

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Diploma Thesis

**Impact of Credit Risk Management on the Financial
Performance of Commercial Banks in Nepal**

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Department of Economics

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DIPLOMA THESIS ASSIGNMENT

Amrit Kumar Joshi

Economics and Management

Thesis title

Impact of credit risk management on the financial performance of commercial banks in Nepal

Objectives of thesis

1. Determine the impact of credit risk management on banks profitability.
2. Determine how non-performing loan affect on bank profitability.
3. Examine the effect of capital adequacy ratio on financial performance.

Methodology

1. Ratio analysis for obtaining ratios needed for data set.
2. Panel data regression analysis for examine the relationship.

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Credit risk management, banks performance, ROA, ROE

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Declaration

I hereby, declare this thesis is my own work and effort and also it has not been submitted anywhere for any reason. Where other sources of information have used, they are cited properly at the end of the thesis. .

Prague, 30th March, 2015

.....
Amrit Kumar Joshi

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**Dopad řízení úvěrových rizik na finanční výkonnost
komerčních bank v Nepálu**

**Impact of Credit Risk Management on the Financial
Performance of Commercial Banks in Nepal**

Souhrn

Ízení úv roových rizik je d ležitým ukazatelem finan ní výkonnosti. Hlavním cílem studie bylo prozkoumat hlavní ukazatele, které jsou relevantní pro ízení úv roových rizik a zjistit dopad na ziskovost komer ních bank v Nepálu. Jako výkonnostní ukazatel pro ziskovost byla použita rentabilita vlastního kapitálu (ROE), zatímco pom r nesplacených úv r (NPLR) a kapitálová p im enost (CAR) posloužily jako ukazatele pro ízení úv roového rizika. Jako kontrolní prom nná byla použita celková aktiva (TA). Z celkového po tu t iceti komer ních bank operujících na Nepálském trhu, byl pro ú ely diplomové práce vybrán vzorek sedmi bank. Pro regresní analýzu byla použita sekundární data z let 2009 – 2013. Za použití statistického softwaru STATA byla provedena ada statistických test , za ú elem zkoumání vztah mezi prom nnými. Z výsledk analýz vyplívá, že pom r nesplacených úv r (NPLR) má pom rn významný negativní vliv na návratnost vlastního kapitálu (ROE), zatímco kapitálová p im enost nijak významn ziskovost v Nepálu neovliv uje. Doporu ení pro banky navrhuje a formuluje strategie, které umož ůjí ízení parametr u nesplacených úv r (NPLR) za ú elem zlepšení výkonu. Strategie minimalizují úv rové riziko, ale mimo jiné také zlepšují ziskovost.

Klí ová slova: ízení úv roových rizik, ziskovost, kapitálová p im enost, rentabilita vlastního kapitálu, pom r nesplacených úv r , celková aktiva

ABSTRACT

Credit risk management is an important predictor of financial performance. The main objective of the study was to explore major indicators pertinent to credit risk management and to examine their impact on profitability of commercial banks in Nepal. Return on equity (ROE) was used as the performance (profitability) indicator while Non-Performing Loans Ratio (NPLR) and Capital Adequacy Ratio (CAR) as credit risk management indicators. Meanwhile, Total Assets (TA) was used as control variable. Among 30 commercial banks in Nepal, required data of seven banks was used as sample. The collected secondary data of time period 2009 to 2013 was analyzed under panel data regression analysis. A series of statistical tests was performed using statistical software STATA to examine the relationship between the variables. The results of those analysis revealed that, non-performing loans ratio (NPLR) have negative and relatively significant impact on return on equity (ROE), while CAR have not significant relationship with profitability in Nepal. The recommendation is to advice banks to gently design and formulate strategies which can address and control parameter NPLR for better performance, that will not only minimize the exposure to credit risk but also improve profitability.

Key words: credit risk management, profitability, capital adequacy ratio, ROE, NPLR, TA

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LIST OF ABBREVIATIONS

CAR	Capital Adequacy Ratio
Coef.	Coefficient
TA	Total Assets
NPL	Non-Performing Loan
NPLR	Non-Performing Loan Ratio
NRB	Nepal Rastra Bank
P-Value	Probability Value
ROE	Return on Equity
ROA	Return on Assets
ROC	Return on Capital
RWA	Risk Weighted Assets
VAR	Value at Risk

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Financial institutions play a vital role in uplifting the country's economy by creating opportunities to their stakeholders and adding value to the overall Gross Domestic Product. The health of financial system has important role in the country as its failure can disrupt economic development of the country (Das and Ghosh, 2007). Bank is a resource mobilization institution, which accepts deposits from various sources and invests such accumulated resources into the different sectors of economy like trade, agriculture, commerce, industry and tourism. There are various types of banks according to their types of product and services they offer (Ben and Howells, 2008). Banking institutions are very important for resource mobilization and also for overall development of the country. The commercial banks all over the world are regulated by certain norms and regulations of their individual countries (Hull, 2012). Among many regulations, one of the major regulation is the minimum capital requirement to counter with the cases of uncertainty or unexpected loss. Such capital requirement, in general is controlled by the Basel committee which major aim is to supervise and also to improve quality of service (Bis.org, 2014). Basel committee become stricter and focused of its activities after the Latin American debt crisis of 1980. Basel accord (Basel I) is mainly intense on the credit risk and also to the minimum capital ratio of capital to risk-weighted assets of 8% to be fully directed by the end of 1992 (Bis.org, 2014). In order to make Basel I more complete, committee developed the Basel II in 2004 with new provision of capital adequacy. Even though Basel II couldn't be able to address the financial crisis of 2007/08, the committee forced to enter into Basel III in 2010 with some revised and new techniques to address such unexpected and complicated crisis. However, Nepalese banks are still following Basel II accord for good governance.

Risk can be address by appropriate understanding of risk followed by assessment, development of the solution strategies and eliminate through managerial resources, tools and techniques (Appa, 1996). To manage different types of risk one has to define properly before proceed to manage them.

Guidelines of NRB (2014), specifies different kinds of risks such as operational risk, credit risk, default risk, competitors risk, foreign exchange flotation risk, investment risk and so on in financial sectors of Nepal. Default risk is the major risk in banking sector, is the possibility that a borrower will default, by failing to repay interest and principal as per agreed terms and conditions. New banking risk measurement techniques were introduced in early 90's to tackle with the possible worst situations of financial crisis.

The credit risk of bank is the possibility of loss arising from non-payment of the principle and the interest, or both or non-realization of securities on the loan. Moreover, it is the most important risk in banking sector because it not helps to manage the credit risk exposure but also contribute to the stability and overall profitability by effective utilization of capital in the economy (Tsolas,Psillaki, , and Margaritis, 2010, p.873). It is the risk of loss due to debtor's non-payment of a loan or other line of credit (either the principal or interest or both). Credit risk is the current and prospective risk earnings or capital arising from an obligor's failure to meet the terms of any contract with the bank or otherwise to perform as agreed (Kargi, 2011). To minimize the credit risk, banks are encouraged to fulfill know your customer (KYC) principle developed by the Basel committee on banking supervision. The non-payment of loan and interest even by the small borrower, results very big loss to the bank (Baeseems and Gestel & 2008, p. 24). Changes in credit risks may reflect changes in the health of a bank's loan portfolio which may in turn affect the bank's performance (Cooper et al, 2003).

The studies conducted by Acharya (2003), Demetriades & Luintel (1996) and Ferrari, Jaffrin, & Shrestha (2007) were more focused on services, policies, working capital requirement, liberalization and development of financial sector. To the best of my knowledge, only Poudel, (2012) has conducted research, to investigate the impact of credit risk management on financial performance of banks in Nepal.

1.1.1 Credit Risk Management

Credit risk management is the process of finding, measuring, checking and controlling of risk arising from the possibility of default in repayments of debt (Coyle, 2000).

The extension of payback period may lead to the default risk, to tackle with such problem financial institutions create loan loss provision account which have negative impact on profit. Basically, top level management has the right to extend the credit limit for business enterprises, to personal friends, to persons with a reputation for non-financial acumen or to meet the personal agenda. This is usually done to maintain the good relationship with the stakeholders. Such subjective decision-making may leads to unexpected loss to the business. A solution to this may be the use of tested lending techniques and especially quantitative ones, which filter out subjectivity (Griffith and Persuad, 2002). The importance of credit risk management cannot be ignored because it is the integral part of loan process. An effective credit risk management helps to reduce bank risk and adjusted risk rate of return by maintaining credit risk exposure.

The key principles of credit risk management are establishment of structure, allocation of accountability and responsibility, processes have to be disciplined and prioritized, responsibilities should be transferred clearly and accountability assigned thereto. The overwhelming concern on bank credit risk management is two-fold (Demirguc-Khunt and Huizinga, 1999). Firstly the Newtonian reaction against bank loss, a realization after the loss occurred is unbearable. Secondly, recent development on non-banking, commercial paper and securitization push banks to find the viable customers. However, properly organizing and managing the lending function can minimize whatever the degree of risk assumed losses. Banks can use increasingly new and sophisticated measuring techniques in approaching risk management issues. Differentiation of the bank profitability is largely determined by the variation of credit risk since increased exposure to credit risk is normally associated with decreased firm profitability. This means that more the banks are exposed to high risk loans, the higher the accumulation of non-performing loans and therefore, less the profitability.

1.1.2 Financial Performance

Financial performance of the bank can be measured by profitability ratios and also gauged by net income. It is the result of how well the bank uses its assets and resources to generate revenue.

The primary objective of any financial institution is to maximize the wealth and this can be done with effective and efficient utilization of available resources. To measure the current situation of the bank, financial health is compared with competitive banks performance over the given period or with the sector as a whole. The performance of banks and other financial institutions can be measured from the combination of various financial ratio analysis, measuring performance against budget, benchmarking or a mix of these procedures (Avkiran, 1995). Bank profitability is an important predictor of financial crisis (Demirguc,Kunt and Detragiache,1999). Financial performance is based on the initiation of upgrading the standard and timeliness of financial information to meet required standard while supporting daily operations (Besis, 1998). Profitability ratios are mostly used indicators to measure credit risk in banks. Profitability is associated with the results of management performance. Return on Equity (ROE) and Return on Assets (ROA) are the mostly used ratios to measure the financial performance in banking sector. Quality level of ROE is considered between 15% -30% and for ROA is at least 1%. Being ROE and ROA in fair position doesn't mean that institution is in good condition but also there should be good connection between other ratios to these ratios to achieve healthier performance. Basically, ROE and ROA are used to measure the profitability comparing to the similar institutions in the same industry. This study has used ROE as profitability indicator, thus the more focus is given to ROE.

1.1.3 Financial Institutions in Nepal

The Nepalese Financial Sector is composed of Banking sector and non-banking sector. Banking sector comprises Nepal Rastra Bank (NRB) and Commercial Banks while the non-banking sector includes:

- financial institutions licensed by Nepal Rastra Bank are Development Banks, Micro-finance, Development Banks, Finance Companies, Co-operative Financial Institutions and also Non-governmental Organizations (NGOs) performing limited monetary functions (NRB,2014) and
- Other financial institutions licensed by Nepal Rastra Bank, Insurance Companies, Citizen Investment Trust, Employee's Provident Fund, Postal Saving Offices and Nepal Stock Exchange(NRB, 2014).

During the last few decades Nepalese financial system has grown significantly. At the beginning of 1980 there were only two commercial banks and two development banks in the country. The history of commercial bank is not so long. It begins with the establishment of Nepal Bank Ltd. in 1937. Until 1945, only NBL used to provide services to the public. Later Central Bank was introduced under Nepal Rastra Bank act 1944. According to (Nepal Commercial Bank act, 1974) commercial bank is the one which exchanges money, accepts deposits, grant loan and performs commercial banking functions and which is not a bank meant for cooperative agriculture, industries as for such specific purpose. Even the member owned financial institutions have the philanthropic motivation generates profit. The only difference between profit oriented and non-profit oriented financial institutions is the degree of the profit accumulation and use of such earned profits. Until 2013 there were 30 commercial banks exists in Nepal including joint venture, public and international banks. When the government adopted liberal and market oriented economic policy, joint venture banks started their operation in mid-80. Nepalese financial system is dominated by commercial banks. They alone hold 80 percent of total assets and liabilities of the financial system. They act as a channel between the surplus economic unit and deficit economic unit.

Figure 1: Progress of Financial Institutions in Nepal (1985-2013)



Source: Nepal Rastra Bank, 2014

1.2 Statement of the Problems

Banks nowadays are offering many kinds of products and services; their risk level has also diversified to some extent. The commercial banks are in the risky business, because there is significant increase of financial institutions all over. However, all of them have their own strategies, plans and policies for existence. The stability of the banks depends upon the profitability and capital adequacy (Tabari et al., 2013, p.1624). After thorough study of various previous researches, the researcher found that most of those research have used Return on Assets as a profitability indicator and also not a single researches has used Capital Adequacy Ratio as a credit risk management indicator in Nepalese context. Hence, this research will try to fill the gap by addressing CAR and ROE as a major indicators of credit risk management and profitability respectively.

Similarly, this research will fulfill many queries of the investors and managers by providing practical evidences explaining which credit risk management indicator is more affecting in profitability of banks. Banks thus can manage and allocate their resources according to the risk position. Moreover, investors can have comprehensive viewpoint of how the profitability is being affected. If the result of this research will show no relationship between the variables, the contribution of this study could be suggesting not to conduct future research by including the variables used in this study but can make effort to find some other variables for more significant results.

1.3 Importance of the Study

This study is mainly focused on analyzing the relationship between credit risk management indicators and financial performance of banks in Nepal. Definitely, the stakeholders who are directly and indirectly dealing with these attributes of financial system can have advantage from this research.

- **To regulators and policy makers**
 - The research will provide the basis for regulatory policy framework to mitigate the financial system from financial crises and to better appreciate and quantify those credit risk exposures.

- **To investors**
 - This research will help investors to understand the factors that influence the return on their investments.
- **To commercial banks**
 - This research will clearly explain the relationship between the credit risk management indicators and their impacts which can help during investment decisions by the managers.

1.4 Hypothesis of the Research

The indicators which has been used in this research to understand the relationship between credit risk management and profitability of commercial banks in Nepal are CAR, NPLR,TA(Control Variable) and ROE. Here, in this section research hypothesis has been set for further process. Few researches has already been conducted in this topic, after a rigorous analysis of those studies, the researcher found much space for research. And for the further analysis, first of all research hypothesis has been set in the form of statement.

Ho= Capital Adequacy Ratio (CAR) significantly affect Return on Equity (ROE) of commercial banks in Nepal.

Ho= Non Performing Loan Ratio (NPLR) significantly affect Return on Equity (ROE) of commercial banks in Nepal.

1.5 Research Objectives

The main purpose of the research is to understand the impact of credit risk management on the financial performance of commercial banks in Nepal. Moreover, the specific objectives is to understand the impact of Non-Performing Loan Ratio and Capital Adequacy Ratio on the financial performance. After analyzing the relationship between dependent and independent variables, this study also examines whether the relationship between the variables are positive or negative.

1.6 Limitations

The major limitations of this study is the sample population. Because, only seven commercial banks are used as sample among 30 commercial banks in Nepal. Beside this, the study does not include information of “B” and “C” Class financial institutions. Moreover, the consideration of only top banks may not justify the relationship between the variables in general. At the same time, the data used in this research are from the year 2009 to 2013, which does not cover the impact of financial crisis.

CHAPTER TWO

DATA AND METHODOLOGY

2.1 Introduction

This section deals with explaining the methods of data collection, sample population, time horizon, explanation of used statistical tests and the applied regression model in this study.

2.2 Data Collection

Secondary data was used for the purpose of empirical analysis and was collected from the annual reports of the respective banks. Micro analysis of Financial Statement, Profit and Loss account and Balance Sheet Account of sample banks was undertaken to gather the required information. The report “*Banking and Financial Statistics*” published by the Central Bank of Nepal in July, 2013 was also used for the data collection process.

2.3 Population and Time Horizon

The population which the researchers wants to generalize the result is basically referred as target population (Mugeda and Mugeda, 2003). The target population which can be benefited from this research could be managers, investors and all other stakeholders who have direct and indirect relationship with banking activities. The sample population in this study is the mix of Joint venture banks, Public banks and International banks currently operating in Nepal. *Level of transparency, data availability and performance of the individual banks is the main reason of selecting those seven banks as a sample population.* But, the banks which were merged and transformed into A’ class commercial bank, between the years 2009 to 2013 are not covered in this research. The sample population are seven commercial banks.

- Standard Chartered Bank Limited
- Everest Bank Limited
- Citizens Bank International Limited
- Nabil Bank Limited
- Bank of Kathmandu Limited
- Nepal SBI Bank Limited
- Nepal Investment Bank Limited

The time period used in this study is from the year 2009 to 2013 in order to discard the possible impact of 2008 world economic and financial crisis in result. Because, the researcher solely wanted to understand the relationship between the internal credit risk management indicators and its impacts on profitability of Nepalese banking.

2.4 Brief Overview of the Selected Banks

2.4.1 Everest Bank Limited

The Bank founded in 1994 is now one of the leading banks of Nepal. Catering to more than 650,000 customers, the bank is helping in different sector of economy. The Everest bank is joint venture with 20 percent equity hold by general public, 30 percent by Punjab National Bank India and rest by Mr. B. K. Shrestha. Moreover, the bank has now 53 branches all over the country with 74 ATM machines, 5 revenue counters and 22 revenue collection offices.

Table 1: Key Financial Indicators, Everest Bank Ltd.

Particular	2009	2010	2011	2012	2013
Total Business (Rs. In Ten Million)	5720.76	6448.87	7278.97	8662.29	10191.82
Operating Profit (Rs. In Million)	1066.04	1349.10	1516.69	1790.39	2401.55
Dividend/ Bonus Payment (In %)					
Cash Dividend	30	30	50	1.58*	50
Bonus	30	30	10	30	10

Source: Annual Report Everest Bank Ltd, 2013

2.4.2 Standard Chartered Bank Nepal Limited

Standard Chartered Bank Nepal Limited is operating in Nepal since 1987. This bank is also joint venture with 75 percent equity hold by Standard Chartered Group and 25 percent by general public of Nepal. Moreover, with 19 points of representation and 23 ATM across the country is pioneer of domestic financial market.

Table 2: Key Financial Indicators, Standard Chartered Bank Nepal Ltd.

Particular	2009	2010	2011	2012	2013
Profit after Tax (In Rs. Million)	1025	1086	1119	1169	1218
Total Shareholder's Equity(In Rs. Million)	3052	3370	3678	4122	4618
Dividend/ Bonus Payment (%)					
Bonus	100	70	50	60	50
Cash Dividend	50	55	50	45	40

Source: Annual Report Standard Chartered Bank Nepal Ltd, 2013

2.4.3 Bank of Kathmandu Limited

Bank of Kathmandu started its operation from 1995 with an aims to facilitate nation's economy. The bank has 50 branches all around the country with 7 extension counters. BOK is also offering branchless banking service in 24 locations and have 25 ATM machines.

Table 3: Key Financial Indicators, Bank of Kathmandu Ltd.

Particular	2009	2010	2011	2012	2013
Profit after Tax (In Rs. Million)	462	509	605	608	617
Total loans (In Rs. Million)	14,946	17,044	17,947	19,319	23,049
Dividend/ Bonus Payment (%)					
Cash Dividend	7.37	15	16.75	21.32	0.74
Bonus Share	47.37	30	34.75	26.32	14.74

Source: Annual Report Bank of Kathmandu, 2013

2.4.4 Nabil Bank Limited

Nabil bank is the first private sector bank of Nepal which was established in 1984. Currently it is providing various range of commercial services from 48 branches and 1300 Nabil Remit agents.

Table 4: Key Financial Indicators, Nabil Bank Ltd.

Particular	2009	2010	2011	2012	2013
Net Profit After Tax (In Rs. Billion)	1.03	1.14	1.34	1.70	2.22
Total Deposit (In Rs. Billion)	37.35	46.41	49.70	55.02	63.61
Dividend/ Bonus Payment (%)					
Cash Dividend	35	30	30	40	40
Bonus Share	85	70	30	60	65

Source: Annual Report Nabil Bank Ltd., 2013

2.4.5 Nepal Investment Bank Limited

Nepal Investment Bank Limited was established in 1986 as a joint venture bank with French partners with 50 percent ownership and Rastriya Banijya Bank holding 15 percent of the capital and also Rastyra Beema Sansthan holding 15 percent ownership. The remaining 20 percent capital is holding by general public. The bank is currently serving its customers with 43 branches.

Table 5: Key Financial Indicators, Nepal Investment Bank Ltd.

Particular	2009	2010	2011	2012	2013
Net Profit After Tax (In Rs. Million)	901	1265	1176	1039	1915
Total Deposits (In Rs. Million)	46,698	50,094	50,138	57,010	62,428
Dividend/ Bonus Payment (%)					
Cash Dividend	20	25	25	5	25
Bonus Share	20	25	50	30	35

Source: Annual Report Nepal Investment Bank Ltd, 2013

2.4.6 Citizens Bank International Limited

Citizen's Banks International was established in 2007 and currently operating with its 34 branches and 33 branchless banking all over the country. The bank has 42 ATM for convenience to its customers

Table 6: Key Financial Indicators, Citizens Bank International Ltd.

Particular	2009	2010	2011	2012	2013
Net Profit/ Gross Income (%)	11.61	12.84	10.37	10.57	16.84
Earnings Per Share (NPR)	12.28	21.18	12.6	10.7	16.84
Dividend/ Bonus Payment (%)					
Bonus Share	10	12.63	10.53	8.42	15
Cash Dividend	10.	12.63	8.53	8.42	15

Source: Annual Report Citizens Bank International, 2013

2.4.7 Nepal SBI Bank Limited

Nepal SBI Bank Ltd. was established in 1992 which is the first Indo-Nepal joint venture with 55 percent ownership held by State Bank of India. Moreover, 15 percent ownership is held by Employee Provident Fund and 30 percent by general public. The bank has currently 54 branches all over the country.

Table 7: Key Financial Indicators, Nepal SBI Bank Ltd.

Particular	2009	2010	2011	2012	2013
Net Profit After Tax (In '000')	3163.73	3917.42	4645.65	4801.45	7714.71
Deposit (IN Rs. Billion)	27.9	34.9	42.41	53.33	58.92
Dividend/ Bonus Payment (%)					
Cash Dividend	2.11	5	5	5	7.50
Bonus Share	42.11	17.50	17.50	17.50	20.00

Source: Annual Report Nepal SBI Bank Ltd, 2013

2.5 Summary of Variables

Profitability of a bank is determined by the various elements like management, size, location and time (Halsem, 1968). The internal and external determinants have equal impacts on the financial performance of commercial banks (Guru et.al, 1999). But, this study is only focused on understanding the impact of internal determinants the year of economic crisis was not included to exclude the possible impact of such crisis in the result.

Financial performance indicator in this research is Return on Equity (ROE) which is calculated as net income after tax divided by the shareholder's equity. Generally, return on equity is calculated to understand the profitability of owner's investment. It simply explains that how efficiently investors' resources are being used by the bank. At the same time, ROE also helps to understand the relative strength and performance in attracting future investment. It relates net income to the level of investment which is also important while making decisions. This ratio is easily understood by the all level of management.

Credit risk management in this research is measured by Non-Performing Loan Ratio (NPLR) and Capital Adequacy Ratio (CAR) which are also used by many other researchers in their research because those indicators measures the soundness of the banking system (Bhanumurthy and Bhawani, 2012). Non-performing loan is the major risk associated in banking sector because the chance of default risk is always high if the repayment of loan exceeds the due date. Capital adequacy is the determination of the minimum capital requirement to satisfy the specific economic capital constraint (Miccolis, 2002). Control variable (bank size) is not an active variable in this research, but it is used to avoid the possibility of impact created by other indicators rather than the selected variables. Control variable is used in this research following the footstep of (Samy and Magda, 2009). However, the previous research conducted by Paudel in 2012 under the same topic has not included the control variable i.e. size of the firm.

As discussed earlier, the dependent variable is ROE and independent variable are CAR and NPLR. They are summarized in following table:

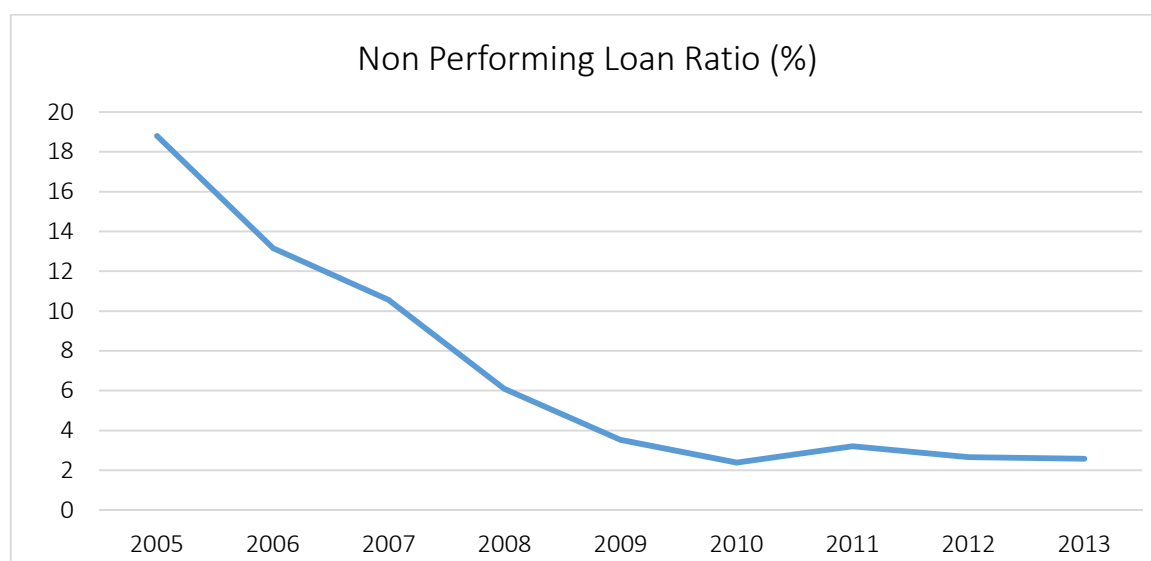
Table 8: Summary of Variables

	Variable Name	Calculating Method
Dependent Variable	ROE	Net income/ Total Equity
Independent Variables	CAR	Total capital/ RWAs
	NPLR	NPLs/Total loans
Control Variable	Bank Size (TA)	Total assets of bank

2.5.1 Non-Performing Loan Ratio of Commercial Banks in Nepal

In this section, trend of non-performing loan ratio has been shown to examine the situation of bad debts in Nepalese banking sector.

Figure 2: Status of NPLR in Nepal (2005-2013)



Source: Nepal Rastra Bank, 2013

The above figure clearly shows that, the trend of NPLR in Nepal is significantly declining in past many years.

It can be seen, in 2005 it was 18.79 percent which significantly declines to 2.57 percent in year 2013 means Nepal makes significant improvement in recovering the bad debts.

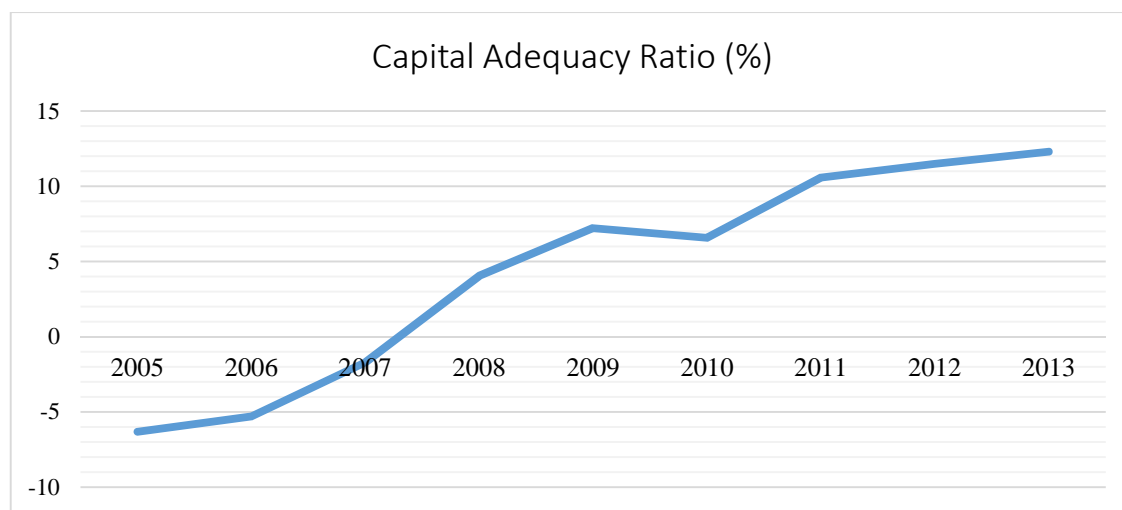
The post impact of world economic crisis can be seen between the years 2010 to 2011 because the line is slightly increased between those years. This reason behind this is the devaluation of the collateral and also many investors suffered huge loss. The decreasing trend could also be the result of strong law enforced by the Central Bank on loan loss provisions and effective credit risk management guidelines.

Meanwhile, the introduction of BASEL II in 2004, created an international standard of banking regulations to control on financial and operational risks of banks in Nepal. The effective lending policies and control of financial institutions direct towards significant reduction of NPL and enhance the banking efficiency (Dhungana BR and Updhyaya TP, 2011).

2.5.2 Capital Adequacy Ratio of Commercial Banks in Nepal

Capital adequacy is influenced by the present and future condition of the economy. If banks operates in prosperous economy, their assets are in excellent quality

Figure 3: Trend of CAR in Nepal (2005-2013)



Source: Nepal Rastra Bank, 2013.

From the above table it can be seen that, CAR is in increasing trend in Nepal. But due to the economic crisis it declined in 2009 till 2010 and again it started increasing. The reason behind declining in such periods is the fall of assets value during the recession.

However, the increasing trend is successful introduction of Basel II accord, which prime motive was to control the banks' capital need.

Basel II define risk in various ways and in various types and it has been designed to develop base of capital regulation, market discipline and supervision to enhance future risk management and financial stability.

2.6 Methodology

Ratio analysis technique was used to calculate required ratios for the analysis. In order to find the correlation between the variables ROE, NPLR, TA and CAR, *Pearson Correlation Coefficient* was computed between all used variables. After analyzing correlation, *Breusch Pagan test* was conducted to test for the heteroskedasticity in a linear regression model. Meanwhile, *Wooldridge test* was also conducted to test autocorrelation in a regression model. Furthermore, *Hausman test and Breusch Pagan LM test* was conducted to find the most appropriate model among POLS, Fixed Effect and Random Effect under panel data regression analysis. Based on Hausman and Breush Pagan LM tests, the best fit regression analysis for this study was Random Effect Model and the further output was generated using the selected regression model.

2.6.1 Pearson Correlation Coefficient

The Pearson correlation coefficient shows the strength of a linear correlation between any two variables. It also describe a line of best fit through the analysis of data of two variables and gives idea of how far is the data on both variables from the line of the best fit. It can be expressed as:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2} \sqrt{\sum (y - \bar{y})^2}}$$

Where, \bar{x} is the arithmetic mean of variable x and \bar{y} is the arithmetic mean of variable y . The Pearson correlation coefficient 'r' can take value between -1 and +1. Closer the value of r to zero, greater the variation the data points are around the line of best fit. i.e., $-1 < r < +1$. And 'r' value of less than zero indicates that there is a negative correlation between the two variables while 'r' with a value bigger than zero indicates a positive relationship between two. Multicollinearity is the situation if the explanatory variables are highly linearly related. The 'r' value more than 0.8 is normally the case of multicollinearity.

2.6.2 Breusch-Pagan Test for Heteroskedasticity

Heteroskedasticity generally exists when the variance of the distribution of error terms changes for each observation or range of observations (Studenmund, 2011). It is said to be occur when the variance of the unobservable error u , conditional on independent variables, is not constant. This also test id, based on the residual of the fitted model. It assumes that the error variance varies with a set of regressor.

Breusch Pagan test is used to test for heteroskedasticity in a linear regression model. It begins by allowing the heteroskedasticity process to be a function of one or more independent variables, and it is usually applied by assuming that heteroskedasticity may be a linear function of all the independent variables in the model. This assumption can be expressed as:

$$\sigma_i^2 = \alpha_0 + \alpha_1 X_{i1} + \dots + \alpha_k X_{in} + \mu_i \dots \dots \dots [1]$$

F statistics is estimated to test the joint significance of independent variable given in the following hypothesis.

- Null Hypothesis H_0 : $\alpha_0 = \alpha_1 = \alpha_2 = 0$ [homoscedasticity]
- Alternative Hypothesis H_a $\alpha_0 \neq 0 \quad \alpha_1 \neq 0 \quad \alpha_2 \neq 0$ [heteroskedasticity]

2.6.3 Wooldridge Test for Serial Autocorrelation

Serial correlation in linear panel-data regression biases the standard errors and the outcomes to be less efficient. The researcher can identify serial correlation in the idiosyncratic residual term in a panel-data model by using Wooldridge test. Wooldridge Test for Serial Autocorrelation was derived by Wooldridge in 2002 for serial correlation in random- or fixed-effects model which is attractive because it can be useful under general conditions and is easy to implement. Following hypothesis has been set in order to do this test:

- Null Hypothesis: No first-order autocorrelation
- Alternative Hypothesis: First order serial autocorrelation

2.7 The Model

The panel data estimation technique was adopted because it takes care of the heterogeneity associated with individual banks by allowing for individual specific variables.

Also by using time series of cross sectional observations, it gives more useful data, less collinearity among selected variables, high variability, more degree of freedom and more proficiency. The whole regression output was obtained using the statistical software STATA.

In order to quantify the impact of credit risk management on return on equity in Nepalese commercial banks, following panel data model is estimated.

$$ROE_{i,t} = \alpha_0 + \alpha_1 NPLR_{i,t} + \alpha_2 CAR_{i,t} + \alpha_3 TA_{i,t} + \mu_{i,t} \dots \dots \dots [2]$$

Where,

$ROE_{i,t}$ is the return on equity across bank i at time t

$CAR_{i,t}$ is the capital adequacy ratio across bank i at time t

$TA_{i,t}$ is the total assets across bank i at time t

$\mu_{i,t}$ is the error term

$\mu_{i,t}$ captures bank specific variations

This estimation is further examined using the Random Effect Regression Model. In order to decide between fixed and random, the researcher run a Hausman test and the result of the test accepted the null hypothesis which proposed that the selected data best fit random effects vs. the fixed effects. Random effects assume that the entity's error term is not correlated with the forecasters which allows for time-invariant variables to play a role as exogenous variables. It allows to generalize the inferences beyond the sample used in the model. Random effects gives better P-values as they are a more efficient estimator.

2.8 Hausman Test

Hausman test was conducted, in order to find the most appropriate method between random effect model and fixed effect model for estimating the equation [2]. It checks a more effective model against a less efficient and also make sure that the more efficient model also gives consistent results. The Hausman test also tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If the p-value in this test is larger than 0.05 then it is safe to use random effects. If P-value is significant, fixed effects model can be used.

Hausman test is based on the hypothesis:

- Null Hypothesis: Random Effect estimator is consistent and efficient while Fixed Effect estimator is consistent but inefficient.
- Alternative Hypothesis: Random Effect estimator is inconsistent and Fixed Effect estimator is consistent.

2.9 Breusch Pagan Lagrangian Multiplier (LM) Test

Breusch Pagan LM test is one of the best test to check the relevance of Random Effects in a panel model which was proposed by Breusch/Pagan in 1980. If p-value is significant, the null hypothesis of “consistent OLS” is rejected, and a random effect model is estimated. This test is based on following hypothesis:

- Null Hypothesis: Consistent OLS
- Alternative Hypothesis: Inconsistent OLS

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter has two parts. First part provides the detailed theoretical literature, with the view of depth understanding the core concepts of credit risk management and financial performance. Second part is empirical literature review, where past studies have been reviewed in neutral manner to understand the relationship between credit risk management and financial performance of commercial banks.

3.2 Theoretical review

Theoretical reviews play a vital role in any kind of research writing. As such, they have also importance in this study because they provide substantive contributions to the knowledge based on credit risk management on banking. Theoretical outline has an importance consequences on decision making in the research process. It helps to understand the relationship between the variables and factors that have deemed importance to the problem. The methods applied by many other researchers helps new researchers in their studies, by transferring the techniques or procedures to gather and analyze data related to research questions. Basically, theoretical review provides the guidelines about the method of data collection, what statistical tools can be used and also helps to find out the relationship between the indicators which researcher are looking for. Under this topic, various theories are used to understand the credit risk management indicators and their relationship with performance.

3.2.1 Credit Risk Models

The main reason of using credit risk models is to determine the probability of occurrence of risk activities that can add to business failure. Over the last few decades, world's largest banks have developed so many sophisticated and new models to encounter with uncertain risks. Such models somehow helped them in quantifying, aggregating and managing risk.

The output of these models plays significant role in risk management and performance measurement process, including portfolio analysis, risk-based pricing, portfolio management, customers' profitability analysis and capital structure decision. Credit risk models are more efficient on portfolio modelling approach for managing risk because they are conceptually sound, empirically validate and produce capital requirements that are comparable across institutions.

Credit scoring model use data on observed borrower characteristics either to calculate the probability of default or to borrowers into different default risk classes (Saunders and Cornett, 2007). Among the major credit scoring models, **Altman's Z-Score** is the prominent statistically derived predictive models used to predict the risk. The Altman's credit scoring model can be expressed in the following form:

$$Z=1.2X_1+ 1.4X_2 + 3.3X_3 + 0.6X_4+1.0X_5$$

Where,

X_1 = Working Capital/ Total assets

X_2 = Retained earnings/ Total assets

X_3 = Earnings before interest and taxes/ Total assets

X_4 = Market value of equity/ Book value of total liabilities

X_5 = Sales/Total assets and

Z = Overall index

According to this model higher the value of Z, the lower the probability of default risk. Any firm with a Z-Score below 1.81 is considered as a high default risk, between 1.81 and 2.99 represents an indeterminate default risk, and higher than 2.99 is considered low default risk. Generally, variables of X_5 are used in manufacturing and sales firms, it can be omitted in banking risk analysis process. The major drawback of this model is that, it address only three borrower behavior defaults. Secondly, this model has ignored macro-economic factors that play a crucial role in default or non-default decision. Altman's Z formula is the multivariate formula used to measure the financial health of the company and to diagnose the probability that the company will bankrupt within two-year period with a proven accuracy of 75-80%.

Z score can be employed on a distress metric areas such as merger and acquisition analysis, credit risk analysis, and turnaround management and it has recently been employed in performance management (Calandro, 2007).

Kealhofer, McQuown and Vasicek (KMV) Model

According to (Merton, 1974), fund can be raised through bank loans or by issuing bonds which holds the repayment or value default options. The KMV is the model for credit monitor which deals with solving the lending problem of bank with the help of repayment incentive problem (Gilbert, 2004). This model is mainly focused on the reason of firm defaults and also on declining value of assets from certain level. KMV model is based on the structural approach to calculated expected default frequency. Mainly, this model is applied to public companies where value of equity is based on stock market. There are basically three steps to the credit risk calculation process under KMV approach:

Step1. Determine the value of assets (V) and its volatility ()

The value of stock price (S) is derived from:

- Value of the firm's assets (V)
- The volatility of the assets ()
- The leverage ratio (L)
- The coupon on long term debt (c)
- The risk-free rate (r)

The volatility of assets is not the same as the volatility of price of the stock. V and are unknown variables in this model. To discover the value of V and , KMV approach uses the iterative method using the knowledge of the rest of variables in the model.

Step 2: Calculation of distance of default

Distance to default is calculated by deducting Default point by Expected value of the firm's assets in one year and multiply by . There is high chance of default risk if the value of assets falls below the value of total debt. KMV tries to set the default point between the short term debt and the total debt and also the total of short term debt and the half value of long term debt.

Step3: Determination of the EDFs (Expected Default Frequencies)

In this step, mapping of the distance to default against probabilities of default based upon a proprietary database is undertaken. EDFs are usually affected by stock price, leverage ratio and assets volatility.

The KMV model is criticized, assuming there are not true probabilities of default. The results are often poor obtained by using the KMV model in order to replicate risky bond prices (Kao et al, 2000). Meanwhile, it also does not distinguish between the different types of long-term bonds, according to the security, superiority, agreements or convertibility.

Risk Adjusted Return on Capital (RORAC)

This model is used to calculate the return on loan. The pioneers of this model are bankers trust but now is widely popular and adopted in all the large banks in Europe and USA, although with some differences among them (Cornett and Saunders, 2007). With the help of this model, lenders balance the loan's expected return against the expected risk. It is expressed in:

$$\text{RORAC} = \text{Net Income} / \text{Allocated Risk Capital}$$

Where,

Allocated risk capital = the firm's capital, adjusted for a maximum potential loss based on the probability of future returns or volatility of earnings.

Duration approach is use in the denominator of RORAC to estimate the worst case loss in value of loan.

$$\text{DL}_n = -\text{DL}_n * \text{L}_n * (\text{DR} / (1 + \text{R}))$$

Where, Default Rate (DR) is an estimation of the worst change in credit risk premiums for the loan class over the past year.

L_n = Loan

DL_n = Change in loan class

R = Interest Rate

The major purpose of this model is to help the bank management to understand the requirement of capital for major activities and also to determine the overall leverage for the bank as a whole

3.2.2 Value at Risk (VAR) theory

This is the statistical technique to measure the level of financial risk associated in the firm over the specific period of time. Generally, value at risk method is used by the risk managers to measure and control the level of risks. This theory is based on historical price trends and volatilities usually used in energy trade and commodities market. VAR theory measures the risk, when the firms take hedging and trading decisions.

This theory is often called new science of risk management and can be denoted by:

$$\text{Value at risk} = \text{Mean} * \text{HPR} + [\text{Z-score} * \text{Std. Dev} * \text{SQRT} (\text{HPR})]$$

Where,

Mean= Average expected or annual rate of return

HPR= Holding period

Z-Score= Probability

Std. Dev= Standard deviation and

SQRT= Square root of time

If c is considered as a confidence level, VAR corresponds to $1-c$ lower tail level. Risk in financial institution is the probability of losing the investment on loan and VAR is normally focused on identification of risky loans.

Value at Risk theory also tries to identify the “*worst situation scenario*” in financial institutions. According to (Jorion, 2001), value at risk measures the poorest estimated loss under the normal condition at the given level of confidence. This theory normally explains the projected distribution of losses and gain over the target horizon.

3.2.3 Portfolio Theory

The portfolio theory provide the detailed structure about the loan portfolio in light to objective of the firm. From the early 80's, financial institutions started using the modern portfolio theory to address the market risk. In the context of Nepalese banking, many banks are using value at risk and earnings at risk models to understand and manage the risk exposures related to interest and market. With the help of this theory, managers can able to concentrate on default risk and can able to find an association of such risks impact on financial performance. Many successful financial institutions in Nepal are using the quantitative approach to understand the credit risk management. In present context, there are many portfolio management theories existing in banking sector.

Risk aversion basically tries to avoid the risky behavior by investing only in an option with low risk.

Markowitz Portfolio Theory at the same time, not only include the expected return but also the risk associated for particular return. This theory assumes, at the same level of expected return an investor will prefer to choose the investment with the lowest amount of risk. Meanwhile, this theory also assumes that investor measures risk in terms of standard deviation or variance and are always seeking to maximize their utility. However, competitive investors make decision on the basis of investment's risk and return because of which many investors' utility curve is based on risk and return.

3.3 Financial Performance Measures

Financial performance measurement is the management initiative, to upgrade accuracy and timeliness of financial information and to meet the required standard by supporting day to day operations (Bessis, 2014). Financial performance is measured on the basis of profitability level, bad debt policy, client's dropout rate, growth, sales turnover, debt age analysis and public media. The cost management system provides the required relevant information to improve performance and profitability.

Financial performance is an earning acceptable return and minimizing the risk attend to earn such return. Moreover, financial performance on banking is measured using the method of benchmarking, profit, financial ratio analysis, performance against budget or the mix of all the mentioned methodologies (Avkiran, 1995). Many financial companies concerning the performance are merely focused on operational effectiveness and efficiency, which might directly, affects the performance of the company (Chien and Danw, 2004). They revealed efficiency doesn't always means to better effectiveness using two stage data development analysis.

Financial performance is measured from interest margin, capital adequacy and return on assets or equity which are directly correlated to customer service quality (Ellot and Elizabeth, 2004). Generally, efficiency is regarded as the relationship between the amounts of output with correspondents to input used in the production system. According to English and Yaisawarng, (1992), efficiency is considered as the relative measure, which replicates the deviation from the maximum attainable output from a given level of input. Banking in Gulf countries are more focused on development and performance (Mazher, 2003). He also added that, banks in these countries are well sophisticated and capitalized because of the intense competition.

Among many performance measures tools and techniques “**CAMEL**” is widely used measure which is the composition of five components; Capital adequacy, Asset quality, Management, Earning and Liquidity. Moreover, ratings are assigned for each components of CAMEL to overall rating of financial condition of banking (Jose, 1999).

3.3.1 Capital Adequacy

Capital adequacy is generally defined as the capital sufficiency against the risk measured in financial institutions. It measures the capital of bank. It can be denoted as a percentage of a bank's risk weighted credit exposures. Capital adequacy measures the minimum capital require to overcome from the specific capital constraints. Usually, capital adequacy ratio is helpful for decision making process for the depositors.

It also helps to encourage financial system around the world because it measures both Tier one and Tier two capitals with respect to risk-weighted assets.

Tier one capital is vital as it safeguards the survival of the bank and stability of the financial system (Reserve Bank of New Zealand, 2007). Tier two capital absorbs losses in the event of a winding-up and offers a lower level of security to depositors (Reserve Bank of New Zealand, 2007). The ultimate result from effective measure of capital adequacy directly affects the balance sheet of the company. It is also helpful to track and manage the capital adequacy ratios by assigning various risk ratios developed by the Bank of International Settlement. Basically, capital adequacy is measured in commercial banks with respect to the relative risk associated to the different category of assets which helps to absorb a reasonable amount of losses.

Capital adequacy ratio is the ratio of capital to the risk-weighted sum of bank's assets (Hyun & Rhee, 2011). It measures the amount of bank capital relative to the amount of its risk weighted credit exposure (Reserve Bank of New Zealand, 2007). The importance of capital adequacy ratio was realized after the financial crisis of 2007, when there was mortgage problem all around the world. Declining value of collateral significantly affects the capital base of many banks (Hyun& Rhee, 2011, p. 323). The minimum capital adequacy ratio protect depositors and promote the stability and efficiency of the financial system (Reserve Bank of New Zealand, 2007).The minimum capital adequacy ratios encouraged by supervisory authorities are:

- Tier 1 capital to total risk-weighted-assets should no less than 4%.
- Total capital (Tier 1+ Tier 2) to total risk-weighted-assets to be no less than 8% (Hull, 2012, p. 262).

Theoretically, there are three steps in calculating CAR. First step starts with calculation of capital which includes Tier 1 and Tier 2. Second step is the calculation of risk-weighted assets and the third step is the calculation of capital adequacy ratios (divide total capital by risk-weighted assets). Based on the capital accord of Nepal Rastra Bank classification of capital and Risk weighted exposures:

Step 1: Calculation of Capital

Table 9: Tier 1 and Tier 2 Capital

Tier 1 Capital (Core Capital)	Tier 2 Capital (Supplementary Capital)
Paid of Equity share capital	General loan loss provision
Proposed bonus equity share	Exchange equalization reserve
Statutory General Reserves	Investment Adjustment Reserve
Retained Earnings	Other Reserve (Deferred Tax Reserve)
Current year cumulative profit	
Less : Deferred Revenue Expenses	

Source: BCBS, 2013

Step 2: Calculation of Total Risk-Weighted-Assets (RWA)

Table 10: Risk Weighted Exposures

RISK WEIGHTED EXPOSURES	
A	Risk Weighted Exposure for Operational Risk
B	Risk Weighted Exposure for Credit Risk
C	Risk Weighted Exposure for Market Risk
Total Risk Weighted Exposures (A+B+C)	

Source: BCBS, 2013

Step 3: Calculation of Capital Adequacy Ratio

$$CAR = \frac{\text{Tier One Capital} + \text{Tier Two Capital}}{\text{Risk Weighted Assets}}$$

3.3.2 Assets Quality

The soundness of the financial institutions is always at risk when the assets values of borrowers weaken, so it is the major responsibility of the manager to monitor the indicators that affect the quality of their assets to get rid from the problem of bad debt.

The declining value of assets have significant impact on cash flow. Meanwhile, when there is cash flow problem in bank, it eventually affects the liquidity position. Poor assets quality affects negatively on financial performance and capital through the extra provision for bad debts.

3.3.3 Management

Efficient management plays the significant role to protect from the bank failure. Management quality is simply denoted by the efficiency ratio. This ratio further explained by operating expenses to total revenues which measures the flexibility of management by adjusting costs to changes in the development of business in terms of revenue. Therefore, higher the efficiency ratio, lower will be the default risk. Moreover, International regulation framework should be follow by the financial institutions for the micro prudential supervision.

3.3.4 Earnings

The effectiveness of the bank is measured from the ability to earn the maximum return from the available capital and assets. The evaluation of the performance is heavily dependent on the comparison of the ratios (ROE and ROA) to industry benchmark and peer group norms. Profitability as a chief measure of performance is generally accepted by the bank, financial institutions, and company owners as they are interested to know that if the firms earning is higher than the interest they paid (Subbaiah and Sadakkadulla, 2002). The return on investment (ROI) is also used to examine the performance in banking industry. Financial performance in general is the profitability. In banking sector, profitability and financial performance is measured by Return on assets and Return on equity. Profitability is also the key concept of this research and profitability ratio (ROE) is used as an indicators to represent the profitability of bank in Nepal.

➤ Return on Equity

Return on Equity is an indicator of the efficiency to generate profit from equity. ROE measures the profitability of the fixed income per dollar of equity and net income after tax from each dollar of equity capital.

Generally, stockholders prefer high ROE. However, increasing ROE represents increasing risk in banking. It is defined as:

$$ROE = \frac{Net\ Income}{Avg\ Stockholder's\ Equity}$$

Where,

Net Income= Total revenue – Expenses

Shareholders equity= Share capital + retained earnings - treasury shares

➤ Return on Assets

Return on Assets is the ratio of net income to total assets. It means how efficiently bank has utilized an assets. ROA over 5 percent are considered good in general. It is the indication of capital intensity of the company. ROA can be computed as:

$$ROA = \frac{Net\ Income}{Average\ Total\ Assets}$$

Where,

Average Total Assets= Total assets (Current Year) + Total assets (Previous Year) / 2

3.3.5 Liquidity

Liquidity is basically the detailed debt obligations which can be paid in twelve months either by cash or assets and can be converted into cash easily. Hence, the managers should shield funding sources and capture huge maturity mismatches. To control the mismatching of interest rates and maturities of the assets and liabilities is fundamental function of the commercial banks. But it is very difficult for the microfinances and cooperative banks to be completely matched because their business is transacted in uncertain terms. An unmatched position possibly enhances the profitability in short run but also increase the risk of loss.

3.4 Guidelines: The Basel Accord

The main function of bank is to take and manage various kind of internal and external risks. The proper management of such risk is prime for financial stability and economic growth in economies (Ferguson, 2003). In order to address such unexpected risks and also to address Latin American debt crisis Basel committee was introduced with G10 governors in 1974.

3.4.1 Basel 1: The Basel Capital Accord

A capital measurement system also called Basel Capital Accord was introduced in December 1987 with the approval of G10 Governors but it was circulated to banks only in July 1988 (BCBS, 2013). The accord has fundamental two major roles. Firstly, to raise constancy and soundness on international banking system by promoting international banks to improve their capital standard. Secondly, to control for the clean competition among banks. To regulate it into the general banking it was signed by 12 members of Basel Committee.

The major achievement of this Basel Accord is the minimum capital ratio to risk-weighted assets of 8 percent which was implemented in 1992. The risk-weighted assets only focus on credit risk and address other types of risks implicitly (Ferguson, 2003). This accord also focused on Tier capitals. Tier 1 capital was to be implemented to all banks equally but Tier 2 capital was to be more focused on each country's own banking system. This accord was criticized because it was so simple and also due to its arbitrary. Moreover, it was only using four risk weights to different types of assets categories. It means that, loans that are allocated same risk weighted can have different assets qualities.

3.4.2 Amendment of 1996

To amend the Basel accord, Basel committee introduced a consultative document to address other risks rather than credit risk which was the main emphasis of Basel I. This document further recognized as "1996 Amendment" which came into effect after 1996 (BCBS, 2013). This amendment started keeping capital to control market risk, interest rate risk, equities, commodities, debt securities and options (Hull, 2012). Under this amendment, banks were allowed to calculate the capital requirement using internal VAR model.

3.4.3 Basel II

After the introduction of Basel accord, there has been series of serious development in theory and practice for measuring market risks. Various kinds of new market instruments and securities like derivative, commodities was introduced to control and improve risk from business activities. But, during this period there has been a significant development of big banking groups with wide range of operations.

Thus, the need of revised framework for capital requirement was realized. The new framework about capital requirement of bank was introduced in 2005 and implemented in 2007. The Basel II mainly develop three pillars:

- Supervisory Review
- Minimum Capital Requirement and
- Market Discipline

The minimum capital requirement of 8 percent from Basel I was unchanged in Basel II but the way to calculate was changed. Moreover, Basel II made massive changes to the treatment of credit risk. Three approaches was specified in Basel II to measure credit risk:

- Standardized Approach: This approach is similar to Basel I, but had high risk weights.
- Internal Rating Based (IRB) approach: This approach is more focused on explaining capital requirement and risk weights are partly based on specific bank's internal requirements.
- The advance IRB approach: In this approach capital requirement is more influenced by individual bank's own calculations.

Basel II is more focused on supervisory process and minimum capital requirement. Therefore, it need regular interaction between supervisors and banks for the assessment of capital adequacy. The last one is more focused on market discipline by expose of key information of bank's regarding risk assessment process and capital adequacy (Ferguson, 2003).

3.4.4 Basel III

The financial crisis of 2007 was the main reason to develop Basel III accord because in that period many big and reputed international banks failed but survived because of government intervention. Basel III comes up with new rules and stricter capital requirement policy. This framework executes tighter capital ratios and also many new rules but most of the banks still follows Basel II accord.

But, the Basel III succeed to make capital requirement more accurate with respect to the credit risk afforded by individual bank asset (Feess & Hege, 2012). The final documents of Basel III was published in 2009 with major six parts for regulations.

1. Definition of Capital and Requirements
2. Capital Conservation Buffer
3. Countercyclical Buffer
4. Liquidity Ratio
5. Leverage Ratio
6. Counterparty Credit Risk

The crisis demonstrated that credit loss is the result of retained earnings, which is the part of common equity base (BCBS, 2011). The new Basel Accord comes up with new capital requirement of Tier 1 equity capital with 4.5 percent of risk-weighted assets at all times. The committee further explained, Tier 1 capital includes share capital and retained earnings but does not include deferred tax assets and goodwill. The additional Tier 1 capital also consist non-cumulative preferred stocks. However, Tier 2 capital includes loan that is subordinated to depositors with a maturity period of 5 years (Hull, 2012). Capital conversion buffer means the capital buffers which banks designed in normal period which can be used in the time of stress to absorb losses. Countercyclical buffer ensure that capital requirement of banking sector are considering macro financial environment. Non-risk based leverage ratio is the prime requirement of Basel II which id developed to act as a credible supplementary measure to the risk based requirement of capital (BSCS, 2011). The major achievement of Basel III is that they introduced two liquidity ratios to survive in the acute stress situation. Those two ratios are Net stable funding ratio and Liquidity coverage ratio. The last focused point of Basel III is the CVA which is the possible loss due to the bankruptcy of the counterparty.

Before proper Basel Accord, large banks in big countries were not maintaining minimum capital requirement according to the risk. But, after the introduction of the Basel Accord, the significant importance of credit risk management was developed among the banks. Moreover, Basel Accord became the foundation for commercial lending and related activities. The capital ratios also helped to establish the strength of the risk management.

3.5 Review of Empirical Studies

This topic is always a matter of debate and controversies, whether credit risk management have impact on financial performance of commercial banks or not.

Many researches has been conducted in this topic where some researchers found positive relationship, some found negative relationship and some other did not found any relationship between credit risk management and profitability in banking. Hence, in this part such past studies are reviewed in neutral way to understand the relationship.

3.5.1 Nepalese Perspective

Credit risk management is the important predictor of banks performance (Poudel, 2012). He conducted the research on the impact of credit risk management on financial performance of Nepalese commercial banks using time series method from 2001 to 2011. Moreover, he used loan loss provision, default risk and non-performing loan as independent variable and return on assets as dependent variable. The result of the study, revealed the positive impact of credit risk management on financial performance.

It is because of the high credit risk on Nepalese banks, they maintain high loan loss provision account which is affecting negatively in overall financial performance. He further added credit risk is the major risk among other risk in Nepal. He concluded in his research that more than 35 percent of banks performance is determined by credit risk management.

Regular changing directives of Central bank on loan loss provision and capital adequacy also leads to low profitability, low interest rate income but increase operational costs of banks (Pokhrel, 2006). Pokhrel in his research found that frequent changes of banking rules have negative impact on profitability. Meanwhile, he also concluded cash reserve ratio and current asset ratio shows the liquid position of bank while income to total expenses ratio shows the overall predominance of the bank. In the context of Nepal, there is always high chance of non-recovery of loan amount because of which banks maintain huge loan loss provision account which affects negatively in profitability. He conducted research on Nepalese Banks using the ratio analysis technique to identify the impact of credit risk ratios on profitability ratios.

For effective credit recovery from the borrower, credit should be channeled through the borrower group (Paudel, 2012). This research was more focused on how effectively loan can be passed to control the problem of loan loss. In his research, he also successfully identified channels for effective utilization of loan.

3.5.2 International Perspective

A bank operates not only to accept deposits but also to grant credit services, therefore unavoidably open to credit risk. Risk is intrinsic to banking. However, the management of risk has gained prominence with improved techniques, banking operations, derivatives trading, securities underwriting and corporate advisory business etc. The risk is also increased on account of the on-line electronic banking, provision of bill presentation and payment services etc. The major risks faced by financial institutions are interest rate risk, course credit risk, foreign exchange risk and liquidity risk. Interest rate risk usually arise due to the frequent change in interest rates, which significantly effect on net interest income. Management of interest rate risk involves methods like Value-at-Risk (VAR), a standard approach to assess potential loss that could crystallize on trading portfolio due to variations in market interest rates and prices.

Credit risk is simply the potential that a bank borrower or counterpart will fail to meet its obligations in accordance with contracted terms and conditions. This risk is by far the most significant risk faced by banks and the success of the bank depends on accurate and efficient management of this risk to a greater extent than any other risks (Gieseche, 2004). Credit risk is the degree of value fluctuations in debt instruments and derivatives due to changes in the underlying credit quality of borrowers and counterparties (Pan and Chen, 2012).

Credit risk management maximizes adjusted rate of return by maintaining credit risk exposure within acceptable limit in order to provide frame work for understanding the impact of credit risk management on bank's profitability (Kargi, 2011). The nature and managerial pattern of individual firms do not determine the impact of credit risk (Kolapo, Ayeni and Ojo, 2012). To construct this statement, they perform research by using panel data regression for the period 2000 to 2010. They also found that, the effect of credit risk on bank's performance measured by Return on Asset (ROA) of banks is cross sectional invariant.

Researchers like Naceur and Kandil (2006), Kargi (2011) in their research found mixed results and concluded indicating some indicators of credit risk management has positive impact while some has negative on financial performance of banking.

Credit risk management has significant impact on financial performance of commercial banks in Nigeria (Munir and Ahad, 2012). They used descriptive, correlation and regression technique to study whether credit risk affects banks performance in Nigeria using the period 2004 to 2008. There is an effect of credit risk management on profitability level in Ghanaian Banks (Boahene, Dasah and Agye, 2012). They used regression analysis to analyze whether there is a significant relationship between credit risk and profitability of Ghanaian Banks. Credit risk management is the important predictor of financial performance and it is the key to success in any financial institutions.

Credit risk management is also development of loan assessment policies and administration of loan portfolio, fixing prudential per borrower or per group limits. The tendency for excessive dependence on collateral should also be looked into. The other weaknesses in Credit Risk Management are inadequate pricing of risk, as well as nonexistence of loan review mechanism and post sanction surveillance. There is negative relationship between credit risk management and banks profitability (Miller and Noulas, 1997).

The objective of credit risk management is to capitalize a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Banks thus maintain the relationship between credit risk and other risks. Also, they need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. The effective management of the credit risk is the critical component of the comprehensive approach to risk management and essential to the long term success of any business organization (Donald et al, 1996).

CAMEL model can be used as a proxy for credit risk management. CAMEL indicator can be used as independent variables and return on equity as a proxy for banks performance measurement.

Profitability ratios are often used in a high esteem as the indicator of credit analysis in banks. ROA and ROE are most commonly used ratios and the quality level of ROE is between 15% and 30% and for ROA is at least 1% . Until early 1990's, the analysis of the credit risk was limited to the individual loans. Banks used to keep most loans on their books of maturity. Today credit risk management encompasses both loan review and analysis of overall portfolio of investment.

With the advancement of time and technology, the lending strategy tries to seek the best mix of assets in light of situation of credit, marketplace environment and opportunities in business. The effectiveness of assets utilization is significantly tied to the amount of assets that the company generates for each dollar of equity. There is positive relationship between capital to assets ratio and profitability (Goddard, Molyeux and Wilson, 2004). They analyzed the determinants of profitability of European banks by considerable endurance of abnormal profits from year to year.

In comparison to the past situations, modern banking is able to control and organize portfolio applications, loan amount and maturity dates to encounter and address with the possible losses. Many banks also stress test their portfolios on a business line basis to help overall management. The banking industry has also made strides in managing credit risk. Basically, there are three stages of credit process: the very first step is the simple risk control of the business avoiding over concentrated in single sector, predicting the probability of nonpayment and accessing recovery. The second phase is the link between economic capital and return. The link between economic profit and risk is the next stage in advancing the practice of credit risk management. At last the risk management technique is used as a strategic management tool to align RAROC (Risk Adjusted Return on Capital) with ROE (Return on Equity). Each banks should understand the driving force of the share price of the bank and thus must understand the link between economic capital, (Intellectual property owners) IPOs and ROE. Once this paradigm is understood, banks will be in the better position to compete more aggressively and likely service in the next decade.

Benedikt, Marsh, Vall and Wagner (2006), examined credit risk management policies for ten banks in the United States using a multivariate model and found that banks that adopt advanced credit risk management techniques, experience a permanent increase in their target loan level of around 50 percent. The findings confirm the general efficiency- enhancing implications of new management techniques in a world with frictions suggested in the theoretical literature.

Chief Risk Officer, Alden Toevs of Commonwealth Bank of Australia (2008), states that a major failure of risk management is due to the global financial crisis. The problem is due to the Banks focusing on individual risk exposures without taking into consideration the broader picture.

He also pointed, major root of the problem is the failure of the Banks to consider risks on an enterprise-wide basis. The new relevance and urgency for implementing the Enterprise Risk Management (ERM) is due to the regulatory insistence with a number of proposals to ensure that institutions stay focused on the big picture. In a way, Three Pillar Approach frame work of the Basel II Accord is an effort to fulfill this requirement. The risk weighted approaches to Credit Risk on the basis of the asset quality, allocation of capital to Operational Risk and Market Risks nearly capture all the risks attendant to a Bank's functioning.

3.6 Conclusion

After analyzing the above mentioned researches, it can be concluded that there is enough room for research in this topic because the mentioned studies are not clear towards the relationship between the credit risk management, processes, techniques, and tools with financial performance in banking. As far as these researches are concerned, they have not done research using capital adequacy as a major indicator of credit risk management. Hence, this research has tried to fill the gap by including CAR as a major credit risk variable. Meanwhile, this research could also be beneficial for those who are interested to know about the banking practices, risk status and financial performance as well as their relationship.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 Introduction

This chapter deals with the finding of the research. It starts with the descriptive statistics, which basically provide the information of the data. Then after the result of statistical tests are mentioned clearly with the evidences. To perform this task data of seven commercial banks of Nepal were used as sample population using the time period 2009-2013.

4.2 Descriptive Statistics

The descriptive statistics of the study is presented in the following (Table 2) which contain overview of the selected data and the variables used in the study. From the histogram analysis of all the variables it can be said the sum of variables follow a normal distribution.

Table 11: Descriptive Statistics of Variables

Variable	N	Mean	Std. Dev	Min	Max
ROE	35	25.19	8.41	8.89	36.92
NPLR	35	1.13	0.80	0	3.32
CAR	35	11.90	1.37	10.43	15.54
TA	35	10.62	0.47	9.49	11.27

Source: STATA output

In the above table, ROE is considered as the measure of profitability and NPLR and CAR represents the credit risk management while TA represent a control variable. The number of observation of each variable is 35. As per the above table, the widest standard deviation is measure in ROE with 8.41. The largest ratio of ROE reaches to 36.92. The difference between highest ROE and lowest is 28.03. These data simply suggested that, selected data have more variability and diversification on their ROE ratio. The table also shows, mean of the ROE is 25.19 and Standard deviation of ROE is 8.41, indicating lack of substantial variation while mean of NPLR and CAR is 1.13 and 11.90 followed by the standard deviation of both NPLR and CAR is 0.80 and 1.37 respectively.

Higher the standard deviation of independent variables (NPLR, CAR and TA) in relation to the Std. Dev of the dependent variable (ROE), the higher will be the risk exposure on profitability of the banks.

Where:

N –Number of observations

CAR- Capital Adequacy Ratios

NPLR- Non-performing loans Ratios

TA- Total assets of banks

ROE- Return on Equity

4.3 Pearson Correlation Coefficient

In order to find the correlation between the three variables in this study, the researcher computed the correlation matrix based on the Pearson Correlation Coefficient for NPLR, CAR and TA. The table below shows the correlation matrix.

Table 12: Correlation Matrix

Variable	CAR	NPLR	TA
CAR	1.00		
NPLR	-0.0280	1.00	
TA	-0.3166	0.1246	1.00

Source: STATA Output

The correlation matrix in the above table shows that, all three variables are not in same direction. Correlation coefficient between NPLR and CAR is -0.0280 which means there is negative relationship between NPLR and CAR but the value indicates weak relationship among the variables. Likewise, correlation coefficient between CAR and TA is -0.3166 which also means negative relationship between CAR and TA but the value shows strong relationship comparing to NPLA and CAR. The correlation coefficient between NPLR and TA is 0.1246 which shows positive relationship but the relationship is weak among them.

The situation where the independent variables are nearly to the linear dependent is the case of multicollinearity. The absolute value larger than 0.80 is considered as the case of multicollinearity (Studenmund, 2011).

By analyzing all the correlation of output all the values are below 0.80. Hence, it can be clearly said, there is no problem of multicollinearity in this regression analysis.

4.4 Wooldridge Test for Serial Autocorrelation

In order to find the status of autocorrelation in panel data, Wooldridge test can be done among the variables. It measures if the error terms are correlated or not.

Table 13: Wooldridge Test for Autocorrelation

F(1, 6)	5.257
Prob > F	0.0617

Source: STATA output

In the above result of autocorrelation, the P-Value is 0.0617 which is higher than 0.05. Therefore, the null hypothesis of no first order correlation cannot be rejected. In panel data, autocorrelation refers to correlation of variable with itself through space. Hence, autocorrelation must be address for correct error determination.

4.5 Breusch-Pagan Test

In order to test the linear form of heteroskedasticity Breuch-Pagan Test can be conducted. Heteroskedasticity generally means there is no constant variance.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance [homoscedasticity]

Variables: Fitted values of ROE

Table 14: Breusch Pagan Test for Testing Heteroskedasticity

chi2(1)	0.03
Prob > chi2	0.8604

Source: STATA Output

A large chi-square would indicate that heteroskedasticity is present. In this study, the chi square value is 0.03 which is small, indicating heteroskedasticity is probably not a problem in this study.

Also, by looking at the P-Value null hypothesis cannot be rejected because P-Value 0.8604 is greater than 0.05. If the P-Value is 0.05 or smaller, then the null hypothesis is rejected and the alternative hypothesis suggest that there is significant evidence of heteroskedasticity. Hence, this study has not the problem of heteroskedasticity.

4.5 Hausman Test

After the successful test of correlation, heteroskedasticity and autocorrelation, Hausman test is conducted to decide between fixed effect and random effect. Null hypothesis is that accept random effect vs alternative fixed effect. It mainly tests whether the unique errors (u_i) are correlated with the regressor, the null hypothesis is they are not.

Table 15: Hausman Test for Estimating Fixed vs Random Effect

	(b)	(B)	(b-B)	Sqrt. (diag(V_b-V_B))
	Fixed	Random	Difference	S.E
CAR	-.1940916	-.2686945	.0746029	.1809574
NPLR	-1.877554	-1.961243	.083689	.1856696
TA	.0001259	.0001413	-.0000155	.0000196
P-Value	0.8702			

Source: STATA Output

It can be seen from the above result, P-value is 0.8702 which is greater than 0.05 so the null hypothesis cannot be rejected. Thus, it can be concluded that, this study should conduct Random effect regression rather Fixed effect regression. The further analysis has been done using the regression output of random effect model.

4.5 Breusch and Pagan Lagrangian Multiplier Test for Random Effects

After the successful test of which model is appropriate between Fixed Effect and Random Effect, Breush and Pagan Lagrangian multiplier test is conducted to understand an appropriate model for this study between POLS and Random Effect model. The result below clearly explains about the proper method for this study.

Table 16: Breusch and Pagan Lagrangian Multiplier Test

	VAR	Sd. = sqrt. (Var.)
ROE	73.41394	8.568193
E	7.105018	2.665524
U	64.74093	8.046175
chibar2(01)	40.78	
Prob > chibar2	0.0000	

Source: STATA Output

By looking at the above results, it can be seen that p-value is less than 0.05 therefore, the null hypothesis of “consistent OLS” cannot be accepted. Hence, a random effect model is estimated.

4.6 Random Effect Regression Result

After Hausman Test and Breusch and Pagan LM Test, it is revealed the selected data best fit Random Effect model. Therefore, the further regression analysis has be done using Random effect model. The results of regression output is shown below:

Table 17: Random Effect Estimates from Equation [2].

Dependent variable: Return on Equity (ROE)

Variable	Coef.	Std. Error	Z	P> z
CAR	-0.2687	0.55703	-0.48	0.630
NPLR	-1.9612	0.71540	-2.74	0.006
TA	0.0001	0.00005	2.72	0.007
Constant	23.889	7.31422	3.27	0.001
P-value	0.0064			
R²	0.4467			

Source: STATA Output

The p-value for the overall regression is 0.0064 which indicates that, the null hypothesis of combined insignificance of the coefficients can be easily rejected at 5% confidence interval. R² measures how close the data are fitted on regression line. It is always between 0 and 100 percent.

Zero percentage means the selected model describes none of the variability of the response data around its mean while 100 percent shows that the model explains all the variability of the response data around its mean. Higher the R-Squared, better the model fit the data. Hence, in above regression analysis result, it can be seen that overall R squared is 44.67 percent, which means the variables used in the model accounts for 45 percent change in dependent variable, i.e. ROE in this study. It means selected model perfectly fits the data. Rho [Appendix 4] indicates that 90 percent variation is due to special features of the individual banks. Two-tailed test has been applied to reject the null hypothesis at 5 percent confidence interval. Thus, the model can be written on the basis of above regression output as:

$$ROE_{i,t} = 23.889 + \beta_1 NPLR_{i,t} + 0.630 CAR_{i,t} + 0.007 TA_{i,t} + \mu_{i,t}$$

CHAPTER FIVE

DATA ANALYSIS, RESULTS AND DISCUSSION

5.1 Introduction

This chapter is focused on the analysis and discussion of the findings. Moreover, the relationship between the dependent variable and independent variables are clearly explained which means significant and insignificant results both are explained properly.

5.2 Insignificant Results

In this part, insignificant results are discussed on the basis of the regression output.

The result of the regression analysis from table [17] shows that P-value for Capital adequacy ratio with the dependent variable Return on Equity is 0.630. Therefore, null hypothesis is rejected. This is to say, there is no significant impact of CAR on ROE in Nepalese Banks.

$$ROE_{i,t} = -0.2687CAR_{i,t}$$

This above relation suggest that, the funds generating from various sources are not being successfully used by Nepalese commercial banks to increase loans. The coefficient is negative which is significant because non-performing loan is significant in this study which means banks have to face low growth of deposit which results to the reduction in lending capacity. It also means, when banks have higher non-performing loan they recollect capital to fulfill the requirement of capital for the improvement of risk position. This relation also indicates one percent increase in capital adequacy ratio brings down return on equity by 0.2687 percent. Moreover, the research conducted by Sun, Ara and Bakaeva, (2009) in Sweden also found the positive relationship between CAR and ROE. However, the researcher believes that, the results could be affected by the financial and economic performance of individual country. Economic indicators that strongly affect to the economy of one country may not affect strongly on the economy of another country. Meanwhile, there are many researches which found CAR have no impact on ROE. Among them, Kithinji (2010) conducted the research using the data of 2004 to 2008 of 43 commercial banks in Kenya found significant relationship between CAR and ROE.

As discussed earlier, financial performance of the commercial banks are affected not only by the internal factor but also equally affected from the external factors. To escape from the risk of being strong influence by economic crisis, this research uses the data from year 2009. Even though the impact of some post global financial crisis can be seen on the result.

The external factors affecting the profitability of commercial bank is basically the economic environment. The economic environment could be exchange rate, political situation, competitions and the behavior of stakeholders. Various previous researches conducted on the similar topic around the globe have included data of year 2007-2008. The researcher think that, the result of such researches could have been more affected by external factors. During the economic crisis, the system risk plays an important role in the performance of commercial banks which are beyond the control of human beings. Therefore, if in case researcher could have included the information of such period, the variable ROE could be significantly affected by external factors. And the purpose of the research could not have been justified.

5.3 Significant Results

In this part, significant relationship between the dependent variable ROE and independent variable NPLR is discussed. NPLR in general is the financial indicator of banking which shows the quality of bank loan. The relationship between NPLR and ROE is explained by the following function.

$$ROE_{i,t} = -1.9612NPLR_{i,t}$$

The results from [table 17) shows that p-value of non-performing loan ratio with return on equity is 0.006. It means that NPLR have significant impact on ROE. Thus, the null hypothesis is accepted. Moreover, the above mentioned relation explains that, for every one percent increase in NPLR, holding other variables constant, Return on Equity of commercial banks in Nepal decrease by 1.97 percent. The research conducted by (Kargi, 2011) in Nigeria, (Paudel, 2010) in Nepal, (Fan Li and Yijun Zou, 2014) in European Banking Industry, (Sun and Bakaeva, 2009) in Sweden also concluded their research revealing NPLR impact negatively on ROE. Theoretically, Higher the NPLR lower will be the profitability and higher will be the loss. NPLR below one percent is fair performance. It is the main job of the manager to keep NPLR below one percent for better performance.

This research have also used Total Assets as control variable. The relationship between TA and ROE can be expressed as:

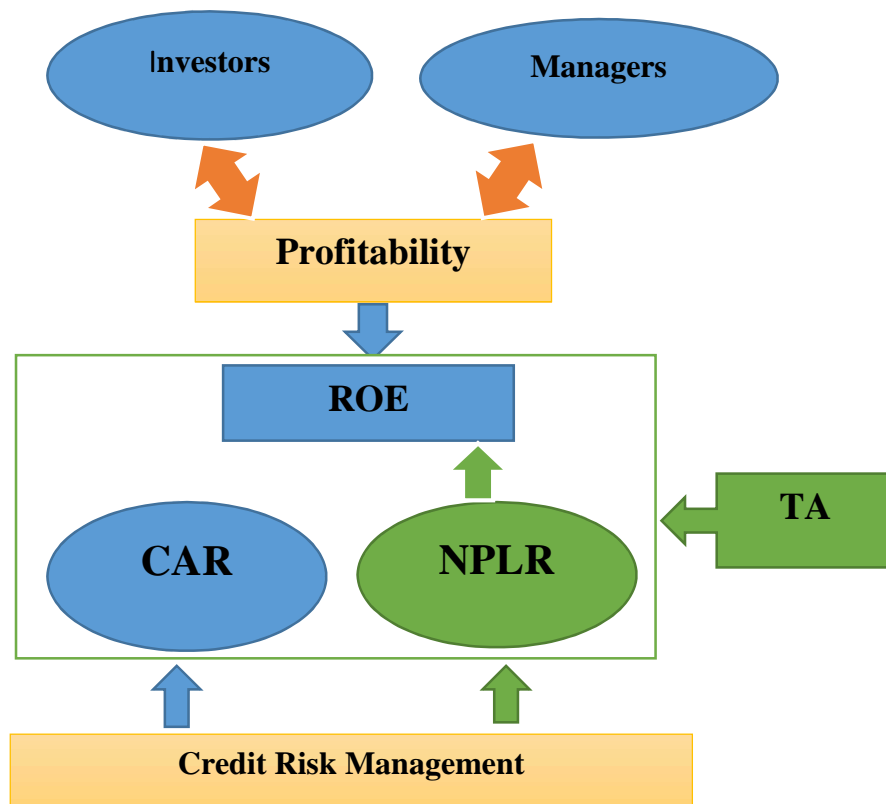
$$ROE_{i,t} = + 0.001TA_{i,t}$$

This relationship explain that, one percent increase in total assets increases ROE by 0.001 percent. It means that the impact of TA on profitability is negligible in Nepalese banking. Theoretically, higher the TA higher should be the profitability. The p-value of TA to ROE is 0.007 [Table 17] simply explains there is significant positive impact of TA on ROE in commercial banks of Nepal. The research conducted by Fan Li and Yijun Zou in 2014 using the data of European Banks also found strong correlation between TA and ROE.

5.4 Graphical Representation of the Study

This research model is solely based on the results of this study. This model simply highlighted the overall purpose and finding of the thesis in diagrammatic way.

Figure 4: Model of the Study



Source: Researchers' own developed model

In the above model, green color indicates that, there exists the significant impact of one variable to another. It means that, NPLR have impact on ROE which is even clearer with the green arrow shown in the diagram. Though CAR is also mentioned in the diagram but neither arrows gone up towards ROE, it means there is no significant impact of CAR on ROE which is proved by the regression result. Total assets (TA) of banks is control variable for the whole test which is shown in the right side of the diagram with green color explains, there is impact of total assets on profitability in Nepalese Banking in negligible amount. The top most blue boxes with investors and managers shows that, they are always looking for the profit and the simultaneous arrows also indicates the same.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter deals with the conclusion and suggest recommendations for the future research. This begin with brief summary of empirical findings followed by discussion of results and then states the assessment of the study and contributions of this study. The recommendations will be supplied in the last session of this part.

6.2 Conclusions

The prime objective of financial institutions is to satisfy the shareholders, positive cash flow and balanced growth. The key to success is to find profitable high value customers and retaining them for long term. But the various types of risk are always connected in banking sector. The major risk associated is the credit risk. The risk of non-repayment of borrowed loan and interest is a serious matter of concern for managers hence, they are always focused on reducing net bad debts and operating costs. However, the declining trend of non-performing loan ratio (Fig.2) from 19 percent in 2005 to 10 percent in 2013 in Nepalese banking simply indicates that there has been a good progress in risk management techniques, monetary instruments, credit risk modellings, information technology, capacity of Central Bank, legal environment and governance in Nepalese financial sector. The financial portfolios also shows that, all the banks currently operating in Nepal are gaining reasonable profit. One of the major reason of increasing profit of Nepalese banks could be the significant decrease of NPL because the researcher have also identified significant relationship between NPLR with profitability in Nepalese banking. The regression result revealed that, in Nepal one percent increase in NPLR decreases ROE by 1.96 percent which is very high. The banks having higher non-performing loan ratio have less incentive to rise loan than banks having lower NPLR. This result also revealed, higher non-performing loan ratio decreases the cost efficiency. Meanwhile, the R-Squared of regression analysis indicates that 44 percent of return on equity is predicted by NPLR and CAR, thus success of bank also depends on proper management of credit risk indicators. This study also disclose the effect of credit risk management on banks profitability is cross sectional variant i.e. it is not similar across banks.

It means that, every banks have their own way of risk management policies, credit risk management affects profitability on different levels in each banks.

Capital adequacy ratio is the important current issue in banking which estimates the banks stability and efficiency. But, this study reveals that this ratio have no significant relationship with financial performance in the context of Nepal. Meanwhile, total assets of banks also shows positive relationship with profitability in this study.

Hence, the recommendation of the study is that, bank managers in Nepal should more focused on credit risk management, especially to control NPL. Before disbursement of loans, they should accurately measure the ability to payback of the borrowers. Although, the researcher could not find any significant relationship between CAR and ROE, it does not mean CAR is less important. The managers should also put effort on managing the capital requirement to counter the possible risks. The researcher also recommend banks to establish appropriate credit risk environment for better performance. Also, the banks should establish the credit guideline policies with clear terms and conditions for better outcome while approving loan. These guideline should be update timely to reflect changes in the economic outlook. A thorough credit risk assessment should be conduct prior to granting of loans. Meanwhile, all banks should establish money laundering and know your customer (KYC) guidelines to control and monitor new borrowers and guarantors. Credit risk grading system can also be beneficial for the measurement of assets quality and the level of risk of being default.

6.4 Recommendations for further research

After analyzing series of findings, the major recommendation regarding this topic for further research is to include more indicators of credit risk management as well as profitability for better result because this research does not able to find the significant relationship between CAR and ROE. The reason could be the selection of time period of only five years and only seven banks as a sample. Hence, this research has created enough room for further research. The researcher recommend to include more banks and more indicators, if anyone wants to do future research on this topic.

Meanwhile, if the researcher include more indicators to test the relationship, it can help to enhance the accuracy of the research model with the most suitable variable.

This research was only focused on credit risk management and profitability of commercial banks but further future suggestions could be move from the core of credit risk management to other risk management. Recently, not only commercial banks but also other forms of financial institutions plays a significant role in financial market. Hence, the researcher suggest further research can be focused on other forms of financial institutions. Meanwhile, liquidity risk operational risk, market risk or reputational risk can also be taken into consideration instead of only credit risk management. Extending this research topic to global banking industry, would be more interesting to uncover the impact of credit risk management and profitability of banks.

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Appendices

Appendix 1: List of Commercial Banks in Nepal until 2014

1. Nepal Bank Limited
2. Rastriya Banijya Bank Limited
3. Agriculture Development Bank Limited
4. Nabil Bank Limited (NBL)
5. Nepal Investment Bank Limited (NIBL)
6. Standard Chartered Bank Nepal Limited (SCBL)
7. Himalayan Bank Limited
8. Nepal SBI Bank Limited (NSBI)
9. Nepal Bangladesh Bank Limited
10. Everest Bank Limited (EBL)
11. Bank of Kathmandu Limited (BOK)
12. Nepal Credit and Commerce Bank Limited
13. Lumbini Bank Limited
14. NIC Asia Bank Limited
15. Machhapuchchhre Bank Limited
16. Kumari Bank Limited
17. Laxmi Bank Limited
18. Siddhartha Bank Limited
19. Global IME Bank Limited
20. Citizens Bank International Limited (CBIL)
21. Prime Commercial Bank Limited
22. Sunrise Bank Limited
23. Grand Bank Nepal Limited
24. NMB Bank Limited (Nepal)
25. Prabhu Bank Limited
26. Janata Bank Nepal Limited
27. Mega Bank Nepal Limited
28. Civil Bank Limited

29. Century Commercial Bank Limited

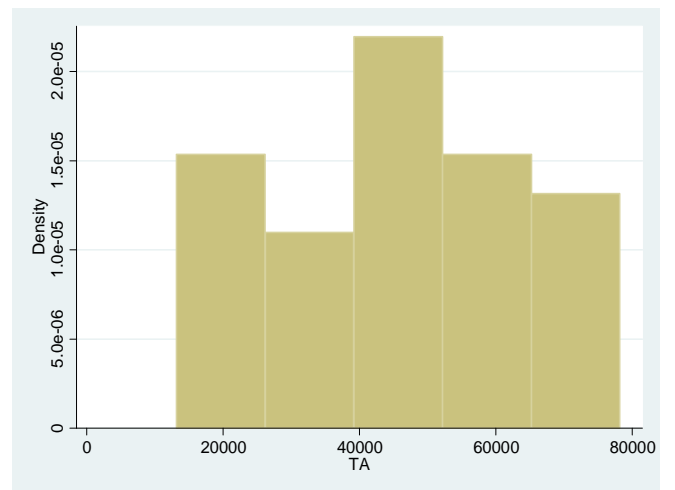
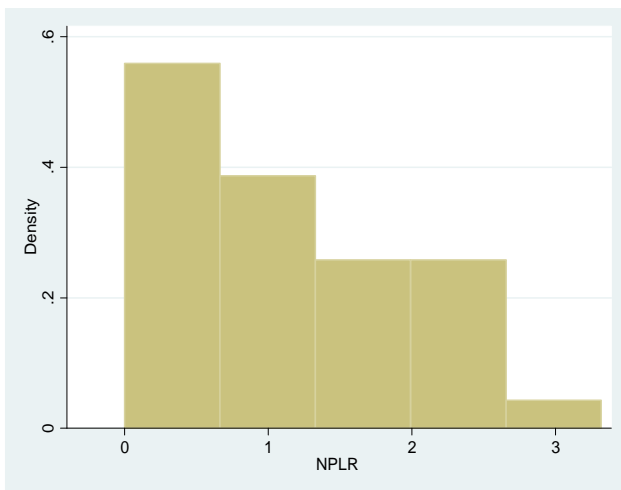
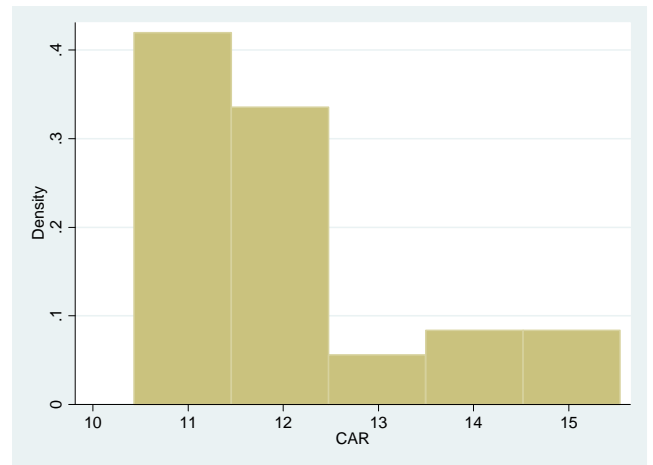
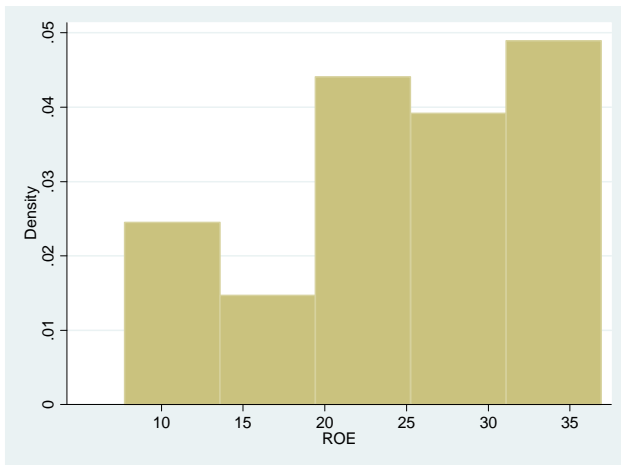
30. Sanima Bank Limited

Appendix 2: Data set for Panel Data Regression Analysis.

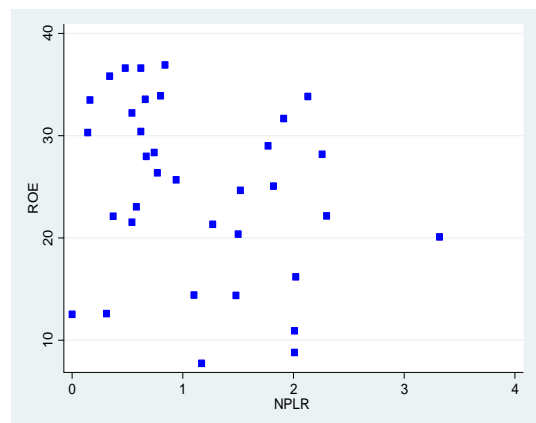
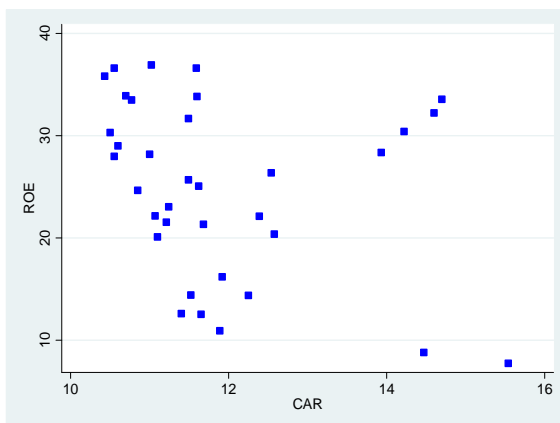
BANK	YEAR	ROE	CAR	NPLR	TA (Million Rs.)	LNTA
EBL	2009	36.62	10.55	0.48	38000.30	10.55
EBL	2010	33.52	10.77	0.16	42053.00	10.65
EBL	2011	35.83	10.43	0.34	46895.60	10.76
EBL	2012	36.92	11.02	0.84	56609.20	10.94
EBL	2013	36.62	11.59	0.62	66677.60	11.11
SCB	2009	33.58	14.70	0.66	41678.80	10.64
SCB	2010	32.22	14.60	0.54	41525.20	10.63
SCB	2011	30.43	14.22	0.62	45227.20	10.72
SCB	2012	28.36	13.93	0.74	42970.80	10.67
SCB	2013	26.38	12.54	0.77	47024.00	10.76
NIBL	2009	23.05	11.24	0.58	54634.50	10.91
NIBL	2010	28.00	10.55	0.67	59554.70	10.99
NIBL	2011	25.70	11.49	0.94	61357.00	11.02
NIBL	2012	20.10	11.10	3.32	69781.60	11.15
NIBL	2013	31.70	11.49	1.91	77999.00	11.26
NSBI	2009	16.19	11.92	2.02	31989.80	10.37
NSBI	2010	14.37	12.25	1.48	39381.30	10.58
NSBI	2011	14.43	11.52	1.10	47129.90	10.76
NSBI	2012	21.55	11.21	0.54	59196.80	10.99
NSBI	2013	22.13	12.39	0.37	66326.60	11.10
NBL	2009	33.90	10.70	0.80	45941.60	10.74
NBL	2010	30.30	10.50	0.14	54609.80	10.91
NBL	2011	29.00	10.60	1.77	61292.60	11.02
NBL	2012	28.20	11.00	2.26	71545.30	11.18
NBL	2013	33.86	11.60	2.13	78260.00	11.27
CBIL	2009	12.54	11.65	0.00	13162.90	9.49
CBIL	2010	12.62	11.40	0.31	16749.40	9.73
CBIL	2011	7.74	15.54	1.17	17503.00	9.77
CBIL	2012	8.80	14.47	2.01	20956.60	9.95
CBIL	2013	10.92	11.89	2.01	27238.30	10.21
BOK	2009	21.35	11.68	1.27	21009.30	9.95
BOK	2010	24.65	10.85	1.52	24058.80	10.09
BOK	2011	25.09	11.62	1.82	25582.10	10.15
BOK	2012	22.16	11.07	2.30	29834.10	10.30
BOK	2013	20.39	12.58	1.50	33575.30	10.42

Source: Nepal Rastra Bank, 2013 & Annual Reports of Individual Banks, 2013

Appendix 3: Histograms of variables, STATA Output



Appendix 4: Scatterplots of Variables, STATA Output



Appendix 4: Regression output from statistic software, STATA.

```

Random-effects GLS regression           Number of obs   =       35
Group variable: bank2                  Number of groups =        7

R-sq:  within = 0.2733                  Obs per group:  min =        5
      between = 0.5155                      avg =       5.0
      overall  = 0.4467                      max =        5

corr(u_i, X) = 0 (assumed)              Wald chi2(3)    =      12.30
                                           Prob > chi2     =      0.0064

```

roe	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
car	-.2686945	.557032	-0.48	0.630	-1.360457	.8230683
nplr	-1.961243	.7154035	-2.74	0.006	-3.363408	-.5590779
ta	.0001413	.000052	2.72	0.007	.0000394	.0002433
_cons	23.88935	7.314229	3.27	0.001	9.553722	38.22497
sigma_u	8.0461751					
sigma_e	2.665524					
rho	.9011076	(fraction of variance due to u_i)				