CAPITAL ADEQUACY &ITS SIGNIFICANCE TO COMMERCIAL BANKS

(With Special Reference to selected Commercial Banks in Nepal)

A THESIS

Submitted by:

SUSMITA SHARMA

Shanker Dev Campus
Campus Roll No.: 977/065
T.U. Regd. No.: 7-2-346-11-2005
Second Year Exam Symbol No.: 391046

Submitted to:
Office of the Dean
Faculty of Management
Tribhuvan University
Kathmandu, Nepal

In partial fulfillment of the requirements for the degree of
Master in Business Studies (MBS)

Kathmandu, Nepal
May,2013

TABLE OF CONTENTS

CHAPTER – II REVIEW OF LITERATURE

CHAPTER – III RESEARCH METHODOLOGY

CHAPTER – IV DATA PRESENTATION AND ANALYSIS

LIST OF TABLES

LIST OF FIGURES

CHAPTER -I

INTRODUCTION

1.1 Background of the Study

Innovation, deregulation and globalization in banking sector have contributed in making banking business more complex and potentially riskier. This has presented new challenges to the bank supervisors with respect to the structure of the ongoing supervision. In response supervisors have developed new methods and processes for monitoring and accessing the banks on an ongoing basis. Particular attention is being paid in this regard towards improving the quality of bank examination and to the development of system that can assists supervisors and examiners in identifying changes, particularly deterioration in bank's financial condition as early as possible.

Amongst the various new initiatives that have been taken or are been taken in this respect are the development of more formal, structured and quantified assessments not only of the financial performance of bank but also of the underlying risk profile and risk management capabilities of individual institutions. The ability to monitor the soundness of the financial sector presupposes the existence of valid indicators of the health and stability of the financial systems. One of the major components to evaluate the soundness is Capital Adequacy.

Human activities are normally directed towards the wellbeing of the people. Energy and efforts devoted by people of the society aims to enhancing material benefit to the community. To enable people to enjoy the material benefit is possible only when base of production is expanded. In other words this requires economic growth of the nation. The economy of Nepal is survived by agricultural sector. The agricultural sector contributes over 40% to the GDP of the country. Over 80% of the population is dependent up on the agriculture.

Therefore, major contribution of Government of Nepal has been the development and advancement of agriculture sector. But still, there has always been scarcity of finance in this sector. To some extent, the establishment of Agriculture Development Bank has provided the support to the farmers to raise the required capital. Also, various programs like microfinance programs, cooperative programs have been introduced in various villages of Nepal which has definitely helped locals to finance their agricultural inputs. To growth the economic development of the country needs formation of adequate capital, for that motive, commercial banks can play a major role. Capital is one of the most important components for every organization. Actually, no organization can exist without capital. Without capital, it is not possible to set up any type of business whether it is general store or a big business house. Every organization is started with a zero level and only come into existence when the promoters, owners or shareholders are initiation for investing their capital on business. Every organization should have enough capital to run business. Although the businesses are the major sources of capital, they also have to raise capital to run business. Especially, the bank's Capital plays the vital role because it has obligations to mass people, its depositors and society as a whole. Thus, the banks should hold an adequate capital to secure the interest of depositors. Capital Adequacy has become one of the most significant factors for assessing the soundness of banking sector. Raising and utilization of funds are the primary functions of commercial banks. As such, commercial bank collects a large amount of deposits from general public. The depositors think that depositing their money in bank is safe and relaxing. But, what does happen if the bank doesn't have enough capital funds to provide a buffer against future, unexpected losses? Therefore, Nepal Rastra Bank as banker's Bank has make rule of capital adequacy so that every Commercial Bank have 10% on Capital Adequacy Ratio from F/Y 2068/69.Capital must be sufficient to protect a bank's depositors and counterparties from the risks like, credit and market risks. Otherwise, the banks will use all the money of depositors in their own interest and depositors will have to suffer loss. After the restoration of

multiparty democracy, several commercial banks made a way to business in Nepal. At present, commercial bank holds large share of economic activities of the country. Stock market has been dominated by commercial banks since a decade. Every day, we can see trading of large amount of stock transactions of commercials banks. Not only in the stock market, but commercial banks have also been major contributors to the revenue of the country. They have been paying a large amount of tax every year. Banking sector has become a mainstay of the economy of the country.

Establishment of commercial banks is governed by Bank and Financial Institutions Act and Company Act. However, Nepal Rastra Bank (NRB), as regulatory body for banks and financial institutions, has right to specify the capital requirements, and other requirements. Being the central bank of Nepal, NRB has the responsibility to give special attention to the interest of depositors. Such a big amount of money should have to be secured and NRB has the major responsibility to protect it's capital adequacy.NRB has issued Unified Directives to be complied by all financial institutions of the country. The Directives consist of 21volumes. The NRB Directive no.1 states about the Capital Adequacy Norms for financial institutions indicating the requirements of maintaining the Capital Fund to the prescribed ratios. The directives are said to be based on the internationally accepted norms of Basel-2 Committee, which is the advanced form of Basel-1. The Basel Committee on banking supervision is a committee of banking supervisory authorities, which was established by the central bank governors of the group of ten countries in 1975. It consists of senior representatives of bank supervisory authorities and central banks from Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Sweden, Switzerland and the United Kingdom and the United States. It usually meets at the bank for international settlements in Basel, Switzerland, where its permanent secretariat is located.

Basel 1

Prior to 1988, there was no uniform international regulatory standard for setting bank capital requirements.in,1988, the Basel Committee on Banking Supervision (BCBS) developed the Capital Accord which is known as Basel I, to align the capital adequacy requirements applicable especially to banks in G-10 countries. First, it defined what banks could hold as capital, as well as designating capital as Tier1 or Tier 2according toits loss-absorbing or creditor protecting characteristics. The second key concept introduced in Basel I was that capital should be held by banks in relation to the risks that they face. The major risks faced by banks relate to the assets held on balance sheet. The first is primarily share capital, the second other types such as preference shares and subordinated debt. The key requirement was that tier onecapital was at least 8% of assets. Each class of asset has a weight of between zero and 1(or100%). Very safe assets such as government debt have a zero weighting, high risk assets (such as unsecured loans) have a rating of one. Other asses have weighting somewhere in between. The weighted value of an asset is its value multiplied by the weight for that type of asset.

Basel 2

The Basel 1 accord has largely been replaced by new rules. Basel 2 is based on the three "Pillars": minimum capital requirement, supervisory review process and market forces.

The first "Pillar" is similar to the Basel 1 requirement; the second is the use of sophisticated risk models to ascertain whether additional capital (i.e. more than required bypillar 1) is necessary

The third pillar requires more disclosure of risks, capital and risk management policies. This encourages the markets to react to the taking of high risks.

In addition to specifying levels of capital adequacy, most countries have regulator run guarantee funds that will pay depositors at least part of what they are owed. It is also usual for regulators to intervene to prevent outright bank defaults.

Basel 3

The Basel 2 rules looked increasingly inadequate in the wake of the financial crisis, and the Basel 3 rule were considerably tighter. The main changes were:

- The required level of tier one capital increased from 4% to 6%.
- Required common equity increased from 2% to 4.5%
- In additional variable amount of counter –cyclical (i.e. higher when the economy is strong, allowed to run down when the economy is weak) buffer is required. This will vary from 0% to 2.5%.
- Total capital required rose to 85-10.5% including the conservation buffer, with the counter cyclical buffer on top of it.

This represents a significant change in the capital structure of banks. Itsimpact is weakened by being phased in over an eight year period. The gradual shift was necessary as increase in capital adequacy.

The Basel committees on Banking Supervision's (BCBS) recommendations on capital accord are important guiding framework for the regulatory capital requirement to the banking industry all over the word and Nepal is no exception. Realizing the significance of capital for ensuring safety & soundness of the banks & the banking system, at large, Nepal RastraBank(NRB) has developed &enforced Capital adequacy requirement based on international practices with appropriate level of customization based on domestic state of market developments. The existing regulatory capital is largely band on the Basel committee's 1988 recommendations.

1.2 Nepal Rastra Bank and Its role on Supervision and Regulation

Nepal Rastra Bank is known as the central bank of Nepal. It was established in 2013 BS. It is an autonomous body and fully owned by the government of Nepal, who works for the development of banking system in the country. The smooth operation of banks must be ensured by the central bank. Failure of a single bank can create and ruin the whole economy of the country. Hence, the

central bank has to supervise and ensure that the banking sector is functioning properly. Some of the purposes of supervision system of NRB are as follows:

- Ensure compliance with acts and instructions given by NRB.
- Ensure operation procedure is carried in consonance with the policies laid by NRB.
- Ensure that the public has faith and trust towards the bank.
- Ensure management and internal control system is effective.
- Ensure sound and healthy financial standing.(This is done though fulfillment of capital adequacy)

Supervision Division is responsible to ensure that the above laid down policies are achieved. They ensure this through off-site inspection and on-site inspection. Same as, NRB has given some instruction in relation to the capital adequacy ratio of a bank, classification of loans, loan depreciation(loss) provision, assessment of interest income, single borrower limit, liquidity, directive credit, asset quality and off-balance sheet activities such as:

1. Classification of Capital Fund and Capital Adequacy Ratio
2. Classification of Loans.
3. Loan depreciation provision (to mitigate default risk).
4. Assessment of Interest Income
5. Single Borrower limit
6. Interest Rate Deregulation
7. SLR and CRR

1.3 Commercial Banks

1.3.1 Evolution of commercial banks in Nepal

Nepalese financial sectors were dominated by two commercial banks viz. Nepal Bank Ltd.(semi government) and RastriyaBanijya Bank (fully government owned) till 1984. Commercial banking Act 1974 was amended in 1984 to increase competition between commercial banks. So,provision was

made to allow private sector including foreign investment to open commercial banks. As a result, Nabil Bank Ltd. the then Nepal Arab Bank Ltd. was established in July12,1984 with the partnership of Dubai Bank Ltd., Dubai. With the advent of new commercial bank policies, foreigners have been encouraged to invest in Nepal, which in turn has led to the establishment of the joint venture companies among which banks have gained a wide popularity. In this context, three of the most dramatic reforms were carried out in the 1980s which allows the foreign banks to operate as joint ventures this deliberated policy of the Nepal Government to allow establishment of the joint venture banks in Nepal is basically targeted to encourage the local traditionally run commercial banks to enhance their banking capacity through competition, efficiency, modernization, mechanization and prompt costumer service (Mishra, 2002:7).

The foreign commercial banks, with full-fledged banking functions in Nepal have been established under company act 2031 B.S. (1974 A.D.) and operate under the commercial bank act 2031 B.S. (1974 A.D.).

Accordingly they have joint venture agreement between Nepalese promoters and their respective parent banks, each supplying minimum 40% and maximum 50% of the total investment (except for Himalayan Bank Limited which has only 20% share of Habib Bank Limited), the local investment has been shared by institutions, both financial and non-financial and individual investors. Nepal Arab Bank Limited was established in 2041 B.S. (1984 A.D.) as first joint venture bank in Nepal as a result of the government's policies in the financial sector. The advent of the liberation policy of the government in the early 1990s brought in many joint venture banks to the Himalayan Kingdom. One can list down certain changes made in the country, which have significantly revolution on the financial landscape.

The foreign commercial banks, with full-fledged banking functions in Nepal have been established under company act 2031 B.S. (1974 A.D.) and operate under the commercial bank act 2031 B.S. (1974 A.D.).

Accordingly they have joint venture agreement between Nepalese promoters and their respective parent banks, each supplying minimum 40% and maximum 50% of the total investment (except for Himalayan Bank Limited which has only 20% share of Habib Bank Limited), the local investment has been shared by institutions, both financial and non-financial and individual investors. Nepal Arab Bank Limited was established in 2041 B.S. (1984 A.D.) as first joint venture bank in Nepal as a result of the government's policies in the financial sector. The advent of the liberation policy of the government in the early 1990s brought in many joint venture banks to the Himalayan Kingdom. One can list down certain changes made in the country, which have significantly revolution on the financial landscape.

Though the commercial banks were established with the concept of supplying short-term credit and working capital need of the industries, they have been providing long-term loans for up to 15 years. After the enforcement to lend to priority and deprived sector, these banks initiated to provide credit to small and cottage industries, agriculture and services presently, commercial banks must lend 5 percent of their total lending in priority and deprived sector and among these,3 percent being compulsory to the deprived sector. NRB has a provision of refinance facility also for such loan provided to priority and deprived sector including export credit.

1.3.2 Present Scenario of Commercial Banks of Special References

The banking industry is continuously evolving with introduction of new service delivery channels, new products and adoption of sophisticated technologies. The advancement in the information technology and the conducive global environment has fastened the pace of evolution of this industry too. With the

adoption of sophisticated technologies, the dimension of banking and financial services has widened a lot. At present there are 32 no. of commercial banks in Nepal. As such, the banks are now equipped with new and innovative service delivery channels offering a number of products on the fore. The banks now have more opportunities, but these are undoubtedly attached with plenty of risks. In light of the rapidly changing scenario, the conventional supervisory tools, techniques and methodology that may have been adequate over a decade ago are unable to meet the supervisory objectives for today's larger, more complex banks.

1.4 Brief Introduction of Commercial Banks of special reference

1.4.1 Nepal Arab Bank Ltd. (NABIL)

Nepal Arab Bank Ltd. the first joint venture commercial bank was established in 1984, Dubai bank Ltd. was the initial foreign joint venture partner with 50% equity investment. Later on, the shares owned by Dubai Bank Ltd. were transferred to Emirates Bank International Ltd.

Again, Emirates Bank International Ltd. Dubai sold its entire 50% equity holding to National Bank Ltd. Bangladesh. At present National Bank Ltd., Bangladesh is managing the bank in accordance with the technical services agreement signed between it (NBL) and the bank on June 1995 (Financial statement, 1997/98: 9)

Current configuration is given as follows:

- National Bank Ltd. Bangladesh 50%
- Nepal Industrial Development Corporation (NIDC) 6.15%
- RatriyaBeemaSansthan 9.67%
- Nepal Stock Exchange (NEPSE) 0.33%
- Nepalese Public 30%
- Others Promotor Group 3.85%

1.4.2 Nepal Investment Bank Ltd. (NIBL)

Nepal Investment Bank ltd. (NIBL), previously Nepal Indosuez Bank ltd., was established in 1986 as a joint venture between Nepalese and French partners. The French partner (holding 50% of the capital) was Credit Agricole Indosuez, a subsidiary of one of the largest banking groups in the world. With the decision of Credit Agricole Indosuez to divest, a group of companies comprising of bankers, professionals, industrialists and businessmen, in April 2002, acquired 50% of the holdings of Credit Agricole Indosuez in Nepal Indosuez Bank. The name of the bank was changed to Nepal Investment Bank ltd. upon approval of the Bank's Annual General Meeting, Nepal Rastra Bank and Company Registrar's office.

The shareholding structure comprises of:

- A group of companies 50%
- RastriyaBanijya Bank 15%
- RastriyaBeemaSansthan 15%
- The general public 20%

1.4.3 Everest Bank Limited (EBL)

Everest Bank Limited (EBL) is a joint venture bank with Punjab National Bank (PNB) of India, which was established in 1994 with a view and objectives of extending professionalized and efficient banking services to various segments of the society. The shareholding structure comprises of:

- Punjab National Bank 20%
- The general public 68%
- A group of companies 12%

1.4.4 Himalyan Bank Limited (HBL)

Himalayan Bank is a joint venture Bank with Habib Bank Ltd. of Pakistan, which was established in 1992 under the company act 1964. This is the first joint venture Bank with maximum share holding by the Nepalese private sector, which is managed by chief executive. The main objective of the bank is to provide modern banking facility and loan to agriculture, commerce and industrial sector.

Current configuration is given as follows:

- Promoter shareholders 51%
- Habib Bank Ltd. 20%
- KarmachariSanchayaKosh 14%
- Nepalese Public Shareholders 15%.

1.4.5Bank of Kathmandu (BOK)

BOK started its operation in March 1995 with the objective to stimulate the Nepalese economy and take it to newer heights. BOK also aims to facilitate the nation's economy and to become more competitive globally. To achieve these, BOK has been focusing on its set objectives right from the beginning. Current configuration is given as follows:

- Nepalese Public Shareholders 58%.
- Promoter shareholders 42%

1.5 Focus of the Study

The research study is related with the implementation of directives by the commercial banks. Nepal Rastra Bank (NRB) has issued a set of sixteen directives related to different areas of regulations among them the study will be focused on one of the directives which is maintenance of minimum capital fund or the capital adequacy norms for the commercial banks. The study will mainly

focus on five commercial banks namely: NABIL Bank Ltd. (NABIL), Nepal Investment Bank Ltd. (NIBL), Everest Bank Limited (EBL), Himalayan Bank Limited (HBL) and Bank Of Kathmandu (BOK).

1.6 Statement of the Problem

The safety of commercial bank depends on the adequacy of the bank's capital. In other words, the capital adequacy of a bank is determined by analyzing and appraising its capital position in relation to such factors as character of its management, character of its ownership, quality of operating procedure and capacity to provide the broadest service to the public.

Over the years, regulatory authority and banking experts have devised several instruments and ratios so as to determine the safe and efficient conditions of a bank. They related capital to a key magnitude in the balance sheet of commercial banks. Regulators have become increasingly concerned that some banks do not hold enough capital and have increased capital requirements. If banks hold more capital, they can more easily absorb potential losses and are more likely to survive. Banks with higher capital ratios are therefore assigned a higher capital adequacy rating. However, a bank with a relatively high level of capital may fail if other components of its balance sheet are not properly managed.

The main reasons of failure of few joint venture banks in Nepal may be due to the manipulation of real data in balance sheet and neglecting the rules according to the NRB directive. The directives, if not properly addressed, may have potentials to destroy the financial system of the nation, as they are the only tools of the NRB to supervise and monitor the financial institutions. Implementation parts of directives are more important than the directives themselves.

In addition to this, the research will try to find the answers to the following questions;

1. What is the capital adequacy requirement as per the NRB directives?
2. Are the commercial banks seriously following the directives regarding capital adequacy set by the NRB?
3. What is the efficiency and weakness of capital adequacy ratio?
4. How do the banks manage its Capital Adequacy? Is it in line with the regulated minimum capital requirements?
5. What is the level of Assets composition and Risk Weighted Assets of the banks and what is the banks quality of loans and loan provision mix?

1.7 Objective of the study

For the smooth operation of the financial institution NRB has been playing a vital role since its establishment. The NRB directives are for-most guidelines for any financial institution to operate in an effective manner. Also, implementing these directives becomes must for all FI.

The main objectives of the study are to review directives of NRB regarding capital adequacy related to commercial banks.

The specific objective of this study is:

- To analyze the implementation status of the directives given by NRB.in respect to capital adequacy.
- To evaluate capital adequacy of the commercial banks (NABIL, NIBL, EBL, HBL, BOK)
- To examine the efficiency and weakness (drawbacks) of capital adequacy ratio.

1.8 Significance of the study

Commercial banks will be the main figure of this research study. The directive of NRB regarding capital adequacy is taken as the main focus of the study. NRB issues directives to the commercial banks from time to time in order to maintain stability in the financial market. The directives are issued on the basis

of monetary policies and the success of the monetary policies of the country depends on the directives of the central bank and central role. So it is important for commercial banks to follow such rules and guidelines made by NRB not only for the success of the country monetary policies but also to meets its own objectives as these directives shows where they go wrong and what improvement they have to made for their own betterment.

The study mainly focuses on how Commercial banks provide the safeguard of general public huge amount of deposit to invest it on productive sectors in the context that they have collected more than Rs. 687587.90 millions of Deposit. We can observe that there is a lack of adequate investment opportunity of funds. In such a situation, these Deposits have to be protected by the adequate Capital Fund of respective commercial banks. In fact, the banks should have adequate Capital Fund apart from the deposits of public to make investments. Presently, raising capital is a tough task. The growing NPAs, being the main headache of commercial banks, meeting the Capital Adequacy is very tough, though it is not impossible. This thesis may not be new study in the field of banking sector but the thesis shall of course present some results, which will reflect the capital structure and position of commercial banks in Nepal.

1.9 Limitations of the study

This study will be done for the partial fulfillment of masters of business studies. The study will be conducted within certain limitation and constraints. They are:-

1. This study has limited scope, as only five commercial banks namely: NABIL Bank Limited, Nepal Investment Bank Limited, Everest Bank Limited, Himalayan Bank limited and Bank of Kathmandu are taken to study, this is because the major portion of the capital market is acquired by these banks where by monitoring capital adequacy becomes interesting so the samples may not represent the entire populations.

2. The study areas are mainly focused on regulatory system on capital adequacy of Nepal. Thus the study area will be very specific.
3. Due to the time limitation and data availability all the directives are not taken for research.
4. Data constraints are the common phenomenon in any study. Study will be based on secondary data and information and by review of relevant literatures. Thus it may bias to some extent.
5. Institutional constraints are also one of common phenomenon to take Though the study will be completed within very limited time in order to be considered in a predetermined academic period it will try its best to provide valid results as per its objectives and will try its best to make it useful for other who want to study on the same issue.

1.10 Organization of Study

The structure of the thesis study comprises a total of 5 chapters, which have been briefly described as follows:

Chapter I: Introduction

To start the thesis report, this chapter includes the background of the study, meaning, functions and importance of a central bank, introduction to NRB, introduction to Commercial banks, statement of problem, objective of the study, limitation of the study, theoretical framework and problem hypothesis. This chapter has been targeted to help the reader to understand get the rhythm of the subject matter of the thesis report.

Chapter II: Review of Literature

This chapter includes conceptual review, review of NRB Capital Adequacy Norms and review of empirical works. For this purpose, various books, journals and periodicals as well as Internet have been adequately utilized.

Chapter III: Research Methodology

Research Design, Sample Selection, Sources of Data, Data Collection Procedure, and Tools for Analysis of the Study and Limitations of the Methodology have been included in this chapter.

Chapter IV: Presentation and Analysis of Data

This chapter illustrates the collected data into a systematic format. The analysis of those data and finding are also included in this chapter. As well as, interpretation of analysis has also been done in this chapter.

Chapter V: Summary, Conclusion and Recommendations

In this chapter, the summary of the entire thesis has been comprised. Conclusions of the study have also been included in this chapter. As well as, possible and viable recommendations has also been presented in this chapter.

CHAPTER-II

REVIEW OF LITERATTURE

Review of literature is the study of past research studies and relevant materials. It is the advancement of existing knowledge and in depth study of subject materials. “Review of literature means reviewing research studies and other relevant proposition in the related area of the study so that all the past studies, their conclusion and deficiencies may be known and further research can be conducted. It is an integral and mandatory process in research work.

A literature review is an essential part of the studies. It is a way to discover what other researchers have covered and left in the area. A critical review of the literature helps the researcher to develop through understanding and insight into previous research works that relates to the present study. It is also a way to avoid investigation problems that have already been definitely answered. Thus literature review is the process of locating, obtaining, reading and evaluating the research literature in the area of the student’s interest.

2.1 Conceptual Review

Conceptual review is essential for gaining the knowledge about the research field to be gone through. A thesis work has three parts first one is explaining phenomena second is verb and lastly is phenomenon to be explained .Conceptual review helps us to know about phenomenon to be explained.

2.1.1 Overview: Capital and Capital Adequacy

"Capital is a stock of resources that may be employed in the production of goods and services and the price paid for the use of credit or money, respectively." **(Microsoft Encarta Reference Library, 2003)**

Rosenberg (1982) has defined capital in relation with banking as a long-term debt plus owners' equity. The efficient functioning of markets requires participants to have confidence in each other's stability and ability to transact business. Capital-rules help foster this confidence because they require each member of the financial community to have, among other things, adequate capital. This capital must be sufficient to protect a financial organization's depositors and counterparties from the risks of the institution's on-balance sheet and off balance sheet risks. Top of the list are credit and market risks; not surprisingly, banks are required to set aside capital to cover these two main risks. Capital standards should be designed to allow a firm to absorb its loses, and in the worst case, to allow a firm to wind down its business without loss to consumers, counterparties and without disrupting the orderly functioning of financial markets. Minimum capital fund standards are thus a vital tool to reducing systematic risk. They also play a central role in how regulators supervise financial institutions. But capital requirements have so far tended to be simple mechanical rules rather than applications of sophisticated risk-adjusted models. Such capital standard is widely known as capital adequacy.

Patheja (1994) has defined banks capital as common stock plus surplus plus undivided profits plus reserves for contingencies and other capital reserves. In addition since a bank's loan-loss reserves also serves as a buffer for absorbing losses, a broader definition of bank capital include this account.

Verma and Malhotra (1993) have indicated that the general public is interested in the higher profitability and safety of the funds of a bank, because the public expects the shareholders to assume all the risks. Lower profitability of a bank fills the faith of the prospective depositors and all their incentive for investing in the various deposit schemes. The Basel Committee sets a standard for all the banking norms, which will be accepted by central banks of all big industrialist countries. Regarding the capital funds the committee has issued the Basel Capital Accord. The first Basel Capital Accord was issued in 1988 and was implemented by 1992. The committee had issued New Basel Capital

Accord, which should have been implemented by 2006 to overcome the drawbacks of the present capital accord. Central banks of developing and underdeveloped countries follow these standards. NRB also follow these standards and accordingly sets standard for commercial banks in Nepal.

According to the Unified Directive issued by NRB, the bank capital has been categorized into two parts: **Core Capital** and **Supplementary Capital**.

The **Core Capital** consists of the following components of capital:

1. Paid Up Capital
2. Share Premium
3. Irredeemable Preference Shares
4. General Reserve Fund
5. Cumulative Profit / Loss
6. Capital Redemption Reserve
7. Capital Adjustment Fund
8. Other Free Reserves

Following are the items which are deducted from **Core Capital** while calculating:

1. Goodwill
2. Investment made in the shares and debentures of the companies crossing the limit prescribed by NRB (Directive No. 8)
3. Total investment made in shares and debentures of those companies where financial interest prevails
4. Fictitious Assets

The Supplementary Capital consists of the following components of capital:

1. General Loan Loss Provision
2. Assets Revaluation Reserve

3. Hybrid Capital Instruments
4. Subordinated Term Debt
5. Exchange Equalization Reserve
6. Additional Loan Loss Provision
7. Investment Adjustment Reserve

The Capital Adequacy Ratio is calculated by the following formula:

$$\text{Capital Adequacy Ratio} = \frac{\text{Total Capital Fund}}{\text{Total Risk Weighted Exposure}} \times 100$$

2.1.2 Relevance of Capital Adequacy to the Commercial Banks

The efficient functioning of markets requires participants to have confidence in each other's stability and ability to transact business. Capital's rules help foster this confidence because they require each member of the financial community to have, among other things, adequate capital. This capital must be sufficient to protect a financial organization's depositors and counterparties from the risks of the institutions on and off-balance sheet risks. Top of the list are credit and market risks; not surprisingly, banks are required to set aside capital to cover these two main risks. Capital standards should be designed to allow a firm to absorb its losses, and in the worst case, to allow a firm to wind down its business without loss to customers, counterparties and without disrupting the orderly functioning of financial markets.

Minimum capital standards are thus a vital tool to reducing systemic risk. They also play a central role as to how regulators supervise financial institutions. But capital requirements have so far tended to be simple mechanical rules rather than applications of sophisticated risk-adjusted models, although moves are afoot to change this by 2002. Further, there is a difference in the capital requirements of banks and securities houses, which could lead to competitive

distortion in the long-run between these two main types of financial institutions.

Capital adequacy has remained one of the biggest single issue in banking industry and a central element in prudential supervision. According to the capital adequacy principle safety and stability of a fragile financial system ultimately rests upon the confidence of the depositors and creditors and confidence is positively related with net worth, stability of earnings, information quality and the market value of guarantees. Capital thus has become an important element in the financial management of the banking firm.

Many other things that are more important than capital adequacy are the quality and character of ownership, the deposit structure and the competition a bank faces. All these factors are in one way or another related with various kinds of risks that a commercial bank is exposed to. If a bank earnings and assets are not growing, it is more susceptible to risk. Thus it is generally recognized that the availability of capital is neither a perfect indicator of state of health of a bank nor a sufficient condition to ensure the maintenance of confidence by depositors and creditors.

Despite all these arguments against it, capital adequacy has remained the most important factor in bank prudential supervision. The apparent scientific exactitude of capital or any ratios may be less relevant today in a nearer of intense competition and high rates of financial innovations. It is quite paradoxical that increasing supervisory demand for more capital may even increase the risk within the system. Therefore bank supervisors is an attempt towards increased international co-operation in supervision are trying to spread their met and exploring new definitions of capital adequacy to encompass recent innovations in it.

2.1.3 Role of Capital Fund Ratio

1 It helps to ensure safety of the fund of general public who aims for higher profitability.

2. It ensures consistent banking activities for the banks without any restrictions from NRB.

3. The refinancing facilities of NRB can be ascertained.

4. Banks can easily initiate new deposit scheme without any restrictions from NRB.

5. The various plans and programs for diversification of banking sector can be carried without any restrictions from NRB.

2.2 Review of Legal Document

2.2.1 Review of NRB Capital Adequacy Norms for Commercial Banks

NRB issues directives from time to time to enhance the strength of commercial banks. The tools described in the directives main objectives are to control and monitor the financial institutions of the country. NRB has been issuing directives into four different parts i.e., directives relating to banking regulation and prudential norms, credit information bureau (CIB), foreign exchange and list of forms, formats and tables. In present situation, NRB issues directives regulatory and put with new directives.

Directives relating to the banking regulation and prudential norms comprise twenty directives, which are as follows (Unified Directives 2068, NRB):

Directive 1: The provision of minimum capital fund to be maintained by the commercial banks.

Directive 2: The provision of loan loss provisioning on the credit.

Directive 3: The provision relating to single borrower limit.

Directive 4:	The provision of accounting and the structure of financial statement to be followed by the commercial banks.
Directive 5:	The provision of reducing risk on activities of the commercial banks.
Directive 6:	The provision of institutional good governance to be followed
Directive 7:	The provision of implementation schedule of regulatory directives issued in connection with inspection and supervision of the commercial banks.
Directive 8:	The provision of investment on shares and securities.
Directive 9:	The provision of submission of statistical data to the Nepal Rastra Bank, Banking management division and inspection and supervision division.
Directive 10:	The provision of sale and re-registration of foundation shares of commercial banks.
Directive 11:	The provision of Consortium Financing Loan.
Directive 12:	The provision of Loan Information and black list.
Directive 13:	The provision of compulsory Inventory.
Directive 14:	The provision of Branch Office.
Directive 15:	The provision of Interest rate.
Directive 16:	The provision of financial source collection.
Directive 17:	The provision for deprive sector loan.
Directive 18:	The provision for Merger & Acquisition.
Directive 19:	The provision for know your customer.

Directive 20: The provision for assistant company.

Directive 21: The provision for other aspects.

Among twenty one directives this research work is only limited to number one directive that is provision of capital adequacy ratio. Following instruments contain the features of both debt and equity which are called hybrid capital instruments.

- Securities issued without collateral, can be fully paid-up instruments, preference in payment after depositors and creditors, participated at loss and can be converted into ordinary capital.
- Instruments, which cannot be redeemable by the issuer without approval of NRB.
- Perpetual or long-term preferred stock convertible to ordinary shares if profit-loss accepts is a negative.
- Debt instruments and redeemable preference shares issued without collateral, has life minimum 5 years and is payable after depositors are subordinated term debts. Banks are required to amortize at 20% discount rate every year. Banks make 100% provision if invested in securities not listed in the stock exchange.

2.2.2 Directives no.1: Capital Adequacy Norms for Commercial Banks

Meaning of Capital

When talked of a capital, the authorized capital is the maximum amount that a bank may issue during the course of its operation and is mentioned in the memorandum of Association of the bank. The issued capital is that portion of the capital, which is issued by the bank to the public for subscription. The subscribed capital is the amount of capital subscribed by the general public. It can be either whole or just a part of the issued capital. Called up capital is the amount of capital that the shareholders need to pay. The paid up capital is the capital already paid by the shareholders. This is the only cash that have been

realized by the bank. The difference between the called up capital and the paid up capital is the uncalled capital.

Maintenance of Minimum Capital Fund

With the objective to develop a healthy, capable and served banking system for promoting economic growth of the country as well as to protect the interest of depositor, as provided under Section 23(1) of Nepal Rastra Bank Act 2012 (with amendment) relating to development and regulation of banking system, this directives in respect of Maintenance of minimum capital fund by commercial banks has been issued in exercise of authority under section 14(a) of commercial banking Act 2031.

All commercial banks need to maintain the prescribed proportion of minimum capital fund on the risk weighted assets. As per the directives issued by the Central Bank, the banks need to follow the following timetable.

Required Capital Fund on the basis of weighted risk exposure (in percentage)

Time Table	Core capital	Total Capital Fund
For FY (060/62)	4.50	9.00
For FY (062/63)	6.00	12.00
For FY (068/69)	6.00	10.00

Definition of Capital

For the purpose of calculation of capital fund, the capital of the banks is divided into the following two components.

1. Core Capital
2. Supplementary Capital

Core Capital

Core Capital of the Commercial banks includes the following:

a. Paid up capital
b. Share premium
c. Non-refundable preference share
d. General reserve fund
e. Accumulated profit and loss a/c

Supplementary Capital

Supplementary Capital of the commercial banks includes the following:

- **General loan loss provision:** Under this head, provision made only against the Passloan shall be included. Previously, the total amount of loan loss provision made for all the six categories of loan used to be included in the supplementary capital but now with the new directives, the amount of general loan loss provision shall be included in the Supplementary Capital as per the following time table.

Provision available for inclusion in the Supplementary Capital

Time Table	Provision available for inclusion in the Supplementary Capital
For FY (058/59)	Pass, Sub-standard and Doubtful Loans.
For FY (059/60)	Pass and Substandard.
For FY (060/61)	Pass Loan

The amount of general loan loss provision shall not exceed 1.25 percent of the total risk weighted asset.

Exchange Equalization Reserve:

- **Assets Revaluation Reserve:** For the Purpose of calculating supplementary capital, theamount of Assets Revaluation reserve shall be limited up to 2 percent of the Total Supplementary capital, inclusive of the amount of this reserve.

- **Hybrid Capital Instruments:** This includes the following instruments that have thecharacteristics of both debt and equity.

I. Unsecured, Fully paid up instruments issued by the banks, which are subordinated to (priority of payment after) depositors and creditors, and available to absorbed losses as well as convertible into ordinary capital.
II. Instruments, which are nonredeemable at the option of the holder except with the approval of Nepal Rastra bank.
III. Perpetual or long-term preference stock (shares) convertible to common stock if the profit and loss account becomes negative.

- **Unsecured Subordinated Term Debt:** Unsecured Subordinated Term Debtinstruments (priority of payment after the depositors) issued by bank with a minimum maturity term of over five years and limited life redeemable preference shares. To reflect the diminishing value of these instruments, a discount (amortization) factor of 20 percent during the last five years shall be applied. The issue of these instruments by banks shall not exceed 50 percent of their core capital.

- Other free reserve not allocated for a specific purpose:

2.2.3 Total Capital Fund

Total capital fund is defined as the sum of core capital and supplementary capital. Value of goodwill shall not include for the purpose of calculation of capital fund.

2.2.4. Total Weighted Risk Weighted Exposure:

Total risk weighted exposure stands for the first pillar of the Basel accord which is sum of none other than risk factor (credit, operational and market) faced by the bank in its operation. Thus it has mainly three factors namely

a. Credit risk
b. Operational risk
c. Market risk

a. Credit Risk :

Credit risk is the major risk that banks are exposed to during the normal course of lending and credit underwriting. Within Basel II, there are two approaches for credit risk measurement: the standardized approach and the internal ratings based (IRB) approach. Due to various inherent constraints of the Nepalese banking system, the standardized approach in its simplified form, Simplified Standardized Approach (SSA), has been prescribed in the initial phase. The credit risk faced by the bank can be mitigating by using the provision of risk mitigation which is described blow.

Banks may use a number of techniques to mitigate the risks to which they are exposed. The prime objective of this provision is to encourage the banks to manage credit risk in a prudent and effective manner. As such, credit risks exposures may be collateralized11 in whole or in part

with cash or securities, or a loan exposure may be guaranteed by a third party. Where these various techniques meet the minimum conditions mentioned below, banks which take eligible financial collateral are allowed to reduce their credit exposure to counterparty when calculating their capital requirements to take account of the risk mitigating effect of the collateral. However, credit risk mitigation is allowed only on an account by account basis, even within regulatory retail portfolio. As a general rule, no secured claim should receive a higher capital requirement than an otherwise identical claim on which there is no collateral. Similarly, the effects of the CRM shall not be double counted and capital requirement will be applied to banks on either side of the collateralized transaction: for example, both repos and reverse repos will be subject to capital requirements. Those portions of claims collateralized by the market value of recognized collateral receive the risk weight applicable to the collateral instrument. The remainder of the claim should be assigned the risk weight appropriate to the counter party. Where the same security has been pledged for both the funded and non-funded facilities, banks should clearly demarcate the value of security held for funded and non-funded facility. In cases where the bank has obtained same security for various forms of facilities; banks are eligible to claim the CRM benefit across all such exposures up to the eligible value of CRM.

b. Operational Risk:

Operational risk is the risk of loss resulting from inadequate internal processes, people, and systems, or from external events. Operational risk itself is not a new concept, and well run banks have been addressing it in their internal controls and corporate governance structures. However, applying an explicit regulatory capital charge against operational risk is a relatively new and evolving idea. Basel II requires banks to hold

capital against the risk of unexpected loss that could arise from the failure of operational systems. The most important types of operational risk involve breakdowns in internal controls and corporate governance. Such breakdowns can lead to financial losses through error, fraud, or failure to perform in a timely manner or cause the interests of the bank to be compromised in some other way, for example, by its dealers, lending officers or other staff exceeding their authority or conducting business in an unethical or risky manner. Other aspects of operational risk include major failure of information technology systems or events such as major fires or other disasters**.**

c. Market risk:

Market risk is defined as the risk of losses in on-balance sheet and off-balance sheet positions arising from adverse movements in market prices. The major constituents of market risks are:

a. The risks pertaining to interest rate related instruments;

b. Foreign exchange risk (including gold positions) throughout the bank.

c. The risks pertaining to investment in equities and commodities**.**

2.2.5 Reporting Requirement of Capital Fund

Banks shall, at the end of Ashoj, Poush, Chaitra and Asadh of each fiscal year, prepare the statements of capital fund and other relevant statements as per the enclosed Directives form and submit to the Banking Operation Department and Inspection and Supervision Department of the Bank within 1 (one) month for the end of each quarter.

In respect of FY 2058/59, such statements may be submitted on half-yearly basis. In determining the capital fund, the unedited quarterly net profit (or net

loss) shall be exhibited separately in the balance sheet under Profit and loss Account and such net profit/loss amount may be included for the purpose of calculation of the capital fund.

2.2.6 Time Period for Fulfilling the Shortfall in Capital Fund

In the event of non-fulfillment of capital fund ratio, the shortfall amount shall be fulfilled within next 6 (six) months. Until the fulfillment of such capital fund, banks shall not declare or distribute dividend to its shareholders under section 18 of commercial Bank act, 2031. The shortfall in the capital fund may be rectified.

a. By issuing new shares.
b. By reallocating assets.

2.2.7 Actions for not complying the Directives Relating to Capital Fund

Where any bank does not fulfill the minimum capital fund, within the specified period, any of the following actions may be initiated.

a. Suspension of declaration or distribution of dividend (including bonus share).
b. Suspension of opening new branch.
c. Suspension of access to refinancing facilities of Nepal Rastra Bank.
d. Restriction on lending activities of the bank.
e. Restriction on acceptance of new deposits.
f. Initiation of any other actions by exercising the authority.

2.3 Empirical Review

Keijser and Haas (2001) have summarized, as the Basel Capital Accord of 1988 was an important first milestone in the regulatory treatment of

collateralized transactions. However, the role played by risk mitigating factors in this Accord, such as the use of financial collateral, is still rather limited. The same holds for the European Directives and national regulations derived from the Basel Accord. The use of a wider range of collateral will be allowed in the new Accord and the banks will be able to choose either the comprehensive or the simple approach for the treatment of collateral. Whereas the simple approach resembles the current Basel substitution methodology in its treatment of collateral, the comprehensive approach is more innovative. It assigns a central role to collateral haircuts, which may be used on banks' own internal estimates of collateral volatility. By making a wider range of collateral available for credit risk mitigation and making the calculation of risk-weighted assets more risk-sensitive, the revision of the Basel Accord is intended further to align regulatory capital which banks must hold and their actual economic risk structure.

(Lamsal, M.,2003,1-3) stated that the commercial banks with seven directives issued in two installments asking banks to start complying with the new strictures by mid-July 2001 or face grave consequences. NRB claims that these are based on the internationally accepted banking norms of Basel committee. Lamsal has opined that banks are expected to be disparate to meet the targets of capital adequacy norms since the consequences the banks have to face in case of non-compliance are very strict. And for this purpose they will have to issue additional shares, which is not possible for them in the short-run. Or they do not prefer to go for additional share issue simply because they will also have to pay the same dividend as the past to the holders of shares so issued. This becomes the more difficult as the business is not going to expand commensurately. The difficulty is understandable now when every banker is complaining of the lack of new investment projects.

Pandey, L.P. (2003) stressed that one of the main objectives of a commercial bank is to safeguard the money of depositors. With the low capital adequacy rate, the banks were previously lending from the money of the depositors because the capital comprised a very small portion of the total risk-weighted assets. However, the returns the shareholders or promoters were reaping were quite high. The risk of the depositors was too high. **Pandey**further put forward that a good banking system is, therefore, a sine qua non for maintaining financial equilibrium in the country. And, NRB's efforts in this direction are really praiseworthy.

Stokes (2003) has mentioned that banks hold capital in excess of reserve requirements to provide a buffer against future, unexpected losses. Such losses are brought about by the credit, market, and operational risks inherent in the business of lending money. Problems created by an insolvent bank are important enough that bank regulators enforce minimum capital standards on banks in an effort to safeguard depositors and ensure the ongoing viability of the financial system. However, from a bank's perspective holding idle capital is an expensive safeguard against risk because the bank's shareholders demand a return on their investment and idle capital provides no such return. For this reason bankers and regulators can have divergent options about the amount of capital a banks should hold making the problem of determining a bank's risk-based capital a complex and important question.

Heakal (2003) has written that the central bank has been described as "the lender of the last resort", which means that the central bank is responsible for providing its economy with funds when commercial banks cannot cover a supply shortage. In other words, the central bank prevents the country's banking system from failing. However, the primary goal of central banks is to provide their countries' currencies with price stability by controlling inflation.

A central bank also acts as the regulatory authority of a country's monetary policy and is the sole provide and printer of notes and coins in circulation. Time has proven that the central bank ca best function in these capacities by remaining independent from government fiscal policy and therefore uninfluenced by political concerns of any regime. The central bank should also be completely divested of any commercial banking interests.

(**Khatiwada, Y.R., 2004, I & II)** has further written that Nepal initiated financial sector reform back in 1980s with donor initiative and assistance. In this process, some progress was made in terms of re-capitalization of the government banks, divestment, branch consolidation, introduction of new regulatory and prudential norms and cleaning up the balance sheets of bad loan loaded banks. But the reform process was stalled in the later 1990s due to political instability and the government's priority in areas other than the financial system. In between, the country observed, from very close by, the financial crisis in the neighbouring region. Keeping in mind the financial crisis and its effect in the Asian region, the Nepal Rastra Bank is now focusing its attention on the reform measures in the financial sector as a drive towards new financial architecture. Khatiwada emphasized various reform measures. One of the measures was increasing capital base and revising capital adequacy. Khatiwada stressed that experience has shown that undercapitalized financial institutions are the ones that are first attacked by the speculators and hedgers at the time of crisis and create contagious effect on the other institutions as well. Besides, undercapitalized financial institutions cannot gain credibility and corporate growth even in normal items. This requires that financial institutions are adequately capitalized and possess resilience against attacks by dealers and customers. In this context, the capital adequacy norms are being revised upward as per the Basel Capital Accord. But increasing the capital base for loss making government owned financial institutions is not easy without involving private sector in the equity capital.

Shah, P.B. (2005) concluded that being the central bank of the nation, Nepal Rastra Bank has to be active by playing important role for monetary and financial stability. Central bank should always be eager to achieve the public faith towards bank and financial institutions enabling them being disciplined, well organized, healthy and competent by providing effective regulation and supervision to appropriate utilization and mobilization of financial resources by increasing financial saving rate by raising financial stability. Also, central bank should always be willing to safeguard the interest of depositors and investors to accomplish the financial stability. Constant financial stability leads to the accomplishment of monetary stability. As the tools for monetary policy are applied through financial sector, the efficiency of monetary policy depends on effectiveness of financial sector. Balanced growth of financial sector helps monetizing of economy. Various drawbacks; like, managerial ineffectiveness, organizational difficulty, contrary financial situation; make the long-term stability of financial sector suspicious. Failure of any one financial institution leads the destructive impact to whole financial sector and such impact will be spread to other countries from the countries where capital accounts are fully convertible. So, the concept of financial system of the country should be boosting and healthy for achieving higher economic growth by steadying macroeconomic stability has been globally supported. The financial sector reform program in Nepal can also be taken in the same background. Since, it is not possible to achieve financial stability without the commanding role of regulation and supervision, new program of financial sector reform program should play role regarding structural reformation / transformation and organizational structure in existing banks and financial institutions by clarifying the role of government and central bank.

Khatiwada, N.K. (2005) enlightened that recent financial crisis have revealed a number of data deficiencies, notably in pledged assets, deposits held in financially weak domestic banks and their foreign affiliates, valuation practices

leading to bank valuation of assets being significantly different from market values and complicating assessments of the realizable value of reserve assets. Similarly, public information is lacking in many countries on the off-balance-sheet activities of the authorities that can affect foreign currency resources. There was a lack of information on the authorities' financial derivatives activities. Also was observed that inadequate information of actual and potential foreign liabilities of the monetary authorities and central government. Financial sector reform envisages for measures for mitigating this information and data gap problem as well.

2.3.1 Review of Thesis Works

Shrestha, Manoj (2003), in his study, *"Capital Adequacy and Its Significance to Commercial Banks"*, has the main objectives of the study are to review directives of NRB regarding capital adequacy related to commercial banks. The specific objectives of this study are;

a) To examine the capital adequacy of Bank of Kathmandu and Himalayan Bank

   Ltd;

b) To examine the relation of capital fund to the other stakes of bank
c) To analyze the steps taken by commercial banks to fulfill the requirements as per
   these norms; and
d) To make necessary suggestions and recommendations

The major findings of the study were;

Capital fund of BOK is less than that of HBL. over the study period, capital fund of HBL seems to be consistently growing whereas capital fund of BOKdoes not seem to be growing consistently.It is found that both the banks are quite successful in maintaining capital adequacy as prescribed by NRB. The capital to deposit ratios of BOK and HBL have beenfound unsatisfactory.The

correlation coefficients between capital and deposit and correlation coefficients between capital and credit of both the banks showed thatthey are correlated. It is observed that both the banks have been complying with the requirement of the capital adequacy norms of NRB. Both the banks have been increasing their capital funds to meet the capital adequacy requirement.It has been found that majority of the depositor's deposit their money in a bank for security of their money. But they are not seemed to be aware of the capital fund of the commercial bank where they are depositing their money.

Lamsal (2006), in his study, *"Capital Adequacy and Its Significance to Commercial Banks"*, has the main objectives of the study are to review directives of NRB regarding capital adequacy related to commercial banks. The specific objectives of this study are;

a. To analyse the implementation status of the directives given by NRB.
b. To evaluate capital adequacy of the commercial banks (SCBNL, NABIL, NIBL, EBL, HBL, NICBL, LBL and KBL).
c. To examine the efficiency and weakness (drawbacks) of capital adequacy ratio.

The major findings of the study are;

a. Among these eight banks, SCBNL, HBL, NICBL, LBL, and KBL have shortfall of supplementary capital in accordance with the NRB requirement.
b. In case of capital adequacy ratio it is seen that NIBL, HBL, LBL and KBL has not meet the standard of 12% directed by NRB.
c. All of these banks make its Internal Audit and Inspection Department stronger so that the directives are properly implemented keeping into mind that the violation of rules of directives have chances to pay penalties which may lead to unfavorable consequences.

d. Among the analyzed banks 50 % of the banks have not been able to meet its capital adequacy ratio, so NRB needs to be practical while issuing these directives, NRB must not make the rules taking into mind only the International standard but to combat these problems the directives must be issued after being proper research and consultation with different banking experts.

Kutal (2007), has conducted as study on, *"CAMEL Study on Joint Venture Banks with Special Reference to SCBL, NABIL and HBL."* The main objective of this study was to find out the comparative details and evaluation of performance of Standard Chartered Bank Nepal Limited (SCBL), Nepal Arab Bank Limited (NABIL) and Himalayan Bank Limited (HBL).

The major findings of the study were;

a. All bank's capital adequacy is in decreasing trend. SCB has higher stakes on earning but seems more conservative in lending to avoid NPL hassles.
b. The employee's job satisfaction reflects efficiency in servicing, which was found very well in average for each bank. Despite of aggressive credit policy, non-performing loan of HBL is increasing which is very risky sign. HBL has highest loan amount than SCBL and NABIL but lowest percentage loan loss provision. HBL should put either extra effort to decrease NPL or increase LLP further.
c. SCB and NABIL despite of meeting CRR statutory requirement on weekly basis also should maintain minimum 5% CRR on balance sheet date. HBL cash and bank balance is highest despite of high volume of lending which means there's still lot of fund lying idle. NABIL's investment chunk in government securities has gone down substantially which clearly indicates more risky lending preferences.

Malla (2008), has conducted a study on, *"Financial Performance Analysis of Annapurna Finance Company Limited in the Framework of CAMEL."* The main objective of the study was to analyze the financial performance of Annapurna Finance Company Limited (AFCL) in the framework of CAMEL from the F.Y. 2002/03 to the F.Y. 2006/07. The study was based on secondary data covering the period of five years. She used various financial and statistical tools to get the meaningful result and to meet the research objective.

The major findings of the study were;

a. The capital fund of AFCL is sound and sufficient to meet the financial operation as per the NRB standard.
b. The non-performing loan ratios are below the international standard and in fluctuating trend. The loan loss ratios are also fluctuating but in increasing trend during the study period.
c. The management proxy ratio total expense to total income ratios are also in fluctuating trend due to changes in taxation rate and increase in provision for possible losses. Another management proxy ratio earning per employee is in increasing trend.
d. The earning quality ratios are generally in fluctuating and decreasing trend except the net interest margin which is in increasing trend.
e. The overall liquidity position of AFCL is in good condition.

2.4 Research Gap

Most of the researchers study concentration of NRB directives relating to its purpose and impact to the financial institutions by generalizing it. Few of them have done specific enquires about capital adequacy norms. Whoever has done the research work has been outdated since NRB has updated its directive

regarding Capital Adequacy Ratio. This study is conducted to make a specific review of capital adequacy norms with a special reference to some of sound performing Commercial Banks. In addition to that, the study has been able to incorporate the views of the depositors regarding the safety of their deposits and other factors relating to the deposit with the help of appropriate questionnaires. The study certainly gives clear picture of the compliance of the capital adequacy norms by Commercial Banks and its impact on the banks with reference to the analytical study of Capital Fund, Deposit, Return on Equity and Risk weighted Assets.

The research gaps more precisely are

1. Past Research doesn't comply with Basel II. Past research is mostly done taking regard to Basel I accord.
2. Past Research doesn't take regard into the first pillar (the risk exposure faced by bank viz: Credit, Operation & Market Risk) of Basel II completely.

CHAPTER-III

RESEARCH METHODOLOGY

Research methodology may be defined as "a systematic process that is adapted by the researcher in studying problem with certain objective in view". In other words, research methodology describes the methods and process applied in the entire aspect of the study focus of data, data gathering instrument and procedure, tabulation and processing and methods of analysis. Hence this chapter looks into the research design, nature and source of data, method of data collection and techniques that will be used to finalize the study (Wolff and Pant, 2000).

Research Methodology can be understood as a science of studying how research has been done i.e. what kinds of tools to be used while preparing it. This chapter looks into the Research Design, Nature and Sources of Data, Data Collection Procedure and Tools and Technique of Analysis. For the purpose of achieving the objectives of the study, the applied methodologies are used. The research methodology used in the present study is briefly mentioned below.

3.1 Research Design

"Research Design is plan structure and strategy investigation conceived so as to obtain answer of research question and to control variance**"** (Kerlinger).

This is a descriptive as well as exploratory type of research; it aims at gaining familiarity with the problematic phenomena under this study the research problems will be formulated precisely. To conduct the study various literatures will be reviewed.

3.2 Population and Sample of Data

The term population of data denotes the data of each organization, which is within the boundary of specific industry whereas sample data are of those organizations, which have been selected from that whole population in a few numbers. There are various commercial banks operating at present in Nepal. Among all, this study comprises five commercial banks namely: Everest bank ltd., Himalayan Bank Ltd., Nabil Bank Ltd., Nepal Investment Bank Ltd, and Bank of Kathmandu have been selected as sample for this study from entire population.

3.3 Sources of Data

This research study is basically based on secondary data. The required data for the study will be collected in followings ways:

- Library research study.
- Internet, home pages and related links visit.
- Directives of NRB.
- Publication, annual report, reports and reviews from NRB reports.
- Annual reports of the commercial banks with special reference taken as sample.
- The other sources will be articles, previous study on related topic, text books, published articles of different authors and journals.

3.4 Data Presentation and Analysis

As mentioned earlier the study is based on secondary data. The required data should be manipulated according to need. The collected data from various source might not be in the readymade format, therefore, they should be classified and presented them in a tabular form in such a way that they will represent some quantitative as well as qualitative results. The tools used for the presentation of data are:

3.4.1 Financial tools

Different types of tools are used whenever necessary in this study. Financial tools used are:

Capital adequacy ratio

To protect the banks from bankruptcy, commercial banks should maintain capital adequacy ratio (CAR). CAR is the relationship between shareholders fund to total risk weighted exposures (TRWE) of the banks.

$$Capital\ Adequacy\ Ratio = \frac{Total\ Capital\ Fund}{Total\ Risk\ Weighted\ Exposure} \times 100$$

Total capital fund: Core Capital + Supplementary Capital

3.4.2 Analytical Tools Used

A. Mean: Mean is the sum of all the observations divided by the number of observations. The arithmetic mean is also known as the Average. It is denoted by μ or Symbolically, μ or $\overline{X} = \frac{\sum X}{n}$

Where,

μ= the population mean of variable "X"

ΣX= Sum of all the observed value of "X" variable

n= the total number of observations.

B. Percentages: Percentage is the rate, number or amount in each hundreds. One of the most useful features of the percentage is that it can reduce everything to a common base and thereby allow meaningful comparisons to be made.

C. Correlation Coefficient: The correlation coefficient is defined as the degree of linear relationship existing between two or more variables. Two variables is said to be correlated when the change in the value of one variable is accompanied by the change of another variable. The Formula for the calculation is as follow;

$$r_{12} = \frac{\sum x_1 x_2}{\sqrt{\sum (x_1)^2 \sqrt{\sum (x_2)^2}}}$$

Where, $x_1=X_1-\sum X_1/n$, $x_2=X_2-\sum X_2/n$

D. Multiple Regression Analysis: In simple regression analysis, we study the linear relationship between only two variables, one independent and the other dependent variable and based upon this relationship, we could predict the value of dependent variable for a given value of independent variable. But in real life, so many independent variables do affect the dependent variable. Thus multiple regression analysis consists of the measurement of the relationship between the dependent variable and two or more independent variables. The procedure is similar to that for simple regression, with a difference that other independent variables are added to the regression equation.

The multiple regression equation of X_1 on X_2 and X_3 (using deviation from actual mean) is

$$x_1=b_1x_2+b_2x_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(i)}$$

Where,

$x_1=X_1-\bar{X}_1$

$x_2=X_2-\bar{X}_2$

$x_3=X_3-\bar{X}_3$

The values of regression parameters b_1 and b_2 are determined by solving the following two normal equations.

$\sum x_1x_2=b_1\sum x_2^2+b_2\sum x_2x_3$……(ii)
$\sum x_1x_3=b1\sum x_2x_3+b2\sum x_3^2$ …… (iii)

E. Analysis of Variance (ANOVA): If the number of populations is three or more, our earlier test viz, t-test (for small samples) will be quite tedious .The analysis of variance is a statistical technique used to test whether the different between the means of three or more population is significant or not. Our testing procedure is to find out differences among the sample means which is done by investigating variances. As the procedure focuses on analysis of variance, we call it Analysis of Variance.

$$\textbf{F statistic} = \frac{\textbf{Variance between samples}}{\textbf{Variance within samples}}$$

CHAPTER-IV

DATA PRESENTATION AND ANALYSIS

This chapter deals with the presentation, analysis and interpretation of relevant data and information of Bank taken as special references. To obtain best result, the data and information have been analyzed according to the research methodology as mentioned in Chapter 3.

The main purpose of analyzing the data is to change it from an unprocessed form to an understandable presentation.The analysis of data consists of organizing, tabulating and performing statistical analysis. The chapter devotes to show the various risks associated with assets of commercial banks, their composition required capital for required capital for each types of risks and comparison of capital adequacy with one other. In order to highlight the formulated objectives related data have been collected from different sources and demonstrated by the use of different tools and techniques. As per the Unified directives of NRB, the bank has to keep minimum 6% of the risk weighted assets as core capital (Tier 1) and 4% of supplementary capital (Tier 2). The total capital and total risk weighted assets maintained by EBL,HBL,NABIL,NIBL and BOK within this Fiscal year 2068/2069 period is presented in the below Table.

4.1 Calculation of total capital fund and total risk weighted assets of various banks as at year end 2069

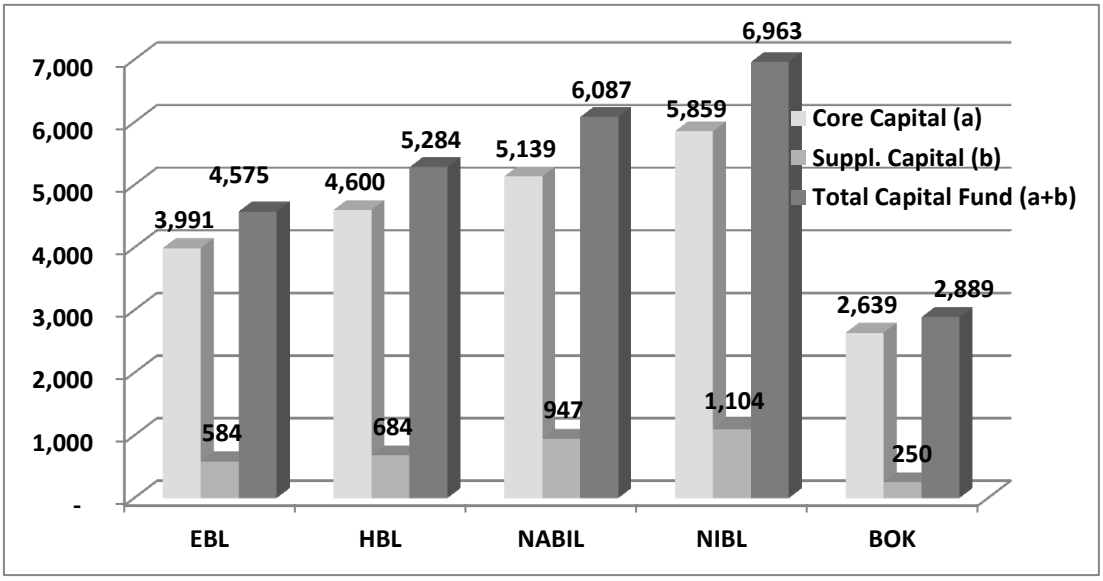
Table 4.1 ("Rs in Million")

Bank	Core Capital (a)	Supplementary Capital (b)	Total Capital Fund (a+b)	Market Risk (c)	Credit Risk (d)	Operational Risk (e)	Adjustment under Pillar II (f)	TRWE (c+d+e+f)
EBL	3,991	584	4,575	86	37,793	2,833	814	41,525
HBL	4,600	684	5,284	25	4,258	350	160	4,793
NABIL	5,139	947	6,087	8	5,002	409	108	5,527
NIBL	5,859	1,104	6,963	590	55,874	3,861	2,379	62,704
BOK	2,639	250	2,889	8	2,351	200	51	2,610

Source: Annual Report, 2011/2012

Figure 4.1

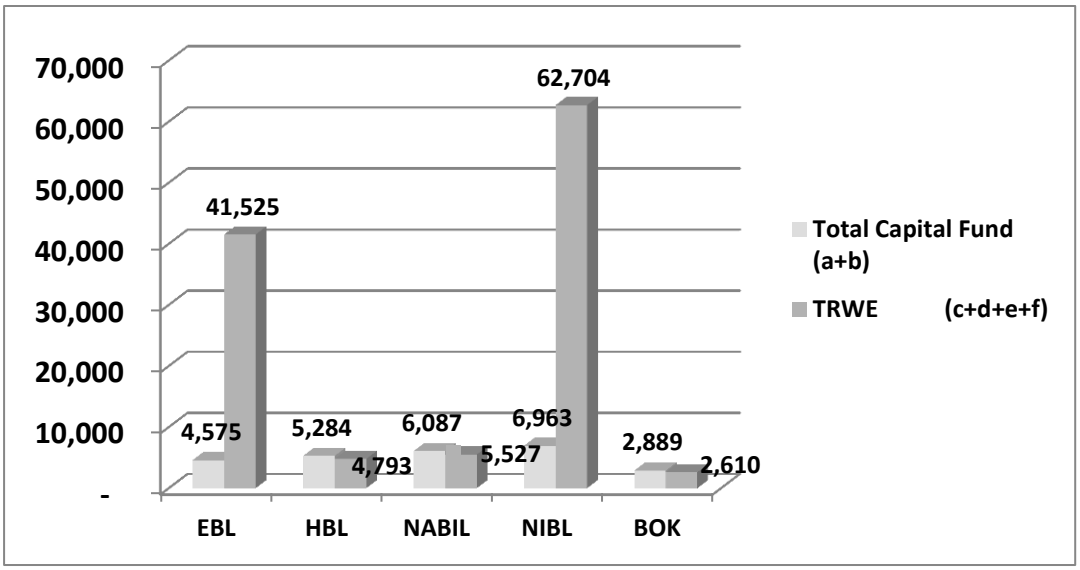
Graphical Representation of Total Capital Fund and its Elements of Various Banks



Source: Annual Report, 2011/2012

Figure 4.2

Graphical representation of comparison of Total capital Fund with Total Risk Exposure of Various Banks



4.2 Provision for Required Capital Adequacy Ratio to be maintained On the basis of Weighted Risk Assets in several years.

Table 4.2

	2061/62	2062/63	2064/65	2065/66	2066/67	2067To69
Core Capital	5.50%	6.00%	5.50%	6.00%	6.00%	6.00%
Supplementary Capital	5.50%	6.00%	5.50%	4.00%	4.00%	4.00%
Total Capital Fund	11.00%	12.00%	11.00%	10.00%	10.00%	10.00%

Source : NRB

4.3 CALCULATION OF CAPITAL ADEQUACY OF EBL, HBL, NABIL, NIBL and BOK

Calculation of Capital Adequacy of EBL with respect to present directives as at Ashad end 2069

Table 4.3

Everest Bank Limited

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		41,525,347	
Core Capital	2,491,521	3,990,924	1,499,403
Supplementary Capital	1,661,014	583,827	-1,077,187
Total Capital Fund	4,152,535	4,574,751	422,216
Capital Adequacy ratio	10.00%	11.02%	1.02%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	9.61%	3.61%
Capital Adequacy w.r.t to Supplementary Capital	4.00%	1.41%	-2.59%

Calculation of Capital Adequacy of EBL with respect to previous directives as at Ashad end 2065

Table 4.4

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		34583547	
Core Capital	1902095.08	2927168	1025072.92
Supplementary Capital	1902095.08	678673	-1223422.08
Total Capital Fund	3804190.16	3605841	-198349.16
Capital Adequacy ratio	11%	10.43%	-0.57%
Capital Adequacy ratio w.r.t to Core Capital	5.50%	8.46%	2.96%
Capital Adequacy w.r.t to Supplementary Capital	5.50%	1.97%	-3.53%

Calculation of Capital Adequacy of EBL with respect to previous directives as at Ashad end 2063

Table 4.5

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		34583547	
Core Capital	2075012.82	2927168	852155.18
Supplementary Capital	2075012.82	678673	-1396399.82
Total Capital Fund	4150025.64	3605841	-544184.64
Capital Adequacy ratio	12.00%	10.43%	-1.57%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	8.46%	2.46%
Capital Adequacy w.r.t to Supplementary Capital	6.00%	1.97%	-4.03%

In order to see the impact of the directives on the various aspects of the bank, the same data as at Ashad end 2069 has been used. The previous provisions of the directives have been applied first and then the new provisions have been applied to see the changes that occur in the outcomes. The previous benchmark as of FY 2062/63 for capital adequacy was 12 % of the total risk weighted exposure with 6% each for core capital and supplementary capital. EBL has a capital adequacy of 10.43 % of the Total Risk Weighted Exposure contributed 8.46 % of it by core capital and 1.97 % by the supplementary. It should be noted that the shortfall in the supplementary capital can be compensated by the use of the excess amount of core capital; however, a shortfall in the core capital cannot be compensated by the excess amount of supplementary capital. Therefore, as per the calculations, EBL has shortfall of 1.57% of the Total Risk weighted Exposure, on the total capital fund ratio with an excess of 2.46% on core capital and shortfall of 4.03% on the supplementary capital. But as per new directive, all the commercial banks are required to maintain a new capital adequacy ratio of 11% for FY 2064/65 contributed by 5.50 % each by both

core and supplementary capital. Hence, the EBL has shortfall of 0.57% of the Total Risk Weighted Exposure, on the total capital fund ratio with an excess of 2.96% on core capital and shortfall of 3.53 % on the supplementary capital. Again regarding the current provision (FY 2068/69) for Capital adequacy ratio i.e. 10% with contribution of core capital 6% and supplementary capital 4% of the Total risk weighted exposure; EBL is above the required level of capital adequacy with a net additional capital of 1.02% with an excess of 3.61% on core capital and shortfall of 2.59% on supplementary capital. The Bank fails to fulfill the provision regarding supplementary capital ratio.

Calculation of Capital Adequacy of HBL with respect to previous directives as at Ashad end 2069.

Table 4.6

HBL

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		4,793,489	
Core Capital	287,609	460,014	172,405
Supplementary Capital	191,740	68,375	-123,365
Total Capital Fund	479,349	528,389	49,040
Capital Adequacy ratio	10.00%	11.02%	1.02%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	9.60%	3.60%
Capital Adequacy w.r.t to Supplementary Capital	4.00%	1.43%	-2.57%

Calculation of Capital Adequacy of HBL with respect to previous directives as at Ashad end 2065

Table 4.7

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		44124520	
Core Capital	2426848.6	3916970	1490121.4
Supplementary Capital	2426848.6	794272	-1632576.6
Total Capital Fund	4853697.2	4711242	-142455.2
Capital Adequacy ratio	11.00%	10.68%	-0.32%
Capital Adequacy ratio w.r.t to Core Capital	5.50%	8.88%	3.38%
Capital Adequacy w.r.t to Supplementary Capital	5.50%	1.80%	-3.70%

Calculation of Capital Adequacy of HBL with respect to previous directives as at Ashad end 2063

Table 4.8

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		44124520.00	
Core Capital	2647471.20	3916970.00	1269498.80
Supplementary Capital	2647471.20	794272.00	(1853199.20)
Total Capital Fund	5294942.40	4711242.00	(583700.40)
Capital Adequacy ratio	12.00%	10.68%	-1.32%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	8.88%	2.88%
Capital Adequacy w.r.t to Supplementary Capital	6.00%	1.80%	-4.20%

The previous benchmark as of FY 2062/63 for capital adequacy was 12 % of the total risk weighted exposure with 6% each for core capital and supplementary capital. HBL has a capital adequacy of 10.68 % of the Total Risk Weighted Exposure contributed 8.88 % of it by core capital and 1.80 % by the supplementary. It should be noted that the shortfall in the supplementary capital can be compensated by the use of the excess amount of core capital; however, a shortfall in the core capital cannot be compensated by the excess amount of supplementary capital. Therefore, as per the calculations, HBL has shortfall of 1.32% of the Total Risk weighted Exposure, on the total capital fund ratio with an excess of 2.88% on core capital and shortfall of 4.20% on the supplementary capital. But as per new directive, all the commercial banks are required to maintain a new capital adequacy ratio of 11% for FY 2064/65 contributed by 5.50 % each by both core and supplementary capital. Hens, the HBL has shortfall of 0.32% of the Total Risk Weighted Exposure, on the total capital fund ratio with an excess of 3.38% on core capital and shortfall of 3.70 % on the supplementary capital. Again regarding the current provision (FY 2068/69) for Capital adequacy ratio i.e. 10% with contribution of core capital 6% and supplementary capital 4% of the Total risk weighted exposure; HBL is above the required level of capital adequacy with a net additional capital of 1.02% with an excess of 3.60% on core capital and shortfall of 2.57% on supplementary capital. The Bank fails to fulfill the provision regarding supplementary capital ratio.

Calculation of Capital Adequacy of NABIL with respect to previous directives as at Ashad end 2069

Table 4.9

NABIL

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		55,273,316	
Core Capital	3,316,399	5,139,280	1,822,881
Supplementary Capital	2,210,933	947,460	-1,263,473
Total Capital Fund	5,527,332	6,086,740	559,408
Capital Adequacy ratio	10.00%	11.01%	1.01%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	9.30%	3.30%
Capital Adequacy w.r.t to Supplementary Capital	4.00%	1.71%	-2.29%

Calculation of Capital Adequacy of NABIL with respect to previous directives as at Ashad end 2065

Table 4.10

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		48884968.00	
Core Capital	2688673.24	4318698.00	1630024.76
Supplementary Capital	2688673.24	854701.00	(1833972.24)
Total Capital Fund	5377346.48	5173399.00	(203947.48)
Capital Adequacy ratio	11.00%	10.58%	-0.42%
Capital Adequacy ratio w.r.t to Core Capital	5.50%	8.83%	3.33%
Capital Adequacy w.r.t to Supplementary Capital	5.50%	1.75%	-3.75%

Calculation of Capital Adequacy of NABIL with respect to previous directives as at Ashad end 2063.

Table 4.11

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		48884968.00	
Core Capital	2933098.08	4318698.00	1385599.92
Supplementary Capital	2933098.08	854701.00	(2078397.08)
Total Capital Fund	5866196.16	5173399.00	(692797.16)
Capital Adequacy ratio	12.00%	10.58%	-1.42%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	8.83%	2.83%
Capital Adequacy w.r.t to Supplementary Capital	6.00%	1.75%	-4.25%

The previous benchmark as of FY 2062/63 for capital adequacy was 12 % of the total risk weighted exposure with 6% each for core capital and supplementary capital. NABIL has a capital adequacy of 10.58 % of the Total Risk Weighted Exposure contributed 8.83 % of it by core capital and 1.75 % by the supplementary. It should be noted that the shortfall in the supplementary capital can be compensated by the use of the excess amount of core capital; however, a shortfall in the core capital cannot be compensated by the excess amount of supplementary capital. Therefore, as per the calculations, NABIL has shortfall of 1.42% of the Total Risk weighted Exposure, on the total capital fund ratio with an excess of 2.83% on core capital and shortfall of 4.25% on the supplementary capital. But as per new directive, all the commercial banks are required to maintain a new capital adequacy ratio of 11% for FY 2064/65 contributed by 5.50 % each by both core and supplementary capital. Hens, the NABIL has shortfall of 0.42% of the Total Risk Weighted Exposure, on the

total capital fund ratio with an excess of 3.33% on core capital and shortfall of 3.75 % on the supplementary capital. Again regarding the current provision (FY 2068/69) for Capital adequacy ratio i.e. 10% with contribution of core capital 6% and supplementary capital 4% of the Total risk weighted exposure; NABIL is above the required level of capital adequacy with a net additional capital of 1.01% with an excess of 3.30% on core capital and shortfall of 2.29% on supplementary capital. The bank fails to fulfill the provision regarding supplementary capital ratio.

Calculation of Capital Adequacy of NIBL with respect to previous directives as at Ashad end 2069

Table 4.12

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		62,704,174	
Core Capital	3,762,250	5,858,857	2,096,607
Supplementary Capital	2,508,167	1,104,325	(1,403,842)
Total Capital Fund	6,270,417	6,963,182	692,765
Capital Adequacy ratio	10.00%	11.10%	1.10%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	9.34%	3.34%
Capital Adequacy w.r.t to Supplementary Capital	4.00%	1.76%	-2.24%

Calculation of Capital Adequacy of NIBL with respect to previous directives as at Ashad end 2065

Table 4.13

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		57993926.00	
Core Capital	3189665.93	5083617.00	1893951.07
Supplementary Capital	3189665.93	1241010.00	(1948655.93)
Total Capital Fund	6379331.86	6324627.00	(54704.86)
Capital Adequacy ratio	11.00%	10.91%	-0.09%
Capital Adequacy ratio w.r.t to Core Capital	5.50%	8.77%	3.27%
Capital Adequacy w.r.t to Supplementary Capital	5.50%	2.14%	-3.36%

Calculation of Capital Adequacy of NIBL with respect to previous directives as at Ashad end 2063

Table 4.14

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		57993926.00	
Core Capital	3479635.56	5083617.00	1603981.44
Supplementary Capital	3479635.56	1241010.00	(2238625.56)
Total Capital Fund	6959271.12	6324627.00	(634644.12)
Capital Adequacy ratio	12.00%	10.91%	-1.09%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	8.77%	2.77%
Capital Adequacy w.r.t to Supplementary Capital	6.00%	2.14%	-3.86%

The previous benchmark as of FY 2062/63 for capital adequacy was 12 % of the total risk weighted exposure with 6% each for core capital and supplementary capital. NIBL has a capital adequacy of 10.91 % of the Total Risk Weighted Exposure contributed 8.77 % of it by core capital and 2.14 % by the supplementary. It should be noted that the shortfall in the supplementary capital can be compensated by the use of the excess amount of core capital; however, a shortfall in the core capital cannot be compensated by the excess amount of supplementary capital. Therefore, as per the calculations, NIBL has shortfall of 1.09% of the Total Risk weighted Exposure, on the total capital fund ratio with an excess of 2.77% on core capital and shortfall of 3.86% on the supplementary capital. But as per new directive, all the commercial banks are required to maintain a new capital adequacy ratio of 11% for FY 2064/65 contributed by 5.50 % each by both core and supplementary capital. Hence, the NIBL has shortfall of 0.09% of the Total Risk Weighted Exposure, on the total capital fund ratio with an excess of 3.27% on core capital and shortfall of 3.36 % on the supplementary capital. Again regarding the current provision (FY 2068/69) for Capital adequacy ratio i.e. 10% with contribution of core capital 6% and supplementary capital 4% of the Total risk weighted exposure; NIBL is above the required level of capital adequacy with a net additional capital of 1.10% with an excess of 3.34% on core capital and shortfall of 2.24% on supplementary capital. The Bank fails to fulfill the provision regarding supplementary capital ratio.

Calculation of Capital Adequacy of BOK with respect to previous directives as at Ashad end 2069

Table 4.15

BOK

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		26,095,913	
Core Capital	1,565,755	2,639,371	1,073,616
Supplementary Capital	1,043,837	250,257	(793,580)
Total Capital Fund	2,609,591	2,889,628	280,037
Capital Adequacy ratio	10.00%	11.07%	1.07%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	10.11%	4.11%
Capital Adequacy w.r.t to Supplementary Capital	4.00%	0.96%	-3.04%

Calculation of Capital Adequacy of BOK with respect to previous directives as at Ashad end 2065

Table 4.16

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		22918299.00	
Core Capital	1260506.45	2377729.00	1117222.55
Supplementary Capital	1260506.45	284340.00	(976166.45)
Total Capital Fund	2521012.90	2662069.00	141056.10
Capital Adequacy ratio	11.00%	11.62%	0.62%
Capital Adequacy ratio w.r.t to Core Capital	5.50%	10.37%	4.87%
Capital Adequacy w.r.t to Supplementary Capital	5.50%	1.25%	-4.25%

Table 4.17

Particular	As per directives	Actual Figure	Surplus (Shortfall)
TRWE		22918299.00	
Core Capital	1375097.94	2377729.00	1002631.06
Supplementary Capital	1375097.94	284340.00	(1090757.94)
Total Capital Fund	2750195.88	2662069.00	(88126.88)
Capital Adequacy ratio	12.00%	11.62%	-0.38%
Capital Adequacy ratio w.r.t to Core Capital	6.00%	10.37%	4.37%
Capital Adequacy w.r.t to Supplementary Capital	6.00%	1.25%	-4.75%

The previous benchmark as of FY 2062/63 for capital adequacy was 12 % of the total risk weighted exposure with 6% each for core capital and supplementary capital. BOK has a capital adequacy of 11.62 % of the Total Risk Weighted Exposure contributed 10.37 % of it by core capital and 1.25 % by the supplementary. It should be noted that the shortfall in the supplementary capital can be compensated by the use of the excess amount of core capital; however, a shortfall in the core capital cannot be compensated by the excess amount of supplementary capital. Therefore, as per the calculations, BOK has shortfall of 0.38% of the Total Risk weighted Exposure, on the total capital fund ratio with an excess of 4.37% on core capital and shortfall of 4.75% on the supplementary capital. But as per new directive, all the commercial banks are required to maintain a new capital adequacy ratio of 11% for FY 2064/65 contributed by 5.50 % each by both core and supplementary capital. Hence, the BOK has excess of 0.62% of the Total Risk Weighted Exposure, on the total capital fund ratio with an excess of 4.87% on core capital and shortfall of 4.25 % on the supplementary capital. Again regarding the current provision (FY

2068/69) for Capital adequacy ratio i.e. 10% with contribution of core capital 6% and supplementary capital 4% of the Total risk weighted exposure; BOK is above the required level of capital adequacy with a net additional capital of 1.07% with an excess of 4.11% on core capital and shortfall of 3.04% on supplementary capital. The Bank fails to fulfill the provision regarding supplementary capital ratio.

4.4 Comparative Study of Capital Adequacy of banks

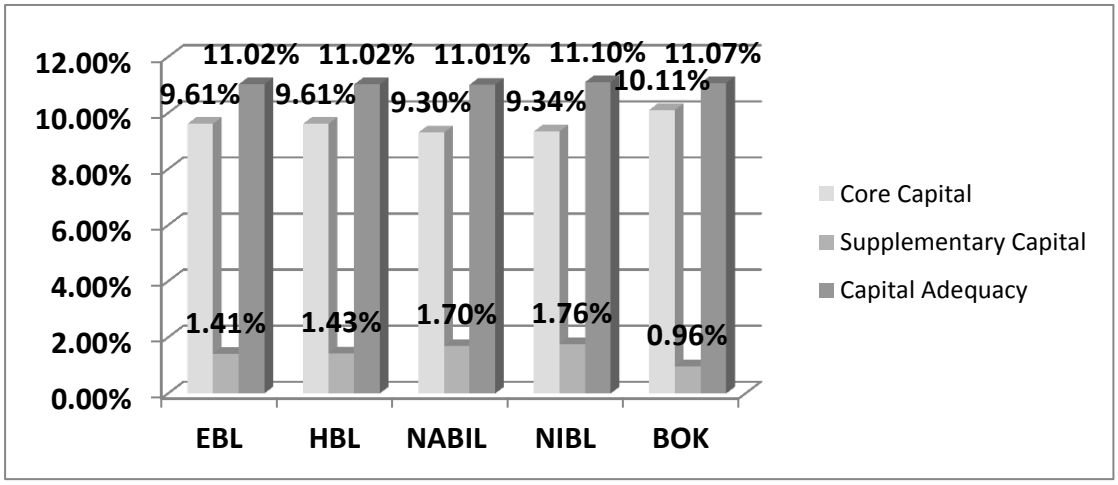
4.4.1 Comparative analysis in terms of surplus/shortfall of Capital Adequacy as per the Present directives

Table 4.18

BANK	EBL	HBL	NABIL	NIBL	BOK
Core Capital	9.61%	9.61%	9.30%	9.34%	10.11%
Supplementary Capital	1.41%	1.43%	1.7%	1.76%	0.96%
Capital Adequacy	11.02%	11.02%	11.01%	11.10%	11.07%

Source: Annual Report ,2068/69

Figure 4.3



It shows that none of the banks have been able to meet the mandatory requirement of supplementary capital of 4% as per the NRB directives. On the other hand the entire above bank exceeds the mandatory requirement of core capital of 6% as per the present NRB directives. The supplementary capital of EBL and BOK are the least as compare to NABIL and NIBL, whereas in terms of core capital they are just the opposite. On, the overall capital adequacy ratio the above findings reveals that every bank taken as sample have met the standards of NRB directives.

Similarly, if we compare the same actual capital adequacy ratio with the previous NRB directive then the scenario will be different. According to the previous NRB directives (F.Y. 2062/63), the standard requirement for capital adequacy was 12% of TRWE with 6% each for core capital and supplementary capital. None of the above banks meet the capital adequacy requirement. Again with respect to the NRB directives (F.Y. 2064/65), the standard requirement for capital adequacy was 11% of TRWE, on which only BOK meet the capital adequacy requirement. On the other hand, in terms of capital adequacy ratio the entire above banks meet the requirement of 10% set by NRB (F.Y. 2068/69).

4.5 Deposit Collection Trend of Various Banks

Deposit Collection Trend of EBL and National Total of Five Years from FY 2064/65 - 2068/69.

Table 4.19 **(in millions)**

Fiscal year	National Total	Bank Total	Share of Bank
2064/2065	426080	23976	5.63%
2065/2066	563604	33323	5.91%
2066/2067	630881	36932	5.85%
2067/2068	687588	41128	5.98%
2068/2069	867862	50006	5.72%

Source: *EBL annual report 2064/65 – 2068/69, NRB*

Deposit Collection Trend of HBL and National Total of Five Years from FY 2064/65 - 2068/69

Table 4.20(in millions)

Fiscal year	National Total	Bank Total	Share of Bank
2064/2065	426080	31843	7.47%
2065/2066	563604	34682	6.15%
2066/2067	630881	37611	5.96%
2067/2068	687588	40921	5.95%
2068/2069	867862	47730	5.50%

Source: *HBL annual report 2064/65– 2068/69, NRB*

Deposit Collection Trend of NABIL and National Total of Five Years from FY 2064/65 - 2068/69

Table 4.21 (in millions)

Fiscal year	National Total	Bank Total	Share of Bank
2064/2065	426080	31915	7.49%
2065/2066	563604	37348	6.63%
2066/2067	630881	46411	7.36%
2067/2068	687588	49696	7.23%
2068/2069	867862	55023	6.34%

Source: *NABIL annual report 2064/65– 2068/69, NRB*

Deposit Collection Trend of NIBL and National Total of Five Years from FY 2064/65- 2068/69

Table 4.22 (in millions)

Fiscal year	National Total	Bank Total	Share of Bank
2064/2065	426080	34452	8.08%
2065/2066	563604	46698	8.29%
2066/2067	630881	50094	7.94%
2067/2068	687588	50138	7.29%
2067/2069	867862	57010	6.57%

Source: *NIBL annual report 2064/65– 2068/69, NRB*

Deposit Collection Trend of BOK and National Total of Five Years from FY 2064/65 - 2068/69

Table 4.23

(in millions)

Fiscal year	National Total	Bank Total	Share of Bank
2064/2065	426080	15833	3.72%
2065/2066	563604	18084	3.21%
2066/2067	630881	20316	3.22%
2067/2068	687588	21018	3.06%
2068/2069	867862	24991	2.88%

Source: *BOK annual report 2064/65– 2068/69, NRB*

4.6 Statistical Analysis (Correlation Co-efficient)

Statistical Analysis is carried out for better understanding of the collected data and information. The result of the statistical analysis is enumerated in the following section.

Correlation Co-efficient

To test the relationship between different variables and capital, the correlation coefficients have been calculated by using Karl Pearson's correlation co-efficient. A detail calculation has been illustrated in Annex.

4.6.1 Correlation co-efficient between Deposit trend and Capital Adequacy

Table 4.24

Bank	Correlation Between	Values
EBL	Capital & Deposit	0.97
HBL	Capital & Deposit	0.98
NABIL	Capital & Deposit	0.96
NIBL	Capital & Deposit	0.97
BOK	Capital & Deposit	0.97

Source: *Annex2*

The calculated correlation co-efficient between Deposit & Capital are positive. Therefore, it can be said that Deposit components of a bank are positively correlated with the Bank's Capital Fund. Here, we can see that all co-efficient are near to 1 which indicates that the correlations seem to be nearly perfectly positive for most of the Banks (For calculation step see ANNEX 2). We can say that the increase in capital causes the increase in deposit.

4.6.2 Correlation co-efficient between Return on Equity and Capital Adequacy

The calculated correlation co-efficient between ROE & Capital is positive (0.67), (See ANNEX 3) Therefore, it can be said that profitability of a bank is positively correlated with the Bank's Capital Fund. Here, we can see that co-efficient is near to 1 which indicates that the correlations seem to be nearly perfectly positive for the Bank. We can say that the increase in profitability causes the increase in capital adequacy ratio and vice versa.

4.6.3 Correlation co-efficient between Capital Adequacy ratio and Risk Weighted Assets.

The calculated correlation co-efficient between RWA & CAR is positive (0.018) (See Annex 4). Therefore, it can be said that RWA of a banks are positively correlated with the Bank's Capital Fund. Here, we can see that co-efficient is near to 0.5 which indicates that the correlations seem to be nearly positive for the Bank. We can say that the increase in capital adequacy ratio causes the increase in Risk weighted assets and vice versa.

4.6.4 Correlation co-efficient between Capital Adequacy ratio and Non-Performing Loan.

The calculated correlation co-efficient between NPL & CAR is negative (0.52) (See annex 5). Therefore, it can be said that NPL of a bank are negatively correlated with the Bank's Capital Fund. Here, we can see that co-efficient is near to 1which indicates that the correlations seem to be negative for the Bank. We can say that the increase in capital adequacy ratio causes the decrease in Non-Performing Loan and vice versa.

4.7 Regression analysis (Relationship between different variables)

4.7.1 Relationship between CAR to ROE & CRR

Table 4.25

	CAR (%)	**ROE (%)**	**CRR (%)**
Year	**X1**	**X2**	**X3**
2064/2065	11.63	27.16	7.31
2065/2066	11.04	28.07	9.59
2066/2067	10.68	24.84	8.28
2067/2068	10.84	26.34	7.19
2068/2069	11.04	27.15	11.37
SUM ∑	**55.23**	**134.48**	**43.74**
Average	**11.52**	**26.90**	**8.75**

Source: *Annex6*

The regression equation for the independent variable CAR (X_1) with ROE (X_2) and CRR (X_3) is given by

$$\mathbf{X_1 = -0.30\ X_2 + 0.041\ X_3 + 18.75}$$

That is, The per unit change in ROE is accompanied by a negative change of 0.30 in the dependent variable CAR and per unit change in CRR is accompanied by positive change of 0.041 in CAR.

TEST OF SIGNIFICANCE OF REGRESSION COEFFICIENT:

To test the significance of the regression coefficient the hypothesis is set up as Null **Hypothesis H_O: $b_1=b_2=0$.** That is, the regression equation of X_1 (CAR) on X2(ROE) and X_3(CRR)is not significant .In other words, there is no relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

Against,

Alternatives Hypothesis H_1: $b_1 \neq b_2 \neq 0$. That is, the regression equation of X_1(CAR) on X_2(ROE) and X_3 (CRR) is significant .In other words, there is relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

From the Calculation (see annex 6) the calculated F = 367.07which is greater than Tabulated value of F at 1% level of significance for 2 and 12 d.f.is 6.93 and for tabulated value of F at 5% level of significance for 2 and 12 d.f.is 3.89 .

Hence, H_0 is not accepted i.e. the regression equation is found to be significant i.e. there is relationship between the considered variables.

4.7.2 Relationship between CARS to ROE & RWA

Table 4.26

	X1	X2	X3
Year	**CAR (%)**	**ROE (%)**	**RWA (%)**
2064/2065	11.63	27.16	10.65
2065/2066	11.04	28.07	10.50
2066/2067	10.68	24.84	10.84
2067/2068	10.84	26.34	11.49
2068/2069	11.04	27.15	12.04
SUM	**55.23**	**134.48**	**59.84**
Average	**11.52**	**26.90**	**11.85**

Source: *Annex7*

The regression equation for the independent variable CAR (X_1) with ROE (X_2) and RWA (X_3) is given by

$$\mathbf{X_1 = 10.5 - 0.49\ X_2 - 1.16\ X_3}$$

That is, The per unit change in ROE is accompanied by a negative change of 0.49 in the dependent variable CAR and per unit change in RWA is also accompanied by negative change of 1.16 in CAR.

TEST OF SIGNIFICANCE OF REGRESSION COEFFICIENT:

To test the significance of the regression coefficient the hypothesis is set up as

Null Hypothesis H_O: $b_1=b_2=0$. That is, the regression equation of X_1 (CAR) on X2(ROE) and X_3(RWA)is not significant .In other words, there is no relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

Against,

Alternatives Hypothesis H_1: $b_1 \neq b_2 \neq 0$. That is, the regression equation of X_1(CAR) on X_2(ROE) and X_3 (RWA) is significant .In other words, there is relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

From the Calculation (see annex 7) the calculated F =964.53 which is greater than Tabulated value of F at 1% level of significance for 2 and 12 d.f.is 6.93 and for tabulated value of F at 5% level of significance for 2 and 12 d.f.is 3.89 .

Hence, H_0 is not accepted i.e. the regression equation is found to be significant i.e. there is relationship between the considered variables.

4.8 Impact of Capital Adequacy Norms on Banks

4.8.1 Study of changes in capital fund of several banks

4.8.1.1. Study of Changes in Capital Fund of EBL

Table 4.27

Fiscal Year	Total Capital Fund	Amount Increased	% Increased
2064/2065	2406.06		
2065/2066	2703.87	297.81	12.38
2066/2067	3257.14	553.27	20.46
2067/2068	3605.84	348.70	10.71
2068/2069	4575	969.16	26.88

Source: *Annual Reports of EBL*

In Fiscal Year 2064/65, the EBL has its Total Capital Fund of Rs. 2406.06(Rs. In millions). In FY 2065/66 it has been increased by Rs 297.81 i.e by12.38%. Simultaneously it has been increased by20.46% and 10.71% in further years. Likewise, in FY 2068/69 its total capital fund is Rs.4575 (Rs in million) which

has been increased by Rs 969.16 i.e by 26.88% from its previous year. From this we can conclude that the total capital fund of EBL is in increasing ratio.

4.8.1.2 Study of Changes in Capital Fund of HBL

Table 4.28

Fiscal Year	Total Capital Fund	Amount Increased	% Increased
2064/2065	3253.52		
2065/2066	3845.21	591.69	18.19
2066/2067	4218.36	373.15	9.70
2067/2068	4711.24	492.88	11.68
2068/2069	5283.90	572.66	12.16

Source: *Annual Reports of HBL*

In Fiscal Year 2064/65, the HBL has its Total Capital Fund of Rs.3253.52 (Rs. In millions). In FY 2065/66 it has been increased by Rs.591.69 i.e. by 18.19%. Simultaneously it has been increased by 9.70% and 11.68% in further years. Likewise, in FY 2068/69 its total capital fund is Rs.5283.90 (Rs in million) which has been increased by Rs.572.66 i.e. by 12.16% from its previous year. From this we can conclude that the total capital fund of HBL is in increasing ratio.

4.8.1.3 Study of Changes in Capital Fund of NABIL

Table 4.29

Fiscal Year	Total Capital Fund	Amount Increased	% Increased
2064/2065	2998.73		
2065/2066	3727.08	728.35	24.29
2066/2067	4390.23	663.15	17.79
2067/2068	5173.39	783.16	17.84
2068/2069	6086.70	913.31	17.65

Source: *Annual Reports of NABIL*

In Fiscal Year 2064/65, the NABIL has its Total Capital Fund of Rs.2998.73 (Rs. In millions). In FY 2065/66 it has been increased by Rs 728.35 i.e by 24.29%. Simultaneously it has been increased by 17.79% and 17.84% in further years. Likewise, in FY 2068/69 its total capital fund is Rs.6086.70 (Rs. In million) which has been increased by Rs 913.31 i.e by 17.65% from its previous year. From this we can conclude that the total capital fund of NABIL is in increasing ratio.

4.8.1.4 Study of Changes in Capital Fund of NIBL

Table 4.30

Fiscal Year	Total Capital Fund	Amount Increased	% Increased
2064/2065	3891.24		
2065/2066	5095.35	1204.11	30.94
2066/2067	5651.05	555.70	10.91
2067/2068	6324.63	673.58	11.92
2068/2069	6963.20	638.57	10.10

Source: *Annual Reports of NIBL*

In Fiscal Year 2064/65, the NIBL has its Total Capital Fund of Rs. 3891.24 (Rs. In millions). In FY 2065/66it has been increased by Rs 1204.11 i.e by 30.94%. Simultaneously it has been increased by 10.91% and 11.92% in further years. Likewise, in FY 2068/69 its total capital fund is Rs.6963.20(in million)which has been increased by Rs 638.57 i.e by 10.10% from its previous year. From this we can conclude that the total capital fund of NIBL is in increasing ratio but in decreasing rate as compare to previous year.

4.8.1.5 Study of Changes in Capital Fund of BOK

Table 4.31

Fiscal Year	Total Capital Fund	Amount Increased	% Increased
2064/2065	1635.24		
2065/2066	2005.70	370.46	22.65
2066/2067	2330.07	324.37	16.17
2067/2068	2662.07	332.0	14.25
2068/2069	2889.40	227.33	8.54

Source: *Annual Reports of BOK*

In Fiscal Year 2064/65, the BOK has its Total Capital Fund of Rs. 1635.24 (Rs. In millions). In FY 2065/66 it has been increased by Rs 370.46 i.e by 22.65%. Simultaneously it has been increased by 16.17% and 14.25% in further years. Likewise, in FY 2068/69 its total capital fund is Rs.2889.40(RS. In million)which has been increased by Rs 227.33 i.e by 8.54% from its previous year. From this we can conclude that the total capital fund of BOK is in increasing ratio.

4.9 Major Findings

This research study is about the NRB first guideline on capital adequacy for the commercial banks. Among the Thirty two Commercial Banks in Nepal only five banks are taken as sample size for comparative analysis. In this study all the Banks taken as sample are up to the mark of current capital adequacy guidelines of NRB.

During the analysis some major findings has been found.

- According to NRB directives every commercial Bank has 10% on Capital Adequacy Ratio, 6% on its core capital and 4% on its

supplementary capital. Banks are following directives but in cases of supplementary capital there has been a shortfall, which can be compensated by the excess amount of core capital in supplementary capital.

- Comparative study of capital adequacy of banks shows that the entire banks taken as sample exceeds the mandatory requirement of core capital of 6% as per the present NRB directives.
- The deposit components of a bank are positively correlated with the Bank's Capital Fund. So that the increase in capital causes the increase on deposit.
- During the analysis it has been found that the capital adequacy ratio is positively correlated to Return on Equity. So, the bank enjoying more return on equity may enjoy the higher capital adequacy ratio.
- Risk weighted Assets of the banks are positively correlated with the Bank's Capital Fund. We can say that the increase in capital adequacy ratio causes the increase in risk weighted assets.
- Non-performing loan is negatively correlated to the capital adequacy ratio. This phenomenon should be kept in regard while managing the risks.
- In every fiscal year the Total Capital Fund of every sample banks have been increasing.
- As per the analysis of Basel II, it has helped in developing suitable prudential norms to save the banks and financial institution from financial crisis and signal of failure. It has become important to prevent unfavorable impact on the economy.

CHAPTER V

SUMMARY, CONCULSION AND RECOMMENDATIONS

5.1 Summary

Financial Sector has undergone a significant evolution in the past two decades in Nepal. Commercial banking activities started with the establishment of Nepal Bank Ltd. in 1937.With the increase in establishment of commercial banks and its activities NRB being the central bank also become active to maintain the financial sector healthiness. So, for the effective functioning of the commercial banks and to ensure the stability and healthy development of banking and financial sector, central bank has issued some directives to the commercial banks. These directives are only the tools of NRB to supervise, monitor and control the financial system.

This research study is about the NRB first guideline on capital adequacy for the commercial banks. There exist twenty eight commercial banks in Nepal at present and among those five banks viz. Nepal Investment Bank Ltd., Everest Bank Ltd., Himalayan Bank Ltd., Nepal Investment Bank Limited and Bank of Kathmandu are taken as sample size for comparative analysis. In this study the entire Bank taken as sample are up to the mark of current capital adequacy guidelines of NRB.

Banks are following directives but in cases of supplementary capital there has been a shortfall, which can be compensated by the excess amount of core capital in supplementary capital.

New directive of NRB are made with a view to protect the deposit of depositors, which also enhances the financial strength of the banks. Even then it has adverse effect in profitability of the banks but this decreasing profit will affect the banks only for short term. This study also reveals that there is a significant impact of NRB directives of capital adequacy on the various aspects of the commercial banks and it also helps in maintaining the stability of

commercial banks in the financial market and to uplift the banking sector in Nepal to international standard. Though this study is limited to five commercial banks among entire population it clears that the new directives of capital adequacy is issued by NRB make good impact more than bad impacts on the various aspects of the banks. It can be seen that the provision has been changed and the increased provisioning amount has decreased the profitability of the commercial banks.

5.2 Conclusions

The amendment of the new capital adequacy ratio, not only shows the negative sides but also there are positive sides of new directives. Recently the problems of banks are increasing operating cost and decreasing liquidity resulting decrease in efficiency of the bank. But it shows it is only for short term because the directives are more effective to protect the banks from bad loans, which protect the bank from bankruptcy as well as protection of deposits of depositors. Increase in capital adequacy ratio strengthens the banks financial position. This will improve the reputation of the banks and increase the goodwill. Above all it can be concluded newly issued directives are more effective than previous one although it has brought some problem toward banks. To increase the decreasing profit of the banks, they should search the alternative such like more investments in other business, bank should adopt new technology according to demand of time and must not depend on only interest income for profits. Analyzing the relationship of the capital fund with the non-performing loan, correlation of capital fund with non-performing loan is found to be perfectly negative. As the analyzing has been made about the trend of non-performing loan and the capital of the past 5 years, the capital fund trends to be increasing in all the years where the NPL trend to decrease. Majority of the banker's and experts believe that the capital adequacy framework prescribed by the central bank is adequate and the commercial bank is should follow the standard for the betterment of every concerned parties associated directly or indirectly with the performance and risk of the bank.

During the study period, the risk management system of the commercial banks as well as the operating environment of the bank has improved significantly.

5.3 Recommendations

The newly issued directives by Nepal Rastra Bank have certain changes in its provisions. Its main objectives are to protect the deposits of the depositors and to uplift the banking system in Nepal to the International standards. Directives issued by NRB are very important to build not only the commercial banking in Nepal but also country's economic stability. On the basis of the analysis some recommendation are made from this study.

- The capital fund of the bank under study is highly depending upon share capital. It is recommended to the commercial banks to follow optimal capital structure which maximizes the market value of the firm. The banks should be able to use some sort of debt financing depending upon its viability. It is notable that the bank has started the debt financing. But still debt financing is an unaccustomed source of financing for commercial banks in Nepal.
- They have to increase their supplementary capital to meet the standard of supplementary capital ratio of 4% directed by NRB.to strengthen the capital fund of the commercial banks, they should focus on credit mitigation along with the supplementary capital fund.
- All of these banks have to make its Internal Audit and Inspection Department stronger so that the directives are properly implemented keeping into mind that the violation of rules of directives have chances to pay penalties which may lead to unfavorable consequences.
- NRB must not make the rules taking into mind only the International standard but to combat these problems the directives must be issued after being proper research and consultation with different banking experts. NRB should consult to the various bank officials before setting or resetting standards on such capital adequacy norms. The complaints and criticisms of

bank officials should be considered accordingly. Consequently, an optimal standard will be ensured which will satisfy almost everyone. They become irrelevant if they are not implemented.

- It has been found that the depositors are not aware of the fact of the necessity of adequate capital fund to safeguard their deposits. They deposit their money to any bank regardless of adequate capital fund which may endanger safety of their money. Therefore, NRB should initiate awareness programs to make the depositors aware of such fact and carefully think before depositing money in any commercial banks.
- During analysis it has been found that the capital adequacy ratio is positively correlated to Return on Equity. This can be justified as the bank enjoying more return on equity may enjoy the higher capital adequacy ratio than mandatory as per NRB directives. But how much the degree is the remaining for future to research.
- Nonperforming loan is one of headache of commercial banks. Analysis shows that the non-performing loan is perfectly negative to capital adequacy ratio. This phenomenon should be kept in regard while fixing the investment policies and for risk mitigation policy.
- Risk weighted exposure of commercial banks are found to be positively correlated to the capital fund ratio. Risk exposure is likely for the commercial banks so to maintain it NRB can increase its CAR so that risk exposure can be more addressed.
- Adequate rules & capital adequacy should be issued for non-bank thrift institution as well, because they are the institution competing with the commercial and other banks and the customer of both industries are same so to protect the savers, along with the banking industry, other financial institution are also should be compiled with the new framework of capital adequacy
- At last it can be said that there is no economic development in the country without capital formation and mobilization and without any guidelines to commercial banks.

BIBLIOGRAPHY

Books:

- Bhandari, D.R. (2003), ***Banking and Insurance: Principles & Practice.*** Kathmandu: Aayush Publications.
- Clark, J. (1999). ***International Dictionary of Banking and Finance***. New York: Glenlake Publishing Co Ltd and AMACOM American Management Association.
- Maisel, S.J. (1982). ***Risk and Capital Adequacy in Commercial Banks.*** Chicago: The University of Chicago Press.
- Pandey, I. M. (1995). ***Financial Management***. New Delhi: Vikash Publishing House Pvt. Ltd.
- Patheja, A. (1994). ***Financial Management of Commercial Banks***. Delhi: South Asia Publications.
- Rose Peter S.(1999),**Commercial Bank Management**,Singapore: Irwin/McGrow-Hill.
- Rosenburg, J. M., Ph.D. (1982). ***Dictionary of banking and finance***. NewYork: John Wiley & Sons.
- Shekhar, K.C. &Shekhar, L. (1998). ***Banking theory and practice*** (Rev.ed.). New Delhi: Vikash Publishing House Pvt. Ltd.
- Verma, H.L. &Malhotra, A.K. (1993). ***Funds Management in Commercial Banks***.
  New Delhi: Deep & Deep Publications.
- Wolf, H.K. & Pant, P.R. (Eds.). (1999). ***A Handbook for Social Science Research and Thesis Writing***. Kathmandu: Buddha Academic Enterprises Pvt. Ltd.

Reports &Journals:

- EBL (F.Y. 2064/65 – F.Y. 2068/69). *Annual Reports.* Kathmandu: Everest Bank Limited.
- HBL (F.Y. 2064/65 – F.Y. 2068/69). *Annual Reports.* Kathmandu: Himalayan Bank Limited.
- NABIL (F.Y. 2064/65 – F.Y. 2068/69). *Annual Reports.* Kathmandu: Nabil Bank Limited.
- NIBL (F.Y. 2064/65 – F.Y. 2068/69). *Annual Reports.* Kathmandu: Nepal Investment Bank Limited.
- BOK (F.Y. 2064/65 – F.Y. 2068/69). *Annual Reports.* Kathmandu: Bank of Kathmandu Limited.

- Khatiwada, Y.R. (2003, April 30 and May 7). Banking Sectors Reform inNepal I & II: Implications for Corporate Governance. ***The Telegraph Weekly***, p.2.

- Nepal Rastra Bank (2064/65-2068/69). *Annual Bank Supervision Report*. Kathmandu: NRB.
- Nepal Rastra Bank (2068/69). *Bank And Finance Statistics*. Kathmandu: NRB.
- Nepal Rastra Bank (Updated 2008).*Capital Adequacy Framework Implementation Group report.*

- Lamsal, M. (2001, July). NRB Directives: Bankers Plea for Lighter Strictures. ***New Business Age, 1(3)***, pp.31-35.
- Pandey, S. (2003, June 10). NRB's effort to reform commercial banks: ***The Rising Nepal***, p.4.
- Shah, R.B. (2003, January). Financial Sector Reform program: Issues andChallenges. ***Banking Pravarddan, 15***, pp.8-19.

Unpublished Thesis:

- Karmacharya, B. (2002). S***tudy on Capital Structure of Joint-Venture Commercial Banks and NRB Directives Issued in Regards to thereof.*** Unpublished Masters Degree (MBA) Thesis, Tribhuvan University, ShankerDev Campus.

- Pandey, S. (2002). ***Nepal Rastra Bank Directives, their Implementation & Impact on the Commercial Banks-A Case Study of Himalayan Bank Ltd. (HBL).***

- Shakya, D.R. (1995). *Financial Analysis of Joint Venture Banks in Nepal*. Tribhuvan University.
- Sharma, R. (2005). *Capital Structure of Selected Commercial Banks in Nepal*. Tribhuvan University.

- Shrestha, D. (2005). ***A Comparative Study on Investment Practice of Joint-Venture Commercial Banks.***UnpublishedMasters Degree (MBS) Thesis, Tribhuvan University, ShankerDev Campus.

Internet:

- Heakal, R., (2006, November). What are central banks? Retrieved February21, 2010.
  from http://www.investopedia.com/articles/03/050703.asp

- Keijser, T. Haas R., (2006, October). *Financial collateral and capital adequacy requirements*. Retrieved February 20, 2010 from http://econwpa.wustl.edu/eps/fin/papers/2002/2002007.pdf
- Strokes, J.R., (2007 February 20 & 21). Using stimulation to determine bank capital adequacy. In *Financial Engineering News*. Retrieved February 21, 2010
  From http://fenews.com/fen28/siminfe.html

Official websites:

- http://www.nrb.org.np
- http://www.everestbankltd.com/
- http://www.himalayanbank.com/
- http://www.nibl.com.np/
- http://www.nabilbank.com/
- http://www.bok.com.np/
- http://www.wikipedia.org/
- http://www.bis.org/
- http://www.bing.com/
- http://www.bing.com/
- http://www.investopedia.com/

Annexure

Annex 1

Calculation of Yearly Average CRR of the Sample Banks

BANK	2064/2065	2065/2066	2066/2067	2067/2068	2068/2069
EBL	4.56%	14.26%	15.53%	9.55%	17.22%
HBL	5.13%	6.76%	6.76%	5.75%	8.72%
NABIL	8.37%	9.03%	3.02%	4.90%	8.60%
NIBL	10.91%	10.32%	7.77%	7.67%	13.60%
BOK	7.57%	7.58%	8.32%	8.10%	8.72%
AVERAGE	**7.31%**	**9.59%**	**8.28%**	**7.19%**	**11.37%**

Calculation of Yearly Average CAR of the Sample Banks

BANK	2064/2065	2065/2066	2066/2067	2067/2068	2068/2069
EBL	**11.44%**	**10.55%**	**10.77%**	**10.43%**	**11.02%**
HBL	**12.42%**	**11.02%**	**10.72%**	**10.68%**	**11.02%**
NABIL	**11.10%**	**10.70%**	**10.50%**	**10.58%**	**11.01%**
NIBL	**11.28%**	**11.24%**	**10.55%**	**10.91%**	**11.10%**
BOK	**11.93%**	**11.68%**	**10.85%**	**11.62%**	**11.07%**
AVERAGE	**11.63%**	**11.04%**	**10.68%**	**10.84%**	**11.04%**

Calculation of Yearly Average ROE of the Sample Banks

BANK	2064/2065	2065/2066	2066/2067	2067/2068	2068/2069
EBL	**21.37%**	**24.13%**	**24.96%**	**35.83%**	**36.92%**
HBL	**25.30%**	**14.94%**	**16.32%**	**17.76%**	**23.53%**
NABIL	**36.30%**	**42.30%**	**30.27%**	**29.02%**	**30.25%**
NIBL	**25.93%**	**23.05%**	**28%**	**24%**	**22.90%**
BOK	**26.90%**	**26.51%**	**24.65%**	**25.09%**	**22.16%**
AVG ROE	**27.16%**	**28.07%**	**24.84%**	**26.34%**	**27.15%**

Calculation of Yearly Average NPL of the Sample Banks

Bank	2064/2065	2065/2066	2066/2067	2067/2068	2068/2069
EBL	0.68	0.48	0.16	0.34	0.84
HBL	2.36	2.16	3.52	4.22	2.09
NABIL	0.74	0.8	1.48	1.77	2.33
NIBL	1.12	0.58	0.67	0.94	3.22
BOK	1.86	1.27	1.52	1.82	2.3
AVERAGE	**1.35**	**1.06**	**1.47**	**1.82**	**2.20**

Calculation of Yearly Average RWA of the Sample Banks

BANK	2064/2065	2065/2066	2066/2067	2067/2068	2068/2069
NABIL	**10.86**	**10.25**	**10.58**	**11.83**	**12.71**
EBL	**10.89**	**10.03**	**10.43**	**10.98**	**11.08**
HBL	**11.12**	**11.06**	**10.68**	**11.23**	**12.00**
NIBL	**10.76**	**10.12**	**10.91**	**10.89**	**11.81**
BOK	**10.96**	**11.02**	**11.62**	**12.51**	**12.58**
TOTAL	**11.23**	**10.50**	**10.84**	**11.49**	**12.04**

Annex 2

Calculation of Correlation co-efficient between Deposit Trend and Capital Fund of Sample Banks

For EBL Bank:

Fiscal year	Capital Fund(X_1)	Total Deposit(X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	x_1^2	$x2^2$
2064/2065	2406	23976	-903	-13097	11832592	816262	171526170
2065/2066	2704	33323	-606	-3750	2271354	366826	14064000
2066/2067	3257	36932	-52	-141	7377	2745	19825
2067/2068	3606	41128	296	4055	1201470	87798	16441403
2068/2069	4575	50006	1265	12933	16363064	1600777	167262489
TOTAL	16548	185366	0	0	31675857	2874408	369313887

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \quad \text{where, } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{31675857}{\sqrt{1695.41}*\sqrt{19217.54}} = \mathbf{0.97}$$

For HBL Bank

Fiscal year	Capital Fund(X_1)	Total Deposit(X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	$x_1 2$	$x_2 2$
2064/2065	3254	31843	-1009	-6715	6774649	1017972	45085585
2065/2066	3845	34682	-417	-3875	1616900	174103	15016245
2066/2067	4218	37611	-44	-946	41732	1945	895257
2067/2068	4711	40921	449	2363	1060552	201398	5584809
2068/2069	5284	47730	1022	9173	9370143	1043532	84136958
TOTAL	21312	192787	0	0	18863976	2438950	150718853

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \quad \text{where, } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{18863976}{\sqrt{1561.71}*\sqrt{12276.70}} = \mathbf{0.98}$$

For NABIL Bank:

Fiscal year	Capital Fund(X_1)	Total Deposit(X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	$x_1 2$	$x_2 2$
2064/2065	2999	31915	-1332	-12164	16200562	1773904	147955111
2065/2066	3727	37348	-604	-6730	4061986	364248	45298015
2066/2067	3668	46411	-663	2332	-1545768	439251	5439717
2067/2068	5173	49696	843	5617	4734249	710278	31555407
2068/2069	6086	55023	1755	10944	19211550	3081394	119778140
TOTAL	21653	220393	0	0	42662579	6369076	350026390

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \text{ where, } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{42662579}{\sqrt{2523.70}*\sqrt{18708.99}} = \mathbf{0.90}$$

For NIBL Bank:

Fiscal year	Capital Fund(X_1)	Total Deposit(X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	$x_1 2$	$x_2 2$
2064/2065	3891	34452	-1694	-13227	22403272	2868999	174941360
2065/2066	5095	46698	-490	-980	480123	239808	961263
2066/2067	5651	50094	66	2416	159405	4354	5835413
2067/2068	6325	50138	740	2460	1819110	546976	6049927
2068/2069	6963	57010	1378	9332	12858542	1898741	87079878
TOTAL	27925	238392	0	0	37720453	5558878	274867842

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \quad \text{where, } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{37720453}{\sqrt{2357.73}*\sqrt{16579.14}} = \mathbf{0.96}$$

For BOK Bank

Fiscal year	Capital Fund(X_1)	Total Deposit(X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	$x_1 2$	$x_2 2$
2064/2065	1,635	15,833	(669)	(4,214)	2,819,921	447,797	17,757,965
2065/2066	2,006	18,084	(299)	(1,963)	586,326	89,231	3,852,662
2066/2067	2,330	20,316	26	269	6,908	658	72,512
2067/2068	2,662	21,010	358	963	344,521	127,916	927,908
2068/2069	2,889	24,991	585	4,944	2,890,347	341,738	24,445,905
TOTAL	11,522	100,234	-	-	6,648,023	1,007,341	47,056,952

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \text{ where, } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{6,648,023}{\sqrt{1,003.66}*\sqrt{6,859.81}} = \mathbf{0.97}$$

Annex 3

Calculation of Correlation co-efficient between Return on Equity and Capital Adequacy

Fiscal year	CAR (X_1)	ROE (X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	x_1^2	x_2^2
2064/2065	**11.63**	**27.16**	**0.95**	**0.45**	**0.43**	**0.91**	**0.2**
2065/2066	**11.04**	**28.07**	**0.35**	**1.36**	**0.48**	**0.12**	**1.8**
2066/2067	**10.68**	**24.84**	**-0.61**	**-1.87**	**1.14**	**0.37**	**3.5**
2067/2068	**10.84**	**26.34**	**-0.45**	**-0.37**	**0.17**	**0.20**	**0.1**
2068/2069	**11.04**	**27.15**	**-0.25**	**0.44**	**-0.11**	**0.06**	**0.2**
TOTAL	**55.23**	**133.56**	**0.00**	**0.00**	**2.10**	**1.66**	**5.9**

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \quad \text{where } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{\mathbf{2.10}}{\mathbf{3.13}}=\mathbf{0.67}$$

Annex 4

Calculation of Correlation co-efficient between Capital Adequacy Ratio and Risk Weighted Assets

Fiscal year	CAR (X_1)	RWA (X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	x_1^2	x_2^2
2064/2065	11.63	11.23	0.58	0.01	0.01	0.34	0.00
2065/2066	11.04	10.50	-0.01	-0.72	0.00	0.00	0.52
2066/2067	10.68	10.84	-0.37	-0.38	0.14	0.13	0.14
2067/2068	10.84	11.49	-0.21	0.27	-0.06	0.04	0.07
2068/2069	11.04	12.04	-0.01	0.82	0.00	0.00	0.67
Total	55.23	56.10	0.00	0.00	0.09	0.52	1.40

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \quad \text{where } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{0.09}{0.85}=0.10$$

Annex 5

Calculation of Correlation co-efficient between Capital Adequacy Ratio and Non-Performing Loan

Fiscal year	CAR (X_1)	NPL (X_2)	$x_1=(X_1-\sum X_1/n)$	$x_2=(X_2-\sum X_2/n)$	$x_1 x_2$	x_1^2	x_2^2
2064/2065	11.63	1.35	0.58	(0.23)	(0.13)	1.15	0.05
2065/2066	11.04	1.06	(0.13)	(0.52)	0.07	0.02	0.27
2066/2067	10.68	1.47	(0.49)	(0.11)	0.05	0.24	0.01
2067/2068	10.84	1.82	(0.33)	0.24	(0.08)	0.11	0.06
2068/2069	11.04	2.2	(0.13)	0.62	(0.08)	0.02	0.38
Total	55.84	7.9	0.00	-	(0.14)	1.53	0.78

$$r_{12}=\frac{\sum x_1x_2}{\sqrt{\sum x_1^2}\sqrt{\sum x_2^2}} \quad \text{where } x_1=X_1-\sum X_1/n,\ x_2=X_2-\sum X_2/n$$

$$r_{12}=\frac{(0.14)}{0.63}=-0.23$$

Annex 6

Multiple Regression Analysis

Multiple Regression Analysis for Period of 2063/2064 - 2067/2068

Let X_1, X_2 and X_3 denote Capital Adequacy Ratio (CAR), Return On Equity (ROE) and Cash Reserve Ratio (CRR) respectively. Here Capital adequacy Ratio is the dependent variable, we have to estimate the multiple regression of X_1 on X_2 and X_3.

The multiple regression equation of X_1 on X_2 and X_3 (using deviation from actual mean) is

$$x_1=b_1x_2+b_2x_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{ (i)}$$

Where,

$$x_1=X_1-\bar{X}_1$$

$$x_2=X_2-\bar{X}_2$$

$$x_3=X_3-\bar{X}_3$$

The values of regression parameters b_1 and b_2 are determined by solving the following two normal equations.

$$\sum x_1x_2=b_1\sum x_2^2+b_2\sum x_2x_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{(ii)}$$

$$\sum x_1x_3=b1\sum x_2x_3+b2\sum x_3^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{ (iii)}$$

Calculation of sum values

Year	CAR %	ROE %	CRR %			
	X_1	X_2	X_3	$x_1=X_1-\bar{X}_1$	$x_2=X_2-\bar{X}_2$	$x_3=X_3\bar{X}_3$
2064/2065	11.63	27.16	7.31	0.58	0.26	(1.44)
2065/2066	11.04	28.07	9.59	(0.01)	1.17	0.84
2066/2067	10.68	25.76	8.28	(0.37)	(1.14)	(0.47)
2067/2068	10.84	26.34	7.19	(0.21)	(0.56)	(1.56)
2068/2069	11.04	27.15	11.37	(0.01)	0.25	2.62
	$\sum(X_1)$= 55.23	**$\sum(X_2)$= 134.48**	**$\sum(X_3)$=43.74**			

We have, Mean $\bar{X}_1 = \sum(X_1)/n = 55.23/5 = 11.05$

Mean $\bar{X}_2 = \sum(X_2)/n = 134.48/5 = 26.90$

Mean $\bar{X}_3 = \sum(X_3)/n = 43.74/5 = 8.75$

x_1x_2	x_2x_3	x_1x_3	x_1^2	x_2^2	x_3^2
0.15	(0.38)	(0.84)	0.34	0.07	2.07
(0.01)	0.99	(0.01)	0.00	1.38	0.71
0.42	0.53	0.17	0.13	1.29	0.22
0.11	0.87	0.32	0.04	0.31	2.43
(0.00)	0.67	(0.02)	0.00	0.06	6.87
$\sum x_1x_2$=0.68	$\sum x_2x_3$=2.67	$\sum x_1x_3$= (0.37)	$\sum(x_1^2)$=0.52	$\sum(x_2^2)$=3.11	$\sum(x_3^2)$=12.30

Substituting the sum values in equalities (ii) and (iii)

$0.68 = 3.11b_1 + \mathbf{2.67}\ b_2$ …… (iv)

$-0.37 = 2.67b_1 + 12.30b_2$ …… (v)

Multiplying (iv) by 4.61and subtracting, we get

$3.13 = 14.34b_1 + 12.30\ b_2$

$-0.37 = 2.67b_1 + 12.30b_2$

$- \quad - \quad -$

$-3.5 = 11.67\ b_1$

Or, $b_1 = -0.30$

Putting the value of b_2 in (iv)

$1.33 = 3.39\ (0.33) - 0.34\ b_2$

Or, $b_2 = 0.04$

Substituting the values of b1 and b2 in (i), we get multiple regression equation of X_1 on X_2 and X_3, using deviation from mean as,

$x_1 = -0.30\ x_2 + 0.041x_3$

Now, $X_1 - \bar{X}_1 = -0.30X_2 - \bar{X}_2) + 0.041X_3 - \bar{X}_3)$

Or, $X_1 - 11.05 = -0.30(X_2 - 26.90) + 0.041(X_3 - 8.75)$

Or, $X_1 = -0.30X_2 + 0.041X_3 + 18.75$

Thus, the required estimated regression equation of x_1 on x_2 and x_3 for the period of FY 2064/2065 to 2068/2069 is

$$\mathbf{X_1 = -0.30X_2 + 0.041X_3 + 18.75}$$

Testing of validity of the equation

ANOVA Calculation

Year	CAR %	ROE %	CRR %			
	X_1	X_2	X_3	X_1^2	X_2^2	X_3^2
2064/2065	11.63	27.16	7.31	135.26	737.67	53.44
2065/2066	11.04	28.07	9.59	121.88	787.92	91.97
2066/2067	10.68	25.76	8.28	114.06	663.58	68.56
2067/2068	10.84	26.34	7.19	117.51	693.80	51.70
2068/2069	11.04	27.15	11.37	121.88	737.12	129.28
TOTAL	**$\sum(X_1)=55.23$**	**$\sum(X_2)=134.48$**	**$\sum(X_3)=43.74$**	**$\sum(X_1^2)=610.59$**	**$\sum(X_2^2)=3620.09$**	**$\sum(X_3^2)=394.94$**

Null Hypothesis HO: $b_1=b_2=0$. That is, the regression equation of X_1on $X_2$and X_3 is not significant .In other words, there is no relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

Alternatives Hypothesis H1: $b_1\neq b_2\neq 0$. That is, the regression equation of X_1on $X_2$and X_3 is significant .In other words, there is relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

Test Statistics, F= $\dfrac{\text{Variance between samples}}{\text{Variance within samples}}$

Now, Grand Total (T) = $\sum X_1+\sum X_2+\sum X_3$

= 55.23+134.48+43.74

= 233.45

Correction Factor (C.F)= T^2/N

= $(233.45)^2$ / 15

= 3633.26

Total sum of square (TSS) = $\sum X_1^2+\sum X_2^2+\sum X_3^2$ - C.F

= 610.59+3620.09+77+394.94-3633.26

= 992.35

Sum of square between samples (SSC) = $\frac{\sum(X_1)^2}{n_1} + \frac{\sum(X_2)^2}{n_2} + \frac{\sum(X_3)^2}{n_3}$ - C.F

$= \frac{(55.23)^2}{5} + \frac{(134.48)^2}{5} + \frac{(43.74)^2}{5} -$ 3633.26

= 976.42

Sum of square within samples) SSW) = TSS - SSC

= 992.35-976.42

= 15.93

One way ANNOVA TABLE

Source of variation	Sum of squares	d.f	Mean sum of square	F-ratio
Between samples	976.42	3-1=2	976.42/2=488.21	F=488.21/1.33 =367.07
Within samples (Error)	15.93	12	15.93/12= 1.33	
Total	992.35	15-1=14		

Tabulated value of F at 1% level of significance for 2 and 12 d.f.is 6.93
And for tabulated value of F at 5% level of significance for 2 and 12 d.f.is 3.89

Decision: Since the calculated value is greater than tabulated value ($F_{cal>}F_{tab}$), the null hypothesis Ho is rejected and hence the alternative hypothesis H_1 is accepted. Therefore, we conclude that the regression equation of X_1 on X_2 and X_3 is significant.

Annex 7

Multiple Regression Analysis

Multiple Regression Analysis for Period of 2064/2065 - 2068/2069

Let X_1, X_2aSnd X_3 denote Capital Adequacy Ratio (CAR), Return on Equity (ROE) and Risk weighted assets (RWA) respectively. Here Capital adequacy Ratio is the dependent variable, we have to estimate the multiple regression of X_1 on X_2 and X_3.

The multiple regression equation of X_1 on X_2 and X_3 (using deviation from actual mean) is

$$x_1=b_1x_2+b_2x_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{ (i)}$$

Where,

$x_1=X_1-\overline{X}_1$

$x_2=X_2-\overline{X}_2$

$x_3=X_3-\overline{X}_3$

The values of regression parameters b_1 and b_2 are determined by solving the following two normal equations.

$\sum x_1x_2=b_1\sum x_2^2+b_2\sum x_2x_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{(ii)}$

$$\sum x_1x_3=b1\sum x_2x_3+b2\sum x_3^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{ (iii)}$$

Calculation of sum values

Year	CAR %	ROE %	RWA			
	X_1	X_2	X_3	$x_1=X_1-\bar{X}_1$	$x_2=X_2-\bar{X}_2$	$x_3=X_3-\bar{X}_3$
2064/2065	11.63	27.16	11.23	0.58	0.26	-0.62
2065/2066	11.04	28.07	11.29	-0.01	1.17	-0.56
2066/2067	10.68	25.76	12.58	-0.37	-1.14	0.73
2067/2068	10.84	26.34	12.1	-0.21	-0.56	0.25
2068/2069	11.04	27.15	12.04	-0.01	0.25	0.19
	$\sum(X_1)=55.3$	**$\sum(X_2)=134.48$**	**$\sum(X_3)=59.24$**	0.00	0.00	0.00

We have, Mean $\bar{X}_1 = \sum(X_1)/n=55.23/5 = 11.05$

Mean $\bar{X}_2 = \sum(X_2)/n = 134.48/5 = 26.90$

Mean $\bar{X}_3 = \sum(X_3)/n = 55.52/5 = 11.10$

x_1x_2	x_2x_3	x_1x_3	x_1^2	x_2^2	x_3^2
0.15	**(0.16)**	**(0.36)**	**0.34**	**0.07**	**0.38**
0.33	**(0.66)**	**0.00**	**0.00**	**1.38**	**0.31**
0.16	**(0.83)**	**(0.27)**	**0.13**	**1.29**	**0.54**
0.79	**(0.14)**	**(0.05)**	**0.04**	**0.31**	**0.06**
0.33	**0.05**	**(0.00)**	**0.00**	**0.06**	**0.04**
$\sum x_1x_2$= 1.76	**$\sum x_2x_3$= (1.74)**	**$\sum x_1x_3$= (0.68)**	**$\sum x_1^2$= 0.52**	**$\sum x_2^2$= 3.11**	**$\sum x_3^2$= 1.33**

Substituting the sum values in equalities (ii) and (iii)

$1.76 = -0.52b_1 - 1.74\ b_2$ …… (iv)

$-0.68 = -1.74\ b_1 + 1.33b_2$ …… (v)

Multiplying (iv) by 1.32and (v) by 3.35 and adding, we get

$5.8996 = 1.74b_1 - 5.829\ b_2$

$-0.68 = -1.74\ b_1 + 1.33b2$

$5.216 = 4.52b_2$

Or, $b_2 = -1.16$

Putting the value of b_2 in (iv)

$-0.68 = -1.74b_1 + 1.33(-1.61)$

Or, $b_2 = -0.49$

Substituting the values of b_1 and b_2 in (i), we get multiple regression equation of X_1 on X_2 and X_3, using deviation from mean as,

$\mathbf{x_1 = -0.49\ x_2 - 1.16\ x_3}$

Now, $X_1 - \bar{X}_1 = -0.49(X_2 - \bar{X}_2) - 1.16\ (X_3 - \bar{X}_3)$

Or, $X_1 - 11.05 = -0.49\ (X_2 - 26.90) - 1.16(X_3 - 11.84)$

Or, $X_1 = 10.55 - 0.49X_2 - 1.16X_3$

Thus, the required estimated regression equation of x_1 on x_2 and x_3 for the period of FY 2064/2065 to 2068/2069 is

$$\mathbf{X_1 = 10.55 - 0.49\ X_2 - 1.16\ X_3}$$

Testing of validity of the equation

ANOVA CALCULATION

Year	CAR %	ROE %	RWA %			
	X_1	X_2	X_3	X_1^2	X_2^2	X_3^2
2064/2065	11.63	27.16	11.23	135.26	737.67	126.11
2065/2066	11.04	28.07	11.29	121.88	787.92	127.46
2066/2067	10.68	25.76	12.58	114.06	663.58	158.26
2067/2068	10.84	26.34	12.1	117.51	693.80	146.41
2068/2069	11.04	27.15	12.04	121.88	737.12	144.96
Total	$\sum(X_1)$= 55.23	$\sum(X_2)$= 134.48	$\sum(X_3)$= 59.24	$\sum(X_1^2)$= 610.59	$\sum(X_2^2)$= 3620.09	$\sum(X_3^2)$= 703.21

Null Hypothesis HO: $b_1=b_2=0$. That is, the regression equation of X_1on $X_2$and X_3 is not significant .In other words, there is no relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

Alternatives Hypothesis H1: $b_1\neq b_2\neq 0$. That is, the regression equation of X_1on $X_2$and X_3 is significant .In other words, there is relationship between dependent variable $X_1$and two independent variables X_2 and X_3.

Test Statistics, F= $\dfrac{\text{Variance between samples}}{\text{Variance within samples}}$

Now, GrandTotal (T) = $\sum X_1+\sum X_2+\sum X_3$

= 55.23+134.48+59.24

= 248.95

Correction Factor (C.F) = T^2/N

$= (248.95)^2 / 15$

$= 4131.74$

Total sum of square (TSS) $= \sum X_1^2 + \sum X_2^2 + \sum X_3^2 - C.F$

$= 610.59 + 3620.09 + 703.21 - 4131.74$

$= 802.14$

Sum of square between samples (SSC) $= \frac{\sum(X_1)^2}{n_1} + \frac{\sum(X_2)^2}{n_2} + \frac{\sum(X_3)^2}{n_3} - C.F$

$= \frac{(55.23)^2}{5} + \frac{(134.48)^2}{5} + \frac{(59.24)^2}{5} - 4131.74$

$= 797.18$

Sum of square within samples (SSW) = TSS - SSC

$= 802.14 - 797.18$

$= 4.96$

One way ANNOVA TABLE

Source of variation	Sum of squares	d.f	Mean sum of square	F-ratio
Between samples	797.18	3-1=2	797.18/2=398.59	F=398.59/0.41 =964.53
Within samples (Error)	4.96	12	4.96/12=0.41	
Total	762.53	15-1=14		

Tabulated value of F at 1% level of significance for 2 and 12 d.f.is 6.93

And for tabulated value of F at 5% level of significance for 2 and 12 d.f.is 3.89

Decision: Since the calculated value is greater than tabulated value ($F_{cal>}F_{tab}$), the null hypothesis Ho is rejected and hence the alternative hypothesis H_1 is accepted.

Therefore, we conclude that the regression equation of X_1 on X_2 and X_3 is significant.