taken as profitability indicators as defined by BCBS.
- e) Other indicators of credit risk management and profitability are not considered

## **1.7. Organization of Study**

The study is divided into five chapters. The first chapter is the introduction that deals with the background of study, statement of problems along with research questions, objectives, hypothesis, justification, limitations and organization of study.

The second chapter is the review of literature that consists of reviews various international and national context. This chapter is followed by third chapter and it is about the research methodology. This chapter includes research design, nature and sources of data, sample period covered tools and method of data collection, data organization and processing, tools and techniques of data analysis, model specification, variables specification, and hypothesis testing.

The fourth chapter is about data presentation and analysis. It shows the status of capital adequacy ratio and non-performing loan ratio. Similarly, here the relationship between credit risk indicators and profitability indicators has been identified. Finally the stability of relationship between credit risk indicators and profitability indicators is presented in this chapter. The fifth and final chapter deals with major findings, conclusion and recommendations.

## **CHAPTER - II**

### **REVIEW OF LITERATURE**

Review of literature is an integral part of the research process and makes a valuable contribution to almost every operational step. In initial step of research, it helps to clarify ideas, establish the theoretical roots of the study and develop research methodology. Later in the process, the literature review serves to enhance and consolidate knowledge base in subject area and helps to examine the findings in the context of the existing body of knowledge. Review of literature basically provides a theoretical background to study and status of the study on given subject matters that have already been done. It also established the links between what researchers propose to examine and what has. It enables to show how researchers' findings have contributed to the existing body of knowledge. It helps to integrate research findings into existing body of knowledge.

#### **2.1. International Context**

Ekanayake and Azeez (2015) investigated the determinant factors of ex-post credit risk considering non-performing loans (NPLs) as proxy variable in Sri Lanka's commercial banking sector and is carried out with a sample of nine licensed commercial banks for the period from 1999 to 2012. Non-performing loans are considered as the dependent variable in the study. The researcher has used OPE ratio to measure cost efficiency and ROA ratio as an indicator of performance efficiency.

The study finds that the level of NPLs can be attributed to both macroeconomic conditions and banks' specific factors. It reveals that, NPLs tends to increase with deteriorating bank's efficiency. There is also a positive correlation between loan to asset ratio and NPLs. Meanwhile, banks with high level of credit growth associated with a reduced level of non- performing loans. Larger banks incur lesser loan defaults compared to smaller banks. With regard to macro-economic variables, NPLs vary negatively with the growth rate of GDP and Inflation and positively with the prime lending rate. The two indicators that is loans to assets ratio and loan loss provision ratio that is used to measure the risk appetite of banks indicated a positive correlation with NPLs. With regard to



macro-economic variables GDP growth rate and inflation has recorded a significant inverse relationship while lending rate record significant positive influence.

Nomanet.al. (2015) studied the effect of credit risk on the profitability of banking sector of Bangladesh. Their study used an unbalanced panel data and 172 observations from 18 private commercial banks from 2003 to 2013. They used Non-Performing Loan to Gross Loan (NPLGL), Loan Loss Reserve Ratio (LLRGL), Loan Loss Reserve to Non-performing Loan Ratio, and Net interest margin as profitability indicators, using OLS random effect model, GLS and System GMM.

Their study found a robust negative and significant effect of NPLGL, LLRGL on all profitability indicators. The analysis also found a negative and significant effect of CAR and ROAE. As an additional analysis, their study also revealed that the effect of the Basel II is significantly positive on NIM but significantly negative on ROAE. More specifically it was found that 1 unit rise in NPLGL decreases ROAA by 0.05 units, ROAE by 0.54 units and NMM by 0.12 units respectively keeping other regressors constant and one unit increase in LLRRGL decreases ROAA by 0.1 units, ROAE by 1.25 units and NIM by 0.02 units keeping other explanatory variables constant.

Alshatti (2015) examined the effect of credit risk management on financial performance of the Jordanian commercial banks during period (2005-2013). He had selected thirteen commercial banks. This research aimed at investigating the effect of credit risk management on financial performance of the Jordanian commercial banks. Data from annual reports of the Jordanian commercial banks were used to analyze for the study years (2005-2013). The panel regression model was employed to estimate the effect of credit risk management indicators (Capital adequacy ratio (CAR), Credit interest/Credit facilities ratio, Facilities loss/Net facilities ratio, Facilities loss/Gross facilities ratio, Leverage ratio, Non-performing loans/Gross loans ratio) on the banks' financial performance.

The empirical findings showed that there is an effect of credit risk indicators of Non-performing Loans/Gross Loan Ratio on financial performance, and no effect of the Capital Adequacy Ratio and the credit interest/credit facilities ratio on banks' financial

performance measured by ROA. The researcher also found a positive effect of Nonperforming loans/Gross loans ratio, and negative effect of Provision for facilities loss/Net facilities ratio on bank's financial performance. The analysis also revealed that an effect of the Credit interest/Credit facilities ratio and the leverage ratio on bank's financial performance as measured by ROE. The results also reveal that the Capital adequacy ratio, Credit interest/Credit facilities and the leverage ratio don't affect the profits of the Jordanian commercial banks as measured by ROE, suggesting that other variables other than Capital adequacy ratio, Credit interest/Credit facilities and the leverage ratio effect on banks' profitability.

Gizaw, Kebede and Selvaraj (2015) empirically examined impact of credit risk on profitability of commercial banks in Ethiopia. Secondary data were used from audited financial reports of commercial banks and from national bank of Ethiopia. 8 banks were taken as sample that had been in operation from 2001 to 2012 were selected which resulted in a panel data of 96 observation. Descriptive statistics of study variable and panel data regression analysis was used to explore the relationship between risk and profitability performance.

The result revealed that credit risk profile of Ethiopian banks had been improving during the study period. The ratio of non-performing loan and loan loss provision ratio were sharply declining. Even as the loan loss provision was about 6%. The capital adequacy ratio of commercial banks was also found a little bit higher than regulatory requirement at local and international level, but the description analysis indicated commercial banks in Ethiopia have adequate capital to withstand shocks resulting from credit and other risk. The study also showed the positive relationship between loan loss provision and commercial banks performance.

Dawood (2014) studied factors effecting profitability of commercial banks in Pakistan for the period of 2009-2012 of 23 commercial banks. Researcher identified both internal and external factors. Internal factors included management policies, capital ratios, risks management etc. and external factors included inflation, government policies etc. Researcher analyzed only internal factors that have impact on profitability of commercial banks in Pakistan. Researcher used ordinary least square (OLS) method to look in to

impact of cost efficiency, liquidity, capital adequacy, deposits and size of banks on the profitability of commercial banks. Researcher used Return on Assets (ROA) of the commercial banks. Researcher used both descriptive statistics and econometric tools to analyze the data.

The finding of the study were that cost efficiency, liquidity and capital adequacy are those variables in the check of management that decide the profitability of commercial banks that were operated in Pakistan. Other variables like deposits and size of bank did not demonstrate any impact on profitability. The negative value of the coefficient indicates this that negative relationship exists between cost efficiency and profitability. Size of the bank and profitability show insignificant positive relationship which means that the size does not lead any type of profitability for the commercial banks or banks are not attaining the advantage of economies of scale. Overall it is resolved that cost efficiency, liquidity, capital adequacy, deposits and size are the major internal determinants of profitability of commercial banks in Pakistan.

Engdawork (2014) empirically examined the quantitative effect of credit risk on the performance of commercial banks in Ethiopia considering variables related to lending activities over the period of 5 years (2008-2012). The empirical investigation uses the accounting measure of Return of Assets (ROA), which is the dependent variable to represent bank's performance. The econometric method involved the assessing the impact of select internal variables, the provision to total loans, loan to total asset, credit administration (cost to total cost) and natural logarithm of total assets (Economies of Scale), on the performance of banking sector. He used multiple regression model to measure the relative weighting of the independent variables on a dependent variable. Similarly, he used descriptive statistics for trend analysis. A non-probability method of judgmental sampling technique is employed in selecting eight banks into the sample and data are sourced from the annual report of the same banks which account for over eighty percent of the total loan and advance in the industry.

The study found that the selected variables: the provision to total loans, loan to total assets, credit administration (cost to total loans) and size (economies of scale) have significant effect. The coefficient of the ratio of provision to total loans (PRTL) variable

in the regression model which is an indicator of the level of credit risk has negative effect on profitability. In addition the variable is significant in explaining the effect of credit risk on the return on assets of Ethiopian commercial banks. The credit administration cost (cost to loan ratio), which reveals the intermediation efficiency in terms of cost, appears most important determinant variable on the profit of Ethiopian commercial banks. The other variable, the natural logarithm of total asset (economies of scale) which is usually used to measure for bank's size appears to have a positive relationship with performance.

Kurawa and Garba (2014) assessed the effect of credit risk management on the profitability of Nigerian banks. Data were generated from secondary sources. Descriptive statistics, correlation, as well as random-effect generalized least square (GLS) regression techniques were utilized as tools of analysis in study. Researchers' assesses the effect of credit risk management (CRM) on the profitability of Nigerian banks with a view to discovering the extent to which default rate (*DR*), cost per loan asset (*CLA*), and capital adequacy ratio (*CAR*) influence return on asset (*ROA*) as a measure of banks' profitability. Data were generated from secondary sources, specifically, the annual reports and accounts of quoted banks from 2002 to 2011. The research design used for the study is ex-post facto research design. The population of interest comprised all quoted banks that operate in Nigeria.

The findings establish that credit risk management measured by three independent variables has a significant positive effect on the profitability of Nigerian banks as indicated by the co-efficient of determination "R<sup>2</sup> Value" which showed the within and between values of 40.89% and 58.35% while overall R<sup>2</sup> is 43.91% indicating that the variables considered in the model accounts for about 44% change in the dependent variable, i.e. probability. Two independent variables, *DR* ratio and *CLA* ratio, have indicated a clear and strong positive relationship with the independent variable *ROA*. These two independent variables are influenced by loan losses, operating expenses, and the proportion of non-performing loans which are the key determinants of asset quality of a bank.

Abiola and Olausi (2014) have investigated the impact of credit risk management on the performance of commercial banks in Nigeria. Financial reports of seven commercial

banking firms were used to analyze for seven years (2005-2011). Panel regression model was employed for the estimation of the model. In the model, return on equity (ROE) and return on assets (ROA) were used as the performance indicators while non-performing loans (NPLs) and Capital Adequacy Ratio (CAR) as credit risk management indicators. The study is both historical and descriptive as it seeks to describe the pattern of credit risk of Nigerian banks in the past, also to empirically examine the quantitative impact of credit risk management on the commercial banks performance in Nigeria over the period of years (2005-2011) a non-profitability method in the form of judgment sampling technique was employed. Seven out of twenty banks in Nigeria were selected.

The study revealed that credit risk management has a significant impact on the profitability of commercial banks' in Nigeria. The findings indicate that the sampled have poor credit risk management practices; hence the high levels of the non-performing loans in their loans portfolios. Despite the high levels of the NPLs, their profit levels keep rising as an indication of the transfer of the loan losses to other customers in the form of large interest margins. The study also revealed that commercial banks with higher capital adequacy ratio can better advance more loans and absorb credit losses whenever they crop up and therefore record better profitability.

Garr (2013) examines bank-specific, industry-specific and macroeconomic factors that influence credit risk (CR) in commercial banks in Ghana using unbalanced panel data set from 33 commercial banks covering the 21-year period 1990 to 2010. The study employed annual time series data from 1990 to 2010. In this research, bank ownership and efficiency of management are the two bank-specific variables used. Two industry-specific factors have been used in this research. These are competition and the financial sector development. This research has investigated the following variables and their effect on credit risk: the Treasury bill rate, the discount rate, Government borrowing, inflation, the GDPPC and the required reserve. An annual time series data for the period 1990 to 2010 has been used for this study.

It has been found that there is no significant relationship between bank ownership, FSD1, Government securities, Treasury bill rate, the discount rate and the GDPPC on one hand and CR1, while management inefficiency, government borrowing and FSD2 have

significant relationship with the CR1. While management efficiency has a positive relationship Government borrowing and FSD2 have a negative relationship. An increase in management inefficiency is supposed to lead to a higher CR1. An increase in Government borrowing and an improvement in the FSD2 (bank assets/GDP) is supposed to lead to a decline in CR1. Again the regression analysis reveals a positive relationship between management inefficiency and GDPPC on one hand and CR2.

Erina and Lace (2013) determined the impact of the external and internal factors of bank performance on the profitability indicators of the Latvian commercial banks in period 2006 to 2011. In order to obtain research results they evaluated return on assets (ROA) and return on Equity (ROE) indicators of Latvian commercial banks. In the research the authors analyzed the Latvian commercial banks and branches of foreign banks, as well as credit institutions incorporated in the European Economic Area countries or their branches in Latvia for the time period from 2006 till 2011. The balance sheet data used in the study were derived from financial stability accounts of the Bank of Latvia and data available on the internet homepage of the Association of Latvian Commercial Banks.

On the basis of obtained results, they have concluded that profitability has had a positive effect on operational efficiency, portfolio composition and management, while it has had negative effect on the capital and credit risks, as measured according to ROA, while according to ROE, positive influence was exerted on composition of capital portfolio and negative on operational efficiency and credit risk. On the basis of the obtained results, the authors conclude that profitability has had a positive effect on operational efficiency, portfolio composition and management, while it has had a negative effect on the capital and credit risks, as measured according to ROA, while according to ROE, positive influence is exerted on composition of the capital portfolio and negative – on operational efficiency and credit risk. With regard to macroeconomic indicators, the authors have revealed that GDP has a positive impact on profitability as measured by ROA and ROE.

Adeusi et.al. (2013) focused on the association of risk management practices and bank financial performance in Nigeria. They used secondary data from 4 year progressive annual reports and financial statements of 10 banks and a panel data estimation technique adopted. Data for this study consists of annual observations on 10 Nigeria banks between

2006 and 2009. The model takes the form:  $Y_{nt} = \alpha + \beta_{nt}X_{nt} + e_{nt} \dots$  (1) Where  $i = 10$  cross sections and periods  $t = 2006 - 2009$ .  $Y_{nt}$  is a dependent variable which represents bank profitability measured by the return on equity (ROE), and return on asset (ROA) and  $X_{nt}$  is a vector of the independent variables which represent liquidity, credit, and capital risks.

The result implied an inverse relationship between financial performance of banks and doubt loans, and capital asset ratio was found to be positive and significant relationship between banks performance and risk management. The diagnostics statistics such as F-statistics and likelihood ratio indicates that the model is fit. In the first model where return on capital employed (ROCE) was used as dependent variable, cost of bad loan was found to be a negative but significant (5%) influence of bank performance. Similarly, managed funds was found to be positive and significant (5%) suggesting that the higher the managed funds by banks, the higher the performance of banks in Nigeria. Similar results were obtained when return on capital asset (ROA) and return on equity (ROE) was used as dependent variables.

Kolapo, Ayeni and Oke (2012) carried out an empirical investigation into the quantitative effect of credit risk on the performance of commercial banks in Nigeria on the period of 11 years (2000-2011). They studied five commercial banking firms on a cross sectional basis for eleven years. The traditional profit theory was employed to formulate profit, measured by Return on Asset (ROA), as a function of the ratio of non-performing loan to loans and advances (NPL/LA), ratio of Total Loan and advances to total deposit (LA/TD) and the ratio of loan loss provision to classified loan (LLP/CL) as measure of credit risk. Panel model analysis was used to estimate the determinants of the profit function.

Their results showed that the effect is similar across banks in Nigeria, though the degree to which individual banks are affected is not captured by the method of analysis employed in their study. A 100 percent increase in non-performing loan reduces profitability (ROA) by about 6.2 percent, a 100 percent increase in loan loss provision also reduce profitability by about 0.65 percent while 100 percent increase in total loans and advances increases profitability by 9.6 percent. Loan and Advances ratio (LA)

coefficient exerts most significant positive effect on the profitability across the banking firms.

Abdullah, Khan and Nazir (2012) evaluated firms level aspects which have more influence on the credit risk managing of domestic and foreign banks in Pakistan. Secondary data for the period of 2001 to 2010 were used. Augmented Dickey-Fuller Test was used for checking stationary, while for long run relationship Johansson's co-integration test was used. Linear regression model is used for co-efficient analysis techniques. Data was collected from the bank's annual reports over the period 2001-2010. Financial data from these annual reports was used to calculate and to evaluate the credit risk management of domestic and foreign banks in Pakistan.

The result of  $R^2$  showed that the model was best fit for both domestic banks and foreign banks. Bank size have positive and significant relationship with credit risk in domestic banks and positive and insignificant in foreign banks. Liquid assets and credit risk have positive and insignificant impact on foreign banks. Study observes the credit risk management by taking comparative study between Domestic and Foreign banks in Pakistan. The study found that the relationship of bank size with credit risk is positive and significant in domestic banks and positive and insignificant in foreign banks. The relationship of debt to equity ratio with credit risk is positive and significant both in domestic and foreign banks. The results further show that the relationship of investment to assets ratio with credit risk is positive and insignificant both in domestic and foreign banks. The relationship of Return on equity with credit risk is positive and insignificant both in domestic and foreign banks. The relationship of liquid assets with credit risk is positive and insignificant in domestic banks and negative and significant in foreign banks.

Chen and Pan (2012) had examined the credit risk efficiency of 34 Taiwanese commercial banks over the period of 2005-2008. Their study used financial ratio to assess the credit risk and was analyzed using Data Envelopment Analysis (DEA). The credit risk parameters were Credit risk technical efficiency (CR-TE), credit risk allocative efficiency (CR-AE) and Credit risk cost efficiency (CR-CC). DEA is a widely applied approach for measuring the relative efficiencies of a set of decision making units (DMUs) which use



multiple inputs to produce multiple outputs. It is used to evaluate the relative efficiency of a set of comparable entities with making simultaneous use of multiple inputs and outputs.

The result indicated that only one bank was efficient in all types of efficiencies over the evaluated periods. Overall, the DEA results show relatively low average efficiency levels in CR-TE, CR-AE and CR-CE in 2008. The DEA results show relatively low average efficiency levels in CR-TE, CR-AE and CR-CE in 2008. It is possible to have the adverse effects in the average efficiency scores due to the global financial crisis over the period of analysis for the banking systems in our sample. However, in order to analyze the relevance between credit risk efficiency and profitability of the DMUs over the four years, researchers' utilize the individual mean of CR-TE as the measurement of the competitiveness and employ the individual mean of EPS to measure the profitability of each bank over the years from 2005 to 2008.

Aduda and Gitonga (2011) showed that there was a relationship between credit risk management and profitability such that credit risk management affect profitability. The researcher also used secondary sources. The data for the banks was extracted from the banks' annual reports and financial statements for a ten year period 2000-2009. These were obtained from the NSE library, the respective banks' secretaries, and the banks supervision department at the central bank of Kenya. The researcher used ROE as the indicator of the profitability in the regression analysis, because ROE has been widely used in earlier research. The researcher chose NPLR (NPL ratio) as the independent variable because it is an indicator of risk management which affects profitability of banks. NPLR indicates how banks manage their credit risk because it defines the proportion of NPL amount in relation to TL amount.

According to researchers, Return on Equity measured a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. Similarly, they used NPLR as an independent variable and found that NPLR was linearly related with the dependent variable (ROE) and they used simple regression model to forecast ROE for commercial banks. Results show that there is a relationship between credit management and profitability such that credit management affects

profitability. Various ratios are used to ascertain profitability. These include return on income ratio, return on equity and cash return on asset ratio. Return on equity is the commonly used ratio followed by return on income.

Zribi and Boujelbène (2011) examined the determinants of credit risk held by Tunisian bank over 1995 to 2008 periods. The researchers' sample consists of a panel of 10 commercial banks that are listed on the Stock Exchange of Tunis over the period 1995 to 2008. The data used in this paper are collected from the annual reports of the Professional association of the Tunisian banks and financial establishments; the activity reports of the Banks, the guides of the Tunis stock exchange, the Documents of the council of financial market and the Web sites news of the companies, the stock exchange and the central bank of Tunisia. Researcher employed the ratio of risk-weighted assets to total assets as a measure of bank credit risk.

Their empirical results showed that the public ownership increases the bank credit risk. The prudential regulation of capital decreases the credit risk taken by Tunisian banks which resulted accounts for the willingness of these banks' to respect the bank regulations. Besides, the banks' characteristics are also important factors influencing the level of risk taken by Tunisian banks. Indeed, the ratio of Return on Assets (ROA) is positively related with credit risk and ratio of capital adequacy ratio is negatively associated with credit risk. Then, the result indicated that the bank credit risk taking decisions are also related to banks' macroeconomic indicators.

Ara, Bakaeva and Sun (2009) used regression model for their empirical analysis. In their research they defined ROE as profitability indicator while NPLR and CAR as credit risk management indicators. The data were collected from four commercial banks from Sweden from the sample banks annual reports (2000-2008). The study was limited to identifying the relationship of credit risk management and profitability of four commercial banks in Sweden. Furthermore, as study only uses the quantitative approach and focuses on the description of the outputs from SPSS, the reasons behind will not be discussed and explained. Researchers' have used regression model to do the empirical analysis. In the model researchers have defined ROE as profitability indicator while NPLR and CAR as credit risk management indicators. The data is collected from the

sample banks annual reports (2000-2008) and capital adequacy and risk management reports (2007-2008).

Among the two credit risk management indicators, NPLR has a significant effect than CAR on profitability (ROE). The analysis is on each bank level shows that the impact of credit risk management on profitability differs. The findings and analysis reveal that credit risk management has effect on profitability in all 4 banks. Among the two credit risk management indicators, NPLR has a significant effect than CAR on profitability (ROE). The analysis on each bank level shows that the impact of credit risk management on profitability is not the same. Basel II application has strengthened the negative impact of NPLR on ROE. Unlike effect of Basel I, CAR has positive and insignificant effect on ROE.

## **2.2. National Context**

Poudel (2012) tried to explore various parameters pertinent to credit risk management as it affect bank's financial performance. Such parameters covered in the study were default rate, cost per loan assets and capital adequacy ratio which was presented in descriptive statistics, correlation and regression was used to analyze the data. The study covered the period from 2001 to 2011. Secondary data was used for the study. The data was analyzed by calculating the profitability for each year for the period of study. The trend analysis was done by computing the profitability ratio to default rate, cost per loan and capital adequacy ratio.

The result showed that credit risk indicator is an important predictor of bank financial performance. Thus, success of bank performance depends on risk management. The study results showed that default rate as one of the risk management indicators is a major predictor of the bank financial performance to the extent of 56% and followed by capital adequacy ratio at 25%, credit risk management is crucial on bank performance since it have a significant relationship with bank performance and contributes upto 22.6% of the bank performance.

Jha and Hui (2012) compared the financial performance of different ownership structured commercial banks in Nepal based on their financial characteristics and identify the

determinants of performance exposed by the financial ratios which were based on CAMEL model. Eighteen commercial banks for the period 2005 to 2010 were financially analyzed. Econometric model (Multivariate regression analysis) by formulating two regression model was used to estimate the impact of capital adequacy ratio, non-performing loan ratio, interest to total loan, net interest margin ratio and credit to deposit ratio on the financial profitability namely return on assets and return on equity of these banks.

The results show that the public sector banks are significantly less efficient than their counterpart are, however domestic private banks are equally efficient to foreign owned (joint-venture) banks. Furthermore, the estimation results reveal that return on assets was significantly influenced by capital adequacy ratio, interest expenses to total loan and net interest margin, while capital adequacy ratio has considerable effect on the return on equity. Though financial ratios analysis compares the financial performance among commercial banks, the same bank had different ranks under the different financial ratios. The ROAs of public sector banks were higher than those of joint venture and domestic public banks due to having utmost total assets but the overall performance of public sector banks was not observed sound because other financial ratios including ROE, CDR, and CAR of most of the joint venture and domestic public banks were found superior. High overhead costs, political interventions, poor management and low quality of collateral created continued deterioration in the financial health of the public sector banks. The values determined for the financial ratios reveal that joint venture and domestic public banks are also not so strong in Nepal to manage the possible large-scale shocks to their balance sheet.

Bhattarai (2015) examined the effect of credit risk on performance of Nepalese commercial banks. He used descriptive statistics and casual comparative research design for the study. The pooled data of 14 commercial banks for the period of 2010 to 2015 have been analyzed using regression model. The convenience sampling method was used in choosing the banks for the study. Data were sourced from the annual reports of the banks in the sample. The data include time-series and cross-sectional data, i.e. pooled data set and estimated the effect of credit risk on the performance of commercial banks

using pooled data regression. Pooled data regression model has been used in the analysis. The technique of pooled data estimation takes care of the problem of heterogeneity in the 14 banks selected for the study.

The regression result revealed that non-performing loan ratio has negative effect on bank performance whereas cost per loan assets has positive effect on bank performance. In addition to credit risk indicators, bank size has positive effect on bank performance. Capital adequacy ratio and cash reserve ratio are not considered as the influencing variables on banks performance. The study concludes that there is significant relationship between bank performance and credit risk indicators. The findings of this study indicate that the sampled commercial have poor credit risk management practices. This is evidenced by the insignificant result of 'capital adequacy ratio' and the negative coefficient of 'non-performing loan ratio'. The insignificant result of 'capital adequacy ratio' indicates that capital adequacy ratio could not be regarded as the influencing variable for bank performance. The study concludes that 'non-performing loan ratio' has negative effect on bank performance whereas 'cost per loan assets' has positive effect on bank performance.

### **2.3. Research Gap**

From the review of literature at both national and international context, the study had made a conclusion that banking development and strength play an important role in the economic growth and its stability. The stability of the bank depends on the profitability and capital adequacy as well. The review shows that there is somehow lacking of analyzing the relationship, role and stability between credit risk management indicators and profitability indicators of commercial banks. There have been various arguments given by different researchers on the proxy of credit risk indicators and profitability indicators. Besides, in Nepalese context, very less research has been found on the issues. There is no a single conclusion in this regard. Thus, the study focused on the two major parameters of profitability (ROE and ROA). The proxies of credit risk management being CAR and NPLR.

## CHAPTER - III

### RESEARCH METHODOLOGY

Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. Relatively simple research is merely aimed at acquiring the most basic type of information—but it is still research in a very real sense because it requires an individual to first identify and then understand the problem, then find out *where* to go for information and *whom* to ask, and also know *what* questions to ask (Adams et.al., 2007). Fundamentally, research is undertaken in order to enhance our knowledge of what we already know; to extend our knowledge about aspects of the world of which we know either very little or nothing at all, and to enable us to better understand the world we live in.

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. Research methodology is the science and philosophy behind *all* research. It goes into the heart of how we know what we know and allows us to understand the very strict constraints placed upon our concept of what knowledge actually is. Moreover, it allows us to understand the different ways in which knowledge can be created. This is especially important since if we know how knowledge and ‘answers’ to research questions can be created, then we are also in a position to understand what might be wrong with it. The concepts that underpin the subject of ‘methodology’ also enable us to be critical and analytical in the face of ‘knowledge’ being presented as ‘fact’. The whole purpose of research is to extend and deepen our knowledge of the world, but if we are uncritical of how such knowledge was or is created, then we can never be in a position to improve its value to society.

#### 3.1. Research Design

The research design is the conceptual structure within which research is conducted. Decisions regarding what, where, how, when, and by how much inquiry or research or study constitute a research design (Kothari, 2004). It constitutes the blueprint for the

collection, measurement, analysis and interpretation of data. As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data.

This research is an inductive. It has moved from particular to general. The research has undertaken the study of 17 commercial banks and are generalized to the other 29 commercial banks.

Similarly, the research is both quantitative and descriptive. The quantitative tools such as correlation, regression are being used. Similarly, descriptive statistics like graph, tables and central tendency and dispersion are being measured.

The research is an ex-post facto used in quantitative analysis examining from three perspectives. It is fully based on secondary data of 12 years collected from 2004-2015. A non-probability sampling technique has been used for selecting the sample of 17 commercial banks using 204 panel observations. Data were collected from concern bank's annual report and banking and financial statistics of NRB. The research is designed in such a way to observe a linear relationship between credit risk indicators (CAR and NPLR) and profitability indicators (ROE and ROA). A panel data regression model has been used to estimate the linear relation between the variables.

### **3.2. Nature and Sources of Data**

The study is fully based on secondary data for 12 years from 2004 – 2015. It is panel (longitudinal) data. It is combination of both cross-sectional and time series data. The required data and information were collected from various books, booklets, research reports, seminar reports, journals, research articles, balance sheet and income statements of sampled commercial banks, and dissertations etc. published from concerned offices and institutions like Ministry of Finance, Nepal Rastra Bank, concerned sampled commercial banks, Central Bureau of Statistics, website of NRB and sample commercial banks etc.

### **3.3. Sample Period Covered**

The study used 12 years as sample period from 2004-2015. It forms 204 panel observations (appendix I). The sample period is considered from 2004 as Nepal had an

unstable political situation when the Maoist conflict was on the peak that makes very high the degree of credit risk and uncertain profitability situation of commercial banks of Nepal during the transition phase of Nepal

### **3.4. Population, Sample and Sampling Procedure**

There are 29 commercial banks in Nepal (NRB, 2015) as population of the study out of which 17 commercial banks are selected as sample units with the help of non-probability sampling method. It is moreover convenience sampling which is primarily guided by the convenience to the researcher w. r. t. accessibility, easy to contacts, and geographical proximity.

### **3.5. Tools and Methods of Data Collection**

Since the data and information are secondary in nature, there is no any specific tool and method used in data collection. However, the required data and information were collected visiting central offices of the sampled commercial banks by the researcher himself. Besides, the study also used various annual publications issued by the NRB and sampled commercial banks also using websites of concerned institutions.

### **3.6. Data Organization and Processing**

The collected raw data and information were organized and processed in such ways that help to provide answers of the given research questions, justify objectives, and to test hypotheses of the study. For the purpose of establishing relationship between credit risk management and profitability of banks, the credit risk indicators as well as profitability indicators are quantified using various tools and methods.

### **3.7. Tools and Techniques of Data Analysis**

The study postulates the joint and simultaneous existence of relationships between two or more than two variables. So, the study used various tools for multivariate relations like descriptive statistics, correlation and regression analysis (Johnston and DiNardo, 1997). Descriptive statistics tools such as tables, graphs, central tendency and dispersion were used to show the trend of the variables. Similarly, correlation, regression, standard error, coefficient of determinants, adjusted coefficient of determinants, t-test, F-test, D-W test,



were used to show the degree of relationship between or among the variables. Both descriptive and quantitative methods of analysis were used.

- a. Tables:** - Tables are the most common method of presenting data analyses in quantitative studies. Tables offer a useful means of presenting large amounts of detailed information in a small space. Tables can be boon for readers. They can diagrammatically clarify text, provide visual relief, and serve as quick point of reference.
- b. Graphs:** - Graphic presentations can make analyzed data easier to understand and effectively communicate what it is supposed to show. The main objective of data is to present data in a way that is easy to interpret and interesting to look at. Graphs can be constructed for every type of data – quantitative or qualitative – and measured for any type of variable.
- c. Correlation Analysis:** - The primary objective of correlation is to measure the strength or degree of linear association between two or more variables. In correlation, there is no distinction between the dependent and explanatory variables. Most of the correlation theory is based on the assumption of randomness of variables.

$$r_{xy} = \frac{n \sum XY - \sum X \sum Y}{\sqrt{[n \sum X^2 - (\sum X)^2] [n \sum Y^2 - (\sum Y)^2]}} \quad (\text{Gupta, 2003})$$

- d. Regression Analysis:** - Regression analysis is concerned with the study of the role of one or more independent variables as explanatory variables on one dependence variable. In regression analysis there is an asymmetry in the way the dependent and explanatory variables are treated. The dependent variable is assumed to be stochastic that have a probability distribution whereas explanatory variables are fixed or non-stochastic.

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + \epsilon \quad (\text{Greene, 2003})$$

- e. Coefficient of Determination (R<sup>2</sup>):**- It is the percentage of the total variation in the dependent variable explained by the explanatory variables that can be calculated as

$$R^2 = 1 - \frac{e'e}{Y'Y - n\bar{Y}^2} \quad (\text{Greene, 2003})$$

The value of R<sup>2</sup> lies in between 0 to 1. If it is 1, the fitted regression line explains 100 percent of the variation in dependent variable. If it is 0, the model does not explain any of the variation in dependent variable. However, R<sup>2</sup> lies between these extreme values. The

fit of the model is said to be ‘better’ the closer  $R^2$  is to 1. The higher  $R^2$  is the closer the estimated regression equation fits the data (Gujarati and Porter, 2010).

**Adjusted R-squared:** -Adjusted  $R^2$  version of co-efficient of determination is adjusted for degree of freedom while  $R^2$  will never decrease when adding a variable to the regression. Adjusted  $R^2$  will rise or fall, depending on whether the contribution of the new variable to the fit of the regression more than offsets the correction for the loss of an additional degree of freedom.

$$\bar{R}^2 = (1 - (1 - R^2) \frac{n - 1}{n - k}) \text{ (Gujarati and Porter, 2010)}$$

### 3.8. Model Specification

The study is used the pooled OLS regression or Constant co-efficient model. The general regression model is as follow:

$$Y_i = \alpha_0 + \beta_1 X_{1,i} + \beta_2 X_{2,i} + \dots + \beta_k X_{k,i} + \epsilon_{k,i} \text{ (Greene, 2003)}$$

Where,

$Y_i$  = dependent variable

$X_i$  = independent variable

$\alpha$  = Intercept or constant

$\beta_i$  = slope or coefficients

$\epsilon_i$  = residual

$i$  goes from 1 to  $n$  and indicates the number of observation

It is assumed that the explanatory variables are non-stochastic. It is also assumed that the error term  $\epsilon_{k,i} \sim iid(0, \sigma_\epsilon^2)$ , that is, it is independently and identically distributed with zero mean and constant variance. (Gujarati and Porter, 2010).

However, the study used two regression models like -

$$ROE_{i,t} = \alpha_0 + \beta_1 CAR_{i,t} + \beta_2 NPLR_{i,t} + \beta_3 TA_{i,t} + \beta_4 CRR_{i,t} + \beta_5 LLP_{i,t} + \beta_6 CLA_{i,t} + \epsilon \text{----- (i)}$$

$$ROA_{i,t} = \alpha_0 + \beta_1 CAR_{i,t} + \beta_2 NPLR_{i,t} + \beta_3 TA_{i,t} + \beta_4 CRR_{i,t} + \beta_5 LLP_{i,t} + \beta_6 CLA_{i,t} + \epsilon \text{----- (ii)}$$

Where,

$ROE_{i,t}$  = Return on Equity of  $i^{\text{th}}$  bank at time  $t$

$ROA_{i,t}$  = Return on Asset of  $i^{th}$  bank at time  $t$   
 $CAR_{i,t}$  = Capital Adequacy Ratio of  $i^{th}$  bank at time  $t$   
 $NPLR_{i,t}$  = Non-performing Loan Ratio of  $i^{th}$  bank at time  $t$   
 $TA_{i,t}$  = Total assets of  $i^{th}$  bank at time  $t$   
 $CRR_{i,t}$  = Cash Reserve Ratio of  $i^{th}$  bank at time  $t$   
 $LLP_{i,t}$  = Loan Loss Provision of  $i^{th}$  bank at time  $t$   
 $CLA_{i,t}$  = Cost per loan asset of  $i^{th}$  bank at time  $t$   
 $\alpha$  = intercept  
 $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$  = coefficients or slopes

### 3.9. Variable Specification

The study used four variables as given below. As mentioned before the variables used are Return on Equity (ROE), return on Asset (ROA), Capital Adequacy Ratio (CAR), Non-performing Loan Ratio (NPLR) and Bank Size. ROE and ROA are dependent variables while independent variables include CAR and NPLR at each model. Moreover, Bank size is represented by natural logarithm of total assets (LNTA).

- a) **Return on Equity (ROE):-** ROE is the value the overall profitability of the fixed income per unit of currency of equity which is defined as -

$$ROE = \frac{\text{Net Income}}{\text{Total Equity Capital}} \quad (\text{Saunders \& Marcia, 2011})$$

It measures the amount of net income after taxes earned for each unit of currency of equity capital contributed by the bank's shareholders. In general, stockholders of bank prefer higher ROE. However, the increasing of ROE demonstrates the increasing risk. For example, as defined equation indicates if total equity capital decreases relative to net income, ROE will have an increase under constant of net income. A large drop in equity capital may results in violation of minimum regulatory capital standards and increases the risk of insolvency for the banks (Saunders & Marcia, 2011). In order to identify potential problems, ROE can be decomposed into two component parts

$$ROE = \frac{\text{Net Income}}{\text{Total Assets}} \times \frac{\text{Total Income}}{\text{Total Equity Capital}}$$

$$ROE = ROA \times EM \text{ (Van Horne \& Wachowicz, 2009)}$$

Where,

ROA= Return on Assets (a measure of profitability linked to the asset size of banks)

EM=Equity Multiplier (a measure of leverage)

Net income = It is the profit after tax

ROE determines the net income produced per unit of currency of assets funded with each currency of equity capital. The higher EM ratio indicates the more leverage (or debt) that is used by banks to fund its assets. High EM ratio and ROA ratio have positive influence on ROE ratios. However, the source of high ROE needs to concern by the bank's manager. For example, increasing EM generates increasing ROE ratio while the leverage of bank has also enhanced as it is also the solvency risk (Saunders & Marcia, 2011).

- b) Return on Assets (ROA):-** ROA is the ratio of net income of total assets that measures the profitable and efficiency of a bank's management that is based on the total assets (Guru et al, 1999). ROA can be disintegrated into the following elements.

$$ROA = \frac{\text{NetIncome}}{\text{TotalOperatingIncome}} \times \frac{\text{TotalOperatingIncome}}{\text{TotalAssets}}$$

$$ROA = PM \times AU \text{ (Van Horne \& Wachowicz, 2009)}$$

Where,

PM=Net income generated per dollar of total operating income

AU= Amount of interest and non-interest income generated per dollar of dollar assets.

Therefore, high value of PM and AU ratio generate higher ROA and ROE. PM measures the capacity of bank on the expense controlling. And expense control and bank's profit have positive relationship. AU values the bank's capacity to generate income from assets (Saunders & Marcia, 2011). But high PM and AU value also demonstrate the potential risks. For example, PM will have an improvement when a bank reduces its expenses of salaries and profits. While if the reduction of expense is due to the loss of high skilled employees the raise of PM and ROA exist an underlying 'labor quality' problem (Saunders & Marcia, 2011). ROA can be also disintegrated into the following elements.

$$ROA = \frac{II-IE}{TA} + \frac{NII-NIE}{TA} - \frac{\text{Provisions}}{TA} \quad \text{(Van Horne \& Wachowicz, 2009)}$$

Where,

II= Interest income

IE=Interest expense

NII=Non-interest Income

NIE=Non-interest expense

TA=Total Assets

This equation can be stated as:

$$ROA = \text{net interest margin} + \text{Non interest margin} - \text{provision to total assets}$$

Based on the equation of ROE, we can restate ROE as

$$ROE = (\text{NETIM} + \text{NONIM} - \text{PROV}) \times \text{EM} \text{ (Van Horne\&Wachowicz, 2009)}$$

Where,

NETIM=Net interest margin

NONIM=Non-interest margin

PROV=Provision to total assets

EM=Equity multiplier

This equation indicates that bank can maximizes stockholders' wealth through maximizing NETIM, NONIM and EM as well as minimizing PROV (Fathi et al., 2012).

- c) **Capital Adequacy Ratio (CAR):-** Capital adequacy ratio (CAR) is defined as the ratio of capital to the risk-weighted sum of bank's assets (Hyun & Rhee, 2011). It measures the amount of a bank's capital relative to the amount of its risk weighted credit exposures (Reserve Bank of New Zealand, 2007). Capital-based regulation has become a major issue in the banking industry after financial crisis in 2007 caused by subprime mortgage problems. Losses on mortgages and other mortgage-related securities significantly decrease the capital base of many banks. To keep the minimum capital adequacy ratio and secure against underlying losses, capital-constrained banks began to collect outstanding loans or became reluctant to grant new lending (Hyun& Rhee, 2011). The specific calculation of capital adequacy ratio is estimated by dividing total capital by total risk-weighted-assets (Reserve Bank of New Zealand, 2007) (see Appendix II for its Calculation).

$$CAR = \frac{\text{Total Capitals}}{\text{Risk Weighted Assets}} \quad (\text{BCBS, 2001})$$

**d) Non-performing Loan Ratio (NPLR):-** A loan is normally defined as non-performing when customer's payments are arrears (Saunders and Cornett, 2008). Generally, default can be defined in the following ways according to Nepal Rastra Bank (NRB, 2010)

- Non-payment of interest 90 days after the interest due date
- Non-payment of a loan 90 days after the loan maturity date
- Restructuring of the borrower's loans
- Filing for bankruptcy, the appointment of administrators, liquidation, and so on

Late payment is often characterized a non-performing loans (NPLs) rather than a defaulted loan if the borrower is still undertaking business. Nevertheless, at some point, irrespective of the state of the borrower, an NPL will be written off as a default loss. The write-down which must be funded out of the bank's capital is often at 100% of outstanding notional value. The bank might recover a percentage but at some later date (Chaudhry, 2011).NPLR is the ratio of non-performing loans to total loans (BCBS, 2001). The equation can be defined as:

$$NPLR = \frac{NPLs}{Total\ Loans}(BCBS, 2001)$$

Where,

NPLR=Non-performing loan ratio

NPLs=Non-performing loans

**e) Control Variables (LNTA):-** To minimize the influence or effect of extraneous variable(s), an additional variable is introduced as control variable. Independent variables that are not related to the purpose of the study, but may affect the dependent variable are termed as extraneous variables. These extraneous variables are not merely possible causes, they are plausible causes. So the variables used as control variables are

i) **Bank size:-**Bank size as measured by total assets is one of the control variables used in analyzing performance of the bank system (Smirlock, 1985). Bank size is generally used to capture potential economies or diseconomies of scale in the banking sector. This variable controls for cost differences in product and risk diversification according to the size of the financial institution. This is included to control for the possibility that large banks are likely to have greater product and loan diversification. In most finance literature, natural logarithm of total assets of the banks is used as a proxy for bank size.

The effect of bank size on profitability is generally expected to be positive (Smirlock, 1985). Likely, a positive relationship between size and bank profitability could be found if there are significant economies of scale (Akhavain et al. 1997; Bourke 1989; Molyneux and Thornton 1992; Bikker and Hu 2002; Goddard et al. 2004).

- ii) **Cash Reserve Ratio (CRR):-** Cash reserve ratio is one of the control variable used in analyzing effect of credit risk on the performance of banks. Traditionally, cash reserve ratio (CRR) has been one of the monetary tools in the hands of the central bank. *Cash reserve ratio (CRR)* is a specified minimum fraction of the total deposits of customers which commercial banks have to hold as *reserves* with the central bank. By changing *CRR*, the central bank *can* control the amount of liquidity. If the reserve requirement is raised, banks will have less money to loan out and this effectively reduces the amount of capital in the economy, therefore lowering the money supply. It will mean less money for investment and spending, and would stunt the growth of the economy. It would also mean that banks earn less interest and expect that their profitability may decline. Moreover, cash reserve requirement does not earn *any* income for the commercial banks and thus, may be viewed as a drain on the profitability of banks (Handa, 2009).
- iii) **Loan Loss Provision:-** Loan loss provision is an expense set aside as an allowance or uncollected loans and loan payments. These provision is used to cover a number of factors associated with potential loan losses including bad loans, customers defaults and renegotiated term of a loan that incur lower than previously estimated payments. Loan loss provisions are an adjustments to loan loss reserves and can also be known as valuation allowances. Banking industry lenders generate revenue from the interest and expenses they receive from lending products. Bank lend to avoid wide range of customers including consumers, small businesses and larger corporations. Lending standards and reporting requirements are constantly changing, and constraints have been rigorously tightening since the height of financial crisis 2008 (Ross, Westerfield and Jordan, 2013).
- iv) **Cost per Loan Asset: -**Cost per loan asset (CLA) is the average cost per loan advanced to customer in monetary term. Purpose of this is to indicate efficiency in distributing loans to customers (Ross, Westerfield and Jordan, 2013). CLA ratio can be calculated as:

$$CLA Ratio = \frac{Total Operating Cost}{Total Amount of Loans} \text{ (Ross, Westerfield and Jordan, 2013)}$$

The variables used in this research are summarized in the following table.

Table 3.8. Summary of Variables

Status of Variables	Names of Variables	Calculating Methods
Dependent Variables	ROE	Net Income / Total Equity
	ROA	Net Income / Total Assets
Independent Variables	CAR	Total Capitals / RWAs
	NPLR	NPLs / Total Loans
Control Variables	i. Bank Size (TA) ii. CRR iii. LLP iv. CLA	Total Assets of Commercial Banks 5% of total deposits As per the provision of Bank Total Operating Cost/Total Amount of Loan

### 3.10. Hypothesis Testing

The given hypotheses were tested by using various testing tools as given.

#### Hypothesis 1:

*Null Hypothesis: There is no correlation between CAR, NPLR and ROE*

*Alternative Hypothesis: There is a correlation between CAR, NPLR and ROE*

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0$$

$$H_1: H_0 \text{ is not true}$$

#### Hypothesis 2:

*Null Hypothesis: There is no correlation between CAR, NPLR and ROA*

*Alternative Hypothesis: There is a correlation between CAR, NPLR and ROA*

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0$$

$$H_1: H_0 \text{ is not true}$$

#### Hypothesis 3:

*Null Hypothesis: The correlation between CAR, NPLR and ROE is stable over time*

*Alternative Hypothesis: The correlation between CAR, NPLR and ROE is fluctuating over time*

$$H_0: \beta_{1,t} = \beta_{1,t-1}; \beta_{2,t} = \beta_{2,t-1}; \beta_{3,t} = \beta_{3,t-1}$$

$$H_1: H_0 \text{ is not true}$$

#### Hypothesis 4:

*Null Hypothesis: The correlation between CAR, NPLR and ROA is stable over time*



*Alternative Hypothesis: The correlation between CAR, NPLR and ROA is fluctuating over time*

$$H_0: \beta_{1,t} = \beta_{1,t-1}; \beta_{2,t} = \beta_{2,t-1}; \beta_{3,t} = \beta_{3,t-1}$$

$H_1: H_0$  is not true

To test the above hypotheses, following tools are used.

- a. **t-test:-** t-test is used for measuring the significance of individual variable. Based on t-distribution and is considered as an appropriate test for judging the significance of sample mean or for judging the significance of a difference between the means of two samples in case of small sample when population variance is not known. The relevant t-statistic is calculated from the sample data and then compared with its probable value at a specified level of significance for concerning degree of freedom.

Under normality assumption:

$$t = \frac{b_i - \beta_i}{SE(b_i)} \quad (\text{Gujarati and Porter, 2010})$$

Where,

$b_i$ : estimated value

$\beta_i$ : actual value

SE: standard error

- b. **F-test: -** F-test is used for testing the significance of the equation. Which is based on F-distribution and is used to compare the variance of the two-independent samples. This test is also used in the context of analysis of variance for judging the significance of more than two sample means at one and the same time. It is also used for judging the significance of more than two sample means at one and same time. It is used for judging the significance of multiple correlation coefficients. Test statistics, F, is calculated and compared with its probable value for accepting or rejecting the null hypothesis.

$$F = \frac{R^2/(k-1)}{(1-R^2)/(n-k)} \sim F(k-1, n-k) \quad (\text{Johnston and Dinardo, 1997})$$

## CHAPTER - IV

### DATA PRESENTATION AND ANALYSIS

#### 4.1. Trend of Capital Adequacy Ratio (CAR) and Non-Performing Loan Ratio (NPLR)

NRB has specified the minimum CAR and maximum limit for NPLR. According to Unified Directives of NRB, CAR for commercial banks must be 12 percent and NPLR must not exceed 5 percent (NRB, 2010). But Basel-II has suggested for the CAR of must not be less than 8 percent (BCBS, 2006). The status of CAR and NPLR in Nepal since 2004 of whole commercial banking industry of Nepal is shown in following table:

Table 4.1. Trend of CAR and NPLR of commercial banks of Nepal

Years	CAR	NPLR
2004	<b>6.35</b>	<b>22.77</b>
2005	6.47	18.79
2006	9.44	13.16
2007	7.88	13.16
2008	10.58	6.08
2009	10.95	3.53
2010	11.95	<b>2.39</b>
2011	<b>13.96</b>	3.20
2012	12.41	2.66
2013	12.36	2.57
2014	9.02	2.95
2015	11.94	2.46
<b>Total</b>	<b>123.31</b>	<b>93.75</b>
<b>Average</b>	<b>10.28</b>	<b>7.81</b>

Source: Banking and Financial Statistics 2016, Nepal Rastra Bank

The table shows that the lowest CAR is 6.35 in 2004, highest CAR is 13.96 in 2011, and the average CAR of the study period is 10.28. There are 5 years of lowest CAR and 7 years of highest CAR than the average CAR. The trend of CAR is generally increasing every year with the S. D. value 2.46. This means the value of CAR is deviated by 2.46 from the average CAR

Similarly, the lowest NPLR is 2.39 in 2004, highest NPLR is 22.77, and average NPLR of the study period is 7.81. There are 8 years of lowest NPLR and 4 years of highest NPLR than the average NPLR. The trend of NPLR shows that it is gradually decreasing with successive year with S. D. value 7.26. This means the value of NPLR is deviated by 7.26 from the average value of NPLR.

Similarly, CAR was -9.0748 in 2004. The main reason for this was again the two government sector bank with -24.97 percent and -42.12 percent of Nepal Bank Limited and Rastriya Banijya Bank Limited. The situation seemed to improve for Rastriya Banijya Bank since 2013 and for Nepal Bank Limited this had been positive since 2014. On the private sector Bank, Lumbini Bank Limited had negative Capital Adequacy Ratio in the year 2006 and 2007. Similarly, Nepal Credit and Commerce Bank had negative Capital Adequacy Ratio in 2007. And Nepal Bangladesh Bank had Negative Capital Adequacy Ratio in 2007 and 2008.

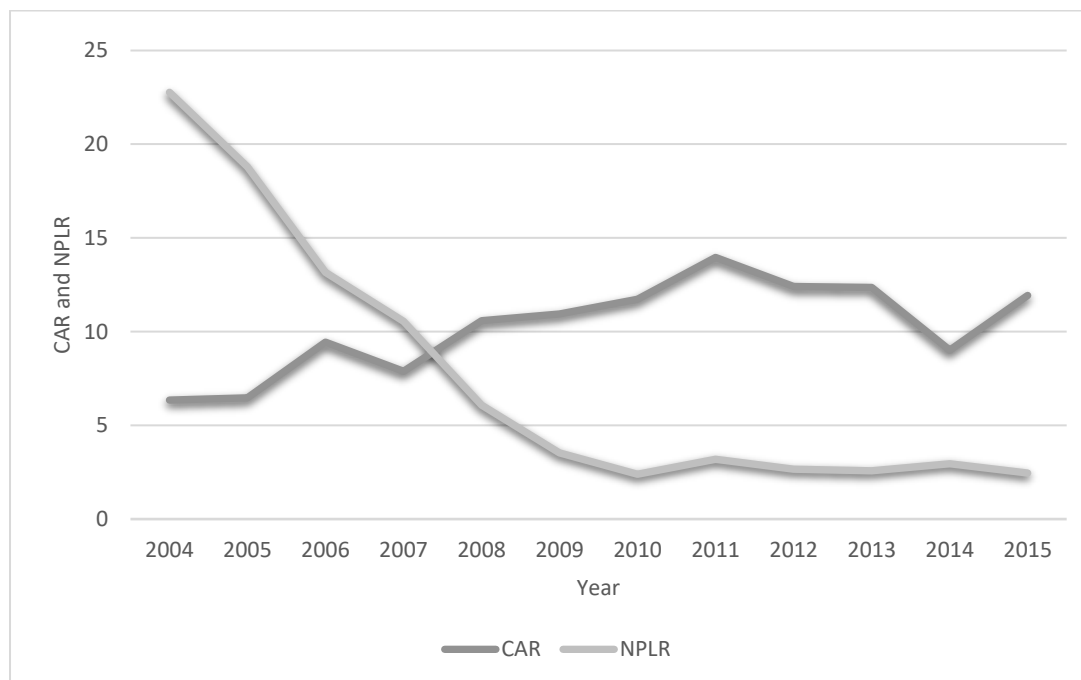
The non-performing loan of commercial banks of Nepal was very high during 2004. Since two of the government banks i.e. Rastriya Banijya Bank and Nepal Bank Limited topped the chart with 50.6 percent and 53.7 percent of Non-performing Loan ratio respectively. Because of this the industrial average reached to the 22.8 percent. The situation tends to improve with each year. It shows the decreasing trend and is moving around 2 to 4 percent per annum since 2009.

The CAR is mandatory obligation for commercial banks and its ceiling is fixed by BCBS and NRB. Similarly, minimum requirement of NPLR is also set by these two. But the failure of meeting these requirements is because of mismanagement of credit. This mismanagement in most case is the outcome of information asymmetry and adverse selection.

It seemed private bank are more efficient on maintaining non-performing loan ratio than government bank. In other words, loan recovery of private commercial bank is more efficient than that of government sector commercial banks. On the other hand, private commercial banks of Nepal are maintaining Capital Adequacy Ratio according to the

guidelines of Nepal Rastra Bank. Financial Sector Reform Program which was launched in 2002 had played significant role in improvement of credit risk indicators of credit risk viz. CAR and NPLR. It took almost 12 years of implementation for the positive outcome of the program. The table can also be shown with the help of given diagram.

Figure 4.1: Trend of CAR and NPLR of commercial banks of Nepal



## 4.2. Relationship between Credit Risk and Profitability Indicators

The two methods of showing relationship between credit risk indicators (CAR and NPLR) and profitability indicators (ROE and ROA) are being used that are correlation and regression analysis. Closely related to but conceptually very much different from regression analysis is correlation analysis where the primary objective is to measure the *strength* or *degree* of *linear association* between two variables. The correlation coefficient instead of estimation or prediction is on the basis of the average value of one variable on the basis of the fixed values of other variables. Regression and correlation analysis have some fundamental differences that are worth mentioning.

In correlation analysis, variables are treated symmetrically and there is no distinction between the dependent and explanatory variables. Moreover, both variables are assumed

to be random. Most of the correlation theory is based on the assumption of randomness of variables whereas most of the regression theory to be expounded in this book is conditional upon the assumption that the dependent variable is stochastic but the explanatory variables are fixed or non-stochastic.

In regression analysis, on the other hand, there is an asymmetry in the way the dependent and explanatory variables are treated. The dependent variable is assumed to be statistical, random, or stochastic, that is, to have a probability distribution. The explanatory variables, on the other hand, are assumed to have fixed values.

#### **4.2.1. Correlation Analysis of Credit Risk Indicators and Profitability Indicators**

In effort to analyze the nature of the correlation between the dependent and independent variables and also to ascertain whether or not multi-co-linearity exists as a result of the correlation among the variables. Karl Pearson Correlation analysis has been computed. The correlation matrix provides some insight into independent variables that are significantly correlated to the dependent variables ROE and ROA as shown in given tables.

**Table 4.2: Correlation Matrix of ROE, CAR, and NPLR**

<b>Variables</b>	<b>ROE</b>	<b>CAR</b>	<b>NPLR</b>
<b>ROE</b>	1.000		
<b>CAR</b>	0.1553	1.0000	
<b>NPLR</b>	-0.1577	-0.7500	1.000

Source: Researcher's Estimation

The table shows that CAR is not significantly correlated with the ROE. Similarly, NPLR has not significant but negative correlation with ROE. The correlation among the independent variables here are less than 0.5. Thus, there is no presence of multicollinearity among the independent variables.

**Table 4.3: Correlation Matrix of ROA, CAR, and NPLR**

<b>Variables</b>	<b>ROA</b>	<b>CAR</b>	<b>NPLR</b>
<b>ROA</b>	1.000		
<b>CAR</b>	0.0439	1.0000	
<b>NPLR</b>	-0.0055	-0.7500	1.000

Researcher's Estimation

This also shows that the CAR is not significantly but positively correlated with Return on Equity. Similarly, NPLR has also not significant relation with dependent variable but stays negative. Here also the correlation between the independent variable is less than 0.5, implying the absence of multicollinearity.

#### 4.2.2. Regression Analysis of Credit Risk Indicators and Profitability Indicators

The study examined the role of CRI (CAR and NPLR) on profitability indicators (ROE and ROA). So, the first regression model is related to the ROE on CAR and NPLR. The second regression model is ROA on CAR and NPLR.

##### 4.2.2.1 Regression Analysis of ROE on CAR and NPLR

The first regression analysis is performed as the linear relationship between ROE as dependent variable with CAR and NPLR as independent variables.

$$ROE_{i,t} = \alpha + \beta_1 CAR_{i,t} + \beta_2 NPLR_{i,t} + \beta_3 TA_{i,t} + \beta_4 CRR_{i,t} + \beta_5 LLP_{i,t} + \beta_6 CLA_{i,t} + \epsilon$$

$$ROE_{i,t} = -18.29 + 6.559CAR_{i,t} - 1.453NPLR_{i,t} + 3.195TA_{i,t} + 17.0358CRR_{i,t} + 22.4831LLP_{i,t} + 20.1754CLA_{i,t} + \epsilon$$

**Table 4.4: Results of Regression Analysis**

Variables	Value	Std. Error	t-statistics	Probability
Constant ( $\alpha$ )	-18.29	23.3744	0.4983	0.0000
CAR ( $\beta_1$ )	6.559	0.6444	1.0716	0.0012
NPLR ( $\beta_2$ )	-1.453	0.8544	8.8079	0.0000
TA ( $\beta_3$ )	3.1950	2.5851	1.2356	0.0323
CRR ( $\beta_4$ )	17.0357	0.1289	8.0328	0.0000
LLP ( $\beta_5$ )	22.4831	0.2077	2.3259	0.0000
CLA ( $\beta_6$ )	20.1755	0.0426	4.1126	0.0000
Summary Statistics:				
<b>r =0.187, R<sup>2</sup>= 0.428824, Adj. R<sup>2</sup> =0.216131</b>				
<b>F-value =26.86280, Prob.(F – Statistics)=0.0000N = 204</b>				

Note: \*Significant at 5% level  
Source: Researcher's estimation.

The co-efficient of explanatory variables represents the slope of regression co-efficient. The co-efficient  $\alpha$ ,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$ , and  $\beta_6$  have the value -18.29, 6.559, -1.453, 3.195,

17.0357, 22.4831, and 20.1755 respectively. From the observed model, we have  $\alpha$  equals -14.141. This represents the intercepts of the model. Despite there is no any credit risk indicators the ROE is negative. It means there is negative return on equity investment. In simple words, banking sectors face loss.

Similarly,  $\beta_1$  is 6.559. Here,  $\beta_1$  is regression co-efficient of CAR. The value 6.559 of  $\beta_1$  means when the CAR is changed by 1 unit, ROE is changed by 6.559 units. Since, the value of  $\beta_1$  is positive, there exist a positive relationship between the CAR and ROE. It means, when the CAR increased the ROE also increases and vice versa. On the other hand,  $\beta_2$  is the coefficient of NPLR. The value of  $\beta_2$  is -1.413. This represents there exist a negative relationship between ROE and NPLR. When NPLR is changed by 1 unit, the ROE is changed by -1.413 units. Since the value of  $\beta_2$  is negative, there exist inverse relationship between the NPLR and ROE. In other words, when the NPLR increases ROE decreases and vice versa.

The above regression equation shows that there is some relationship between bank size and ROE. The bank size is represented by of total assets of Nepalese commercial banks (TA). The regression coefficient of TA is given by  $\beta_3$  its value is 3.195. It means per unit change in TA results in 3.195 units change in ROE. It shows a positive relationship between ROE and TA. Thus, when the TA increases ROE increases and vice versa.

Here the value of  $\beta_4$  is 17.0357. This shows a positive relationship between ROE and CRR. The per unit change in CRR leads to change in ROE by 17.0358 units. It means when CRR is increased by 1 unit ROE is increased by 17.0358 units and vice-versa. Likewise, the value of  $\beta_5$  is 22.4831. This shows that the per unit change in loan loss provision changes ROE by 22.4831 units. Since the value is positive there exists positive relationship between the variables. Similarly, the value of  $\beta_6$  is 20.1755. The value is positive and established positive relationship with the variable. It shows when the CLA is changed by 1 unit ROE is changed by 20.1755 units.

The co-efficient of determination is represented by  $R^2$ . The co-efficient of determination is a summary measure that tells how well the sample regression line fits the data.  $R^2$  is non-negative and its limits are  $0 \leq R^2 \leq 1$ . An  $R^2$  of 1 means a perfect fit and on the other hand  $R^2$  of zero means there is no relationship between regressor and regressand.

The value of  $R^2$  is 0.4288. It suggest that this model explains only 42.88 percent of variation in ROE, considering  $R^2$  can be at most 1 and at least 0, the regression here is less significant relationship between regressor and regressands. This value might seem low, but in cross sectional study  $R^2$  values are typically low, possibly because of the diversity of the units in the sample (Gujarati and Porter, 2010).

Adjusted  $R^2$  version of co-efficient of determination is adjusted for degree of freedom while  $R^2$  will never decrease when adding a variable to the regression. Adjusted  $R^2$  will rise or fall, depending on whether the contribution of the new variable to the fit of the regression more than offsets the correction for the loss of an additional degree of freedom.

Here the value of adjusted  $R^2$  is 0.21613. It is less than that of  $R^2$ . This implies that as number of variable increases, the adjusted  $R^2$  increases but less than unadjusted  $R^2$ .

For the relationship between Return on Equity with Capital Adequacy Ratio and Non-performing Loan Ratio first hypothesis is used. The first hypothesis stated that:

*Null Hypothesis: There is no correlation between ROE with CAR and NPLR of commercial banks of Nepal*

*Alternative Hypothesis: There is a correlation between ROE with CAR and NPLR of commercial banks of Nepal*

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0$$

*H<sub>a</sub>: H<sub>0</sub> is not true*

Here,  $\alpha \neq \beta_1 \neq \beta_2$ , so the first part of the hypothesis is rejected. The value of  $\alpha$  is -18.29,  $\beta_1$  is 6.559 and  $\beta_2$  is -1.413. Thus, this implies that second part of first hypothesis is accepted. The p-value is less 0.05 of CAR, NPLR and TA with ROE shows that we cannot reject relationship between them but is significant.

The p-value for CAR with dependent variable ROE is 0.0012. Thus, similarly p-value for NPLR with dependent variable ROE is 0.0000 and p-value for TA with dependent variable ROE is 0.0313. Thus, it can be said that the significant relationship between independent variables CAR, NPLR and TA with independent variable ROE is found. But



the significant results are being observed in case of CRR, LLP and CLA. Since the p-statistic is all the variable CAR, NPLR and TA are greater than 0.5 for their relation with dependent variable (Gujarati & Porter, 2010).

The F-statistics value is 26.86280. The null hypothesis can be rejected if the p-value of F-statistic is very low. In this analysis p-value of F-statistic is 0.000. It can be suggested that we can reject the hypothesis that there is no correlation between ROE and CAR and NPLR of commercial banks.

#### 4.2.2.2 Regression Analysis of ROA on CAR and NPLR

The second regression analysis is performed as the linear relationship between ROA as dependent variable with CAR and NPLR as independent variables.

$$ROA_{i,t} = \alpha + \beta_1 CAR_{i,t} + \beta_2 NPLR_{i,t} + \beta_3 TA_{i,t} + \beta_4 CRR_{i,t} + \beta_5 LLP_{i,t} + \beta_6 CLA_{i,t} + \epsilon$$

$$ROA_{i,t} = -0.336 + 12.22CAR_{i,t} - 2.132NPLR_{i,t} + 0.055TA_{i,t} + 15.045CRR_{i,t} + 14.692LLP_{i,t} + 24.175CLA_{i,t} + \epsilon$$

**Table 4.5: Results of Regression Analysis**

Variables	Value	Std. Error	t-statistics	Probability
Constant ( $\alpha$ )	-0.336	0.470	0.7200	0.0000
CAR ( $\beta_1$ )	12.22	0.009	1.5432	0.0063
NPLR ( $\beta_2$ )	-2.132	-0.015	4.0572	0.0045
TA ( $\beta_3$ )	0.0554	0.0464	1.1936	0.2341
CRR ( $\beta_4$ )	15.045	4.3154	3.4864	0.0021
LLP ( $\beta_5$ )	14.692	5.6250	2.6119	0.0153
CLA ( $\beta_6$ )	24.175	0.0426	4.1126	0.0000
Summary Statistics:				
r = 0.101, $R^2=0.4537$ , <b>Adj. <math>R^2 =0.3431</math></b> <b>F-value =</b>				
<b>135.5452, Prob.(F – Statistics)= 0.0000N = 204</b>				

Note:,\*Significant at 5% level,  
Source: Researcher's estimation.

The co-efficient of explanatory variables represents the slope of regression co-efficient. The co-efficient  $\alpha$ ,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$ , and  $\beta_6$  have the value 1.131, 0.012, 0.0102, 0.055, 15.045, 14.692, and 24.175 respectively. From the observed model, we have  $\beta_0$  equals 1.131. This represents the intercepts of the model. Despite there is no any credit risk

indicators the ROA is positive. It means there is positive return on assets. In simple words, banking sectors face minimal profit.

Similarly,  $\beta_1$  is 0.012. Here,  $\beta_1$  is regression co-efficient of CAR. The value 0.012 of  $\beta_1$  means when the CAR is changed by 1 unit, ROA is changed by 0.012 units. Since, the value of  $\beta_1$  is positive, there exist a positive relationship between the CAR and ROA. It means, when the CAR increased the ROA also increases and vice versa. On the other hand,  $\beta_2$  is the coefficient of NPLR. The value of  $\beta_2$  is 0.010. This represents there exist a positive relationship between ROA and NPLR. When NPLR is changed by 1 unit, the ROA is changed by 0.010 units. Since the value of  $\beta_2$  is negative, there exist direct and proportional relationship between the NPLR and ROA. In other words, when the NPLR increases, ROA also increases and vice versa but by very minimal change.

The above regression equation shows that there is some relationship between bank size and ROA. The bank size is represented by total assets of Nepalese commercial banks (TA). The regression coefficient of TA is given by  $\beta_3$  its value is 0.055. It means per unit change in TA results in 0.055 units change in ROA. It shows a positive relationship between ROE and TA. Thus, when the TA increases ROA increases and vice versa.

The value of  $\beta_4$  is 15.045. This is positive value. This shows there exist a positive relationship between ROA and CRR. The per unit change in CAR lead to change in ROA by 17.0358 units. Likewise, the value of  $\beta_5$  is 14.692. This shows that the per unit change in loan loss provision changes ROA by 14.692 units. Since the value is positive there exist positive relationship between the variables. Similarly, the value of  $\beta_6$  is 24.1755. The value is positive and established positive relationship with the variable. It shows when the CLA is changed by 1 unit ROE is changed by 24.1755 units.

The co-efficient of determination is represented by  $R^2$ . The co-efficient of determination is a summary measure that tells how well the sample regression line fits the data.  $R^2$  is non-negative and its limit is  $0 \leq R^2 \leq 1$ . An  $R^2$  of 1 means a perfect fit and on the other hand  $R^2$  of zero means there is no relationship between regressor and regressand.

The value of  $R^2$  is 0.453650. It suggest that CAR and NPLR explains 45.365 percent of variation in ROA, considering  $R^2$  can be at most 1 and at least 0, the regression here is

less significant relationship between regressor and regressands. This value might seem low, but in cross sectional study  $R^2$  values are typically low, possibly because of the diversity of the units in the sample (Gujarati and Porter, 2010).

Adjusted  $R^2$  version of co-efficient of determination is adjusted for degree of freedom while  $R^2$  will never decrease when adding a variable to the regression. Adjusted  $R^2$  will rise or fall, depending on whether the contribution of the new variable to the fit of the regression more than offsets the correction for the loss of an additional degree of freedom.

Here the value of adjusted  $R^2$  is 0.343100. It is less than that of  $R^2$ . This implies that as number of variable increases, the adjusted  $R^2$  increases but less than unadjusted  $R^2$ . Adjusted R-squared may even be negative (Greene, 2003).

For the relationship between Return on Asset with Capital Adequacy Ratio and Non-performing Loan Ratio second hypothesis is used. The second hypothesis stated that:

*Null Hypothesis: There is no correlation between ROA with CAR and NPLR of commercial banks of Nepal*

*Alternative Hypothesis: There is a correlation between ROA with CAR and NPLR of commercial banks of Nepal*

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0$$

*H<sub>a</sub>: H<sub>0</sub> is not true*

The second regression analysis shows that p-value for CAR is 0.2917 and for NPLR is 0.5043. Under the condition, the level of significance is 5 percent. Here,  $\alpha \neq \beta_1 \neq \beta_2$ , so the first part of second hypothesis is rejected. The value of  $\alpha$  is -0.336,  $\beta_1$  is 12.22 and  $\beta_2$  is -2.132. This implies that second part of first hypothesis is accepted. The p-value is less than 0.05 of CAR, NPLR and TA with ROA shows that we cannot reject relationship between them it is significant as well.

The p-value for CAR with dependent variable ROA is 0.0063. Similarly, p-value for NPLR with dependent variable ROA is 0.0045 and p-value for TA with dependent variable ROA is 0.0234. Whereas the p-value of CRR, LLP and CLA are 0.0021, 0.0153,

and 0.0000 respectively. Thus, it can be said that the significant relationship between independent variables CAR, NPLR, and TA with independent variable is found but CAR, LLP and CLA has significant relationship with ROA.

The F-statistics value is 135.5452. The null hypothesis can be rejected if the p-value of F-statistic is very low. In this analysis p-value of F-statistic is 0.0000. It can be suggested that we cannot reject the hypothesis that there is no correlation between ROE and CAR and NPLR of commercial banks.

The result is similar to the findings of Bhattarai (2015) in terms of CAR and on NPLR and TA has no study found that there is significant relationship between bank performance and credit risk indicators. But in this study it is found that there is no significant relationship between credit risk indicators and bank performance. Since the p-statistic is all the variable CAR, NPLR and TA are greater than 0.5 for their relation with dependent variable (Gujarati & Porter, 2010).

Similarly, this research is not accordance with some of the previous researchers, including the research conducted by Ara, Bakeva and Sun (2009) in Sweden, the research conducted by Uwaigbe, Ratiuwigbe and Oyewo (2015) in Egypt, Erina and Lace (2013) in Latvia, Abdullah (2012) in Pakistan, Poudel (2012) in Nepal Gizaw, Kebede and Selvaraj (2015) in Ethiopia and Aduda and Gitonga (2011) in Nigeria. All of these research found a positive relationship between CAR and ROE or between CAR and ROA. It is natural to consider that CAR internalized the risk for the stakeholders and hence faces lower cost of funding and further supports for higher ROE and ROA. However, there are some other researches that found no relationship between CAR and ROE, including the one conducted by Kithinji (2010) in Kenya. Kithinji couldn't find a relationship between CAR and ROA based on the data of 43 commercial banks in Kenya.

One thing which is interesting from our result is that, although the relationship is not significant, the correlation co-efficient of NPLR for both ROE and ROA is negative. That is to say, the NPLR could negatively affect the banks' profitability.

As to the insignificant results, they could possibly come from the type II error. It is an error that occurs when one fails to reject a hypothesis when it in fact should be rejected

(Gujarati and Porter, 2010). This means that alternative hypothesis could be actually true, but this model is not able to detect this relationship. It cannot be neglected that the two regression have  $R^2$  only to be 0.035420 and 0.010720. This is signal that the model does not have a good overall fit. Further, it could attribute to omitted variables that needed to be take into account in order to make the result significant, such as location variables. This could be one possible explanation that there is an insignificant relationship between CAR and ROE and CAR and ROA.

The determinant of probability of commercial bank is attributed to internal and external control. The external determinants of profitability contain factor such as economic environment. Nepal had moved through political instability during this period. This has also created economic instability. Therefore, the variable ROE and ROA could be affected abnormally during this period. This could be another explanation of insignificant relationship.

#### **4.3. Stability of Relationship between Credit Risk Indicators and Profitability Indicators**

To test the stability of relation time horizon of 12 years is divided to 12 sub-periods; each sub-period contains one year's observation. Therefore, 12 regression analysis is performed for 12 sub-periods. It is required that the beta-coefficient for each sub-periods need to be equal for the stable in relation (Ara, Bakaeva and Sun, 2009). If the beta coefficient for each sub-period is not equal, then relationship over time is not stable (fluctuating). As to test the stability of the relationships between credit risk indicators and profitability indicators, the first stability is related to the ROE with CAR and NPLR. The second stability model is ROA with CAR and NPLR.

##### **4.3.1. Stability of ROE with CAR and NPLR**

###### **A) Regression of CAR and NPLR with ROE**

###### **Hypothesis: 3**

*Null Hypothesis: The correlation between CAR, NPLR and ROE is stable over time*

*Alternative Hypothesis: The correlation between CAR, NPLR and ROE is fluctuating over time*

$$H_0: \beta_{1,t} = \beta_{1,t-1}; \beta_{2,t} = \beta_{2,t-1}; \beta_{3,t} = \beta_{3,t-1}$$

$H_a: H_0$  is not true

To test the stability of these relationships, further regression analysis is made. The time horizon of 12 years is divided into 12 sub periods; each sub-period contains one-year observations. The following are the regression equations:

$$ROE_1 = \alpha + \beta_1 CAR_1 + \beta_2 NPLR_1 + \beta_3 LNNTA_1 \text{ --- (1)}$$

$$ROE_2 = \alpha + \beta_1 CAR_2 + \beta_2 NPLR_2 + \beta_3 LNNTA_2 \text{ --- (2)}$$

$$ROE_3 = \alpha + \beta_1 CAR_3 + \beta_2 NPLR_3 + \beta_3 LNNTA_3 \text{ --- (3)}$$

$$ROE_4 = \alpha + \beta_1 CAR_4 + \beta_2 NPLR_4 + \beta_3 LNNTA_4 \text{ --- (4)}$$

$$ROE_5 = \alpha + \beta_1 CAR_5 + \beta_2 NPLR_5 + \beta_3 LNNTA_5 \text{ --- (5)}$$

$$ROE_6 = \alpha + \beta_1 CAR_6 + \beta_2 NPLR_6 + \beta_3 LNNTA_6 \text{ --- (6)}$$

$$ROE_7 = \alpha + \beta_1 CAR_7 + \beta_2 NPLR_7 + \beta_3 LNNTA_7 \text{ --- (7)}$$

$$ROE_8 = \alpha + \beta_1 CAR_8 + \beta_2 NPLR_8 + \beta_3 LNNTA_8 \text{ --- (8)}$$

$$ROE_9 = \alpha + \beta_1 CAR_9 + \beta_2 NPLR_9 + \beta_3 LNNTA_9 \text{ --- (9)}$$

$$ROE_{10} = \alpha + \beta_1 CAR_{10} + \beta_2 NPLR_{10} + \beta_3 LNNTA_{10} \text{ --- (10)}$$

$$ROE_{11} = \alpha + \beta_1 CAR_{11} + \beta_2 NPLR_{11} + \beta_3 LNNTA_{11} \text{ --- (11)}$$

$$ROE_{12} = \alpha + \beta_1 CAR_{12} + \beta_2 NPLR_{12} + \beta_3 LNNTA_{12} \text{ --- (12)}$$

Here, the regression co-efficient of the variable CAR and NPLR with dependent variable ROE is shown in the following table:

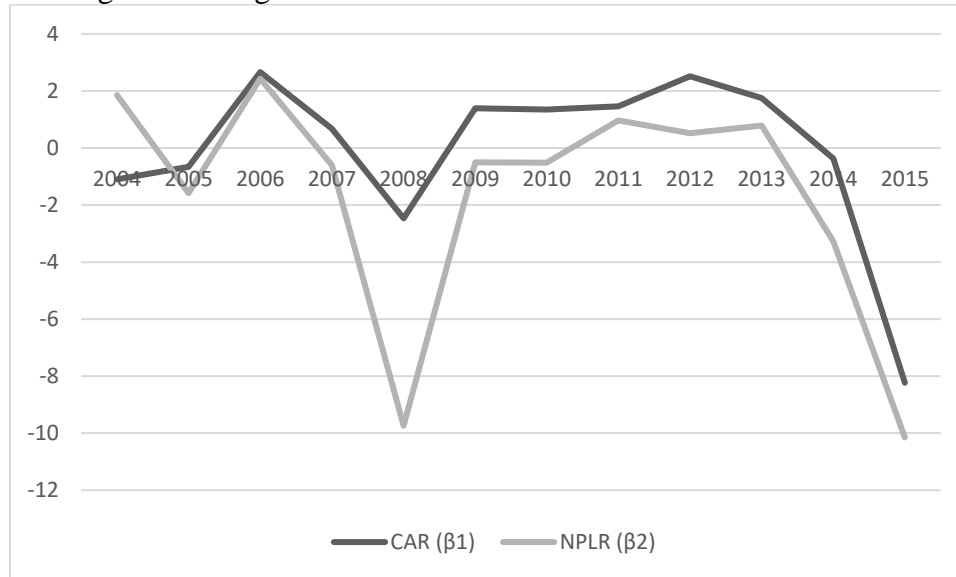
Table 4.6. Regression coefficients of CAR and NPLR with ROE

Years	CAR ( $\beta_1$ )	NPLR ( $\beta_2$ )
2004	-1.095	1.851
2005	-0.663	-1.585
2006	2.660	2.431
2007	0.674	-0.610
2008	-2.470	-9.738
2009	1.393	-0.502
2010	1.350	-0.519
2011	1.465	0.965
2012	2.518	0.519
2013	1.751	0.788
2014	-0.365	-3.277
2015	-8.231	-10.146

Source: Researcher's estimation

Here,  $\beta_1, \neq\beta_1, t-1; \beta_2, \neq\beta_2, t-1; \beta_3, \neq\beta_3, t-1$ , thus, the first part of hypothesis 3 is rejected it means the alternative hypothesis of hypothesis 3 is accepted. It means there is fluctuating relationship between ROE, CAR and NPLR overtime. The above table can be shown with the help of following figure:

Figure 4.2. Regression coefficients of CAR and NPLR with ROE



### B) Correlation of ROE with CAR and NPLR Overtime

The correlation co-efficient of 12 sub period are presented in the following table:

Table 4.7. Correlation coefficients of ROE with CAR and NPLR

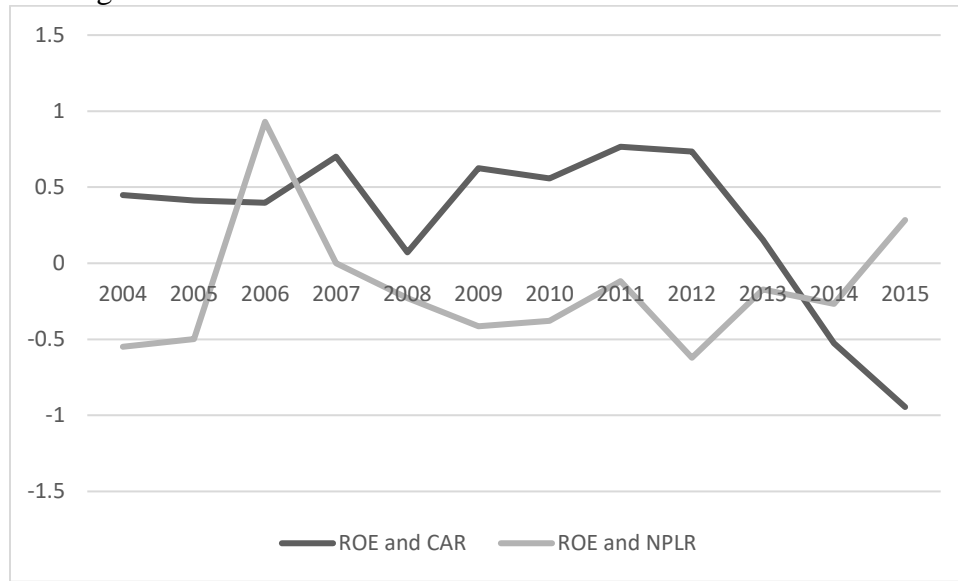
Years	ROE and CAR	ROE and NPLR
2004	0.448	-0.549
2005	0.412	-0.498
2006	0.397	0.930
2007	0.700	-0.673
2008	0.071	-0.229
2009	0.625	-0.414
2010	0.558	-0.378
2011	0.766	-0.118
2012	0.735	-0.621
2013	0.153	-0.172
2014	-0.526	-0.266
2015	-0.945	0.284

Source: Researcher's estimation

From the table of correlation co-efficient of CAR and NPLR, it is obvious that the relationships between ROE with CAR and ROE with NPLR are never constant, and

always in change. In addition, the correlation coefficient of CAR and NPLR has no obvious pattern. Correlation coefficient of CAR has fluctuated among positive and negative, with the highest value in 2011 and lowest value in 2015. Correlation coefficient of NPLR is always negative except that for 2015. This led us to infer that the variables are instable. This can be illustrated with the help of following figure

Figure 4.3. Correlation coefficients of ROE with CAR and NPLR



### 4.3.2. Stability of ROA with CAR and NPLR

#### A. Regression between NPLR and CAR with ROA

##### Hypothesis: 4

*Null Hypothesis: The correlation between CAR, NPLR and ROA is stable over time*

*Alternative Hypothesis: The correlation between CAR, NPLR and ROA is fluctuating over time*

$$H_0: \beta_{1, t} = \beta_{1, t-1}; \beta_{2, t} = \beta_{2, t-1}; \beta_{3, t} = \beta_{3, t-1}$$

$H_a: H_0$  is not true

As to test the stability the relationship between ROA, CAR and NPLR, the time period is again divided into 12 sub-periods of one year. Following are the regression equation:

$$ROA_1 = \alpha + \beta_1 CAR_1 + \beta_2 NPLR_1 + \beta_3 LNTA_1 \text{ --- (1)}$$

$$ROA_2 = \alpha + \beta_1 CAR_2 + \beta_2 NPLR_2 + \beta_3 LNTA_2 \text{ --- (2)}$$



$$ROA_3 = \alpha + \beta_1 CAR_3 + \beta_2 NPLR_3 + \beta_3 LNTA_3 \text{ --- (3)}$$

$$ROA_4 = \alpha + \beta_1 CAR_4 + \beta_2 NPLR_4 + \beta_3 LNTA_4 \text{ --- (4)}$$

$$ROA_5 = \alpha + \beta_1 CAR_5 + \beta_2 NPLR_5 + \beta_3 LNTA_5 \text{ --- (5)}$$

$$ROA_6 = \alpha + \beta_1 CAR_6 + \beta_2 NPLR_6 + \beta_3 LNTA_6 \text{ --- (6)}$$

$$ROA_7 = \alpha + \beta_1 CAR_7 + \beta_2 NPLR_7 + \beta_3 LNTA_7 \text{ --- (7)}$$

$$ROA_8 = \alpha + \beta_1 CAR_8 + \beta_2 NPLR_8 + \beta_3 LNTA_8 \text{ --- (8)}$$

$$ROA_9 = \alpha + \beta_1 CAR_9 + \beta_2 NPLR_9 + \beta_3 LNTA_9 \text{ --- (9)}$$

$$ROA_{10} = \alpha + \beta_1 CAR_{10} + \beta_2 NPLR_{10} + \beta_3 LNTA_{10} \text{ --- (10)}$$

$$ROA_{11} = \alpha + \beta_1 CAR_{11} + \beta_2 NPLR_{11} + \beta_3 LNTA_{11} \text{ --- (11)}$$

$$ROA_{12} = \alpha + \beta_1 CAR_{12} + \beta_2 NPLR_{12} + \beta_3 LNTA_{12} \text{ --- (12)}$$

Here the regression 1 contains the observation in the year 2004 and is followed by 2005, 2006, 2007,2008, 2009, 2010, 2011, 2012, 2013, 2014, and 2015 by regression 2,3,4,5,6,7,8,9,10,11,and 12 respectively. The regression co-efficient of the variable CAR and NPLR with dependent variable ROA is shown in the following table:

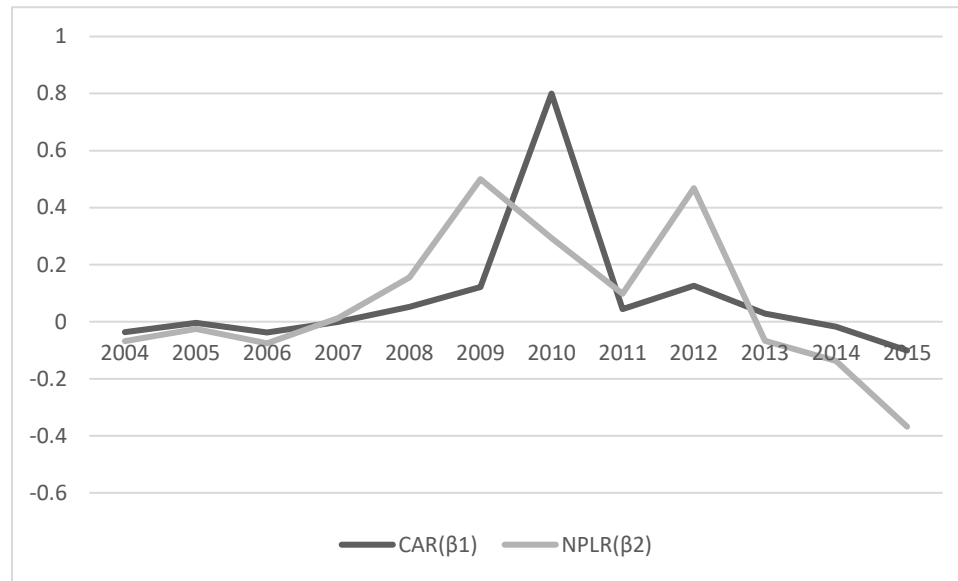
Table 4.8. Regression coefficient of CAR and NPLR with ROA

Years	CAR( $\beta_1$ )	NPLR( $\beta_2$ )
2004	-0.036	-0.068
2005	-0.004	-0.025
2006	-0.038	-0.076
2007	-0.001	0.013
2008	0.052	0.155
2009	0.122	0.500
2010	0.80	0.293
2011	0.044	0.098
2012	0.126	0.468
2013	0.029	-0.067
2014	-0.018	-0.138
2015	-0.101	-0.368

Source: Researcher's Estimation

Here,  $\beta_1, t \neq \beta_1, t-1; \beta_2, t \neq \beta_2, t-1; \beta_3, t \neq \beta_3, t-1$ , thus, the first part of hypothesis 3 is rejected it means the alternative hypothesis of hypothesis 3 is accepted. It means there is fluctuating relationship between ROA, CAR and NPLR overtime. This regression result can be shown with the help of following figure:

Figure 4.4. Regression coefficient of CAR and NPLR with ROA



**B. Correlation Coefficient between ROA with CAR and NPLR**

The correlation co-efficient of 12 sub period are presented in the following table:

Table 4.9. Correlation coefficient of CAR and NPLR with ROA

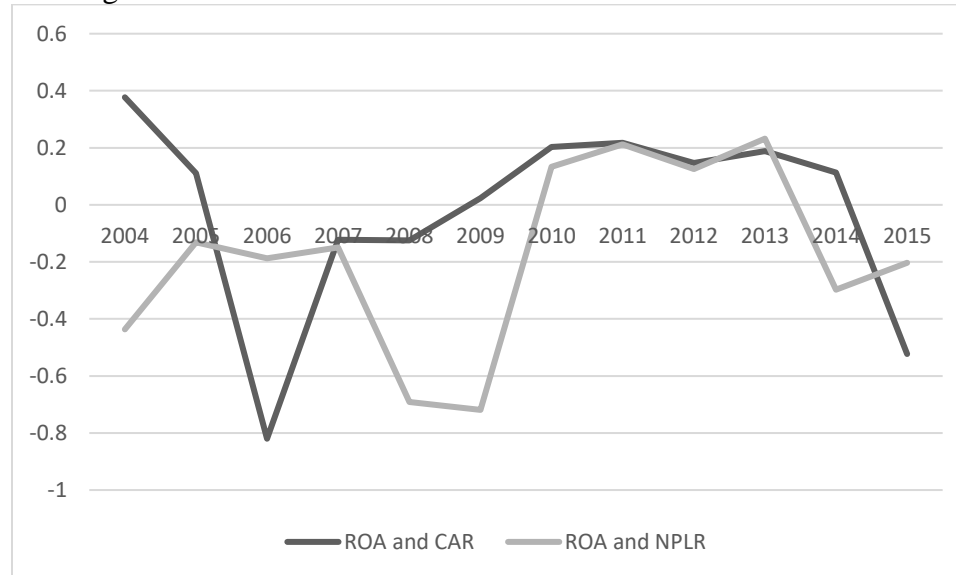
Years	ROA and CAR	ROA and NPLR
2004	0.377	-0.437
2005	0.111	-0.131
2006	-0.820	-0.187
2007	-0.122	-0.149
2008	-0.125	-0.691
2009	0.023	-0.719
2010	0.203	0.133
2011	0.217	0.212
2012	0.147	0.125
2013	0.188	0.232
2014	0.113	-0.297
2015	-0.523	-0.203

Source: Researcher’s Estimation

The pattern for both CAR and NPLR are fluctuating between negative and positive numbers. Therefore, the relationship between CAR and ROA and in between NPLR and ROA are not constant, and always in change. The figure indicates no obvious pattern of the two lines.

In addition, the correlation coefficient of CAR and NPLR for ROA has demonstrated a more volatile trend than for ROE, therefore indicates a higher instability of the relationship. This can be shown with the help of following figure:

Figure 4.5. Correlation coefficient of CAR and NPLR with ROA



It is obvious from results that the relationships between CAR and ROE and between CAR and ROA are not stable, always in change. All the relationship with independent variable CAR are insignificant at 95% confidence level. Moreover, the correlation coefficient of CAR fluctuates from positive to negative. This could be explained by the contradictory prediction of the relationship between CAR and ROE and ROA. However banks would restrict their activities which could be negatively associated with bank development in order to keep higher CAR and this could increase banks' net interest margins or overhead costs. The mixed effect can lead to the fluctuating correlation coefficient among positive and negative numbers.

The relationship between NPLR and ROA seems to be more violating than the relationship with ROE, with negative and positive fluctuations. The reason for this could be that one year observation is too limited. For a regression with only 17 observations could not be significant and therefore demonstrate a strange pattern.

# **CHAPTER - V**

## **MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1. Major Findings**

Credit risk management and profitability of commercial banks are interrelated as per the past literature. Credit risk does play a vital role in banks' performance since a large volume of banks' revenue accrues from loans from which interest margin is derived. Efficient risk management is crucial and valuable for banks to improve the performance. Four indicators (CAR, NPLR, ROA and ROE) framed this research. The combination of ratios representing credit risk management and ratios disclosing profitability are measured in the analysis.

The determinant of profitability of commercial bank is moreover effected by internal and external determinants. External determinant that effect the profitability of banks in this period is transitional political environment which lead to political instability. This might be the reason that the findings .of this research doesn't resembled to that of past literature.

The status of non-performing loan seemed very high in 2004. The industrial average at this period was 22.8 percent. The situation improved with the years followed by. It moves around 2-4 percent annually after 2009. Similarly, capital adequacy ratio also had a deteriorating situation at 2004. It was -9.0748 at that point of time. It also improved and changed gradually since then. Financial sector reform program which was launched on 2002 has crucial role in this regard for improvement in CAR. Now the CAR of industry is at 11.98 percent. As compared to the ceiling fixed by NRB, i.e. maximum of 4 percent of NPLR and minimum of 12 percent of CAR, the situation at 2015 is not that worse as compared to 2004.

The p-value of CAR with dependent variable ROE is 0.0012 and the p-value of NPLR with dependent variable ROE is 0.0000. Thus, significant relationship between dependent variable (ROE) and independent variables CAR, NPLR and LNTA has been. Similarly,

the p-value for CAR with dependent variable ROA is 0.0063 and the p-value of NPLR with ROA is 0.045. Here too significant relationship between independent variable and dependent variables could not be established. Similarly, the two regression have  $R^2$  is found 0.4288 and 0.4537. This indicates that this model have moderate overall fit.

The relationship between CAR and ROE and between CAR and ROA is not stable, resulting to annually change. The relationship with independent variable CAR is found significant at 95% confidence level. Similarly, the correlation coefficient of CAR fluctuates from positive to negative. The correlation coefficient of CAR and NPLR for ROA demonstrated more violate trend than ROE, therefore indicates a higher instability of the relationship. The pattern observed for both CAR and NPLR are fluctuating between both positive numbers. Therefore, the relationship between CAR and ROA and NPLR and ROA are not constant. Similarly, the relationship between CAR and ROE and NPLR and ROE are also never constant, and always in change. Additionally, the correlation coefficient of CAR and NPLR also does not show the obvious pattern. Correlation coefficient also fluctuated between positive and negative.

Empirical findings shows that the relationship between CAR and ROE and CAR and ROA is not significant. This could be due to the controversy theoretical prediction of the relationship between CAR and banks' profitability. Similarly, there is negative relationship between NPLR and ROE but positive relationship between NPLR and ROA. The imperfection of the model specification could be another reason for the lack of significant relationships. In addition, the impact of systematic risks during political insurgency and economic slump of the Nepal during this period should not be neglected.

The findings of trend for the relationships demonstrate a fluctuating relationship between all four variables. This could be explained by the effect of political insurgency and economic slump of Nepal because of Maoist war and post-war transition of the Nepalese Economy.

## **5.2. Conclusions**

Commercial banks are being under the various rules and regulation around the globe. The main problem commercial banks facing today is absorbing loss under unexpected situation. For this purpose a minimum capital requirement is presented under Basel Committee on Banking Regulation and Supervisory practices under this regulation and supervisory practices. Under this regulation NRB has prescribed the regulation for minimum capital adequacy ratio. Similarly, during the process of bank management its profitability is influenced by various factors like management decisions, size, location and time.

Minimum capital adequacy ratio has been developed to ensure that banks can absorb a reasonable level of losses before solvency and before depositor fund cost. Applying minimum capital adequacy ratio aims to protect depositors and promote the stability and efficiency of the financial system. NPLR is a financial soundness indicator which demonstrates the quality of bank loan. The quality of bank loan plays an essential role in the overall bank soundness because one of the core activities of banking institutions is to make loan. The determinants factors of NPLs can be attributed to various factors such as disposable income, unemployment and monetary conditions have strong impacts on NPLs.

Bank strength is needed for the stability and growth of the economy, and it is shown by profitability and capital adequacy of banking and financial institutions. The ROE and ROA are most common means to measure the profitability of financial institution regarding the profitability in relation to investment.

Profit is the ultimate objective of commercial banks. The plan, policies and strategies of them are directed towards achieving this objective. With the improved financial performance the requirement for improved functions and activities of commercial bank is also required. As the bank increases its activities and is able to achieve its objective of profitability the risk is also increased. Banks' profitability will generally vary directly with the riskiness of its portfolio and operations. As a result, in order to increase the return, bank need to know which risk factors have greater impact on profitability eventually leads to bank financial performance. Credit risk is the most significant factors

for commercial banks. This means the probability where the credit risk influences the profitability is large. Risk management is important both for banks and policy makers because a strong banking system can promote financial stability of a country and increase economy's resilience in facing economic crisis. Therefore, this study and measure of effect of credit risk management to banks' profitability are crucial for financial institutions.

This research provides the information regarding credit risk indicators and how they affect the profitability. Despite the fact that the relationship between profitability indicators and credit risk indicators is not significant in this study but the relationship between these two are profoundly important.

### **5.3. Recommendations**

This study focus on the relationship between credit risk management and profitability of commercial banks. On the basis of findings as according to objectives following recommendations are made:

- i. The Board of directors has a vital role in granting credit as well as managing the credit risk of the bank. It is the overall responsibility of a bank's Board to approve credit risk strategy and significant policies relating to credit risk and its management which should be based on the overall business strategy.
- ii. The responsibility of senior management is to transform strategic direction set by board in the shape of policies and procedures. The formulation of policies relating to risk management itself may not be adequate until and unless these are clearly communicated down the line.
- iii. Senior management has to ensure that these policies are embedded in the culture of an organization. Senior Management is responsible for implementing the bank's credit risk management strategies and policies and ensuring that procedures are put in place to manage and control credit risk and the quality of credit portfolio in accordance with these policies.
- iv. The credit procedures should aim to obtain a deep understanding of the bank's clients, their credentials and their businesses in order to fully know their customers. These

strategies should be reviewed periodically and amended, as deemed necessary; it should be viable in the long run.

- v. Every bank has to develop Credit Policies Guidelines (CPG) that clearly outline the bank's view of business development priorities and the terms and conditions that should be adhered to for loans to be approved. The CPG should be updated at a regular interval to reflect changes in the economic outlook and the evolution of the bank's loan portfolio.
- vi. Banks should develop procedures that adequately capture salient issues regarding the borrower's industry; macro-economic factors; the purpose of credit; source of repayment; track record and repayment history of the borrower; repayment capacity of the borrower; the proposed terms and conditions and covenants; adequacy and enforceability of collaterals; and appropriate authorization for the loan.
- vii. Banks have to make sure that the credit is used for the purpose it was borrowed. Where the obligor has utilized funds for purposes not shown in the original proposal, banks should take steps to determine the implications on creditworthiness. In case of corporate loans where borrower own group of companies such diligence becomes more important. Banks utilize collateral and guarantees to help mitigate risks inherent in individual credits but transactions should be entered into primarily on the strength of the borrower's repayment capacity. Collateral cannot be a substitute for a comprehensive assessment of the borrower or counter party, nor can it compensate for insufficient information.
- viii. Banks should have policies covering the acceptability of various forms of collateral, procedures for the ongoing valuation of such collateral, and a process to ensure that collateral is, and continues to be, enforceable and realizable. With regard to guarantees, banks should evaluate the level of coverage being provided in relation to the credit-quality and legal capacity of the guarantor.
- ix. Prior to entering into any new credit relationship the banks must become familiar with the borrower or counter party and be confident that they are dealing with individual or organization of sound reputation and credit worthiness. However, a bank must not grant credit simply on the basis of the fact that the borrower is perceived to be highly reputable i.e. name lending should be discouraged.



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## APPENDIX - I

### LIST OF SAMPLE COMMERCIAL BANKS

(Rs. in million)

S. N.	Name	Operation Date (A.D)	Head Office	Paid up Capital
1	Nepal Bank Ltd.	1937/11/15	Dharmapath,Kathmandu	6465.00
2	RastriyaBanijya Bank Ltd.	1966/01/23	Singhadurbarplaza,Kathmandu	8588.97
3	Nabil Bank Ltd.	1984/07/12	Beena Marg, Kathmandu	3657.65
4	Nepal Investment Bank Ltd.	1986/03/09	Durbarmarg, Kathmandu	6345.70
5	Standard Chartered Bank Nepal Ltd.	1987/02/28	Nayabaneshwor, Kathmandu	2248.16
6	Himalayan Bank Ltd.	1993/01/18	Kamaladi, Kathmandu	3332.70
7	Nepal SBI Bank Ltd.	1993/07/07	Kesharmahal, Kathmandu	3058.06
8	Nepal Bangladesh Bank Ltd.	1994/06/06	Kamaladi, Kathmandu	2430.29
9	Everest Bank Ltd.	1994/10/18	Lazimpat , Kathmandu	2137.39
10	Bank of Kathmandu Ltd.	1995/03/12	Kamaladi, Kathmandu	2120.2
11	Nepal Credit and Commerce Bank Ltd.	1996/10/14	Siddharthanagar, Rupandehi	2028.60
12	NIC Asia Bank Ltd.*	2013/6/30*	Biaratnagar, Morang	2658.28
13	Lumbini Bank Ltd.**	2014/6/29*	Narayangadh, Chitawan	2000.83
14	Machhapuchhre Bank Ltd.	2012/7/9*	Prithwchowk, Pokhara, Kaski	2776.25
15	Kumari Bank Ltd.	2001/04/03	Durbarmarg, Kathmandu	2431.68
16	Laxmi Bank Ltd.	2002/04/03	Adarsanagar, Birgunj, Parsa	3039.23
17	Siddhartha Bank Ltd.	2002/12/24	Hattisar, Kathmandu	2031.18

Source:

Note: \*Joint operation date after merger

\*\*Merged with Bank of Kathmandu but is not explained here

**APPENDIX II**  
**THESIS DATA**

S. No	BANK NAME	YEAR	ROE	ROA	CAR	NPLR	LNTA	CLA	LLP	CRR	TA
1	NBL	7/1/2004	-34.8586	-0.57911	-24.97	53.7	11.06763	0.08	11.34	7.8	5514.415
2	RBB	7/1/2004	-1.43583	0.42351	-42.12	57.6	11.3004	0.11	17421	7.7	6609.814
3	Nabil	7/1/2004	35.2012	3.483	13.56	3.4	9.81106	0.13	456.3	10.6	2073.51
4	NIBL	7/1/2004	21.20967	1.1581	11.18	2.5	9.81106	0.1	157.4	10.9	2073.51
5	SCBL	7/1/2004	36.43563	2.27604	15.99	3.8	10.10476	0.08	92.4	13.6	2606.116
6	HBL	7/1/2004	50.17062	2.69296	10.62	8.9	10.19433	0.03	922.7	16	2794.303
7	SBI	7/1/2004	16.25936	1.49782	10.25	6.3	9.90975	0.09	152.7	19.2	2239.077
8	NBBL	7/1/2004	17.16569	1.12162	5.61	10.8	9.67386	0.1	1055	11.1	1863.479
9	EBL	7/1/2004	40.74797	2.72193	11.07	1.7	9.20663	0.11	273.8	11.5	1295.31
10	BOK	7/1/2004	28.20583	2.0797	11.18	6.7	9.20663	0.07	236.5	11.3	1295.31
11	NCC.	7/1/2004	12.32338	1.52307	3.42	12.7	8.93803	0.06	1407	16	1050.924
12	NIC Asia	7/1/2004	0.59013	0.05362	13.75	3.9	8.93803	0.11	225.6	19.2	1050.924
13	LBL	7/1/2004	-14.8158	-1.10969	8.71	7.4	8.47326	0.13	412.4	12	731.9009
14	MBL	7/1/2004	8.32566	1.2928	17.82	1	8.15946	0.14	36.1	3.02	573.2839
15	KBL	7/1/2004	14.43957	1.26353	12.81	0.8	8.65347	0.12	113	4.9	842.1194
16	LBL	7/1/2004	3.34546	0.70184	29.13	0	7.87158	0.09	22.3	8.6	458.1942
17	SBL	7/1/2004	10.4	1.86217	19.36	1.6	2.11934	0.03	53.4	9.32	5.205466
18	NBL	7/1/2005	-13.525	2.14855	-19.54	49.6	10.89683	0.08	9250	11.3	4827.91
19	RBB	7/1/2005	-1.81174	0.50055	-40.54	50.7	11.25925	0.11	15214	9.03	6401.447
20	Nabil	7/1/2005	55.0796	4.38627	12.44	1.3	9.83172	0.11	392	7	2107.125
21	NIBL	7/1/2005	21.50668	1.42627	11.58	2.7	9.83172	0.08	256.2	8.33	2107.125
22	SCBL	7/1/2005	42.05958	2.36434	16.36	2.7	10.03234	0.07	277.7	9.58	2463.267
23	HBL	7/1/2005	56.64057	2.58499	11.1	7.4	10.27858	0.03	937.1	9.32	2983.698
24	SBI	7/1/2005	0.66734	0.04333	9.47	6.5	9.27017	0.09	397.3	10.9	1360.987
25	NBBL	7/1/2005	9.33436	0.62398	3.02	19	9.65049	0.11	1185	15.5	1829.886
26	EBL	7/1/2005	28.13424	1.83025	13.57	1.6	9.6204	0.11	317.7	9.55	1787.524
27	BOK	7/1/2005	24.27781	1.54207	11.22	5	9.23464	0.09	269.7	17.2	1323.862
28	NCC.	7/1/2005	13.54928	1.13453	5.51	8.6	9.06698	0.1	332.2	15.2	1161.887
29	NIC Asia	7/1/2005	17.53707	0.26872	13.29	3.8	9.06698	0.12	174.7	16.9	1161.887
30	LBL	7/1/2005	-31.5789	-3.08733	6.35	15.2	8.59106	0.15	645.9	24.3	802.1868
31	MBL	7/1/2005	21.03455	0.57558	11.36	0.4	9.91373	0.14	67.3	8.32	2246.025
32	KBL	7/1/2005	16.72324	1.2163	11.15	1	8.94839	0.11	144.2	8.1	1059.434
33	LBL	7/1/2005	6.11945	0.95788	20.72	1.6	8.28255	0.1	60.4	8.72	630.9301

34	SBL	7/1/2005	1.32025	1.34201	13.93	2.6	3.04617	0.05	62.4	9.41	10.70981
35	NBL	7/1/2006	-23.1431	4.31386	-29.67	18.2	10.89683	0.03	3270	6.82	4827.91
36	RBB	7/1/2006	-9.72858	2.43343	-50.3	34.8	11.30328	0.04	13593	13.6	6624.648
37	Nabil	7/1/2006	57.67803	4.05725	15.08	1.4	10.0914	0.03	352.9	24.2	2579.154
38	NIBL	7/1/2006	33.25274	1.59563	12.35	2.1	10.0914	0.05	374.3	21	2579.154
39	SCBL	7/1/2006	42.0097	2.47122	19.13	2.1	10.19603	0.02	270.4	22.9	2798.003
40	HBL	7/1/2006	33.32685	1.66045	13.1	6.6	10.3392	0.03	1029	15.2	3127.865
41	SBI	7/1/2006	11.78782	0.96117	15.01	6.1	9.52757	0.03	613.6	5.89	1662.915
42	NBBL	7/1/2006	194.7997	2.73471	6.7	29.9	9.72383	0.04	1692	15.3	1937.391
43	EBL	7/1/2006	45.70571	2.27647	12.86	1.3	9.72403	0.04	356.1	11.1	1937.693
44	BOK	7/1/2006	45.88594	2.612	15.71	2.7	9.44627	0.03	236.2	9.24	1560.939
45	NCC	7/1/2006	11.96778	0.31571	5.22	21.9	9.06288	0.03	584.9	5.66	1158.185
46	NIC Asia	7/1/2006	22.10667	0.30234	13.692	2.6	9.06288	0.06	244.7	5.61	1158.185
47	LBL	7/1/2006	-95.7587	-2.14568	-13.29	31	8.46276	0.05	1391	11.9	725.9432
48	MBL	7/1/2006	19.89287	1.73561	12.98	0.3	9.12711	0.05	77.4	9.6	1217.563
49	KBL	7/1/2006	21.32238	1.7411	12.64	0.9	9.14746	0.06	130.3	17.2	1237.003
50	LBL	7/1/2006	6.21259	0.69901	14.7	0.8	8.61132	0.04	69.8	8.63	814.938
51	SBL	7/1/2006	18.60941	2.04398	14.83	0.9	2.99036	0.02	73.9	24.2	10.25451
52	NBL	7/1/2007	-6.89649	0.87724	-32.47	13.5	10.77091	0.02	2376	24.3	4377.145
53	RBB	7/1/2007	-9.66761	2.4672	-48.45	27.7	11.18499	0.03	8968	32.4	6041.906
54	Nabil	7/1/2007	34.92106	2.20732	12.04	1.1	10.29757	0.02	356.3	33.5	3028.131
55	NIBL	7/1/2007	37.62037	1.73868	12.17	2.4	10.29757	0.02	442.7	34	3028.131
56	SCBL	7/1/2007	39.42916	2.31195	15.71	2.4	10.30681	0.02	287.5	30.7	3049.989
57	HBL	7/1/2007	46.90561	2.39927	12.11	3.6	10.4495	0.02	760	28.2	3408.284
58	SBI	7/1/2007	36.35721	2.33767	13.29	4.6	9.64184	0.02	589.2	26.6	1817.607
59	NBBL	7/1/2007	-36.924	4.04119	-23.55	39.8	9.5663	0.03	3634	30.2	1713.812
60	EBL	7/1/2007	31.19552	1.28818	11.19	0.8	10.05772	0.13	418.6	31	2512.415
61	BOK	7/1/2007	33.14685	1.85698	12.38	2.5	9.61564	0.03	286.5	26.7	1780.914
62	NCC.	7/1/2007	33.92799	-1.18742	-9.13	31.4	9.08353	0.03	397.5	22.3	1176.952
63	NIC Asia	7/1/2007	30.2544	0.93913	12.2	1.1	9.08353	0.06	20.7	7.24	1176.952
64	LBL	7/1/2007	-36.3125	3.16613	-7.8	20.4	8.87275	0.05	1062	9.22	998.8563
65	MBL	7/1/2007	9.6691	0.80844	12.07	1.2	9.31762	0.05	229.3	19.6	1412.195
66	KBL	7/1/2007	32.29842	2.26218	11.2	0.7	9.41934	0.06	133.4	12.3	1528.559
67	LBL	7/1/2007	8.1998	0.74516	12.43	0.4	9.08138	0.06	91.8	18.3	1174.984
68	SBL	7/1/2007	28.157	2.0973	11.84	0.3	2.26894	0.04	99.3	12.6	5.848346
69	NBL	7/1/2008	-15.6524	1.70507	-22.6	8.9	10.81114	0.04	2142	6.76	4516.386
70	RBB	7/1/2008	-10.7294	2.18114	-44.14	21.6	11.34659	0.05	7709	5.75	6851.791
71	Nabil	7/1/2008	36.48031	1.92018	11.91	0.8	10.55786	0.04	404.6	8.72	3708.239
72	NIBL	7/1/2008	36.21235	1.84362	11.31	1.1	10.55786	0.04	537.2	6.08	3708.239
73	SCBL	7/1/2008	38.4659	2.37356	16.8	1.1	10.44323	0.02	245.5	8.72	3391.69

74	HBL	7/1/2008	48.95411	2.80879	12.5	2.4	10.52972	0.03	679	6.74	3627.896
75	SBI	7/1/2008	21.929	1.3752	12.54	3.6	9.83054	0.03	616.2	6.1	2105.191
76	NBBL	7/1/2008	-24.585	4.39273	-16.49	31.1	9.65362	0.04	3301	22.4	1834.35
77	EBL	7/1/2008	45.13269	2.81718	11.34	0.6	10.15257	0.04	497.3	16.4	2704.931
78	BOK	7/1/2008	37.43381	2.02433	11.47	1.8	9.80693	0.1	279	21.2	2066.855
79	NCC.	7/1/2008	245.441	4.84229	11.22	16.4	9.22749	0.09	403	9.04	1316.515
80	NIC Asia	7/1/2008	23.26386	1.61093	12.96	0.9	9.22749	0.08	143.7	10.1	1316.515
81	LBL	7/1/2008	-966.765	4.44562	5.99	14.9	8.9084	0.07	914	17.5	1026.963
82	MBL	7/1/2008	13.49038	1.12188	11.3	1	9.47787	0.05	263.7	13.2	1599.811
83	KBL	7/1/2008	18.30659	1.87016	14.96	1.4	9.65624	0.04	189.6	11.5	1838.095
84	LBL	7/1/2008	11.52782	0.92738	11.16	0.1	9.4747	0.03	113.5	13	1595.868
85	SBL	7/1/2008	26.43555	2.02845	11.2	0.6	2.60198	0.02	141	11.9	7.579138
86	NBL	7/1/2009	-21.114	1.91714	-14.85	5.9	10.90802	0.01	2189	13.2	4870.147
87	RBB	7/1/2009	-15.2899	2.03914	-37.7	15.7	11.50947	0.02	6483	9.04	7777.983
88	Nabil	7/1/2009	42.43494	2.50248	11.71	0.8	10.73513	0.06	403.1	10.7	4256.918
89	NIBL	7/1/2009	26.73409	1.99079	12.1	0.8	10.73513	0.04	584.4	10.7	4256.918
90	SCBL	7/1/2009	68.8563	2.46936	14.7	0.8	10.63687	0.05	200.9	6.76	3943.462
91	HBL	7/1/2009	47.0394	2.90787	11.31	2.2	10.6128	0.03	708.4	5.75	3870.264
92	SBI	7/1/2009	23.8654	1.05535	12.18	2	10.37316	0.04	474.9	12.6	3211.652
93	NBBL	7/1/2009	-19.668	11.85401	6.62	19.3	9.7305	0.02	2376	10.8	1947.476
94	EBL	7/1/2009	30.20082	1.64236	11.04	0.5	10.54535	0.02	584.9	11.5	3672.304
95	BOK	7/1/2009	54.07943	3.45466	11.91	1.3	9.95272	0.06	297.5	13.2	2315.237
96	NCC.	7/1/2009	59.96787	3.52268	10.93	2.7	9.36357	0.05	861.4	17.5	1463.621
97	NIC Asia	7/1/2009	26.2999	0.38764	14.6	0.9	9.36357	0.03	199.7	9.04	1463.621
98	LBL	7/1/2009	100.9388	4.70998	17.78	9.1	9.04144	0	698	22.4	1139.016
99	MBL	7/1/2009	5.87265	0.50192	11.61	2.8	9.82771	0.08	517.3	6.1	2100.558
100	KBL	7/1/2009	31.05839	2.20866	11.57	0.4	9.86605	0.04	186.6	6.74	2164.193
101	LBL	7/1/2009	16.07528	0.98758	11.49	0.1	9.84491	0.04	147.7	8.72	2128.871
102	SBL	7/1/2009	26.9115	1.87573	10.45	0.5	1.77031	0.03	171.9	18.3	3.967046
103	NBL	7/1/2010	-8.83338	0.85644	-11.17	2.3	10.82066	0.03	1528	12.3	4549.978
104	RBB	7/1/2010	-23.3338	2.2486	-24.08	11.4	11.4011	0.07	5363	7.24	7148.775
105	Nabil	7/1/2010	36.25935	2.07783	11.61	0.1	10.90797	0.02	752.2	8.63	4869.957
106	NIBL	7/1/2010	31.67428	2.18386	11.69	0.5	10.90797	0.02	627.5	17.2	4869.957
107	SCBL	7/1/2010	35.9577	2.61919	17.78	0.5	10.6333	0.03	217.9	9.6	3932.519
108	HBL	7/1/2010	27.9432	1.95414	11.02	3.2	10.70578	0.02	1093	11.9	4160.766
109	SBI	7/1/2010	18.69835	1.01698	14.14	1.5	11.58105	0.04	464.2	5.61	8223.66
110	NBBL	7/1/2010	119.376	8.28808	12.87	1.8	9.68156	0.08	1533	5.66	1874.682
111	EBL	7/1/2010	37.74732	1.97798	10.56	0.2	10.64669	0.03	600	9.24	3973.721
112	BOK	7/1/2010	29.26045	2.11814	11.45	1.2	10.08826	0.09	387.1	11.1	2572.858
113	NCC.	7/1/2010	41.58326	3.16427	14.25	2.7	9.57793	0.1	554.9	15.3	1729.397

114	NIC Asia	7/1/2010	26.94694	2.16175	15.3	0.6	9.57793	0.11	196.5	5.89	1729.397
115	LBL	7/1/2010	26.33956	3.75492	24.62	4.7	8.99683	0.07	385.5	15.2	1100.143
116	MBL	7/1/2010	8.01082	0.63194	11.18	0.1	9.97825	0.06	654.6	6.82	2361.707
117	KBL	7/1/2010	30.84641	2.33073	13.8	1.8	9.97579	0.11	199	8.72	2357.189
118	LBL	7/1/2010	18.16663	1.50818	14.99	0.4	9.81776	0.13	176.2	8.1	2084.352
119	SBL	7/1/2010	17.09539	1.09656	10.73	0.4	2.08079	0.14	229.3	8.32	5.051582
120	NBL	7/1/2011	-8.32085	0.68888	-9.66	5.3	10.92694	0.12	1501	7.8	4942.403
121	RBB	7/1/2011	-23.701	1.85951	-22.52	10.9	11.45753	0.09	3861	7.7	7469.788
122	Nabil	7/1/2011	33.10217	2.07154	11.75	1.8	11.02341	0.03	941	13.6	5327.833
123	NIBL	7/1/2011	27.54831	2.06093	12.09	0.6	11.02341	0.08	615.4	3.02	5327.833
124	SCBL	7/1/2011	33.23348	2.47898	17.38	0.6	10.71885	0.11	234	4.9	4203.312
125	HBL	7/1/2011	41.02698	2.87264	11.45	3.9	10.80199	0.11	1348	8.6	4484.332
126	SBI	7/1/2011	18.69324	0.9728	11.84	1.1	10.76048	0.08	453.7	9.32	4341.752
127	NBBL	7/1/2011	35.49331	3.58564	10.53	19.2	9.81302	0.07	1780	11.3	2076.676
128	EBL	7/1/2011	3.37549	1.9859	10.43	0.3	10.75568	0.03	604.2	9.03	4325.56
129	BOK	7/1/2011	29.51627	2.38995	11.62	1.8	10.14965	0.09	488.8	7	2698.79
130	NCC.	7/1/2011	14.10097	1.42861	13.58	3.9	9.61818	0.11	583	8.33	1784.438
131	NIC Asia	7/1/2011	28.23796	2.20848	24.49	0.6	9.61818	0.11	231.6	9.58	1784.438
132	LBL	7/1/2011	27.72655	4.38226	14.68	1	9.11883	0.09	101.1	9.32	1209.741
133	MBL	7/1/2011	0.36087	0.03188	10.86	0.9	9.90723	0.1	314.9	10.9	2234.689
134	KBL	7/1/2011	12.1656	1.0921	14.45	4.5	9.99437	0.12	296.4	9.55	2391.528
135	LBL	7/1/2011	19.88708	1.69427	13.21	1.1	10.01914	0.15	185.5	8.32	2438.087
136	SBL	7/1/2011	16.13676	1.18758	11.75	0.6	-1.01924	0.14	258.2	8.72	0.452312
137	NBL	7/1/2012	-13.187	0.66356	-5.49	5.8	11.01918	0.11	1696	9.41	5310.319
138	RBB	7/1/2012	-62.5195	1.34558	-9.35	7.3	11.58504	0.1	3509	6.82	8249.241
139	Nabil	7/1/2012	37.68532	2.40533	12.71	2.3	11.17809	0.05	1228	13.6	6009.542
140	NIBL	7/1/2012	25.54201	1.84261	11.82	2	11.17809	0.03	853.9	24.2	6009.542
141	SCBL	7/1/2012	31.89951	2.73173	16.28	0.7	10.66772	0.04	252.5	9.24	4039.306
142	HBL	7/1/2012	26.34213	1.88604	11.9	2.1	10.92962	0.03	940.1	5.66	4952.724
143	SBI	7/1/2012	16.69324	0.79624	11.97	0.5	10.9881	0.05	321.6	9.6	5183.388
144	NBBL	7/1/2012	42.69993	4.00117	11.86	4.3	10.3827	0.02	613.1	7.24	3235.59
145	EBL	7/1/2012	35.0281	1.92654	11.08	0.8	10.94393	0.03	705.9	9.22	5008.201
146	BOK	7/1/2012	25.00821	2.04129	12.58	2.3	10.30341	0.03	505.2	6.76	3041.928
147	NCC.	7/1/2012	11.31191	0.99195	11.81	0.7	9.90051	0.04	623.2	5.75	2223.03
148	NIC Asia	7/1/2012	19.72677	1.52033	12.85	0.7	9.90051	0.04	280.9	8.72	2223.03
149	LBL	7/1/2012	11.76725	1.12639	23.55	0.5	9.2334	0.03	89	6.08	1322.585
150	MBL	7/1/2012	0.40968	0.04267	14.6	0.6	10.13896	0.03	497.2	8.72	2676.426
151	KBL	7/1/2012	11.76258	0.97339	13.27	2.7	10.19436	0.06	508.7	6.74	2794.369
152	LBL	7/1/2012	16.90241	1.31605	11.81	2.2	10.20911	0.05	218.6	6.1	2826.637



153	SBL	7/1/2012	15.30766	0.98402	11.47	2.3	-0.89238	0.05	407	9.04	0.499257
154	NBL	7/1/2013	-82.0888	1.02608	-0.49	4.5	11.25336	0.06	1994	10.8	6372.164
155	RBB	7/1/2013	65.39245	1.14923	-3.33	5.3	11.65574	0.04	3540	13.3	8715.949
156	Nabil	7/1/2013	40.85128	2.85254	13.17	2.1	11.26779	0.02	1276	10	6444.143
157	NIBL	7/1/2013	32.90756	2.54472	12.99	1.9	11.26779	0.02	1178	11	6444.143
158	SCBL	7/1/2013	29.40935	2.59107	14.48	0.8	10.75798	0.03	309.5	7.8	4333.311
159	HBL	7/1/2013	22.11572	1.62854	12.15	2.2	11.04935	0.02	112.7	4.9	5436.505
160	SBI	7/1/2013	24.29711	1.17171	12.86	0.4	11.10202	0.02	450.8	8.33	5664.027
161	NBBL	7/1/2013	27.15978	3.24572	12.09	3.1	10.11532	0.02	562.8	6.82	2627.626
162	EBL	7/1/2013	35.31459	3.20629	13.22	0.6	11.10762	0.02	804.6	5.61	5688.771
163	BOK	7/1/2013	22.85556	1.83796	12.62	1.5	10.42155	0.02	493.6	6.76	3334.933
164	NCC	7/1/2013	19.29058	1.39706	11.95	2.3	10.18673	0.03	332.5	6.1	2777.821
165	NIC Asia	7/1/2013	14.76553	1.2912	14.37	2.3	10.18673	0.13	856.6	8.72	2777.821
166	LBL	7/1/2013	7.49484	1.10692	21.57	0.9	9.5301	0.03	167.3	18.3	1666.193
167	MBL	7/1/2013	5.96654	0.50295	12.66	1.3	10.35503	0.03	479.3	5.89	3166.645
168	KBL	7/1/2013	12.26284	0.95633	12.23	2.9	10.32424	0.06	752.6	9.41	3091.652
169	LBL	7/1/2013	19.25852	1.41607	12.27	3.9	10.35107	0.05	356.3	8.32	3156.899
170	SBL	7/1/2013	-50.9438	0.63677	12.28	2.4	1.78627	0.05	1994	9.55	4.016638
171	NBL	7/1/2014	39.51181	1.21771	3.34	5.8	11.33007	0.06	2065	9.32	6764.246
172	RBB	7/1/2014	152.998	1.49708	-2.02	3.9	11.77565	0.06	3385	9.58	9568.662
173	Nabil	7/1/2014	35.89636	2.55716	9.06	2.2	11.4485	0.04	1511	8.33	7417.466
174	NIBL	7/1/2014	27.45319	2.05562	8.8	1.7	11.4485	0.04	1432	9.03	7417.466
175	SCBL	7/1/2014	29.95347	2.51492	10.56	0.3	10.91095	0.05	351.8	9.32	4881.267
176	HBL	7/1/2014	20.80873	1.45905	8.26	2.6	11.22831	0.04	1411	8.6	6249.117
177	SBI	7/1/2014	24.22743	1.46672	8.54	0.3	11.04695	0.04	434.7	4.9	5426.358
178	NBBL	7/1/2014	2.18748	2.28296	11.32	1.4	10.44168	0.02	408	9.6	3387.6
179	EBL	7/1/2014	32.15479	2.1688	8.48	0.6	11.17681	0.03	878.6	7.24	6003.557
180	BOK	7/1/2014	14.62267	1.29349	8.87	1.1	10.59954	0.03	562.5	9.22	3830.522
181	NCC	7/1/2014	16.26437	1.36836	10.2	2.2	10.19937	0.04	684.7	6.76	2805.287
182	NIC Asia	7/1/2014	18.5657	1.53246	10.79	2.2	10.19937	0.04	994.5	5.75	2805.287
183	LBL	7/1/2014	100.9548	1.15742	14.26	0.9	9.95286	0.07	239.8	8.72	2315.489
184	MBL	7/1/2014	16.56953	1.08719	8.33	1.1	10.66016	0.02	453.8	6.08	4015.606
185	KBL	7/1/2014	12.08642	0.95458	9.84	1.7	10.42341	0.03	937.3	8.72	3339.764
186	LBL	7/1/2014	17.3448	1.2568	8.78	3.5	10.53337	0.48	372.6	6.74	3638.218
187	SBL	7/1/2014	31.10862	1.78739	7.13	1.7	2.80757	0.08	654.9	6.1	8.894492
188	NBL	7/1/2015	15.71808	0.58267	7.8	3.9	11.4108	0.09	2315	9.04	7202.957
189	RBB	7/1/2015	195.261	3.09494	-10.34	3.4	11.92219	0.1	3689	7.8	10724.83
190	Nabil	7/1/2015	28.63812	1.75299	11.86	1.8	11.73486	0.11	1660	7.7	9269.618
191	NIBL	7/1/2015	24.72376	1.76517	11.99	1.8	11.73486	0.12	1461	3.02	9269.618
192	SCBL	7/1/2015	25.68757	1.87296	13.89	0.3	11.10158	0.08	339.5	4.9	5662.087

193	HBL	7/1/2015	18.56034	1.3174	11.45	2.8	11.35868	0.11	1930	8.6	6916.577
194	SBI	7/1/2015	23.18173	1.7545	13.34	0.2	11.02018	0.04	493.7	4.9	5314.454
195	NBBL	7/1/2015	28.7042	2.70294	11.36	1.3	10.68393	0.03	487.2	9.32	4090.597
196	EBL	7/1/2015	28.67053	1.56167	13.22	0.7	11.51327	0.05	895.2	8.6	7801.024
197	BOK	7/1/2015	10.05185	0.75761	13.07	3.4	10.75966	0.03	1463	9.24	4338.982
198	NCC	7/1/2015	15.31687	1.26948	11.39	2.2	10.35377	0.08	485.3	8.63	3163.541
199	NIC Asia	7/1/2015	15.14467	1.18386	13.16	2	10.35377	0.09	1101	7.24	3163.541
200	LBL	7/1/2015	13.94308	1.47604	14.75	0.7	10.08849	0.12	283.1	9.22	2573.318
201	MBL	7/1/2015	19.16432	1.20899	12.47	0.6	10.84526	0.13	557.2	9.04	4637.945
202	KBL	7/1/2015	11.88903	0.88021	11.12	2.8	10.59839	0.06	861.5	6.1	3827.095
203	LBL	7/1/2015	10.77932	0.80945	10.87	1.3	10.79798	0.02	586.6	6.74	4470.357
204	SBL	7/1/2015	24.62331	1.78928	11.17	1.8	2.95305	0.05	807.5	6.08	9.960974

## APPENDIX III

### CALCULATION OF CAPITAL ADEQUACY RATIO

Theoretically, three steps are involved in the calculation of CAR: First step: calculation of capital (tier 1 capital and total capital). Second step: calculation of total risk-weighted-assets. Third step: calculation of capital adequacy ratios (divide capital by total risk-weighted-assets).

#### Step One: calculation of Tier I capital

The calculation of capital illustrates in the following. Capital includes:

Tier 1 Capital generally includes:

1. Paid up Equity Capital.
2. Irredeemable non-cumulative preference shares which are fully paid-up and with the capacity to absorb unexpected losses. These instruments should not contain any clauses whatsoever, which permit redemption by the holder or issuer upon fulfillment of certain condition. Banks should obtain prior approval of NRB for this kind of instruments to qualify as a component of core capital.
3. Share Premium
4. Proposed Bonus Equity Share
5. Statutory General Reserve
6. Retained Earnings available for distribution to shareholders
7. Un-audited current year cumulative profit, after all provisions including staff bonus and taxes. Where such provisions are not made, this amount shall not qualify as Tier 1 capital.
8. Capital Redemption Reserves created in lieu of redeemable instruments
9. Capital Adjustment reserves created in respect of increasing the capital base of the bank.
10. Dividend Equalization Reserves.
11. Any other type of reserves notified by NRB from time to time for inclusion in Tier 1 capital

*Table 1. Tier 1 capital*

*Source: Nepal Rastra Bank, Capital Adequacy Framework, 2007.*

Tier 2 capital generally comprises

<p>1. Cumulative and/or redeemable preference shares with maturity of five years and above.</p>
<p>2. Subordinated term debt fully paid up with a maturity of more than 5 years; unsecured and subordinated to the claim of other creditors, free of restrictive clauses and not redeemable before maturity. Since, subordinated term debt is not normally available to participate in the losses; the amount eligible for inclusion in the capital adequacy calculations is limited to 50% of core capital. Moreover, to reflect the diminishing value of these instruments as a continuing source of strength, a cumulative discount (amortization) factor of 20% per annum shall be applied for capital adequacy computations, during the last 5 years to maturity.</p>
<p>3. Hybrid capital instruments. Those instruments which combine certain characteristics of debt and certain characteristics of equity. Each such instrument has a particular feature, which can be considered to affect its quality as capital. Where these instruments have close similarities to equity, in particular when they are able to support losses on an ongoing basis without triggering liquidation, they may be included in Tier 2 capital with approval from Nepal Rastra Bank.</p>
<p>4. General loan loss provision limited to a maximum of 1.25% of total Risk Weighted Exposures. General loan loss provision refers to the provisions created in respect of Performing Loans only and it does not include provisions of rescheduled/restructured and classified loans. The additional loan loss provisions created in respect of Personal Guarantee loans and loans in excess of Single Obligor Limits are specific provisions and hence cannot be included under this category. Such provisions however can be deducted from the gross exposures while calculating risk weighted exposures for credit risk.</p> <p>However, provisions created in excess of the regulatory requirements or provisions which is not attributable to identifiable losses in any specific loans shall be allowed to be included in the General Loan Loss Provision and shall be eligible for Tier II capital subject to a maximum of 1.25% of total risk weighted exposures.</p>

5. Exchange equalization reserves created by banks as a cushion for unexpected losses arising out of adverse movements in foreign currencies.
6. Investment adjustment reserves created as a cushion for adverse price movements in bank's investments falling under "Available for Sale" category.
7. Revaluation reserves often serve as a cushion against unexpected losses but may not be fully available to absorb unexpected losses due to the subsequent deterioration in market values and tax consequences of revaluation. Therefore, revaluation reserves will be eligible up to 50% for treatment as Tier 2 capital and limited to a maximum of 2% of total Tier 2 capital subject to the condition that the reasonableness of the revalued amount is duly certified by the internal auditor of the bank.
8. Any other type of reserves notified by NRB from time to time for inclusion in Tier 2 capital

*Table 2. Tier 2 capital*

Banks shall be required to deduct the following from the Tier 1 capital for capital adequacy purposes. The claims that have been deducted from core capital shall be exempt from risk weights for the measurement of credit risk.

1. Book value of goodwill.
2. Deferred Tax Assets
3. Miscellaneous expenditure to the extent not written off. E.g. VRS expense, preliminary expense, share issue expense, deferred revenue expenditure, etc. However, software expenditure or software development expenditure, research and development expenditure, patents, copyrights, trademarks and lease hold developments booked as deferred revenue expenditure are subject to 100% risk weight and may not be deducted from Tier 1 capital.
4. Investment in equity of financial institutions licensed by Nepal Rastra Bank
5. All Investments in equity of institutions with financial interest
6. Investments in equity of institutions in excess of the prescribed limits.

7. Investments arising out of underwriting commitments that have not been disposed within a year from the date of commitment.
8. Reciprocal crossholdings of bank capital artificially designed to inflate the capital position of the bank.
9. Any other items as stipulated by Nepal Rastra Bank, from time to time.

*Table 3. Items to be deducted from tier 2 capital*

**Step Two: calculation of total risk-weighted-assets (RWA)**

As other important element when calculating CAR, risk-weighted-asset (RWA) has been developed from Basel I to Basel II. Under Basel II, the total risk-weighted-asset is determined by multiplying the capital requirement for credit risk, market risk and operational risk by 12.5 (i.e. the reciprocal of the minimum capital ratio of 8%) (BCBS, 2006, p.12).

$$Total\ RWA = credit\ risk\ RWA + Market\ Risk\ RWA + Operational\ RWA$$

Where,

$$Credit\ risk\ RWA = 12.5 \times Credit\ risk\ capital\ requirement$$

$$Market\ risk\ RWA = 12.5 \times Market\ risk\ requirement$$

$$Operational\ risk\ RWA = 12.5 \times Market\ risk\ requirement$$

**Step Three: calculation of capital adequacy ratios**

Consequently, capital adequacy ratios are:

$$Tier1\ capital\ to\ total\ risk - weighted\ assets$$

$$= Tier\ 1\ Capital / Total\ risk\ weighted\ assets$$

$$Total\ Capital\ to\ total\ risk - weighted\ assets$$

$$= Total\ capital / Total\ risk\ weighted\ assets$$