CHAPTER - I

INTRODUCTION

1.1 Background of the Study

Nepal is small but multi cultural, multiparty democracy country sandwiched between two densely populated countries India and china. On the basis of previous level of economic development, it has potential to compete in the international market. Even though government made various competitive practices & exercise through formulating different policies like industrial policy, foreign investment policy, privatization policy, and trade policy, but the pace of economic development is still very low.

Government liberalization policies after the restoration of Democracy helped in the emergence of multi national companies, joint venture banks, and financial companies in Nepal, which aim in aiding economic development of the country. Banks and financial institutions are vehicle of economic development through the process of saving mobilization towards productive investments in the country. Other non-banking private institutions gear the economy upward through the generation of employment opportunities and the collection of revenue fund in nation.

Now a days, Competition in the financial system was enhanced only after the restoration of democracy in 1990. Commercial banks and Finance companies compete to each other's through various strategies and schemes offering deposit in high interest and providing loan in low interest rate with convenient way to the public. This stage of banking is not automatic outcome. So banking has come to its present advance form through various stages. In Nepal goldsmiths and moneylender knows, as 'Merchants or Sahu Mahajan' was the ancestors of bank. During the tenure of the Prime Minister Randolph singh in 1933 B.S 'Tejarath Adda' was established. It was the first step toward the development of banking system in Nepal. Tejarath Adda established only for providing loan to bullion but not collected deposit from public. So establishment of Nepal Bank limited on 1994 B.S was the first attempt of government for the development of banking sector. Then Nepal Rastra Bank was established (1956) to formulate monetary policies and making rule and regulations regarding banking sector and to implement it. Till 1990, two

Governments owned commercial banks (Rastriya Banijya Bank and Nepal Bank Limited) dominated the financial systems. After restoration of democracy (1990), Due to liberalization policy of Government, Competition of commercial bank enhanced and various joint venture banks also emerged. At present, there are 28 commercial banks, 36 development banks, 58 Micro Credit and Development bank including, 25 finance companies and 14 Cooperatives.

Financial intermediation helps to promote economic growth through the process of saving mobilization and promotion of productive investment in the country. In this process, financial institutions generally pay certain prevailing rate of interest on deposit and receive the higher rate of interest from lending. The differential interest margin is basically incentives to financial institution to cover their operational costs and contribute to the worth of the equity holder. The determination of interest rate is more and less governed by the market forces. But the differential rate is mostly influenced by operational efficiencies and profits margins of financial institutions i.e. commercial banks.

In other words financial intermediation has two fold viz. deposit and credit. Mainly commercial banks used to possess this sort of fold. They get money from one side in the form of deposit and they provide it to borrower in other side. It always charged higher interest rate in comparison to depositors and the differences between there will be the profit of commercial banks.

As an instrument of monetary policy, interest rate is being used to mobilize savings, to influence bank liquidity and to determine cost of credit etc. Modern economic thinking acknowledges the important role of interest rate policy as a demand management technique to achieve both internal and external balance by ensuring efficient allocation as well as mobilization of financial resources in an economy.

Interest rate policy in Nepal was directly controlled and regulated by the central bank i.e. NRB before the economy was completely liberalized in 1991. The control on interest rate in the earlier period was motivated by a number of factors.

- First, there was limited competition in the banking system as the two largest Government controlled bank dominated the market.
- Second, the direct control of deposit rates was potentially effective for

mobilizing domestic saving at a higher level of interest rates.

- Third, the direct control of interest rates provided a convenient vehicle for Concessionary credit allocation to the priority sector.

But the regulation of the financial system aimed at the control of the economy rather than the foster the safety and soundness of financial institutions. The interest rate was completely liberalized in Aug 31, 1989, paving the way for determination of interest by market forces. The financial sector liberalization measures included, among others, the deregulation of interest rates, free entry and exit arrangement of commercial banks and removal of statutory liquidity ratio. After the reform measures particularly after the fully deregulation (liberalization) of the interest rate regime in 1989, it was expected that there would be competitive behavior among commercial banks and financial institutions which will prompt the banks to provide higher interest rate on deposits while charging competitively lower interest rate on lending. It was also envisaged that, while doing so, banks could increase the quantum of financial intermediation and thus profit from it. Consequently, it was expected that competition would further bring down the interest rate spread, which would contribute to the economic growth by benefiting both the depositors and the borrowers alike.

But the following the deregulation of interest rates, the deposit rate particularly those of commercial banks, however, went on declining whereas the lending rates either remained constant or declined marginally causing the spread to go up. This spread rate of commercial banks has a direct bearing on saving and investment and thus on economic growth of the country because the commercial banks hold dominant portion of financial intermediation.

Thus my study attempts to evaluate the impact of structural change in interest rates on deposit and portfolio lending and glance into the possibilities of further reforming the prevailing interest rate regime.

Profile of Sample Organizations

a. Himalayan Bank Ltd. (HBL)

Himalayan Bank was established in 1993 in joint venture with Habib Bank Limited of Pakistan. Despite the tough competition in the Nepalese Banking sector, Himalayan Bank has been able to maintain a lead in the primary banking activities- Loans and Deposits.

Legacy of Himalayan lives on in an institution that's known throughout Nepal for its innovative approaches to merchandising and customer service. Products such as Premium Savings Account, HBL Proprietary Card and Millionaire Deposit Scheme besides services such as ATMs and Tele-banking were first introduced by HBL. Other financial institutions in the country have been following our lead by introducing similar products and services. Therefore, we stand for the innovations that we bring about in this country to help our Customers besides modernizing the banking sector. With the highest deposit base and loan portfolio amongst private sector banks and extending guarantees to correspondent banks covering exposure of other local banks under our credit standing with foreign correspondent banks, we believe we obviously lead the banking sector of Nepal. The most recent rating of HBL by Bankers' Almanac as country's number 1 Bank easily confirms our claim.

b. NMB Bank Ltd (NMBBL)

NMB Bank Limited licensed as 'A' class financial institution by Nepal Rastra Bank in May 2008 has been operating in the Nepalese Financial market for over twenty years and is one of the leading commercial banks in the banking industry.

The Bank has a Joint Venture Agreement with Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (FMO), wherein FMO holds 20 percent of the Bank's shares and is the largest shareholder of the Bank. In September 2016, the Bank signed a Joint Venture Agreement with Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (FMO), the Dutch development bank following which FMO became the single largest share holder of the Bank. The alliance with FMO positions the NMB Bank in becoming the market leader in managing environmental & social risks and the leading player in renewable energy and agribusiness.

1.2 Focus of the Study

In this section brief introduction of only two banks is given which is supposed to be useful to finish research work smoothly. Most of the public limited financial institutions in Nepal are

profit motivated. These organizations survive who can make for these organizations is the interest spread between sources and uses of funds. The main focus of this study is to examine the influencing factors interest rate in Nepalese banking sector taking financial institution as sample commercial banks. Interest rate is believed as one of the most important factors for the development of financial institutions and financial system as a whole. This study also attempts to analyze the methods used by various financial institutions to calculate the interest. The study is also concentrated on whether the theories on interest rate founded by various economists match in Nepalese context or not. Since interest rate is the main concern of every individual who saves (deposits) and borrows money, it is important to study about interest rate. Therefore this study focuses on the interest rate of sample financial banks and the central bank's role regarding interest rate.

1.3 Statement of the Problem

The acceleration of economic development slowly started taking place among developing countries. But they are still facing various hindrances in the way of economic development. However each hindrance is different for each nation. Nepal, due to its own peculiar condition is facing numerous problems. Nepal has to build up infrastructure for the economic development. The main among numerous problems is the lack of capital.

For many years, the indigenous individual, wealthy agriculturists landlords, merchants and traders conducted some banking activities. These unorganized private moneylenders used to extend loans to the people on the collateral of land, house, and precious metals. This resulted in worsening the economic condition of the poor people. In today's world investment is needed highly in every sector of the economy. For that banking and financial institutions are also equally important for providing credit at cheaper rate and enhance deposits providing higher interest rate. People keep their savings idle because they are provided with less interest. In lending, investors are charged high interest rate so the investment is not done in the useful and priority sector. Instead investment is done in unproductive and wasteful sector. The basic problem arises from fact that Nepal Rastra Bank, the central bank of the country, maintains, and is expected to continue, selective and discretionary controls on the interest structure of banks and financial institutions. It has however, not been able to develop consistent interest rate policy. Changes in interest rate offered and charged by commercial banks can be used to attain basic national

economic goals. It follows from this approach that money and capital in developing economy are complementary assets so that raising the real rate of interest on money would tend to increase both the volume of real financial savings and investment and subsequently, the growth rate of the economy. As a result interest rate plays a very important role in underdeveloped country like Nepal where the demand for capital is increasing at every field of the economy. An appropriate interest rate can divert investment in proper field. In short, interest on deposit must be able to increase the amount of deposit by encouraging people to save their income. On the other hand, the lending rate of interest must be attractive to the borrowers, so that they will be able to enjoy benefits by utilizing borrowed fund. This is possible only when the fund-seeking people will be able to earn more than what they pay as interest while borrowing. Thus the appropriate interest rate policy contributes to accelerate the economic development of the nation. But, whether Nepal is able to attain such situation or not is a matter of concern for us. With the above-discussed problem this study attempts to answer the following questions:

- What are the interest rates offered and charged by different commercial banks of Nepal on deposits and loans?
- How much has the interest rate been fluctuated within different time period?
- How far change in interest rate has influenced total amount of deposits and loan advances?
- What are the different ways banks charges interest rate on deposits and loans?

1.4 Objectives of the Study

The main objective of the study is to analyze the changes in interest rate structures and their impact on deposits and lending volume of HBL and NMBBL. The specific objectives are as follows:

- To analyze the changes in interest rate structure of sample banks over different time periods;
- To evaluate the effect of deposit interest rate on deposit volume and flow;
- To examine the effect of lending interest rate on volume and flow of credit exposure; and
- To compare the sample banks in terms of the effect of interest rate on deposit and lending volumes and flows

1.5 Significance of the Study

Interest rate structure being very much sensitive, but also crucial aspect of economic development, much research work has not been found on this topic. Many researchers have not been provided more emphasis about its effect on economic development. Even Depositors and loan holders do not seriously undertake their own exploitation of Commercial banks though high spread rate of interest. So this study will be helpful to public to understand interest rate structure of Commercial banks. Interest rate charged by Commercial banks on loan influences the investment habit of people and again interest offered on deposit also effect on deposit collection and saving mobilization of the nation. This study will also help the policy makers to make strong policy regarding interest rate charged on deposits and lending and also help to teachers, researchers, students & common people providing some valuable information about interest rate, deposit and lending.

1.6 Limitations of the Study

This study is being based on secondary data extracted from published sources is not exact and hundred percent genuine. Though there are many financial institutions in the financial system including banks, finance companies, micro- credit development banks, and ruler development banks play significant role in economic development by accepting deposits and then lending to public. But whole study based on comparative study of two leading banks. Resources-time, money constraints and inaccessibility of sufficient information limit this study.

Although this study has trend try its utmost care to cover most of the important sectors, it is still subjected to following limitations:

- The study is associated only to the deposit and Lending of Himalayan Bank Limited and NMB Bank Ltd.
- In this study, only selected financial and statistical tools and techniques are used, and therefore, the data calculations may contain some error.
- The study is based only on the past years periods data.
- The study relies heavily on secondary data only.
- The whole study is only based on the data of fiscal years period from the F.Y. 2010/11 to 2016/17.

1.7 Organization of the Study

The whole study is divided into five chapters.

Chapter I: The introduction part of the study contains background & introduction, focus of study, statement of problem, objectives of study, significance of the study, and limitations of the study and organization of study.

Chapter II: Review of Literature consists of conceptual framework, revision of Interest Rates Policy, theories of interest rate, economics factors affecting interest rate, factors affecting interest rate and review of related studies

Chapter III: Research methodology focuses on research design, population and sample, sources of data, data analysis tools and presentation.

Chapter IV: The body part of this study includes analysis and interpretation of data of related topic based on annual reports of sample banks and NRB reports

Chapter V: The last chapter includes summary, conclusion and recommendation of the study.

CHAPTER - II

REVIEW OF LITERATURE

It is an integral and mandatory process in research works that consist of reviewing research studies and other relevant proposition in the related area of the study so that all kind of information, conclusion and discrepancies could be known and further study can be conducted. The impact of interest rate structure in deposit collection and it mobilization through loans is an important aspect of financial field. So this study intends to find the impact of interest rate change in deposit and lending of commercial banks. Thus, to have feedback this chapter devotes on the conceptual framework, revision of interest rate policy, theories of Interest Rates and review of books, papers, thesis, articles and policy document.

2.1 The Conceptual Framework

Conceptually, interest is both a payment and receipt for the use of money, interest therefore can be considered from the above two viewpoints. If the interest is paid, it can be considered as a 'cost'. On the other hand, if interest is received it can be considered as a 'return'. Since money can earn a return over a period of time, interest rates are often considered as an expression of the time value of money. Usually interest rates are expressed in percentages.

Interest factor is the main factor in fund-based activities of commercial banks. In recent years interest rate policy has intensified greatly for a number of reason including an increasing dissatisfaction with performance of fiscal policy for economic stabilization. Interest rate affects on the collection of deposits, mobilization of savings and profit position.

Interest rate policy as a monetary instrument was employed by the NRB since September 1966. The basic objectives behind the changes in interest rates has been to strike trade off between bank resources and bank lending, to give a positive real rates of interest to depositors and encourage savings to make efficient and rational allocation and use of bank resources, and to contribute to price stability and favorable position of balance of payment. There is a negative relationship existing between interest rate and deposits. This implies that increase in interest rate was followed by decrease in the amount of deposits.

As a form of income accruing to its owner for the use of capital, interest has been subject of deep and fierce controversy from very early times. Philosophers, religious, leaders, Social reformers and statesman all had expressed their views on the desirability or otherwise of accepting the payment of interest on the part of the lenders. Various economists in following ways define interest rate, one of the components of monetary economics;

Keynes community's liquidity preferences and quantity of money determines the level of rate of interest. These three things liquidity preferences, quantity preferences (quantity of money) and rate of interest are negatively correlated. At low rate of interest the liquidity preference of community is high and it is low at high rate of interest. It is Keynes (1936) who gave interest rate a small but significant role.

The neo-classical as the modern theory of the rate of interest is an offspring of the marriage between classical and Keynesian theory. Hicks developed this in 1937. He gave birth to a new theory by combining the above theories. Following the classical approach, investment has been treated as a negative function of interest rate while saving has been regarded as a positive function of interest rate. Similarly, following the Keynesian approach, the liquidity preference or the demand for the money has been treated as a function of income and the rate of interest while the supply of the money has been treated as being autonomously determined by the monetary authorities. Carver (1979) considers interest "as the income which goes to the owner of capital".

From the above theories and definition it has been cleared that there are four determinants (along with income) of the rate of interest. These are saving functions, the investment function, the liquidity preference function, and supply of money. Thus the study includes two determinants i.e. saving and investment functions of commercial banks.

Thus Deposit collection and fund mobilization in different sector is the main function of Commercial Banks. Commercial Banks are also generated income from fee-based activities rather than always depending upon fund based activities. Interest factor is the main factor in fund activities of Commercial banks. Interest rate affects on the collection of deposits, lending, and mobilization of saving and profit position. From appropriate interest rate, Commercial Banks fix their decision that whether to control the loans to flow the saving.

The level of interest rate is set by the interaction of supply and demand of Fund. Generally, the higher interest rates attract more deposits and lower interest rates on loans attract more loans and vice –versa. However, in Nepal, due to existence of some uncommon practices, the interest rate does not seem to have such impacts on deposits and credits. We may notice that, at some time there is increase in loan demand in spite of rising rates or increase in deposits even when deposit rates are reduced. People deposit in the banks not only for interest earning but also for safety. Funds from the banks are much cheaper than that from unorganized moneylenders. Therefore, loan demand in bank always tends to increase even at higher interest rate. Further more, an increase in economic and business activity always increase funds demand.

Thus the interest rate is the price of money, the price of renting the use of the resources for a specified period of time. Again, it is the price a borrower must pay to secure scarce lonable funds from a lender for an agreed upon time period. The rate of interest is really a ratio of two quantities: the money cost of borrowing divided by the amount of money actually borrowed, usually expressed on an annual percentage basis. An important aspect of interest rate policy is the setting of an appropriate margin between the lending and deposit rate. If the margin is too high, banks will make excessive profits and this lead to waste of saved resources. If it is too low it will discourage intermediation and devitalize financial institutions. Hence it can be concluded that changes in interest rate structure produces either positive or negative impact upon the growth of developing economy. When such amendments are introduced without thinking seriously, the more spread rate effects negatively rather than positive ones.

Interest also includes Reward for risk taking. The lender exposes him to risk when he lends money. The greater the risk element the higher rate of gross interest. Unsecured loans are more risky than secured loans and they carry a high premium rate. Interest also termed as Reward for inconvenience. When a lender loans money he forgoes its use for the duration of the loan. His money is locked up and cannot be used for more profitable purposes. From above theoretical discussion, we come to know that there is intensive relation of interest rate with other terms and brief discussion is held below:

2.1.1 Interest Rates and Deposit

Interest is the price for deposits. A high interest rate diverts the resources from productive tangible assets into financial claims. Interest rate acts as a mark of clearing device in respect of Nepalese imperfect market. Pant (1983), mentioned that changing interest rates in deposits changes the saving held by the Nepalese individuals. The change in interest rate structure helped to raise the savings, especially from rural areas.

2.1.2 Interest Rates and Lending

Interest rate is the reward for lending money. A high interest (lending) rate will discourage the investor's productive efforts and similarly low interest attracts the investor to lend money for business and industrial purpose. NRB, through various attempts, change periodically the interest

rate structure typically decreasing lending rate and increasing deposit rate to minimize the spread rate of interest. So negative relationship exists between lending rate and its amount.

2.1.3 Interest Rate and Monetary Policy

There is a deep relationship between interest rates and monetary policy. Increasing the money stock can lower the interest rates, but this act also produces forces, which will of set the lowering within several months. In order to keep low interest rates it is necessary to increase money stock continuously. But this act generates expectation of rising prices that tend to raise interest rates.

2.1.4 Interest Rate and the Profitability

Schulz (1978) explains that an important aspect of interest rate policy is the setting of an appropriate margin between the lending and deposit rate. If the margin is too high, banks will make excessive profits and this may lead to waste of saved resources. If it is low, it will discourage intermediation and devitalize financial institution. The profit of commercial banks, as an accounting identity, is equal to the interest from earning assets less the interest cost on deposit. So the change in interest rate structure has positive impact on profit position.

2.1.5 Interest Rates and Price Level Changes

One study depicted that there is a relation between interest rates and price level. They are as follows:

- 'High' interest rates accompany 'high' prices and 'low interest rates Accompany 'low' prices.
- Interest rates and weighted average of past price level changes are correlated with each other.
- Interest rate tends to be high when prices are rising and vice-versa.
- Interest rate movement lags behind price level changes.

2.2 Revision of Interest Rates Policy

2.2.1 Revision of interest rates policy before liberalizations (1966 to 1989) or NRB's domination of Interest Rates

Interest rates policy as a monetary policy instrument was employed by NRB since September 1966 after a decade of its establishment. Before 1966, there was only one commercial bank i.e.

Nepal Bank Limited that was 51 percentage governments controlled. Bank interest has been changed only once in 1965 since its establishment in 1938. The reason behind this the Nepal Rastra Bank (NRB), which was established as central banks in April 26, 1956 has been taking increasing interest in the activities of commercial banks. Accordingly, commercial banks and financial institutions had to fix their rates with the prior approval NRB. NRB under dominant role imposed various rules & regulation about interest rate upon commercial banks. The first attempt of NRB was to make flexible policy in controlling interest rate aimed to increase deposit rate & lending rate also through various exercises and practices. Under this revision of interest rate was held lot of times. There is strong control in interest rate structure up to 3 decade of its establishment. Interest rat was taken as s main weapon of saving mobilization. Even though it was lower at that very period. During this period NRB increased saving and fixed (two and above years) deposit rate up to 8 percentage & 16 percentage respectively and also increased lending rate up to 18 percent. Second attempt of NRB made downward revision in the interest rate structure in which deposit rate and lending rate decrease significantly but supposed not to be adversely affect on deposit collection and expected to promote investment in productive sectors.

2.2.2 Gradual Liberalization in Interest Rates and Economy before restoration of Democracy

Regulation of the financial system aimed at control of the economy rater than foster the safety and soundness of financial system. But the interest rate deregulation, curtailment or elimination of directed credits, lifting entry and exit barriers for financial intermediaries, restructuring of banking system and institution of regulatory and supervisory mechanism are some of the components which open the door of such liberalization.

The era of interest rate liberalization started in November 16, 1984 when NRB granted autonomy to commercial banks to fix the rates of interest over and above the NRB rates by 1.5 and 1 percentage points respectively on saving and term (fixed) deposit. NRB directed commercial banks to reduce the interest rates by 2 percentage points than the normal credit for agricultural and cottage industries in the 18 remote districts.

Interest rate liberalization, could not fully meet the objectives behind this step. The oligopolistic nature of the commercial banking system produced car telling in interest rate determination. As a

result, the lending rates and deposit rates declined faster than the lending rate resulting in widened spread between lending and deposit rates. Interest rate structure could not be transparent and depositors and borrowers were not treated uniformly in terms of interest rate. Thus instead of fair competition in the market, discrepancies were observed in interest rate structure after its deregulation.

2.2.3 Gradual liberalization of Interest Rate after Restoration of Democracy

After the restoration of the democratic government in the country, efforts have been geared to liberalize the economy and liberalization caught its speed in May 1991. As a result many of the business are flourishing up in the country. With the process of liberalization, efforts are underway to remove and deregulate the rigid regulations, minimize the bureaucratic controls, simplify the procedures and to create an appropriate climate for market force to participate in the process of development.

To correct dissatisfaction of 1984 financial liberalization, effective August 22, 1992 NRB issue following directives to banks and other financial institutions.

- Interest rate on deposits of at least up to one year to be clearly spelled out,
- Range of interest rates on the credit of same type or purpose not to be more than one percent,
- Fixation of interest rate on flat basis to be stopped,
- The information about the changes in interest rates immediately and in other condition one in every three months (within the first week of Shrawan, Kartik, Marga and Baishakh) should be sent to NRB in the prescribed form and should be published in the major newspapers for public information,
- Violation of the above-mentioned directions would be punishable according to Commercial Bank.

In addition to this, the NRB also suggested to commercial banks and other financial institutions to limit the spread of interest rate at 6 percentage within mid-December 1993. This rate is

difference of interest rate on deposit and credit. NRB also formulated the rules to check this spread rate strictly in respect of Commercial banks and Financial Company.

Finally, in considering the situation of sluggish economic growth, slowdown in the growth of private sector credit, higher interest rate spread of commercial banks rising demand of the entrepreneurs and businessmen for the reduction of the interest rate and as per the commitment of the government in the Budget Speech of fiscal year 2001/02 to limit the interest spread within 5 percent, the NRB issued the following directives on interest rate from February 14, 2001.

a) The commercial banks should inform NRB in written form regularly and compulsorily, and publish in the news media within every three months and immediately in case of change in interest rate.
b) The commercial banks could offer interest rates more than published interest Rates by 50 basis points on the basis of negotiation with the customers for the Deposits up to Rs 200 million and 100 basis for the deposits more than Rs.200 million.
c) Over the published lending rate for all types of loans, the banks could make adjustment up to 50 basis points on the basis of negotiation with the customers.
d) While publishing any deposits or any lending rate except the provision made above (b) and (c), the commercial banks were not allowed to mention the term could be determined on the basis of negotiations. If interest rates are determined against this directive, penalty equivalent to an amount arising from such increased or lowered rate of interest would be imposed.

2.3 Theories of Interest Rate

Various interest rate theories have been propounded by various economists, which describe how interest rate is determined in various situations. Some well-known theories of interest rates are as follows:

2.3.1 The classical theory of interest rates

One of the oldest theories concerning the determinants of the pure or risk-free interest rate is the classical theory of interest rates, developed during 18th and 19th centuries by a number of British economists and elaborated by Fisher (1930) earlier in this century. The classical theory argues

that two forces determine the interest: first is supply of savings, derived mainly from households, and second the demand for investment capital, coming mainly from the business sector.

Saving by Households by Peter (2003): Individuals and families carry out most of the saving in modern industrialized economies. For these households, saving is simply abstinence from consumption spending. Current savings therefore are equal to the difference between current income and current consumption expenditures. In making the decision on the timing and amount of saving to be done, households typically consider several factors: the size of current and long term income, the desired savings target, and the desired proportion of income to be set aside in the form of savings (i.e the propensity to save). Generally the volume of household savings rises with income. Higher income families and individuals tend to save more and consume less relative to their total income than families with lower incomes. Although income levels probably dominate saving decisions, interest rates also play an important role. Interest rates affect an individual's choice between current consumption and saving for future consumption. The classical theory of interest assumes that individuals have a definite time preference for current over future consumption. A rational individual, it is assumed, will always prefer current enjoyment of goods and services over future enjoyment. Therefore the only way to encourage an individual or family to consume less now and save more is to offer a higher rate of interest of current savings. If more were saved in the current period at a higher rate of return, future consumption and future enjoyment would be increased. The classical theory considers the payment of interest a reward of waiting-the postponement of current consumption in favor of greater future consumption. Higher interest rates increase the attractiveness of saving relative to consumption spending, encouraging more individuals to substitute current saving (and future consumption) for some quantity of current consumption. This so-called substitution effect calls for a positive relationship between interest rates and the volume of savings. Higher interest rates bring forth a greater current volume of savings.

Savings by business firms

Not only households, but also business, save and direct a portion of their savings into the financial markets to purchase securities and make loans. Most businesses hold savings balances in the form of retained earnings, In fact, the increase in retained earnings reported by businesses each year is a key measure of the volume of current business saving. And these retained earnings

supply most of the capital for annual investment spending by business firms. Saving depends on two key factors: the level of business profits and the dividend policies of corporations. These two factors are summarized in the retention ratio, the ratio of retained earnings to net income after taxes. This ratio indicates the proportion of business profits retained in the business for investment purposes rather than paid out as dividends to the owners. Experience has shown that dividend policies of major corporations do not change very often. Many corporations prefer to keep their dividend payments level constant or increase them slightly each year, regardless of their current earnings. Any shortfalls in earnings needed for dividend payments are made up though borrowing. The critical element determining the amount of business saving is then, the level of business profits or retained earning. If profits are expected to rise, business will be able to draw more heavily on earnings retained in the firm and less heavily on the money and capital markets for funds. The result is a reduction in the demand for credit and a tendency toward lower interest rates. On the other hand, when profits fall but firms do not cut back on their investment plans; they are forced to make heavier use of the money and capital markets for investment funds. The demand for credit rises, and interest rates may rise as well. Although the principal determinant of business saving is profits, interest rates also play role in the decision of what proportion of current operating costs and long term investment expenditures should be financed internally and what proportion externally. Higher interest rates in the money and capital markets typically encourage firms to use internally generated funds more heavily in financing projects. Conversely, lower interest rates encourages greater use of external funds form the money and capital markets, Panta (1983).

Savings by government

Governments also save, though less frequently than households and business. In fact, most government receipts unexpectedly exceed the actual amount of expenditures. Income flows in the economy (out of which government tax revenues arise) and the pacing of government spending programs are the dominant factors affecting government savings. It increases the supply of funds, Keynes (1936).

The demand for investment funds:

Seth (1979), stated the major determinant of interest rate discuss above is saving of Government, Individuals and Business. Saving is the surplus money exceed than their expenditure. The next

side of interest rate is the investment and spending by business, individual and Govt. Investment consists of purchasing of huge Machinery, Plant and Equipment by business firm.

The Classical Economist believed that interest rate is determined by supply of saving and demand of investment. Supply of saving increase if interest rate offering is high and vice versa. But demand of investment increase if interest rate is less provided by bank. Thus supply of saving & demand of investment are two factors that one move co-path with interest and another move in opposite path of interest. During the interaction, Equilibrium point can be obtained where the quantity of saving supplied to the market is exactly equal to quantity of fund demands for investment. It is called equilibrium point of rate of interest.

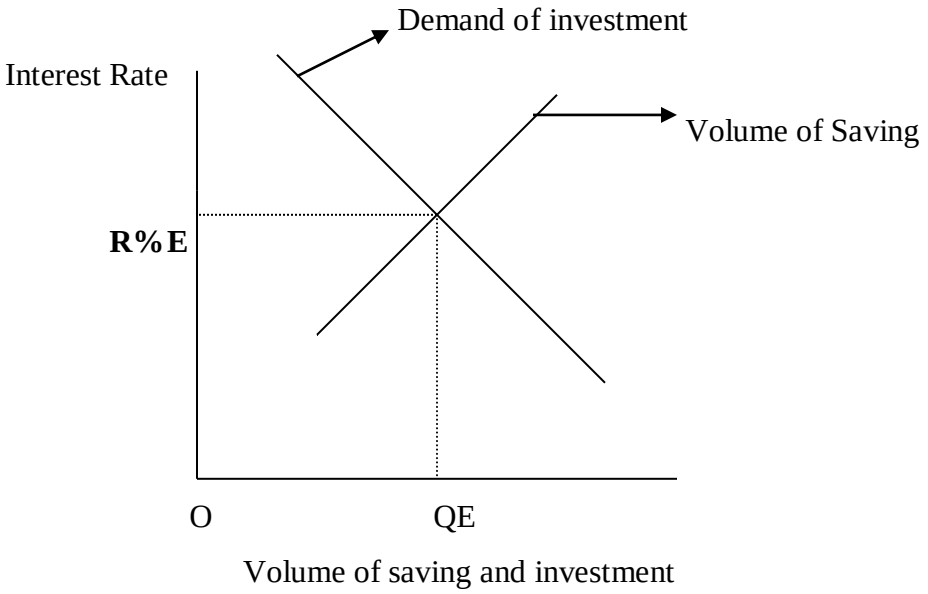


Figure.1 The equililibrium rate of interest in the classical theory

As shown in figure, E is equilibrium point of Demand & Supply of Fund and R percent is interest Rate. Classical Economist, if interest is temporarily above the equilibrium i.e. supply of saving exceed demanded fund, savers offer low interest continuously until interest rate come down equilibrium point. Similarly if interest rate is temporarily below equilibrium i.e. Demand of investment exceed supply of saving, fund holder demand high interest rate continuously until it reaches to the equilibrium point.

2.3.2 The Loanable Fund Theory of Interest Rate

It is advance form of Classical Theory in which many of limitation of previous theory try to overcome. Classical theory especially based on saving and spending of Individual, government & business. But it is mainly based on two forces: the risk free rate of interest is determined by interplay of demand for &supply of credit (loanable fund).

Total demand for loanable funds

Bhattarai (2014), viewed sum of loanabe fund demanded by domestic consumer, National business and government and foreign business. Consumers demand loan for purchasing good and service, Business demand loan for purchasing of Machine and Equipment and Government generally demand loan for nation's building and administration. Recent research indicates that consumers are not particularly responsive to the rate of interest when they seek credit but focus instead principally on the non-price terms of loan, such as the down payment, maturity, and the size of installment payments. This proves that consumer demand for credit is relatively inelastic with respect to the rate of interest. The credit demands for domestic businesses generally are more responsiveness to changes in the rate of interest than in consumer borrowing. Government decisions on spending and borrowing are made in response to social needs and the public welfare not the rate of interest. In recent years foreign banks and corporations, as well as foreign governments, have increasingly entered the huge U.S. financial marketplace to borrow billions of dollars. This huge foreign credit demand is sensitive to the spread between domestic lending rates and interest rates in foreign markets. Higher interest rates lead some businesses, consumers and governments to curtail their borrowing plans: lower interest rates bring forth more credit demand.

Total supply of loanabe funds Bhattarai (2014): It is accumulated fund of supply mainly from domestic saving, dishoarding of money, foreign lending and domestic lending from banks. Dishoarding of money is the difference between supply of money and it's public demand. Negative hoarding of money i.e. dishoarding created only when supply of money is greater than it's demand. Domestic saving is the saving of public if their current income exceed than current expenditure. Businesses, however, also save, by retaining a portion of current earnings and by adding to their depreciation reserves. Government saving while relatively rare occurs when current revenues exceed current expenditures.

The equilibrium rate of interest in the loanable funds theory:

The demand and supply of loanable fund are two forces that determine volume of lending and borrowing as well as rate of interest. The equilibrium point in which demand and supply of loanable fund equal with each other is the equilibrium point of interest.

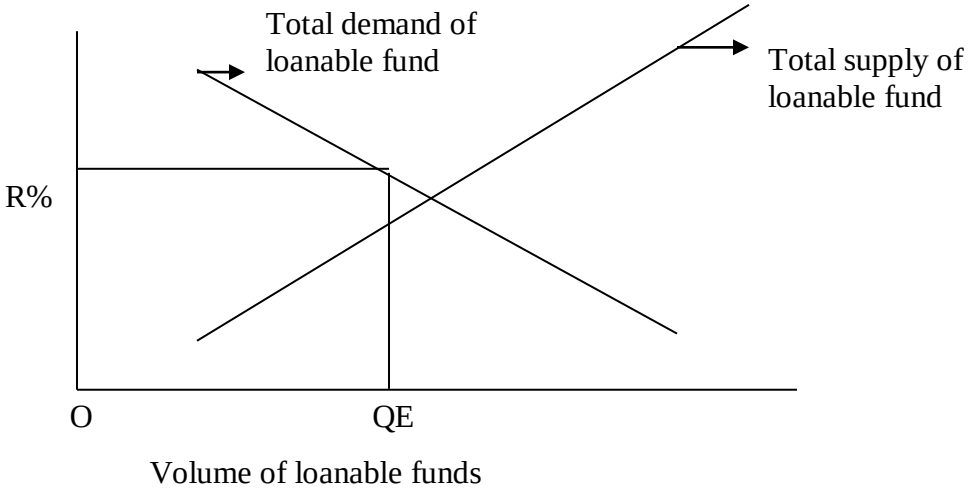


Figure 2. The equilibrium rate of interest in the lonable funds theory

As shown in above figure, QE is the volume of loanable fund in which total demand and supply of loanable fund equal and R percent is equilibrium point of interest rate.

2.3.3 The Liquidity preference theory of interest

This is Keynes (1936) theory of interest rate. According to this theory, interest is the interplay of demand for liquidity and supply of money. The first major element determining interest rates in liquidity preference theory is the demand for liquidity. Keynes argued that the rate of interest is really a payment for the use of scarce resource, money. Business and individuals prefer to hold money for carrying out daily transactions and also as a precaution against future cash needs even though its yield is low or nonexistent. Investors in fixed-income securities, such as corporate and government bonds, frequently desire to hold money as a haven against declining security prices. Interest rates, therefore are the price that must be paid to induce money holders to surrender a perfectly liquid asset and hold other assets that carry more risk. At times the preference for liquidity grows very strong unless the government expands the money supply, interest rate will rise. In the theory of liquidity preference only two outlets for investor funds are considered: bonds and money (including bank deposits). Money provides perfect liquidity (instant spending

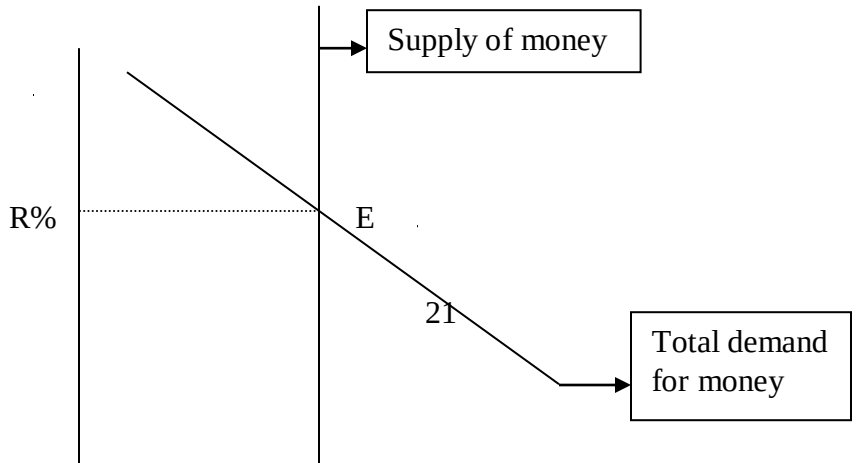
power); bonds pay interest but cannot be spent until converted into cash. If interest rates rise, the market value of bond paying a fixed rate of interest falls.

The investor would suffer a capital loss it those bonds were converted into cash On the other hands, a fall in interest rates results in higher bond prices: the bondholder will experience a capital gain if his or her bonds are sold for cash. To the classical theorists, it was irrational to hold money because it provided little or no return. To Keynes, however the holding of money could be a perfectly rational act if interest rates were expected to rise, because rising rates can result in substantial losses for investors in bonds. The total demand for money in the economy is simply the sum of transactions, precautionary, and speculative demands. Because the principal determinant of transactions and precautionary demand is income, not interest rates, these money demands are fixed at a certain level of national income.

The second element determining interest rates in this theory is the supply of money. In modern economies, the supply is controlled or at least closely regulated, by government decision concerning the size of the money supply presumably are guided by the public welfare, not by the level of interest rates; we assume that the supply of money is inelastic with respect to the rate of interest.

The equilibrium rate of interest in liquidity preference theory

The interplay of the total demand for and the supply of money determine the equilibrium rate of interest in the short run. As shown in the figure 2, the equilibrium rate is found at point E, where the quantity of money demanded by the public equals the quantity of money supplied.



QE Quantity of money demand and supply

Figure 3. The equilibrium rate of interest in the liquidity preference theory.

As shown in above figure, Supply of money is constant i.e. inelastic with interest rate but demand for money is elastic with interest rate. Above this equilibrium rate, the supply of money exceeds the quantity demanded, and some businesses, households and units of government will try to use their balance money by purchasing bonds. The price of bonds will rise, driving interest rates down toward equilibrium point. On the other hand, at rates below the equilibrium the quantity of money demanded exceeds the supply. Liquidity preference theory provides some useful insights into investor behavior and the influence of government policy on the economy and financial system. Liquidity preference theory illustrates how central banks such as Federal Reserve System can influence interest rates in the financial markets, at least in the short term. If higher interest rates are desired, the central bank can reduce the size of the money supply and interest rates will tend to rise (assuming the demand for money is unchanged). If the demand for money is increasing the central bank can bring about higher interest rates by ensuring that the money supply grows more slowly than money demand. In contrast, if the central bank expands the money supply, interest rates will decline in the short term (provided the demand for money does not increase).

2.3.4 Rational Expectancy Theory

In recent years, a fourth major theory about the forces determining interest rates has appeared and now appears to be gaining supporters. This is the rational expectations theory of interest rates. It builds on a growing body of research evidence that the money and capital markets are highly efficient institutions on digesting new information affecting interest rates and security prices. The important assumptions and conclusions of the rational expectations theory are that the prices of securities and interest rates should reflect all available information and the market

uses all of this information to establish a probability distribution of expected future prices and interest rate; changes in rates and security prices are correlated only with unanticipated information; the correlation between rates of return in successive time periods is zero; expectations concerning future security prices and interest rate are formed efficiently. The rational expectations view argues that forecasting interest rates requires knowledge of the public's current set of expectations. If new information is sufficient to alter those expectations, interest rates must change. It implies that policy makers cannot cause interest rates to move in any particular direction without knowing what the public already expects to happen and indeed, cannot change interest rates at all unless government officials can convince the public that a new set of expectations is warranted.

Nevertheless, the rational expectations view is still in the development stage. One key problem is that it is not known very much about how the public forms its expectations, what data are used, what weights are applied to individual bits of data, and how fast people learn from their forecasting mistakes.

2.4 Economics Factors Affecting Interest Rate

Interest is really the yield rate of lender and Investors. We had discussed different theories in which we know the various factors and element that affect the interest rate. From these theories, we come to know that Demand and Supply of money or loanable fund or volume of liquidity in economy surely affect the interest rate. Moreover we have also the following other factors to affect interest rate.

2.4.1 Impact of inflation on interest rate

Peter (2003), one of the most serious problems confronting economies around the globe in recent years is inflation. The relationship between interest rates and expected inflation is often referred to as the Fisher effect. Inflation is defined as a rise in the average level of prices for all goods and services. To explore the relationship between interest rate and inflation it is better to distinguish nominal and real interest rates. The nominal rate is the published or quoted interest rate on a security or loan. In contrast real interest rate is the return to the lender or investor measured in terms of its actual purchasing power. An increase in expected inflation automatically increases nominal interest rates. But expected real rate of return tends to be

relatively stable over time because it depends on such long-term factor as the productivity of capital is likely to influence only the nominal interest rate, at least in the short run.

2.4.2 Impact of default risk

Varying of interest rate caused by degree of default risk associated with different kind of securities. Default risk is the probability of not paying the promised amount on time. There is positive relationship between yield of securities (interest) and degree of default risk. Higher level of default risk requires higher level of interest to compensate it effect and Vice versa.

2.4.3 Marketability and liquidity

Marketability is the capacity of being sold quickly at low transaction costs. A liquid financial asset is readily marketable. Both features of securities closely influences interest rate or yield. Even of an asset is marketable it is not liquid if selling immediately rather than waiting to sell, involves an expected loss. In addition its prices tend to be stable over time and it is irreversible. Because the liquidity feature of financial assets lowers their risk. So liquid and marketable assets carry lower interest rates than illiquid and less marketable assets.

2.4.4 Impact of budget deficit on interest rates

When the Government enacts fiscal policies that result in more expenditure than tax revenue, the budge deficit is increased. A higher government deficit increases the quantity of lonable funds demanded at any prevailing interest rate, causing as upward shift in the demand schedule. Assuming no offsetting increase in the supply schedule, interest rate will rise. Given the certain amount of loanable funds supplied to the market (through savings), excessive government demand for these funds tends to crowd out the private demand (by consumes and corporations) for funds. The government may be willing to pay whatever is necessary to borrow theses funds, while the private sector may not. This impact is known as crowding out effect. This effect causes upward pressure on interest rate. Thus Government deficit budget place upward pressure on interest rate.

2.5 Maturity Structure (Term Structure) of Interest Rates

Interest rate varies according to the maturity of Securities. If two securities are identical in every aspect except maturity, they might have different yield (interest rate).Generally a short-term security has higher interest than one of long-term security because of risk factor. In our real practice, we have to pay high interest rate in short-term loan than long term one. The fixation of short term rates on bank loans at a level higher than the rates on their terms loans and long term loan. Thus the relationship between market rates of interest with term to maturity of same security is called Term Structure of interest rates. Long-term rates tend to change gradually over time while short-term interest rates are highly volatile and often move over wide ranges. Vaidya (2015) Short-term interests rate various per day, per week, per month and per year and to the maximum numbers of year for which it may be considered is three years. However, three years is usually too long for short-term purpose.

The short term rates may be defined as interest rate of bank, the Treasury bill rate, the call money rate, the short term deposit rate and the commercial bank rate or any other rates applied by Commercial banks and organizations. Many business enterprises always suggested that the short-term interest rates should be reduced to establish a proper alignment between two kinds of interest rate. People generally held both long term and short-term securities depending on the relative yields. Usually the long term securities tend to fluctuate more in price than the short-term securities, even though their yields do not fluctuates as much. There are various factors, which determine the term structure of interest rate: as risk preference, supply demand conditions, expectations and uncertainty.

2.6 Deposits

Deposits are the real economic variable, which is influenced by the interest rate. It is closely linked to savings in the economy. Personal and Institutional saving influence the volume of Deposits. It is one of major functions of bank. Fixing appropriate interest rate on deposits is very important because it is the cost of resource on one hand and on the other; it is an attraction to the customers' savings. Attractive interest rates and other facilities can also be helpful towards mobilization of the scattered domestic savings as well as attracting foreign saving in banking system. Banks provide various kind of interest according to the term of Deposit. Bank collects money through three type of Deposits i.e. Current Deposit, Saving deposit and Fixed or Term Deposit. Bank provide higher rate of interest in Fixed Deposit according to term of deposit. So

fixation of interest rate is very critical and sensitive because too high interest on deposit rate is unprofitable and to low rate is unattractive to the savers. Radhaswami (2015) businessmen favor current deposits because bank allows unrestricted freedom regarding the withdrawal of those deposits. Saving deposits are not intended for current transaction. There are several restrictions on these deposits regarding the amount of deposit, and number of withdrawals etc. They are used more as investments and hence they earn some interest. Besides interest there are other numerous factors other factors that affect deposits as income of people, their saving behavior, foreign investment opportunities, security and future expectations.

2.7 Lending

Lending is the process of providing loan to public, institution, and government to support and increase investment activities in the country. Investment is very essential factor in economic development. Fair and Reliable Lending policy of the Commercial bank direct the investment behavior of the people toward productive sectors. This is regular function of bank by which the accumulated deposit money distributes to public as loan. The amount of money which bank lends is invested in various sectors for the health and vitality of the economy. Improper and unsystematic lending may lead to fragile economy. Money is lended to investors in various forms as short-term loan, medium term loan and long-term loan. With the term structure of loan interest rate also varies. Banks charge different percentage of interest rate taking into consideration the nature of loan. Rates vary also with the degree of credit risk associated with the loan, its maturity, and the size of the borrower and of the loan. In addition, rates on lending are influenced by habit and custom, competition between banks and other sources of funds.

2.8 Review of Previous Theses and Other papers, articles, documents

2.8.1 Review of Papers

Athukorala and Rajapatirana (2014) developed a framework for analyzing the relationship between financial markets and the effects of trade liberalization. They found that the financial markets significantly affect the outcome of trade liberalization. They stated that a rise in interest rates toward market clearing levels, when it is one part of financial reform package, may be an effective means of preventing premature appreciation of the exchange rate. An increase in interest rate raises the demand for interest bearing bank deposits and reduces non tradable prices for a given rate of money expansion and inherited set of inflationary expectations. A rise in

interest rates will produce a immediate increase in the volume of bank credit and thus it facilitate supply side adjustments.

Economic Literature of American Economic Association, presented regarding the definition of interest it is interesting to note some conflicting arguments of two groups. The classical idea was that interest rate was the reward for not spending, i.e. it is the incodement to retrain from spending. In apparent contrast the Keynesian doctrine is that interest is the reward for not hoarding, i.e. it is the inducement to part with liquidity.

Kafle (1990), opines in the economic review of NRB that Consolidation and liberalization of interest rate reform measure was initiated with a view to provide more option to commercial banks in the mobilization of saving and portfolio management through market determined interest and lending rates.

Kunt and Detragiactie (1991), has defined in their working paper about debt and international finance that Differential treatment has resulted in average in interest rates well below market rates. Lower interest rates were in part the result of a favorable assessment of default risk, which could be attributed to prudent policies in the borrowing country.

Willamson (2014), found that savings and investment decisions are highly interdependent in Asian sector. Interest rates mostly attract household people to save money for short period. Its influence is less in the long run saving decisions.

There is some relevant evidence on the sensitivity of consumption to interest rates in United States. In Hamburger's (2015) stated monetary policies have a significant effect on consumer purchase of durable goods and the most appropriate measures of these variables are interest rate.

2.8.2 Review of Articles

Sharma (2015) in the study, 'Banking the future on competition' has found that all the Commercial banks are establishing and operation in urban areas. The achievements are:

- Commercial banks are establishing and providing their services in urban areas only. They do not have interest to establish in rural areas. Only the branch of Nepal Bank Ltd and Rastriya Banijya Bank Ltd are running in those sectors.
- Commercial Banks are charging higher interest rate on lending.
- They do not properly analyze the credit system.
- They have maximum tax concession.

Sharma (2015), stated that due to lack of investment avenues, banks are tempted to invest without proper credit appraisal and on personal guarantee, the negative side effects would show colors only after four or five years. There has further included that private Commercial Banks have mushroomed only in urban areas where large volume of banking transaction and activities are possible.

Shrestha's (2014) view in his article that the main point to be considered in interest rate reform is that such change in interest rate provides fair distribution of fixed deposits according to their length and amount. This king of information, if extended to other items, would be a good bare for analysis of bank's liquidity. Although the belief that high interest rate tends to avoid capital flights to India, yet the actual fact is that increase in interest rate of government securities has compelled banks to raise interest rate on deposits and there by making lending to productive sector costly it is advisable to lower interest on government securities enjoying tax advantage so that there will be better effect on deposit and lending rates.

K.C.(2016) has written that the interest rate is one of the main weapon of monetary policy. The best level of interest should be mentioned for the identification of the opportunities within economic investment. Interest rate changed according to the change in economic situation or according to the demand and supply of capital. He added the following facts regarding interest rate.

- The level of interest depends upon the internal liquidity situation of nation. The change in interest rate is occurred by the deregulation of demand and supply of resources. Interest rate also depends upon the change in real national income, return on alternative income, number of financial institution, financial tools and the capacity of financial institutions.

- Less spread shows the ability of financial institutions, but it is necessary to keep appropriate spread level for financial institution to mention then qualified in this sector.
- Low rate of interest affects negatively in saving mobilization, flexibility of capital, effective utilization of capital resources and high interest rate affects investment.
- The desire of saving money of general people closely related with the rate of Interest on deposits. And the rate of interest on deposits of financial institutions depends upon the liquidity position and loans demanded.

Pant (2016) stressed that in article that management of internal loan affected by the interest rate directly. Interest rate structures help government to take decision regarding loans. It also decides about the level of investment, which can invest by the investors. In the case of perfect money and capital market interest rate declare by the supply of money that can be invest and its demand from private sector to government sector. But in developing countries interest rate must be higher because of government's high demand for capital.

2.8.3 Review of Thesis

Chitrakar (2016) emphasized that interest rate is an essential feature of loan. It is based on principle of profitability. The bank charges interest on loan and gives interest on deposits. In general if rate of interest on loan is highest it results in the low demand of loan and vice-versa. However, the rates of interest, which the banks change on loan, are higher than the rate of interest, which it pays to its depositors. If it doesn't do so it could not run its business.

K.C (2015) concluded that the liquidity of interest rate highly affects the deposits and lending position. The relation of interest rate and deposits show that interest elasticity is greater than unity. If the rate of interest increases, deposit volume increases in greater level. In the same way Credit is related with the loan rate of interest. It is known that there is negative relationship between loan rate of interest and credit flows i.e. if the loan rate is low the credit flow increases. So, deposits and loans depend upon the interest rate. It is one of the important factors, which determines the deposit and loan amount. If interest rate only taken by keeping other variable constant we will get that the institutional interest rate is the important explanatory variable to influence the volume of deposits in Nepal.

Neupane (2014) mentioned that interest rate varies among nations. It depends upon their economic activities and existing policies. In every economy, we find inverse relationship between investment and interest rate. Higher the interest rate, lower the investment and vice-versa. Direct relationship may be found between interest rate and savings. With the lower the interest rate, the deposit also falls down. So while determining interest rate there should always be equality in savings and investment. Appropriate interest rates scan direct investment in the proper field. For resources, interest rate should be positive. In Nepal, interest rate can perform the following functions,

- The interest rates mobilize savings.
- The interest rate is an effective rationing device for the allocation scarce resources between alternative investments.
- The interest rate can provide a social discount rate for decision to save and invest. Interest rate has the guideline for directing the investment into productive sector. The cheaper interest rate of the commercial Banks diverted the capital into unproductive and speculative sectors.

Shrestha (2015) enlightened that a study on deposit mobilization and utilization of Commercial Banks with special reference to Nepal Bank Ltd. Shrestha has made the following conclusion of this study, which covers a period of ten years (2031 to 2040).

Nepal Bank Ltd has been much efficient in the collection of resources from the people in both urban and rural are as of the country. But in the progress of its utilization, they are still behind. There is a decrease in the ratio of loans and investment to deposits and a wide gap has existed between them. The collection of deposits the percentage has increased too much because of the facts that the Commercial Banks have not able to motivate and facilitate too their client except to change in the rate of interest. The interest rate has played important role in mobilizing and utilizing the resources of the bank. So the structure of interest rate should be changed according to the need of nation.

Again the function of Commercial Banks is to offer short-term loans for working capital but they collect fixed deposits. Thus they have capacity to offer medium and long-term credit and are found keeping deposits idle. Thus it can be said that the Nepal Bank Ltd is not playing active role to utilize the collected savings according to the borrowers and national requirement for long term and medium term investments.

Dangol (2016) presented that the impact of interest rate on financial performance of Commercial Banks of Nepal was carried out in 2060 and the major findings of this study are as follows;

- Most of the sample commercial banks contradict the general financial theory. The average data also is contradictory with the general financial theory. Thus, the whole banking sector represents an anomaly in the financial theory.

- The relation between deposit and interest rate must be positively correlated. But this is not so as indicated in the study. The analysis shows just the opposite picture. The study reveals that in our economy as a whole, deposits are increasing despite the decrease in the general level of interest. This is because of the lack of investment opportunities for the investors. The economy of the country is stagnant at the present time. This has resulted in low consumer and business confidence. As a result of such psychological phenomenon, businesses are reluctant to invest in new ventures. The result of such phenomenon is that there are fewer investment opportunities for the banking sector as well as the general investors. This causes people to deposit money in banks and banks are forced to lower the interest rate to cut the cost of fund and induce more loans from the bank.

- The relation between total amount of loan and the lending rate is negative and significant in all the cases. This thus is what is expected in an economy. This is one aspect, where the general economic theory is applicable. The change in the total amount of loan flow is not however proportionate with the change in the lending rate, this also caused by the current state of the economy.

- The general trend of the operating cost of the Commercial banks is growing this is probably the result of inflation prevailing in the economy. The trend of the interest rates are however just

opposite. Thus, since the general trends of both the variables under consideration are opposite the correlation analysis is not able to clearly decipher the relation between the variables.

CHAPTER - III

RESEARCH METHODOLOGY

3.1 Introduction

In previous chapter, the conceptual framework regarding interest and relevant literature, concerning my study has been reviewed as an input to broaden the base of this study. As a result these study and analysis has become a major tool to comfort me to come to the choice of research methodology. This is useful to reflect the interest rate policy practices of Nepal Rastra Bank. Thus, the basic objective of this study is to analyze the interest rate policy of commercial banks in Nepal and is to find out the factors that affect interest rate policy. It also tries to find out the relationship between interest rate with saving deposits, fixed deposit and total credit. To accomplish, these objectives the study follows the research methodology described in this chapter. Kothari (1989) stated that research methodology refers to the various sequential steps to adopt by a researcher in studying a problem with certain objectives in view. In other words methodology describes the methods and process applied in the entire aspect of the study.

3.2 Research Design

Kothari (1992), stated that research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy procedure. Research design is the plan, structure and strategy of investigation conceived. So as to obtain answers to research question and to control variances to achieve of the study, description and analytical research design have been used.

The research design is less descriptive but more prescriptive because the historical secondary data have been employed to analyze the using variables which is related to interest rate practices of commercial banks. Some statistical and techniques have been adopted to evaluate deposit mobilizing performance of commercial banks.

3.3 Note of Data

Mainly the study is conducted on the basis of secondary data. The data relating to the investment, deposit, loan and advances, assets and others are directly obtained concerned banks. The supplementary data and information are collected from number of institution and regulating authorities like NRB, Security Exchange Board, Nepal Stock Exchange Ltd, Ministry of Finance and National Planning Commission etc. All the secondary data are complied processed and tabulated in the time series as per the need and objectives. In other to judge the reliability of data provided by the banks and other Notes, they were complied with the annual reports' of auditor. Formal and informal talks to the concerned dead of the department of the bank were also helpful to obtain the additional information of the related problem. Similarly, various data and information are collected from the economic journal, periodicals, bulletins, magazines and other published reports and documents from various Notes.

3.4 Population and Sample

The term 'Population' or universe for research means all the members of research study in which the research is based. Here the population or universe of the study comprises of all 28 commercial banks within the kingdom of Nepal. As the study of whole population makes the comparative study of only two banks are taken as sample. Even though, we know there are various sampling methods when taking sample from population, here the simplest method of sampling that is simple random sampling method is used. Here Himalayan Bank Ltd. and NMB Bank Ltd. are taken as sample and study held comparatively to draw the conclusion.

3.5 Data Analysis Tools

To achieve the objectives of the study, various financial and statistical tools have been used in this study. The analysis of data will be done according to pattern of data available. Because of

limited time and reNotes, simple analytical statistical tools such as graph, percentage, Karl Pearson's co-efficient of correlation, co-efficient of Determination, trend analysis and test of hypothesis are adopted in this study. Some strong accounting or financial tools such as ratio analysis have also been used.

3.5.1 Financial Tools

3.5.1.1 Percentage

Percentage is used to measure the changing position of different amounts. The difference shows the actual impacts on this sector: we use the given formula to find out the annual percent change.

$$\text{Annual Percentage Change} = \frac{\text{Amount of this year Deposit(credit)}}{\text{Amount of Last year deposit or credit}} X 100\%$$

3.5.1.2 Ratio Analysis

Ratio analysis has been accepted as the most dominant financial tool to analyze and interpret the financial statements. Alexander wall is considered the pioneer of ratio analysis. He presented, after a serious thinking, a detailed system of ratio analysis of 1909. He explained the work of interpretation can be made easier by establishing quantitative relationship between the facts given in the financial statements. (Gupta, 1974)

In financial analysis, a ratio is used as index or yardstick for evaluating the financial position of a firm, (Pandey, 1993). Ratio analysis is such a powerful tool of financial analysis that through it, economic and financial position of a business unit can be fully examined, (Kothari, 1989). Webster's dictionary (1995) defined ratio as the indicated quotient of two mathematical expressions, and as the relationship between two or more things.

In this topic it is tried to find out various financial ratios that plays assistant role to know whether the Interest-related items i.e. Deposit, loan, advance and investment and other cash and bank balance, liquid fund are unnecessarily blocked or not. These items are interest-carrying item. So unnecessarily used of these items might badly affect on profitability position of banks. Interest rate and its relevant items have two-ply effect.

An arithmetical relationship between two figures is known as ratio. It is computed by dividing one item of relationship with other. Ratio simply means one number expressed in terms of another. Ratio analysis is the main numerical or quantitative statement analysis. It can be expressed as percentage, fraction or stated comparison between two numbers. Ratio analysis is used to compare a firm's financial performance and status to that of other firm's overtime. The main objectives of calculating different Ratios are to find interest bearing factors and to find whether those factors unnecessarily increased or not. For example high cash and bank balance among total yearly deposit even if increase the liquidity position but the Commercial Bank has to pay high interest on it and badly affect on profitability position. Whether the Deposit collection and its mobilization through the means of interest go equally or not, this is checked by Ratios. That means whether the increase or decrease volume of deposit properly used through the means of Loan and Investment is checked by Ratios. Though I have to find the effect of interest rate on deposit and lending, it will be incomplete if we forget that improper use of deposit also effect badly on profitability position due to huge Interest volume. Thus Financial or Ratio analysis are useful for identification of various related terms and their relationship among each other.

In this study, different ratios are calculated and analyzed, which is given below:

Liquidity Ratio

The ability of a firm to meet its obligation in the short-term is known as liquidity. It is measured by the speed with which a bank's assets can be converted in to cash to meet deposit withdraws and other current obligations. This also known as solvency ratio or working capital ratio, is the relative proportion of current assets to current liabilities. It is most commonly taken as the yardstick of measuring the short-term solvency of a concern. A firm should ensure that it does not suffer from lack of liquidity and that it is not too much highly liquid. The failure to meet the obligations as they became due damaged the company's reputation resulting in the disability to complete with the other banks. On the other hand, over liquidity results in lower profitability. Both the conditions are unfavorable for the company. There are various ratios under liquidity ratio, which are given as follows:

NRB Balance to Total Deposit Ratio

Nepal Rastra Bank has made the Commercial Banks to deposit certain fund of the Commercial Bank in the central Bank, which is changing time to time as demand of the time. It is calculated by dividing NRB balance by total Deposit.

$$\text{NRB Balance to total deposit} = \frac{\text{NRB Balance}}{\text{Total deposit}}$$

Total Deposit= Current deposit + saving deposit+ fixed deposit + Call deposit + others

NRB Balance to Current and Saving Deposit Ratio:

The Directives of Central Bank has issued to keep minimum 8 percent of the total saving and current deposit amount of Commercial Banks in NRB balance. It is for the purpose of the liquidity to meet the demand of the customer.

This can be stated as,

$$\text{NRB Balance to total deposit} = \frac{\text{NRB Balance}}{\text{Current and saving deposit}}$$

NRB Balance to Fixed Deposit Ratio:

Fixed deposit is that deposit which a bank can mobilize with for sure. For this deposit NRB has directed to the Commercial Bank to keep 6 percent of fixed deposit in the NRB balance for the purpose of the liquidity

This ratio is computed by dividing NRB Balance by Fixed deposit

$$\text{NRB balance to Fixed deposit} = \frac{\text{NRB balance}}{\text{Fixed deposit}}$$

Assets Management Ratio (Activity Ratio)

Activity ratio reflects the firm's efficiency in utilizing its assets. Activity ratios measure the effectiveness of the employment of the rsources in a business concern. If deposit doesn't properly mobilize, it will badly effect on profitability by the means of interest. Over mobilization have an effect on liquidity and a lesser amount of mobilization also have an effect on

profitability. Thus in our study of change effect of interest on deposit and lending, we shouldn't also forget the interest effect due to deposit mobilization on profitability of Banks.

This ratio measures how efficiently the bank manages the resource at its command. The following ratios are used under the assets management ratio.

Credit to Total Deposit Ratio

This ratio measures the extent to which the banks are successful to mobilize their total deposit on loan and advances. Loan and advances are outside asset, which yield profit to the bank. Increment of loan and advances is the main target of all Commercial Bank. So, higher the ratio better is the mobilization of the funds.

$$\text{Credit to total deposit ratio} = \frac{\text{Loan and Advance}}{\text{Total deposits}}$$

Total Credit= Loan and Advances provided by the CBs

Total Investment to Total Deposit Ratio

A Commercial Bank mobilizes its deposits by investing it fund in different securities issued by Government and other financial institution. It is useful to know how the CBs are mobilizing their deposit in the investment of the various securities.

$$\text{Total Investment to Total Deposit Ratio} = \frac{\text{Total Investment s}}{\text{Total Deposits}}$$

Interest Rate Risk Ratio

The main function of CBs is accepting deposit and providing loan to public and other institutions in which interest is to be paid on deposit and earned interest through loan. Thus it is the ratio calculated, dividing the interest earned assets by interest paid liabilities. Higher the ratio shows more risk from interest rate structure and more profit Table No. Too because higher volume of deposit mobilization in loan, advance and Investment is the matter of risk but the reward of it's compensation is also high. There is frequent fluctuation in interest rate structure of CBs in both

side i.e. deposit and loan which surely effect on it's volume and on financial position too which will study detail on Statistical analysis.

Interest is one of major factor of earning profit of a bank. A bank pays the interest to the depositor and takes it from the payee. It is major Note of income and expenditure depending upon the interest that the banks can make investment to maximize their income through interest rate structure. There is higher degree of risk related with interest rate and the possibility of loss due to change in interest rate is known interest rate risk. The asset return and values versus the liabilities loss and values may change at different magnitude because of change in market interest rate.

The relationships are as under:
Interest rate risk ratio = interest sensitive asset / interest sensitive liabilities.
Interest sensitive asset = Loan amount + Investments in bond and debentures
Interest Sensitive Liabilities = Borrowings + Deposit excluding the current deposit.

3.5.2 Statistical Tools

The main important tool to achieve the objectives of this study is Statistical Tools. These tools are useful to find the relationship of interest rate with Deposit and Lending. In this study, statistical tools such as Arithmetic Mean, Standard Deviation, Coefficient of Correlation, Co-efficient of Determination, Co-efficient of multiple Determinations, t-test for significance of Correlation Coefficient

Arithmetic Mean

Gupta (2002), presented arithmetic mean of a given set of observations is their sum divided by the number of observations. In such a case all the items are equally important, simple arithmetic mean is used in this study as per the necessity for analysis.

$$Mean(\bar{X}) = \frac{(\Sigma X)}{(N)}$$

Where,

$\sum$ X = Sum of all Values of the variable 'X'

N= number of observations

X= Variables involved

Standard Deviation

The standard deviation usually denoted by the letter sigma (σ). It measures dispersion and is defined as the positive square root of the arithmetic mean of the squares of the deviation of the given observations from their arithmetic mean of a set of value. Standard deviation, in this study, has been used to measure the degree of fluctuation of interest rate and that of other variables as per the necessity of the analysis

$$\text{Standard Deviation } (\sigma) = \sqrt{\frac{\sum\left(X - \bar{X}\right)^2}{n}}$$

The greater the standard deviations the greater will be the magnitude of the deviation of the values from mean and vice versa.

Coefficient of Correlation (r)

Correlation is a statistical tool suggested by Karl Pearson, which studies the relationship between two variables, and correlation analysis involves various methods and techniques used for studying and measuring the extent of the relationship between the two variables. Two or more variables are said to be correlated if change in the value of one variable appears to be related or linked with the change in the other variables.

$$\text{Simple Correlation coefficint } (r) = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{n\Sigma X^2 - (\Sigma X)^2}\sqrt{n\Sigma Y^2 - (\Sigma Y)^2}}$$

- Correlation Co-efficient is defined by r
- It may be positive or negative and ranges from –1 to + 1. When r = +1 there is perfect correlation; where r=-1, there is perfect negative correlation, when r=0, there is no correlation and when r<0.5 then there is low degree of correlation.

- When ‘r’ lies between 0.7 to 0.999 or –0.7 to –0.999, there is high degree of positive or negative correlation.
- When ‘r’ lies between 0.5 to 0.699, there is moderate degree of correlation.

Simple correlation coefficient, in this study is used to find the relationship between interest rate and deposit and interest rate and lending.

Co-efficient of Determination (r2)

It is square of Simple correlation co-efficient that measures the percentage of total variation in dependent variable explained by independent variable.

Multiple Correlation Co-efficient $(R_{1.23})$

Multiple correlation coefficients show the relationship among three or more variables assuming one dependent variable and other independent variables. Similarly multiple correlation coefficients between above mentioned variable also have been determined once assuming interest rate on deposit as dependent variable and other two variable (deposit amount and lending rate) as independent and then assuming interest rate on lending as dependent variable and other two variables (lending amount and deposit rate) as independent.

The Multiple Correlation Coefficient i.e. R1.23 shows the degree of relationship between one as dependent and variables two and three as independent.

$$(R_{1.23}) = \sqrt{\frac{r_{12}^{\ 2} + r_{13}^{\ 2} - 2r_{12}r_{13}r_{23}}{1 - r_{23}^{\ 2}}}$$

Where,

r12= correlation coefficient between variable one and two

r13 =correlation coefficient between variable one and three

r23= correlation coefficient between variable two and three

Coefficient of Multiple Determinations

The square of multiple correlation coefficients is called coefficient of multiple determination and it is very useful in interpreting the value of multiple correlation coefficient. The main significance of the multiple determinations is to represent the proportion of total variations in the dependent variable, which is explained by the independent variables.

$$\text{Coefficien t of multiple determinat ion} = R_{1.23}^{2}$$

Test of Hypothesis or t-test

Test of hypothesis is done for significance of Correlation Coefficient determines through the value of t. T can be determined by the following formula as:

$$t = \frac{r}{\sqrt{1-r^2}} X \sqrt{n-2} \qquad \sim t_{n-2}$$

If hypothesis is related to the significance of the correlation coefficient between interest rate and deposits, Null hypothesis, H0: P=0 means that interest provided on deposits by commercial banks and deposit amount are uncorrelated. And alternative hypothesis, H1=0 means that interest rate provided on deposits by banks and deposit amount are correlated. Similarly if the calculated value's'(i.e. t-calculated> t-tabulated) is greater than tabulated value for 5 d.f (degree of freedom) at 5 percent level of significance, hence null hypothesis is rejected and alternative hypothesis is accepted.

CHAPTER - IV

DATA PRESENTATION AND ANALYSIS

This part is the heart of research study. Without this part the study remains incomplete to achieve the objectives set in chapter I. It is necessary to know the practicability aspect of interest rate and it affect on deposit and its mobilization (lending). To know what are the real problems and factors affecting those problems, this part is utmost valuable. This chapter consists of relevant data and information necessary for the study presented and analyzed keeping the objectives set in mind. This chapter consists of various calculations made for the analysis of interest rate and its effects on deposit and lending amount of two sample banks. This part also categorized into three parts (viz. presentation, analysis and interpretation) to make the study clear, effective, systematic, result oriented and easily understandable.

Since, the analysis is fully based on secondary data: Firstly, the data's are presented in tabular. Then the data are analyzed using various financial tools and statistical tools as mentioned in chapter three, finally the result are interpreted. In this chapter, financial tools are used to know overall deposit and lending position and its utilization overtime of sample banks. But Statistical tools are very specific and more useful to establish relationship of interest rate with deposit and lending. Thus firstly financial analysis is done for finding Deposit Pattern and it's mobilization through loan, advance, and Investment and secondly statistical analysis is done for finding Interest rate structure and it's relation and effect on deposit and lending. Financial analysis is

made through percentage and Ratios and statistical analysis is made through Mean, S.D, Correlation coefficient and test of hypothesis.

4.1. Financial Analysis

4.1.1 Analysis of Deposit Collection and Mobilization

The main objectives of Commercial banks are to collect the deposit through different account and its mobilization.

The following Table No. shows the situation of HBL and NMBBL with relation to deposit collection and its utilization in recent years.

***Table No.* 1**

Deposit Collection, Loan and Advance, Investment and their Change Rate (in millions)

	Deposit				Loan and Advances				Investments			
Year	HBL	Ch%	NMBBL	Ch%	HBL	Ch%	NMBBL	Ch%	HBL	Ch%	NMBBL	Ch%
2010/11	2397		4145.2		1812		3258.7		120		708.7	
2011/12	3983	66.2	6455.6	55.7	2995	65.4	4611.8	41.5	152	26.4	60	-92
2012/13	5724	43.7	8578.8	32.9	4327	44.5	7347.4	59.3	325	115	277.5	363
2013/14	5736	0.21	9514	10.9	4978	15	8222.1	11.9	631	93.8	1029.4	271
2014/15	6170	7.57	10548	10.9	4956	-0.4	8491.9	3.28	1619	157	2276.7	121
2015/16	7742	25.5	12747.3	20.9	6105	23.2	10254	20.8	2395	47.9	2617.3	15
2016/17	8943	15.5	12125.5	-4.9	6167	1.02	8739.8	-15	2236	-6.6	2275.3	-13

Note: From Annual Reports of Himalayan Bank Ltd. and NMB Bank Ltd.

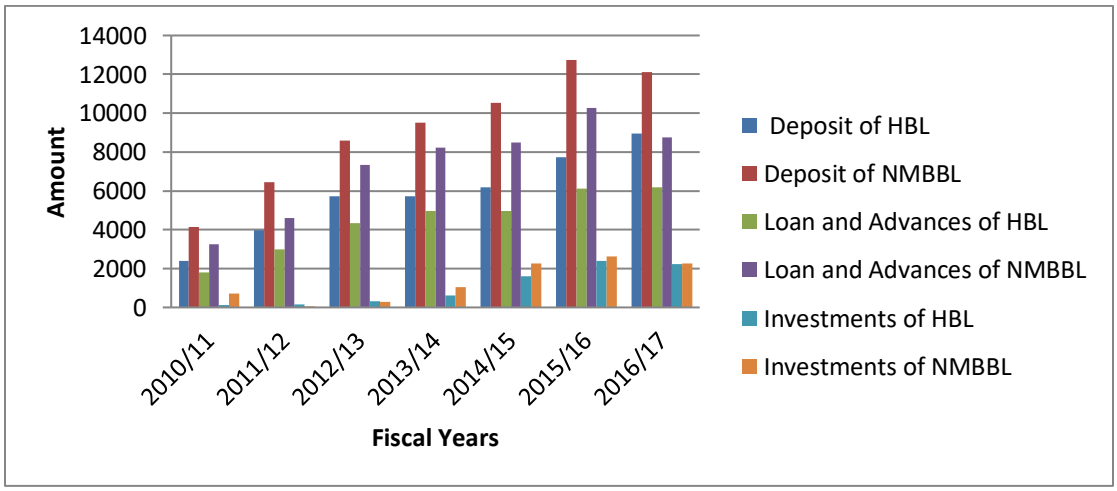


Figure No.4: Deposit Collection, Loan and Advance, Investment and theirs Change Rate

From the *Table No. No.* 1, it is found that the total deposit collection of NMBBL and HBL has been increasing each year except NMBBL in 2013/14 but increasing rate of expanding is decreasing each year. The volume of deposit collection of NMBBL is the higher than HBL in every year. Similarly, Loan and advances of two Banks has been increasing every year. Commercial Banks provides Loan and Advances generally to Govt Enterprises, Financial and Non financial Enterprises, private sector, for bills P & D and Foreign A.B.C. Comparatively NMBBL provides more Loan and Advances than HBL. Similarly Investment includes total investment in Govt securities, share, and debenture of other Institutions and other investment and NRB Bond. From above Table No. , investment of two banks went up unevenly.

Table No..2

Classification of Loan & Advances (in millions)

Years	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
HBL	1811.50	2995.30	4327.10	4977.60	4956.20	6104.90	6166.90
a) Govt Entp	0.00	0.00	0.00	88.40	0.00	0.00	0.00
i) Financial	0.00	0.00	0.00	88.40	0.00	0.00	0.00
ii) Non financial	0.00	0.00	0.00	0.00	0.00	0.00	0.00
b) Private Sector	1239.20	2827.90	4275.30	4751.70	4913.30	6049.70	6166.90
c) For Bills P & D	572.30	167.40	51.80	137.50	27.70	25.00	0.00
d) Foreign A.B.C	0.00	0.00	0.00	0.00	15.20	30.20	0.00
NMBBL	3258.70	4611.80	7347.40	8222.10	8491.90	10253.60	8739.80
a) Govt Entp	136.80	180.90	318.90	260.70	283.00	333.50	409.60
i) Financial	127.60	141.20	199.90	228.50	230.10	295.90	286.50
ii) Non financial	9.20	39.70	119.00	32.20	52.90	37.60	123.10
b) Private Sector	2854.40	4237.50	6703.40	7708.40	8079.90	9662.10	8330.20
c) For Bills P & D	267.50	192.00	325.10	245.40	129.00	258.00	0.00
d) Foreign A.B.C	0.00	1.40	0.00	7.60	0.00	0.00	0.00

Note: Annual Reports of Himalayan Bank Ltd. and NMB Bank Ltd.

From the *Table No.* 2 shows that Both HBL and NMBBL provide more loans to private sectors than Government sectors. HBL has not shown any interest on providing loan and advances to the government bodies. From above two Table No. s Deposit and lending volume of HBL and NMBBL had been increasing even there is decreasing pattern of deposit and lending interest rate of commercial banks.

4.1.2 Financial Ratio Analysis

4.1.2.1 Analysis of Liquidity position in relation to deposit

Balance with Current and saving deposit of NMBBL is greater than HBL by higher rate but balance with fixed deposit of HBL is greater than NMBBL by lower rate. However, it seems that both Banks keep more NRB balance with (Current + Saving) and fixed deposit than 8 percent and 6 percent i.e. direction rate

***Table No. -No.*3**

Calculation of Various Liquidity Ratios in relation to deposit

	NRB deposit/total deposit		NRB deposit/Current & Saving deposit		NRB Bal/Fixed Deposit	
Fisc Yrs	HBL (%)	NMBBL (%)	HBL (%)	NMBBL (%)	HBL (%)	NMBBL (%)
2010/11	5.09	9.03	12.54	35.32	11.95	14.36
2011/12	6.45	6.21	16.07	25.39	14.18	9.21
2012/13	6.99	7.39	15.8	27.23	20.52	12.11
2013/14	5.2	12.31	11.24	39.67	15.22	21.47
2014/15	5.87	4.84	11.31	13.46	18.2	10.16
2015/16	5.78	6.28	11.56	14.92	19.47	16.41
2016/17	4.67	6.17	8.8	11.41	14.52	21.14
Average	5.72	7.46	12.47	23.91	16.29	14.98

Note: From Annexure E1

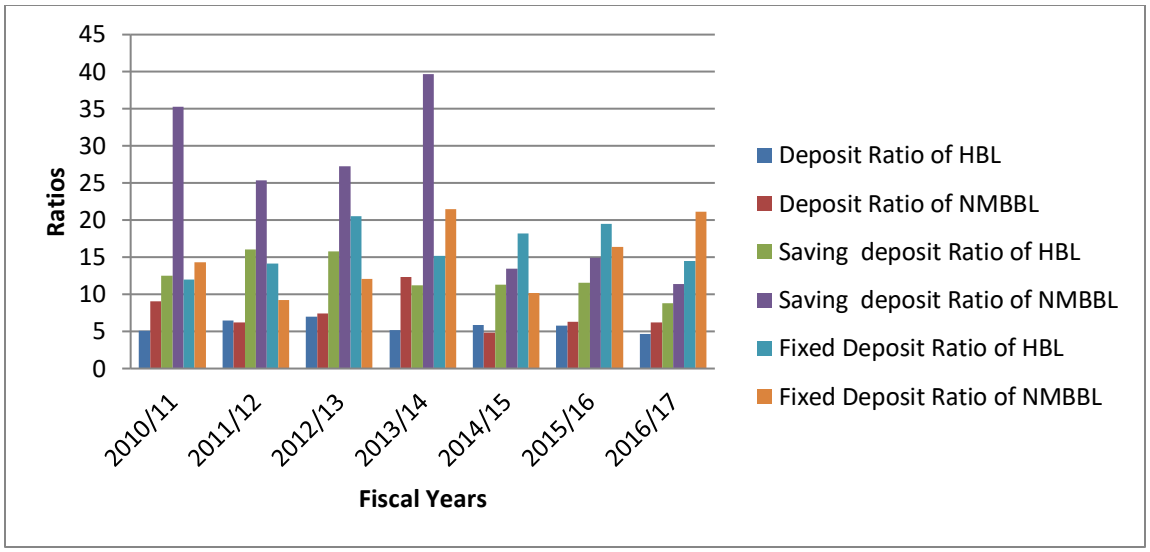


Figure No.5: Various Liquidity Ratios in relation to deposit

From *Table No.* 3, NMB Bank Ltd. has kept more balance with total deposit in comparison to Himalayan Bank Ltd. This means that the liquidity position of NMBBL stronger than HBL. Balance with Current and saving deposit of NMBBL is greater than HBL by higher rate but balance with fixed deposit of HBL is greater than NMBBL by lower rate. However, it seems that both Banks keep more NRB balance with (Current + Saving) and fixed deposit than 8% and 6% i.e. direction rate. It shows the strong liquidity position of two banks but the profitability position might be low because NRB do not provide interest to Commercial banks in balance amount but the CBs should pay interest to Depositor. Thus this shows that HBL and NMBBL both have strong capacity to pay short-term obligation but proper attention should be given for utilization of deposit (lending). Thus Liquidity position and interest rate change effect should properly mention equally by CBs.

4.1.2.2 Analysis of Activity position or Asset utilization position of Banks

The analysis of activity and asset utilization position of HBL and NMBBL are calculated different ratios under asset management as below:

***Table No.* 4**

Calculation of Different Ratios (in %) under Asset Management (Activity Ratio)

Years	HBL	NMBBL

	Interest % on credit	Total credit/ Total Deposit	Total Inv/Total Deposit	Interest % on Credit	T.Credit/T. deposit	T.Invest/T. Deposit
2010/11	13.25	75.59	5	13.94	78.61	17.1
2011/12	12.17	75.2	3.81	13.13	71.44	0.93
2012/13	11.69	75.59	5.68	12.32	85.65	3.23
2013/14	11.69	86.78	11	12.24	86.42	10.82
2014/15	10.5	80.33	26.24	12.17	80.51	21.58
2015/16	9.93	78.86	30.93	10.36	80.44	20.53
2016/17	9.83	68.96	25	9.08	72.08	18.76
Average		77.33	15.38		79.307	13.28

Note: From Annexure E2

(Average interest rate on loan and advance taken from following Table No.6 and Table No.9)

From *Table No.* 4, Deposit mobilization on Loan and advance of NMBBL seems more efficiently in comparison to HBL in our study period because the average rate of deposit mobilization through credit of NMBBL and HBL is 79.30 and 77.33 respectively and Similarly it's mobilization on investment of HBL was higher than NMBBL because the average rate of deposit mobilization on investment of HBL and NMBBL was 15.38 and 13.28 respectively. Again average interest rate on loan and advance of both HBL and NMBBL is in decreasing trend during our study period. In 2010/11, HBL mobilized its 75.59 percent deposit in Loan and advance at 13.25 percent interest rate. Deposit mobilization of HBL on loan and advance had been increasing to 75.59 percent, 75.2 percent, 75.59 percent, and 86.78 percent in 2010/11, 2011/12, 2012/13, and 2013/14 respectively and also decreasing lending rate to 13.35, 12.17, 11.69 and 11.69 in 2010/11, 2011/12, 2012/13, and 2013/14 respectively. This means HBL in these four years, was able to mobilize more deposit on loan and advance taking benefit of decreasing credit rate. But Beyond 2013/14, deposit mobilization of HBL on loan and advance gradually decreasing even decreasing of lending rate, which is against Real theory of Credit. The percentage of deposit mobilization decreases to 80.33 percent, 78.86 percent, and 68.96 percent in 2014/15, 2012/13 and 2016/17 respectively and Interest rate on credit decreases to 10.5, 9.93, and 9.83 in last three years respectively. Similarly Interest rate on credit of NMBBL decreases continuously from 13.94 in 2010/11 to 9.08 in 2016/17. But deposit mobilization of its increases to 78.61 percent, 71.44 percent, 85.65 percent and 86.42 percent in 2010/11, 2011/12, 2012/13

and 2013/14 respectively but again decreases to 80.51 percent, 80.44 percent and 72.08 percent in 2014/15, 2015/16 and 2016/17 respectively.

4.1.2. 3 Analysis of Interest Rate Risk

Data under Financial analysis gave us lot of ideas about the identification of Deposit and Lending terminology and its mobilization.

***Table No*. 5**

Calculations of Interest Rate Risk Ratio (in millions)

Years	HBL			NMBBL		
	Int Sens Asset	Int Sens Liab	Ratio (%)	Int Sens Asset	Int Sens Liab	Ratios(%)
2010/11	1811.50	2154.20	84.09	3258.70	3770.00	86.44
2011/12	2995.30	3545.20	84.49	4611.80	5977.40	77.15
2012/13	4327.10	5042.60	85.81	7347.40	7944.70	92.48
2013/14	4977.60	4946.30	100.63	8222.10	8649.50	95.06
2014/15	4956.20	5234.20	94.69	8491.90	9663.80	87.87
2015/16	6104.90	6743.70	90.53	10253.60	11610.30	88.31
2016/17	6166.90	7640.20	80.72	8739.80	11047.90	79.11
Average			88.71			86.63

Note: Annual Reports of Himalayan Bank Ltd. and NMB Bank Ltd.

From *Table No*. -5 shows the fluctuation of interest rate of two Commercial Banks in study period in which the average interest rate risk ratio of NMBBL and HBL is 86.63 and 88.71 respectively. This means that HBL carry more risk in mobilizing deposit than NMBBL. Thus HBL has great chance of earning more profit. HBL, in 2013/14 mobilize 100 percent deposit except current one. The average percentages of two banks show the higher volume utilization of their deposit because they have to balance some extent on NRB fund among their deposit and remaining some extent should keep for liquidity.

Data under Financial analysis gave us lot of ideas about the identification of Deposit and Lending terminology and its mobilization and its effect on profitability of Bank by the means of interest rate structural change. From above study, we come to know that deposit and loan & advance are interest-carrying items so that change of them would effect on Bank's financial position. Both Deposit and Lending have their own interest rate i.e. deposit interest rate and loan

interest rate. Till now, we don't study the fluctuation of interest rate and it's effect on deposit and lending volume. Thus the above study play background role for our focus concern. Thus we focus more on statistical analysis for our study in which we use various statistical tools to attain the objectives set.

4.2 Statistical Tools

Statistical tools are major tools used for analysis and interpretation of tabular data. Analysis is made using various statistical tools i.e. mean, coefficient of correlation, coefficient of simple determination, multiple correlation coefficient, Coefficient of multiple determination and test of significant (t- statistics). For this, at first the interest rate structure is shown (that of deposit and lending) then after the relationship between interest rate on deposit and deposit amount and relationship between interest rate on lending and lending amount is shown and analyzed. After presenting analyzing and interpreting the relationship between interest rate and deposit amount, interest rate and lending amount, interest rate on deposit and interest rate on lending of two banks, the comparative analysis is made.

4.2.1 Analysis of Himalayan Bank Ltd.

4.2.1.1 Analysis of Deposit rate of Himalayan Bank Ltd.

The analysis of interest rate on deposit of Himalayan bank in different time and scheme as below:

Table No. 6
Interest Rate Structure on Deposit of Himalayan Bank Ltd.

Deposit	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Savings	7.5	5	5	5	4.25	2.75	2.375
Fixed							
7 days	4.5	2.5	2.5	2.5	2.5	2	1.5
14 days	5	3	3	3	3	2.5	2.5
1 month	6	4	4	4	3.5	2.5	2.5

2 months						3	
3 months	8	5	4.75	4.75	4		3
6 months	8.5	5.5	5.25	5.25	4.5	3.5	3.5
1 year	10	6.75	6.5	6.5	5	4	4.25
2years/above	9.5	7.25	7	7	5.375	4.7545	5.125
Mean=X Average of all deposits	7.375	4.875	4.75	4.75	4.016	3.126	3.093
Average of Average (Mean)	4.57						
Standard deviation	1.216						
Coefficient of variation	26.60						

Note: From Annual Reports of Himalayan Bank Ltd.

Note: Calculation of Average rate of Deposit and Its Standard deviation is done as shown in Annex-E3. From the Calculation of *Table No*.6 shows average deposit interest rate of Himalayan Bank Ltd. is in decreasing trend. It has decreased to 3.093 percent in 2016/17 from 7.375 percent in 2010/11. In 2011/12, the average deposit rate decreased to 4.875 percent and again decreased continually to 4.75 percent, 4.75 percent, 4.016 percent, 3.126 and 3.093 respectively in years 2012/13, 2013/14, 2014/15, 2015/16, 2016/17. It was not any change in 2001 and 2010/11. Average of average interest rate i.e. (Mean) value among deposit interest rate of HBL is 4.57 in seven study period. The standard Deviation of 1.216 explains that the dispersion or scattered ness among deposit rate is 1.216 percent. To check whether the above calculated value of S.D is either low or high, we have to find the most comparative value that we call Coefficient of Variation (CV). The Coefficient of Variation of deposit rate of HBL is 26.6 percent means that the variation percentage with respect to their average value is 26.6 percent.

4.2.1. 2 Analysis of Lending rate of Himalayan Bank Ltd.

Analysis of Lending rate of Himalayan Bank on different Loans provided at different time period to customers:

***Table No*. -7**

Interest rate structure on Lending of HBL

Loan and Adv	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Overdraft	15.75	13.25	12.25	12.25	11.75	11.75	11.75
Export Credit	10.25	9.5	9.5	9.5	10	10	7.25
Import L/C					10.625	10.25	10.25
Against FDR	11.5	9.25	9	9	9	7.5	9.25
Against Govt. bond	11.5	9	8.5	8.5	7.25	7.25	7.25
Against BG/CG	15.5	11.5	11	11	9.75	9.25	
Against other guarantee					9	7.5	7.5
Industrial Loan		13	12.5	12.5	11.5	11.75	11.75
Commercial Loan		13.5	13	13	12.25	12.25	12.25
Priority Sector	15	13.5	13.5	13.5	13.5		
Poorer Sector	12	9	9	9	9	8.75	8.75
Term Loan	15.5	13.5	12.5	12.5	12	11.5	11.75
Working Capital	15.25	13.25	12.75	12.75	11.75	11.75	11.75
Hire purchase	17	15	13.5	13.5	11.25	10.75	9.5
Others	18	15	15	15	8.75	8.75	8.75
Mean (X)= Average of all Loan and Advance	14.3	12.17	11.69	11.69	10.49	9.93	9.83
Mean(average of average)	11.44						
Standard Deviation	1.278						
Coefficient of variation (CV)	11.17						

Note: From Annual Reports of Himalayan Bank Ltd.

Note: Calculation of average, standard deviation and coefficient of variation OF Lending rate of Himalayan Bank Ltd. as shown in Annex-E4

From the Calculation of *Table No.*7 shows average Lending interest rate of Himalayan Bank Ltd. is in decreasing trend. It has decreased to 9.83 percent in 2016/17 from 14.3 percent in 2010/11. In 2011/12, the average lending rate decreased to 12.17 percent and again decreased continually to 11.69 percent, 11.69 percent, 10.49 percent, 9.93 percent and 9.83 percent respectively in years 2012/13, 2013/14, 2014/15, 2015/16, 2016/17. It was not any change in 2011/12 and 2013/14. Average of average interest rate i.e. (Mean) value among lending rate of HBL is 11.44

percent in seven study period. The standard Deviation of 1.278 explains that the dispersion or scattered ness among lending rate is 1.278 percent. The Coefficient of Variation of lending rate of HBL is 11.17 percent means that the variation percentage with respect to their average value is 11.17 percent.

4.2.1. 3 Analysis the various Correlation Coefficients and their significance

***Table No*. 8**

Computation of correlation coefficient, coefficient of simple, multiple determination and T-statistics of HBL

Years	**Deposit Interest rate (1)**	**Deposit amount(2) in millions**	**Lending Interest rate (3)**	**Lending amount(4) in millions**	
2010/11	7.38	2,396.50	14.3	1,811.50	
2011/12	4.88	3,983.00	12.17	2,995.30	
2012/13	4.75	5,724.10	11.69	4,327.10	
2013/14	4.75	5,735.90	11.69	4,977.60	
2014/15	4.02	6,169.90	10.49	4,956.20	
2015/16	3.13	7,741.60	9.93	6,104.90	
2016/17	3.09	8,942.80	9.83	6,166.90	
r_{12}= -0.935	r_{34} = -0.9528	r_{13} =0.9889	r_{24}=0.9732	r_{23}= -0.9496	r_{14}= -0.9343
r^2_{12}=0.874	r^2_{34}=0.9078	r^2_{13}=0.978	r^2_{24}=0.9471	r^2_{23}=0.90174	r^2_{14}=0.8729
t-tabulated value at 5 degree of freedom at 5% level of significance=2.571					
t-calculated t_{12}=5.896	t-calculated t_{34}=7.016	t-calculated t_{13}=14.95			
$R_{2.14}$ = 0.976					
$R^2_{2.14}$ = 0.9525					
$R_{4.32}$=0.9775					
$R^2_{4.32}$=0.9555					

Note: Average Interest rate on deposit and Lending is taken from rate calculated Table No. 5 and Table No.6 and Deposit amount and lending amount is taken from the banking and financial statistics published by NRB and from Economic bulletin of sample banks. Calculation of simple and multiple correlation coefficients, coefficient of simple and multiple determination and t-calculated is made as shown in appendix-E5

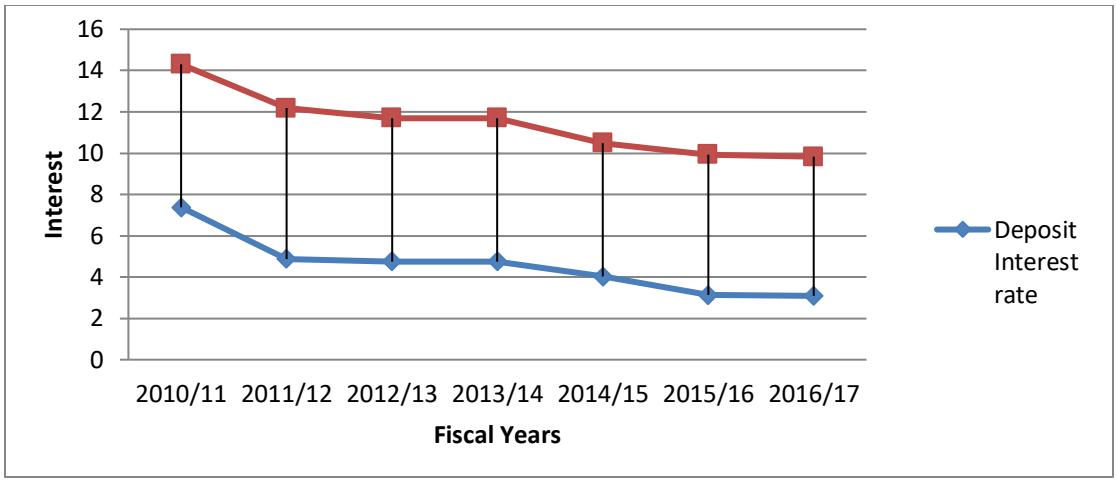


Figure No. 6: Analysis the various Correlation Coefficients

From the Calculation of *Table No.*8, the correlation coefficient (simple correlation) between deposit rate and deposit amount is -0.935 which means that two variables are negatively correlated. From the analysis, it clears that the small increase or decrease in deposit rate highly decrease or increase in deposit amount. In general concept it clears that relationship between interest rate and deposit amount must be positive i.e. with the increase in deposit rate must increase deposit amount and with the decrease in deposit rate deposit amount must decrease. But from the analysis of HBL it is seen that the real theory doesn't match practically. Taking the deposit amount as dependent variable and deposit rate as an independent variable, the coefficient of simple determination i.e. $r_{12}^{\ 2}$ Comes 0.8742 indicates that 87.42 percent of total variation in the dependent variable (deposit amount) is explained by an independent variable (deposit rate) and remaining 12.58 percent variation is due to the other factors in the economy which has not been covered by this study. To know the effect of two independent variables the coefficient of multiple determinations is computed.

The coefficient of multiple correlations $R_{2.14}^{\ 2} = 0.9525$ indicates when deposit amount is taken as dependent variable and deposit rate and lending amount as independent variables, 95.25 percent of total variation in deposit amount has been explained by two independent variables (deposit rate and lending rate) and 4.75 percent variation has been explained by other factors in the economy. From this analysis i.e. (mainly from simple correlation) it can be said that deposit interest rate is affecting deposit amount negatively. Test of significance of correlation coefficient between deposit rate and deposit amount also support it Because the tabulated value of t-statistics

for 5 degree of freedom at 5 percent level of significance is 2.571 which is less than the calculated value 5.895 i.e. (t-calculated>t-tabulate) or 5.895>2.571. Thus't' is significant hence null hypothesis is rejected and alternative hypothesis is accepted which means that the variable (deposit rate and deposit amount) of HBL are correlated. But other factors affecting the deposit amount are not study here and also will be scope for further study.

Similarly the correlation coefficient between interest rate on lending and lending amount of HBL are found negatively correlated i.e. $r_{34} = -0.9528$. It means that with the increase/decrease on lending rate decrease/increase highly. As the concern of the study is to know whether lending amount is affected by lending rate; lending amount is taken as dependent variables and lending rate as an independent variable. The coefficient of determination $R_{34}^{\ 2} = 0.9079$ explains that 90.79 percent of total variation in the dependent variable is explained by an independent variable and remaining 9.21 percent is due to the effect of other factors in the economy. When the lending amount is taken as dependent variable, to know the effect of two independent variables i.e. interest rate on lending and deposit amount, the coefficient of multiple determinations is computed i.e. $R_{4.32}^{\ 2} = 0.9555$ which indicates that 95.55 percent of total variation in lending amount are explained by lending rate and deposit amount and 4.45 percent of variation in lending amount causes by other factors in the economy. From this analysis, it can be cleared that low lending rate attract more in loan amount and high interest on lending doesn't attract the loan holders.

So this analysis also supports the real theory of lending rate and lending amount. Test of significant of correlation coefficient between lending rate and lending volume of HBL makes clear that; since the tabulated value of t-statistics for 5 degree of freedom at 5 percent level of significant is 2.571 which is less than't'-calculated value i.e. 7.017. Thus t is significant. Hence null hypothesis is rejected & alternative hypothesis is accepted which means that the two variable (lending rate & lending amount) of HBL are correlated.

But the computed correlation coefficient between deposit amount & Lending amount of HBL (i.e. $r_{24} = 0.9732$) is seen positive. The high degree of positive correlation coefficient explains that with less increment/decrement in deposit amount increase/decrease more proportionately. This means that both variable move in same direction. This analysis also supports the practical

concept of deposit and lending. If Banks collect more deposit, they mobilize most of all (except some in current account) through different schemes and policy. Himalayan Bank Ltd. is also continually increasing Deposit and Loan amount in seven year study period. Similarly there is negative correlation (i.e. $r_{14} = -0.9343$) between deposit rate and lending amount . The coefficient of determination between deposit rate & lending amount $R_{14}^2 = 0.8729$ indicates that 87.29 percent variation in one variable is explained by other variable. Again there is negative correlation between deposit amount and lending rate (i.e. $r_{23} = -0.9496$) and coefficient of determination $R_{23}^2 = 0.90174$ indicate that 90.17 percent variation in one variable is explained by other one.

From calculation, the correlation coefficient between deposit rate and lending rate is positive i.e. $r_{13} = 0.94389$. Small increment or decrement in deposit rate increase or decrease in lending rate of HBL more proportionately. Both variables move in same direction. From above figure-1, it also clears that both interest rate of deposit and lending of HBL continuously decreasing in these study period. Coefficient of determination $R_{13}^2 = 0.89$ indicates that 89 percent variation in one variable (lending rate) is explained by other variable (deposit rate). And other remaining 11 percent variation in lending rate is due to other factors in the economy. Test of hypothesis also supports this analysis because t-tabulate value at 5 degree of freedom at 5 percent level of significance 2.571 is less than calculated value of t i.e. 6.119. Thus t is significant; null hypothesis is rejected and alternative hypothesis is accepted which means that two variable (deposit rate and lending rate) are correlated to each other.

4.2.2 Analysis of NMB Bank Ltd.

4.2.2.1 Analysis of Deposit rate of NMBBL

Analysis of deposit rate of NMB Bank on different d at different time period to customers as shown below:

***Table No*.9**

Interest rate structure on deposit of NMBBL

Deposit	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Savings	6.5	6	6	5.5	5.5	4.5	4.125
Fixed							
1 month	4.5	4	4	3.5	3.5	3.5	3.5
2 months							
3 months	6	5.5	5	4.5	4.5	4	4
6 months	6.5	6	5.5	5.5	5.5	4.5	4.5
1 year	8.5	7.5	7	7	6.5	4.75	4.75
2years/above	9	8	7.375	7.5	7	5	5
Mean(X) =Average of all deposits	6.833	6.167	5.813	5.583	5.417	4.375	4.313
Average of Average (Mean)	5.5						
Standard Deviation(б)	0.846						
Coefficient of Variation (CV)	15.38%						

Note: From Various Annual Reports of NMBBL Bank Ltd.

Note: Calculation of Average rate of Deposit and Its Standard deviation is done as shown in Annex-E6. Shows the interest rate structure of NMBBL Bank Ltd and mean of all deposit of seven year is computed. Interest rate on deposit i.e. (average of all deposits) within seven years time period is in decreasing trend. The rate was 6.833 in 2010/11 then it decreased to 6.167, 5.813, 5.583, 5.417, 4.375 and 4.313 in year 2011/12, 2012/13, 2013/14, 2014/15, 2015/16 and 2016/17 respectively. The Standard Deviation of interest rate of 0.846 signifies that dispersion among interest rate is 0.846 percent .To know the dispersion percentage with respect to theirs mean, Coefficient of Variation is most scientific and realistic which is also calculated here. The CV of NMBBL of 15.38 percent means only 15.38 percent of scattered less among their average value exist.

4.2.2.2 Analysis of Lending rate of NMB Bank Ltd.

Analysis of Lending rate of NMB Bank on different Loans provided at different time period to customers as shown below:

***Table No*. 10**

Interest rate structure on Lending of NMBBL

Loan and Adv	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**

Overdraft	15.75	14.75	14.25	14	13.75	12.5	
Export Credit	10.25	10	9.75	10.625	11.5	10.25	9.25
Import L/C	14.5	12.75	12.5			10.25	
Against FDR	11	10	9.375	9.5	9	7	
Against Govt. bond	12.5	11	9	9	9	8.5	7.5
Against BG/CG	15	15	13	13	13	12	8
Industrial Loan	15.25	14.5	13	12.625	12.625		11
Commercial Loan	16	15	13.5	13.125	12.875		8.75
Priority Sector	13.5	13	13	13	13	11	10
Poorer Sector	12.5	12	12	12	12	10	9.5
Term Loan	14.75	14.5	13.5	13.5	13.25	11.5	
Hire purchase	16.25	14.5	14.25	14.25	14	11	9.5
Others	14	13.75	13	12.25	12	10	8.25
Mean (X)= Average of all Loan and Advance	13.94	13.13	12.32	12.24	12.17	10.36	9.08
Average of Average(Mean)	11.89						
Standard Deviation (б)	1.53						
Coefficient of Variation (CV)	12.86						

Note: From Annual Reports of NMB Bank Ltd.

Note: Calculation of Average rate Lending and Its Standard deviation is done as shown in Annex-E7. The Calculation from above Table No. 9 shows the interest rate structure on lending of NMB Bank Ltd. and average on all credit of seven years (2010/11-2016/17) is computed even standard deviation on all average lending rate is computed. It is seen that the lending rate of NMBBL is in decreasing trend. The highest rate was on year 2010/11 (13.94 percent) and lowest on year 2016/17 i.e. (9.08 percent). From 13.94 percent in year 2010/11 the rate decreased to 13.13 percent, 12.32 percent, 12.24 percent, 12.17 percent, 10.36 percent & 9.08 percent respectively in years 2010/11, 2011/12, 2012/13, 2013/14, 2014/15, 2015/16, and 2016/17. The standard deviation of 1.53 shows that the dispersion among the interest rate on lending in seven year time period of NMBBL is 1.53 percent. To know whether this dispersion percent is comparatively high or low, Coefficient of variation is computed. The CV of NMBBL of 12.86 percent shows that dispersion from their mean value is 12.86 percent.

4.2.2. 3 Analysis the various Correlation Coefficients and theirs significance of NMBBL

Table No. **11**

Computation of Correlation Coefficient, Coefficient of Simple, Multiple determination and T-statistics of NMB Bank Ltd.

Year	Deposit Interest rate (1)	Deposit amount(2) in millions	Lending Interest rate (3)	Lending amount(4) in millions	
2010/11	6.83	4,145.20	13.94	3,258.70	
2011/12	6.17	6,455.60	13.13	4,611.80	
2012/13	5.81	8,578.80	12.32	7,347.40	
2013/14	5.58	9,514.00	12.24	8,222.10	
2014/15	5.42	10,548.00	12.17	8,491.90	
2015/16	4.38	12,747.30	10.36	10,253.60	
2016/17	4.31	12,125.50	9.08	8,739.8	
r_{12} = -0.9695	r_{34} = -0.79675	r_{13} =0.9673	r_{24}=0.9749	r_{23}= -0.894	r_{14}= -0.9022
r^2_{12}=0.94	r^2_{34}=0.6348	r^2_{13}=0.9356	r^2_{24}=0.95043	r^2_{23}=0.80	r^2_{14}=0.81396
t-tabulated value at 5 degree of freedom at 5% level of significance=2.571					
t-calculated t_{12}=8.85	t-calculated t_{34}=2.9481	t-calculated t_{13}=8.17	Only absolute value of t-statistics is taken		
$R_{2.14}$ = 0.9969					
$R^2_{2.14}$ = 0993					
$R_{4.32}$=0.9893					
$R^2_{4.32}$=0.98					

Note: Average Interest rate on deposit and Lending is taken from rate calculated Table No. -8 and Table No. -9 and Deposit amount and lending amount is taken from the banking and financial statistics published by NRB and from Economic bulletin of sample banks.

Calculation of simple and multiple correlation coefficients, coefficient of simple and multiple determination and t-calculated is made as shown in appendix-E8

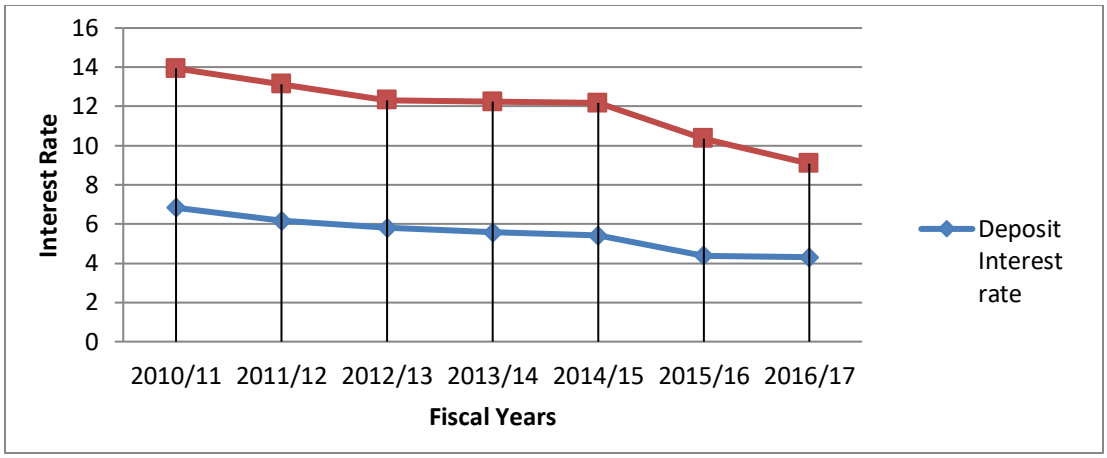


Figure no.7: Relationship between Deposit rate and Lending Rate of NBBL

The Calculation from Table No. -10 shows that the deposit rate and deposit amount are negatively correlated and the correlation between them is high i.e. ($r_{12} = -0.9695$) which means that with the less increase/decrease in interest rate, deposit amount decrease/increase with more proportionately. It can says that deposit rate and deposit amount moves in opposite direction but according to the real theory it is stated that deposit rate and deposit amount moves in same direction. From the analysis it is stated that deposit rate and deposit amount of NMBBL moves in opposite direction.

The Coefficient of simple determination i.e.($R_{12}^{\ 2} = 0.94$) says that when deposit amount is taken as dependent variable and deposit rate as independent factor, 94 percent of total variation in dependent variable (deposit amount) is explained by other independent variable (deposit rate) of NMBBL and remaining 6 percent effect is due to other factors in the economy. The coefficient of multiple determination i.e. ($R_{2.14}^{\ 2} = 0.993$) explain the effect of two independent variable in the dependent variable that when one variable (deposit amount) is assumed dependent and other two variables (deposit rate and lending amount) as independent variable, 99.3 percent of total variation in deposit amount (dependent variable) is explained by two independent variables. And remaining 0.70 percent (very small) of variation is due to the effect of other factors in the economy. Test of significance of correlation coefficient between deposit rate and deposit amount of NMBBL makes clear that the variable are statistically significant, Since the Calculated value of t-statistics is greater than that of the tabulated value of t for 5 degree of freedom at 5 percent level of significance i.e. (8.85>2.571). Hence two variables of NMBBL are correlated to each other.

Similarly the lending rate and lending amount of NMBBL are negatively correlated. $R_{34} = -0.79675$ Signifies that two variables are negatively correlated meaning that increase/decrease in one variable i.e. (interest rate on lending) decrease/increase in other variable (lending amount). It means that this relation match with the real theory that with the increase in lending rate, lending amount decrease and vice-versa. The coefficient of simple determination of $R_{34}^{2} = 0.6348$) signifies that 63.48 percent of total variation in lending amount is explained by lending rate and remaining 36.52 percent of variation explained by other factors.

The coefficient of multiple determination of $R_{4.32}^{2} = 0.98$ indicates that 98 percent of total variation in the dependent variable (lending amount) is explained by two independent variables (lending rate and deposit amount) and remaining 2 percent is due to the effect of other variables in the economy. Test of significance for the correlation coefficient between lending rate and lending amount of NMBBL also support this study since calculated value of t- statistics 2.9481 is greater than tabulated value at 5 degree of freedom at 5 percent level of significance i.e 2.571 i.e 2.9481>2.571. Thus "t" is significant hence null hypothesis is rejected and alternative hypothesis is accepted which means that lending rate and lending amount of NMBBL are correlated to each other and are statistically significance. From the calculation of same Table No.11 it is clear that the relationship between deposit amount and lending amount is positive which is shown by $R_{24} = 0.9749$. It means both variables move in same direction meaning that with the increase/decrease in one variable also increases/decreases in other variable. It follows the real theory in which lending amount increases surely when increase in deposit collection. The coefficient of determination i.e. $R_{24}^{2} = 0.95043$ explains that 95 percent variation in one variable due to the effect of other variable. Similarly correlation coefficient between deposit rate and lending amount is $R_{14} = -0.9022$ explains the negative relation meaning that the increase/decrease in one variable decrease/increase in other variables. That means deposit rate and lending amount moves in opposite direction. Similarly the correlation between deposit amount and lending rate of -0.894 i.e. ($R_{23} = -0.894$) explain the negative relation between two variables.

Again from the calculation of above Table No. shows the correlation coefficient between deposit rate and lending rate is 0.9673 i.e. ($R_{13} = 0.9673$) means that highly positive relation

exist between two variables. It also clears from graphical chart in figure-2 in which deposit rate and lending rate were decreasing continuously during the study period. The relation of interest rate on deposit and interest rate on lending of NMBBL really match with the theory, which also says that with the increase in deposit rate lending rate also increases and vice- versa.

The coefficient of simple determination of $R_{13}^{\ 2} = 0.9356$ makes clear that 93.56 percent of total variation in dependent variable (lending rate) is explained by one independent variable (Deposit rate) and remaining 6.44 percent variation is due to the effect of other variable in the economy. Test of significance for correlation coefficient between deposit rate and lending rate of NMBBL i.e. value of t-statistics is 8.17 which is greater than the tabulated value of t for 5 degree of freedom at 5 percent level of significance i.e. 2.571. Thus "t" is significant. Hence null hypothesis is rejected and alternative hypothesis is accepted which means that deposit rate and lending rate of NMBBL are correlated to each other and are statistically significant.

4.3 Analysis of Correlation Coefficients between Inflation and Deposit rate, Inflation and Lending rate of Commercial Banks

***Table No*. -12**

Calculation of Correlation coefficient, coefficient of Determination and t- statistics of Commercial Banks

Year	Inflation rate (1)	Deposit rate (2)	Lending rate (3)
2010/11	11.4	7.35	13.7
2011/12	3.5	6.025	12.85
2012/13	2.4	5.375	11.95
2013/14	2.9	4.765	11.7
2014/15	4.8	4.625	11.45
2015/16	4	3.725	11.05
2016/17	4.5	3.505	10.225
	r_{12}=0.6232	r_{13}=0.58144	
	r^2_{12}=0.38837	r^2_{13}=0.338	
	t_{12}=1.782	t_{13}=1.5978	

Note: From calculation of correlation coefficients between Inflation and deposit rate: Inflation rate and lending rate of CBS, coefficient of simple determination and t-calculated is made as shown in appendix-E9

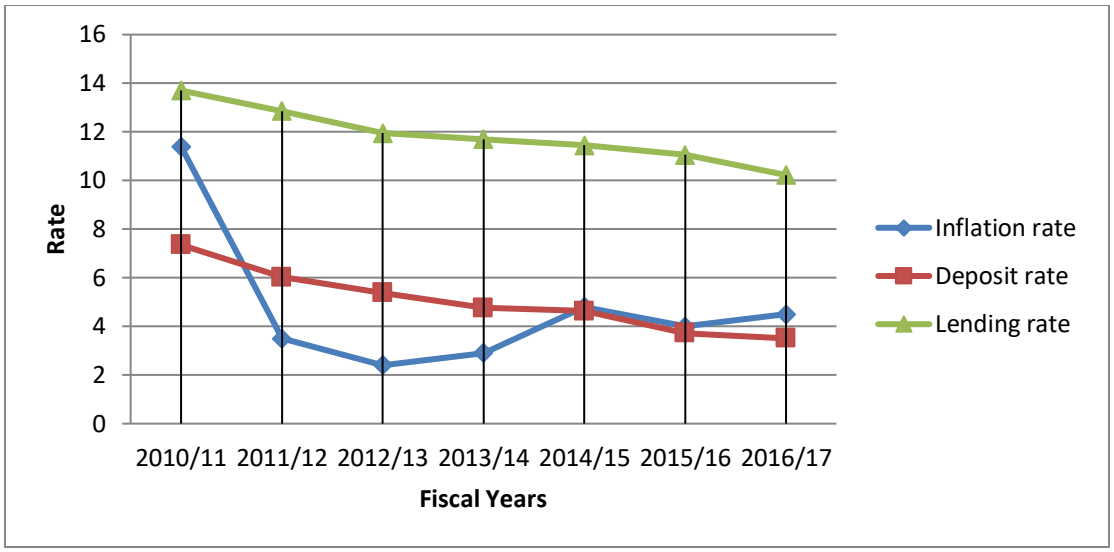


Figure No. 8: Relationship between Inflation rate, deposit rate and lending rate

In Table No. 11 the correlation coefficient between Inflation rate and deposit rate and between Inflation rate and lending rate is shown. From this analysis, we come to know the relationship of Inflation with deposit rate and lending rate of Commercial bank is positive. The correlations of ($R_{12} = 0.6232$) and ($R_{13} = 0.5814$) shows positive but moderate relationship of Inflation rate with deposit rate and lending rate respectively. This indicates that with the increase/decrease in inflation rate both deposit rate and lending rate of commercial banks increases/decreases. The coefficient of simple determination of $R_{12}^{\ 2} = 0.38837$ and $R_{13}^{\ 2} = 0.338$ signifies that 38.83 percent and 33.8 percent of total variation in dependent variable (deposit rate and lending rate) respectively is explained by an independent variable and remaining is due to the effect of other variables in the economy.

Test of significance for correlation between two variables explains whether the above calculated correlation coefficients between two variables are statistically significant or not. For this value of t- statistics is calculated. From Table No. 11, the calculated value of t- statistics between Inflation rate and deposit rate is 1.782 which is less than tabulated "t" at 5 degree of freedom in 5percent level of significant i.e. 2.571. Thus null hypothesis is accepted and alternative hypothesis is rejected. This means that the relationship between two variables (inflation rate and deposit rate) of commercial banks is statistically insignificant. Similarly, test of significance of correlation coefficient for inflation rate and lending rate of commercial banks i.e. t-calculated

makes clear that since 't' calculated value 1.5978 is greater than 't' tabulated for 5 degree of freedom at 5 percent level of significance i.e. 2.571, null hypothesis is accepted and alternative hypothesis is rejected. Thus 't" is insignificant, this means that there is no correlation between inflation rate and lending rate of commercial banks. Even though computed correlation between inflation rate and lending rate is moderately positive. But the correlation between these two variables is not statistically significant. From this analysis, we come to know that Deposit rate and lending rate of HBL and NMBBL has not any significant relationship with Inflation rate.

4.4 Comparative analysis between HBL and NMBBL

***Table No*.13**

	Himalayan Bank Ltd.				NMB Bank Ltd.			
Years	**Deposit Interest rate (1)**	**Deposit amount(2) in millions**	**Lending Interest rate (3)**	**Lending amount(4) in millions**	**Deposit Interest rate (1)**	**Deposit amount(2) in millions**	**Lending Interest rate (3)**	**Lending amount(4) in millions**
2010/11	7.38	2,396.50	14.3	1,811.50	6.83	4,145.20	13.94	3,258.70
2011/12	4.88	3,983.00	12.17	2,995.30	6.17	6,455.60	13.13	4,611.80
2012/13	4.75	5,724.10	11.69	4,327.10	5.81	8,578.80	12.32	7,347.40
2013/14	4.75	5,735.90	11.69	4,977.60	5.58	9,514.00	12.24	8,222.10
2014/15	4.02	6,169.90	10.49	4,956.20	5.42	10,548.00	12.17	8,491.90
2015/16	3.13	7,741.60	9.93	6,104.90	4.38	12,747.30	10.36	10,253.60
2016/17	3.09	8,942.80	9.83	6,166.90	4.31	12,125.50	9.08	8,739.80
	CV=26.60%		CV=11.17%		CV=15.38%		CV=12.86%	
	r_{12}= -0.935				r_{12} = -0.9695			
	$r^2$12=0.874				r^2_{12}=0.94			
	r_{34} = -0.9528				r_{34} = -0.79675			
	r^2_{34}=0.9078				r^2_{34}=0.6348			
	r_{13} =0.9889				r_{13} =0.9673			
	r^2_{13}=0.978				r^2_{13}=0.9356			
	$R_{2.14}$ = 0.976				$R_{2.14}$ = 0.9969			
	$R^2_{2.14}$ = 0.9525				$R^2_{2.14}$ = 0993			
	$R_{4.32}$=0.9775				$R_{4.32}$=0.9893			
	$R^2_{4.32}$=0.9555				$R^2_{4.32}$=0.98			

Note: Computation of simple and multiple correlation coefficient and coefficient of simple and multiple determinations of two banks are taken from Table No. -7 and Table No. -10

From Table No. -12, it is cleared that comparatively the NMBBL has been able to collect more deposit as well as provide more loan to public each year than of HBL. The deposit mobilization rate of NMBBL is also higher than of HBL. The Table No.13 also shows the structure of average

interest rate on Deposit and Lending of two Commercial banks. The average deposit rate of NMBBL i.e. 5.5 is comparatively higher than of HBL i.e. 4.57. As same average lending rate of NMBBL is 11.89 percent which is also higher than 11.44 percent of HBL i.e. (11.89 percent >11.44 percent). But the data distribution of deposit rate of HBL is less consistency than of NMBBL because the standard deviation of Deposit rate of HBL and NMBBL are 1.216 and 0.846 respectively. Again Coefficient of Variation on deposit rate of HBL is 26.6 percent and of NMBBL is 15.38 percent . Since CV of HBL is higher than NMBBL, the scattered Less or variation among deposit rate of HBL is higher than that of NMBBL.

Even the average rate of lending of NMBBL is higher than HBL, it's lending rate is less consistency than of HBL because the standard deviation of NMBBL i.e.(1.53) is greater than of NMBBL i.e. (`1.278). This also clears from CV, the higher the CV; there is less consistency or more variability in the data. The CV of lending rate of HBL is lower than HBL i.e. 11.17 percent < 12.86 percent.

As taking about correlation, from Table No.13 it is cleared that both bank have highly negative correlation between deposit rate and deposit amount (i.e. r_{12}). The have correlation of $r_{12} = -0.935$ & $r_{12} = -0.9695$ of HBL and NMBBL respectively explains that the small rate increase/decrease in deposit rate decrease /increase in deposit amount more proportionately. The coefficient of determination i.e. $r_{12}^2 = 0.874$ & $r_{12}^2 = 0.94$ Of HBL & NMBBL respectively shows 87.4 percent and 94 percent of total variation on deposit amount of each bank is explained by theirs deposit rate. Thus Deposit amount of NMBBL is highly affected by its deposit rate than of HBL. The simper correlation coefficient of both banks don't support of practical theory of deposit amount and deposit rate because practically high deposit rate attract more deposit collection and low despite rate don't attract more deposit amount.

But Correlation between lending rate and lending volume (r_{34}) of both banks seem negative. This analysis of both banks supports the real theory of lending rate and lending amount. The correlation of HBL i.e. $r_{34} = -0.9528$ is said to be highly negative but $r_{34} = -0.79675$ of NMBBL is moderately negative. From coefficient of determination of $r_{34}^2 = 0.9078$ shows that

90.78 percent of variation in lending amount of HBL is caused by its lending rate. But $r_{34}^2 = 0.6348$ of NMBBL shows only 63.48 percent of variation in lending amount is explained by its lending rate.

Similarly the above analysis between lending rate and deposit rate of two sample banks shows high positive relationship. The correlation coefficient between deposit rate and lending rate i.e. r_{13} of HBL and NMBBL are 0.9889 and 0.9673 respectively. The coefficient of determination $r_{13}^2 = 0.978$ & $r_{13}^2 = 0.9356$ of HBL and NMBBL shows that 97.8 percent & 93.56 percent of variation in one variable is explained by other independent variable. The multiple correlation coefficients explain the effect of two independent variables in dependent variable shows that higher correlation coefficient than its simple correlation coefficient of both banks. The coefficient of multiple determinations taking deposit amount as dependent and deposit rate and lending amount as independent variable i.e. $R_{2.14}^2$ of HBL and NMBBL are 0.9525 & 0.993 shows that 95.25 percent and 99.3 percent of total variation in deposit amount of respective Banks is explained by two other (deposit rate and lending amount) variable and remaining 4.75 percent and 0.70 percent of variation is due to other variable which is not study here. Similarly $R_{4.32}^2$ of HBL and NMBBL is 0.9555 & 0.98 explains that 95.5 percent & 98 percent of total change in dependent variable (deposit amount) is explained by two independent variables (lending rate and deposit amount).

4.5 Major Findings

From the analysis of relevant data of two banks (HBL and NMBBL) under study; using financial tools: percentage, asset utilization ratio and liquidity ratios as well as statistical tools: mean, standard deviation, correlation coefficient and coefficient of simple and multiple determination and test of statistics , the following findings have been drawn.

1) Deposit rates, interest on loans and advance (lending rate) of two commercial banks under study period are in decreasing trend means that every year interest rate either in deposit or in lending has been decreasing.

2) Loan and advance (total credit) to total deposit ratio of two commercial banks have higher than 75 percent each year shows that they mobilize theirs deposit with maximum extent.
3) The average Interest Rate risk ratio of two Commercial Banks show that over 85 percent of total deposits except current deposit mobilize by two banks in loan and investment. Comparatively being NMBBL the higher interest rate risk, both Commercial banks carry high risk in mobilizing deposit.
4) Statistical analysis shows that interest rates on lending are far higher than deposit rate of two sample banks. The correlation coefficient between these two variables (deposit rate and lending rate) of sample banks comes highly positive.
5) The simple correlation coefficient between deposit rate and deposit amount of two commercial banks comes highly negative but comparatively the higher correlation of these variables of NMBBL is computed. Hence the real theory which says with the increase/decrease in deposit rate; deposit amount increase/decrease does not match the analysis (increase in deposit rate decrease deposit amount and vice-versa).
6) The simple correlation between lending rate and lending amount (loan and advance) of sample banks are negatively correlated. This correlation of HBL is highly negative but NMBBL has moderately negative. This analysis match to the real theory i.e. increase in interest rate decrease the loan amount and vice-versa. Hence it can be concluded that the customers Banks are interest conscious.
7) The coefficient of simple determination r_{12}^2 of two sample banks clear that the variation in dependent variable (deposit amount) has been explained by one independent variable (deposit rate) is to large extent and less percentage variation is due to the effect of other factors in the economy.
8) The simple coefficient of simple determination r_{34}^2 of two commerce banks (HBL and NMBBL) under study that explains total variation in dependent variables (loan and advance) has been explained by one independent variable (lending rate) is to high in the case of HBL but moderate in case of NMBBL. Thus loan and advance of HBL is affected by to large extent by its interest rate but moderate extent effect made by lending rate on its volume of NMBBL. Whatever it has been affected, lending interest rate is major determinant of lending volume.

9) The simple correlation between deposit interest rate and interest rate on loan and advance i.e. r_{13} of two banks are highly positive meaning that increase or decrease in one variable also increase or decrease in other variable. They move in same direction. Similarly correlation coefficient between deposit amount and lending rate r_{23} & between deposit rate and lending amount r_{14} of two banks are highly negative meaning that they move in opposite direction.

10) The multiple determinations $R_{2.14}{}^2$ of HBL and NMBBL comes to Know that 95.25 percent and 99.3 percent total variation explained on Deposit amount by deposit rate and lending volume. This clears that no other more determinant factors in economy to effect on deposit amount.

11) The multiple determination ($R_{4.32}{}^2$) of two sample banks also high make clears that to large extent variation on dependent variable (lending amount) has been explained by two independent variable (lending rate and deposit amount) and less percentage of variations is due to the effect of other factors in the economy. From this analysis 95.55 percent and 98 percent of total variation in lending amount of HBL and NMBBL is explained by two other independent variables (lending rate and deposit amount).

12) From the analysis, it is cleared that even though correlation between
Inflation rate and deposit rate, inflation rate and lending rate is positive but test of significance for correlation between these variables of all Commercial banks comes insignificant. So it can be concluded that there is no correlation between inflation rate and deposit rate, inflation rate and lending rate of commercial banks.

13) Test of significance for correlation coefficient between deposit rates and deposit amount of two banks shows the significance relationship between them.

14) Test of significance for correlation coefficient between lending rate and Lending amount of two commercial banks comes significant. Hence it can be concluded that lending rate and lending amount are correlated to each other.

CHAPTER- V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Finally, the research study comes to the very end. This is the last chapter which includes the briefing about the entire chapter ahead known as summary. To know the actual theme of the study; following four chapters Introduction, Literature Review, Research Methodology and Analysis the study is summarized. Then conclusion is drawn from following analysis part and comparing the theoretical aspect and analysis. Based on conclusion, recommendations are suggested with a hope of improving present situation of interest rate structure so that could mobilize deposit more enough in the upcoming year by Nepalese Commercial banks.

5.1 Summary

There are various factors which contribute in the acceleration of economic development of a country. Such various factors are varied from each nation. Today, all the developing countries are making their endeavor for the economic growth through building the domestic resources. For the development of the country's economy sound and coordinated, fiscal and secondary policy plays an important role. Regarding this fact, in Nepal after liberalization policy, various banks and financial institutions came into existence with a hope to play an important role in the development of financial system of the country. Accepting deposit from savers (household, businesses or government) and transferring the collected deposit to the investment sector (i.e. by lending collected amount from depositors to borrowers) is one of the major functions of banking business. Banks are the real intermediaries who transfer savings (i.e. collected deposit) to the needy investors, so that money can be used in the productive sector for economic development. To collect deposit bank lure savers by providing certain percentage of interest and collected amount is loaned to borrowers in which banks charge certain percentage of interest to them. The proper decision making in charging and providing interest rate affects profit position of bank. Even though there are various factors in the economy that affect deposit and lending amount; interest rate is one of the major economic indicator that affect deposit and lending amount of banks.

With the help of interest rate theories we come to know that interest rate fluctuates time to time. Such a fluctuation has been analyzed with the help of financial tools and statistical tools in systematic manner. From financial analysis, various financial tools are used to know real financial position; whether interest rate on deposit and loan is either increasing or decreasing in above study period, whether the percentage change in deposit and loan and advance increasing

or decreasing; whether the deposit mobilization is properly done or not. From above financial analysis it is cleared that even though interest rate on deposit and lending of HBL and NMBBL is in decreasing trend, the volume of deposit and loan and advance is in increasing trends. In the side of deposit mobilization, NMBBL has kept more money in NRB deposit than HBL. Deposit mobilization in side of lending of NMBBL seems more satisfactory than HBL. In summary both Commercial banks mobilize its deposit to the maximum extent i.e. more than 75 percent of deposit in loan and advance in each year.

From statistical analysis, the effect of interest on deposit and lending amount is analyzed using statistical tools mentioned in chapter three. Secondary data are collected from NRB's economic reports and annual report of related banks. From this analysis of HBL and NMBBL, there is high negative correlation between deposit interest rate and deposit amount and lending interest rate and lending amount. Even though, the analysis between deposit rate and deposit amount do not match with practical theory, test of hypothesis shows that there is significant relationship between deposit rate and deposit amount. Similarly analysis also shows the significant relationship between lending rate and lending amount of both commercial banks. These studies also try to find the relationship between inflation rate, deposit rate and lending rate but test of significance for correlation coefficient shows that these variables are not correlated. The coefficient of simple determination as well as multiple determination shows that the structural change in interest rate highly effect on deposit volume and lending volume of two sample banks (HBL and NMBBL) .

5.2 Conclusions

In conclusion we can say that interest rate has greater influence over the resource mobilization and utilization in the productive sector. It is the main determinant factor of firm's profit. The interest rates that have greater effects on deposit, flow of credit are fully liberalized in August 1991. Before liberalization it was fixed and monitored by NRB. After liberalization period NRB has allowed commercial banks to fix the interest rates on their own under some certain directives. From this study, we come to know that different structural changes has been occurred on interest rate under which Commercial Banks operated an ERA of reducing lending rate to mobilize the resource into productive sector. In spite of decreasing the deposit rate under study period deposit collection has been increasing significantly. It is because of increasing of people

awareness and education about bank and banking system and as well as efficiency of Commercial Banks. From above study, we conclude that both Commercial Banks (i.e. HBL and NMBBL) mobilize their collected deposit through loan and advance in maximum extent (over 75 percent) due to decrement of lending rate during study period. It is because of negative relationship between Lending interest rate and Lending volume.

Finally, it can be concluded that whatever extent of negative correlation between deposit interest rate and deposit amount, lending interest rate and lending amount of sample banks; interest rate is considered as the major variable which affect deposit amount and lending amount of commercial banks to large extent. From simple and multiple correlation coefficients, it can be concluded that beside interest rate there are few other factors also in the economy which has less effect of deposit amount and lending amount of sample two banks as well as other commercial banks also. But those other factors are not covered by this study.

5.3 Recommendations

After analyzing and finding out the structural change effect of interest rate on deposit collection and its mobilization of commercial banks it is thought that there are some recommendation (suggestions) which would be helpful in near future for the banker, researchers and academicians, which are as follows;

- NRB as a Central bank should provide clear-cut policies, guideline or directive to discipline commercial banks in order to maintain effective interest rate with minimum spread.
- There is inconsistency in payment and charging of interest rates. This may create misconception about the organizations regarding its financial position and profit. So banks are suggested to fix concessional rates on lending so that it can increases investment opportunities and promote industrial sector.
- There is inconsistency in average deposit rate, also very low especially for Bank of Katmandu. Deposit collection is also comparatively low so that it is suggested to make attractive rate.
- As NRB's publications are the major Note of data and information regarding this topic, untimely and late publication makes the researcher wait long and even individual banks

do not put available information regarding interest rate structure on their annual report. So, NRB and even individual commercial banks are suggested to publish all necessary publication in time and in their own publication respectively for the convenience of researcher and other interested people.

- Commercial banks should convince borrower to repay loan by offering services, facilities, fine waivers discount etc. collection of more saving from the private sectors and its effective mobilization is possible only through good repayment of loans. Good repayment of loans ensures the strength of the commercial banks.
- As the key to success for any organization and for good financial system in the country capital and investment is essential, this is possible only by proper decision making of interest. So, all commercial banks are suggested to set proper and practical interest rate policy.
- Future researchers are suggested to make more explanatory research in this topic.

Annexure E1

Rs in Millions

Mid July	Current & Saving deposit		Fixed Deposit		Total Deposit		NRB balance	
Year	HBL	NMBBL	HBL	NMBBL	HBL	NMBBL	HBL	NMBBL
2010/11	972.6	1060	1020.6	2608.1	2396.5	4145.2	122	374.4
2011/12	1599	1580	1812	4356.8	3983	6455.6	256.9	401.2
2012/13	2530.4	2329	1948.5	5236.8	5724.1	8578.8	399.9	634.1
2013/14	2652.2	2951.4	1958.8	5453.6	5735.9	9514	298.2	1170.7
2014/15	3203	3797.8	1991.1	5031.6	6169.9	10548	362.4	511
2015/16	3871.7	5363	2297.7	4875.7	7741.6	12747.3	447.4	800.3
2016/17	4750.1	6552.8	2878.9	3536.6	8942.8	12125.5	417.9	747.7

Source: Annual Reports of Himalayan Bank Ltd. and NMB Bank Ltd.

Annexure E2

(Rs. in Million)

Years	HBL			NMBBL		
Mid-July	Total Credit	Investment	Deposit	Total Credit	Investment	Deposit
2010/11	1811.5	119.9	2396.5	3258.7	708.7	4145.2
2011/12	2995.3	151.6	3983	4611.8	60	6455.6
2012/13	4327.1	325.4	5724.1	7347.4	277.5	8578.8
2013/14	4977.6	630.7	5735.9	8222.1	1029.4	9514
2014/15	4956.2	1618.8	6169.9	8491.9	2276.7	10548
2015/16	6104.9	2394.6	7741.6	10253.6	2617.3	12747.3
2016/17	6166.9	2235.7	8942.8	8739.8	2275.3	12125.5

Source: Annual Reports of Himalayan Bank Ltd. and NMB Bank Ltd.

Analysis of Himalayan Bank Ltd.

Annexure E3

Calculation of Average Rate of Interest on Deposit of HBL

Deposit	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Savings	7.5	5	5	5	4.25	2.75	2.375
Fixed							
7 days	4.5	2.5	2.5	2.5	2.5	2	1.5
14 days	5	3	3	3	3	2.5	2.5
1 month	6	4	4	4	3.5	2.5	2.5
2 months						3	
3 months	8	5	4.75	4.75	4		3
6 months	8.5	5.5	5.25	5.25	4.5	3.5	3.5
1 year	10	6.75	6.5	6.5	5	4	4.25
2years/above	9.5	7.25	7	7	5.375	4.7545	5.125
Total (X)=	59	39	38	38	32.125	25.0045	24.75
Mean=X Average of all deposits	7.375	4.875	4.750	4.750	4.016	3.126	3.093

Source: Annual Reports of Himalayan Bank Ltd.

Where,

$\sum X =$

N = NC

X = VA

MEAN

MEAN

MEAN

MEAN

MEAN

MEAN

MEAN

Calculation of Standard Deviation of Average Interest Rate on Deposit of HBL

Year	Average Interest (X)	d	d^2
2010/11	7.375	2.805	7.868
2011/12	4.875	0.305	0.093
2012/13	4.750	0.180	0.032
2013/14	4.750	0.180	0.032
2014/15	4.016	(0.554)	0.307
2015/16	3.126	(1.444)	2.085
2016/17	3.031	(1.539)	2.369
	∑X = 31.985		∑d2=12.60

$$\bar{X} = Average \text{ of Average Deposit interest rate} = \frac{\sum X}{N} = \frac{31.985}{7} = 4.57$$

$$d = X - \bar{X} = X - 4.57$$

$$\text{Standard Deviation}(\sigma) = \sqrt{\frac{\sum\left(X - \bar{X}\right)^2}{n}} = \sqrt{\frac{126}{7}} = \sqrt{1.799} = 1.216$$

$$\text{Coefficien t of Variation} = \frac{S.D}{Mean} X100\% = \frac{1.216}{4.57} X100\% = 26.60\%$$

Annexture-E4

Interest rate structure on Lending of HBL

Loan and Adv	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
Overdraft	15.75	13.25	12.25	12.25	11.75	11.75	11.75
Export Credit	10.25	9.5	9.5	9.5	10	10	7.25
Import L/C					10.625	10.25	10.25
Against FDR	11.5	9.25	9	9	9	7.5	9.25
Against HMG bond	11.5	9	8.5	8.5	7.25	7.25	7.25
Against BG/CG	15.5	11.5	11	11	9.75	9.25	
Against other gurantee					9	7.5	7.5
Industrial Loan		13	12.5	12.5	11.5	11.75	11.75
Commercial Loan		13.5	13	13	12.25	12.25	12.25
Priority Sector	15	13.5	13.5	13.5	13.5		
Poorer Sector	12	9	9	9	9	8.75	8.75
Term Loan	15.5	13.5	12.5	12.5	12	11.5	11.75
Working Capital	15.25	13.25	12.75	12.75	11.75	11.75	11.75
Hire purchase	17	15	13.5	13.5	11.25	10.75	9.5
Others	18	15	15	15	8.75	8.75	8.75
Total (∑X)	157.25	158.25	152	152	157.375	139	127.75
Mean (X)= Average of all Loan and Advance	14.30	12.17	11.69	11.69	10.49	9.93	9.83

Source: Annual Reports of Himalayan Bank Ltd.

Where,
X= lending rate
N= No of observations

$$\text{MEAN}\left(\overline{X}_{2010/11}\right)=\frac{\sum X_{2010/11}}{N}=\frac{157.25}{11}=14.30$$

$$\text{MEAN}\left(\overline{X}_{2011/12}\right)=\frac{\sum X_{2011/12}}{N}=\frac{158.25}{13}=12.17$$

$$\text{MEAN}\left(\overline{X}_{2012/13}\right)=\frac{\sum X_{2012/13}}{N}=\frac{152}{13}=11.69$$

$$\text{MEAN}\left(\overline{X}_{2013/14}\right)=\frac{\sum X_{2013/14}}{N}=\frac{152}{13}=11.69$$

$$\text{MEAN}\left(\overline{X}_{2014/15}\right)=\frac{\sum X_{2014/15}}{N}=\frac{157.375}{15}=10.49$$

$$\text{MEAN}\left(\overline{X}_{2015/16}\right)=\frac{\sum X_{2015/16}}{N}=\frac{139}{14}=9.93$$

$$\text{MEAN}\left(\overline{X}_{2016/17}\right)=\frac{\sum X_{2016/17}}{N}=\frac{127.75}{13}=9.83$$

Calculation of S.D of Interest rate on Lending of HBL			
Year	Average Interest on lending (X)	d	d^2
2010/11	14.3	2.86	8.1796
2011/12	12.17	0.73	0.5329
2012/13	11.69	0.25	0.0625
2013/14	11.69	0.25	0.0625
2014/15	10.49	(0.95)	0.9025
2015/16	9.93	(1.51)	2.2801
2016/17	9.83	(1.61)	2.5921
	$\sum X = 80.1$		$\sum d^2 = 14.6122$

Where,

$$\bar{X} = Average \text{ of Average Deposit interest rate} = \frac{\sum X}{N} = \frac{80.1}{7} = 11.44$$

$$d = X - \bar{X} = X - 11.44$$

$$\text{Standard Deviation}(\sigma) = \sqrt{\frac{\sum\left(X-\bar{X}\right)^2}{n}} = \sqrt{\frac{14.6122}{7}} = \sqrt{2.0875} = 1.278$$

$$\text{Coefficien t of Variation (CV)} = \frac{\text{S.D}}{\text{Mean}} \text{X} 100\,\% = \frac{1.278}{11.44} X 100\% = 11.17\%$$

(Note: Interest rate on deposit and lending is taken from Annex-E3 and Annex-E4 and Deposit amount and lending amount from Annex-E2)

Correlatio n Coefficint between Deposit rate (1) and Deposit amount (2) = r_{12}

$$r_{12} = \frac{n\sum 12 - \sum 1X \sum 2}{\sqrt{n\sum 1^2} - \left(\sum 1\right)^2 \sqrt{n\sum 2^2} - \left(\sum 2\right)^2}$$

Where,

$n = no$ of fiscal year = 7

$\sum 12 = \text{Sum of Variable "1" multiply v ariable "2"} = 168,164.95$

$\sum 1 = \text{Sum of Variable "1"} = 31.985$

$\sum 2 = \text{Sum of Variable "2"} = 40,693.8$

$\sum 1^2 = \text{Sum of Square of Variable "1"} = 158.75$

$\sum 2^2 = \text{Sum of Square of Variable "2"} = 26,52,47,079.3$

$\left(\sum 1\right)^2 = \text{Whole Square of sumation of Variable "1"} = (31.985)^2 = 1023.04$

$\left(\sum 2\right)^2 = \text{Whole Square of sumation of Variable "2"} = (40693.8)^2 = 1,65,59,85,358$

$\sum 24 = \text{Sum of Variable "2" multiply v ariable "4"} = 202581614$

$\sum 13 = \text{Sum of Variable "1" multiply v ariable "3"} = 379.42$

$\sum 14 = \text{Sum of Variable "1" multiply v ariable "4"} = 130221.46$

$\sum 23 = \text{Sum of Variable "2" multiply v ariable "3"} = 446214.52$

$\sum 34 = \text{Sum of Variable "3" multiply v ariable "4"} = 344362$

$\sum 3 = \text{Sum of Variable "3"} = 80.1$

$\sum 4 = \text{Sum of Variable "4"} = 31339.5$

$\sum 3^2 = \text{Sum of Square of Variable "3"} = 931.185$

$\sum 4^2 = \text{Sum of Square of Variable "4"} = 155618028.6$

$\left(\sum 3\right)^2 = \text{Whole Square of sumation of Variable "3"} = (80.1)^2$

$\left(\sum 4\right)^2 = \text{Whole Square of sumation of Variable "4"} = (31339.5)^2$

Correlatio n Coefficint between Deposit rate (1) and Deposit amount (2) = r_{12}

$$r_{12} = \frac{n\sum 12 - \sum 1X\sum 2}{\sqrt{n\sum 1^2 - \left(\sum 1\right)^2}\sqrt{n\sum 2^2 - \left(\sum 2\right)^2}}$$

$$= \frac{7X168164.95 - 31.985X40693.8}{\sqrt{7X158.75 - 1023.04}\ \sqrt{7X265247079.3 - 1655985358}}$$

$$= \frac{-124436.543}{9.392X14168.42253}$$

$$= \frac{-124436.543}{133069.8244}$$

$$= -0.935$$

Coefficient of Determinat ion between Deposit rate (1) Deposit amount(2)

$$\left(r_{12}\right)^2 = \left(-0.935\right)^2 = 0.8742$$

Similarly,

Correlation Coefficien t between Deposit amount "2" and lending amount "4"

$$r_{24} = \frac{n\sum 24 - \sum 2X\sum 4}{\sqrt{n\sum 2^2 - \left(\sum 2\right)^2}X\sqrt{n\sum 4^2 - \left(\sum 4\right)^2}}$$

$$= \frac{7X202581614 - 40693.8X31339.5}{\sqrt{7X265247079.3 - \left(40693.8\right)^2}\sqrt{7X155618028.6 - \left(31339.5\right)^2}}$$

$$= \frac{142747952.9}{14168.42253\,X10351.90513}$$

$$= 0.9732$$

Coefficient of Determinat ion between Deposit amount (2) Lending amount(4)

$$\left(r_{24}\right)^2 = \left(0.9732\right)^2 = 0.9471$$

Correlation Coefficien t between Deposit amount "1" and lending amount "4"

$$r_{14} = \frac{n\sum 14 - \sum 1X\sum 4}{\sqrt{n\sum 1^2 - \left(\sum 1\right)^2}\,X\,\sqrt{n\sum 4^2 - \left(\sum 4\right)^2}}$$

$$\frac{7X130221.46 - 31.985X31339.5}{\sqrt{7X158.75 - (31.985)^2}\,\sqrt{7X155618028.6 - (31339.5)^2}}$$

$$= \frac{-90843.6875}{9.392\ \text{X}10351.90513}$$

$$= -0.9343$$

Coefficient of Determinat ion between Deposit amount (1) Lending amount(4)

$$(r_{14})^2 = (-0.9343)^2 = 0.8729$$

Correlation Coefficien t between Lending rate "3" and lending amount "4"

$$r_{34} = \frac{n\sum 34 - \sum 3X\sum 4}{\sqrt{n\sum 3^2 - \left(\sum 3\right)^2}\,X\,\sqrt{n\sum 4^2 - \left(\sum 4\right)^2}}$$

$$\frac{7X344362 - 80.1X31339.5}{\sqrt{7X931.185 - (80.1)^2}\,\sqrt{7X155618028.6 - (31339.5)^2}}$$

$$= \frac{-99759.95}{10.1136\ \text{X}10351.90513}$$

$$= -0.9528$$

Coefficient of Determinat ion between Lending rate (3) Lending amount(4)

$$(r_{34})^2 = (-0.9528)^2 = 0.9079$$

Correlation Coefficien t between Deposit amount "2" and lending rate "3"

$$r_{23} = \frac{n\sum 23 - \sum 2X\sum 3}{\sqrt{n\sum 3^2 - \left(\sum 3\right)^2}\,X\,\sqrt{n\sum 2^2 - \left(\sum 2\right)^2}}$$

$$\frac{7X446214.52 - 40693.8X80.1}{\sqrt{7X931.185 - (80.1)^2}\,\sqrt{7X265247079.3 - (40693.8)^2}}$$

$$= \frac{-136071.74}{10.1136\ \text{X}14168.42252}$$

$$= -0.9496$$

Coefficient of Determinat ion between Deposit amount "2" Lending rate "3"

$$(r_{23})^2 = (-0.9496)^2 = 0.90174$$

Correlation Coefficien t between Deposit interest rate "1" and lending rate "3"

$$r_{13} = \frac{n\sum 13 - \sum 1X \sum 3}{\sqrt{n\sum 3^2 - \left(\sum 3\right)^2}\, X \sqrt{n\sum 1^2 - \left(\sum 1\right)^2}}$$

$$\frac{7\,X\,379.42 - 31.985\,X\,80.1}{\sqrt{7\,X\,931.185 - (80.1)^2}\,\sqrt{7\,X\,158.75 - (31.985)^2}}$$

$$= \frac{93.9415}{10.1136\ \text{X}9.392}$$

$$= 0.98899$$

Coefficient of Determinat ion between Deposit amount "2" Lending rate "3"

$$(r_{23})^2 = (.98899)^2 = 0.978$$

Now we have,

$r_{12} = -0.935$

$r_{24} = 0.9732$

$r_{14} = -0.9343$

$r_{34} = -0.9528$

$r_{23} = -0.9496$

$r_{13} = 0.98899$

Thus,

Multiple Correlatio n Coefficien t assuming variable "2" i.e Deposit amount as dependent varable & other two variables ie variable "1" and variable "4" (i.e deposit rate & Lending amount) as independen t variable s

$$R_{2.14} = \sqrt{\frac{(r_{12})^2 + (r_{24})^2 - 2r_{12}r_{24}r_{14}}{1 - (r_{14})^2}}$$

$$= \sqrt{\frac{(-0.935)^2 + (0.9732)^2 - 2X - 0.935X\,0.9732X - 0.9343}{1 - (-0.9343)^2}}$$

$$= \sqrt{\frac{0.121}{0.127}}$$

$$= \sqrt{0.952755}$$

$$= 0.976$$

Coefficient of Multiple Determinat ion assuming variable "2" i.e Deposit amount as dependent varable & other two variables ie variable "1" and variable "4" (i.e deposit rate & Lending amount) as independen t variable s.

$(R_{2.14})^2 = (0.976)^2 = 0.9525$

This means that 95.25% change in Deposit amount due to change in Deposit rate and Loan amount and Remaining 4.75% change due to other factors.

Similarly,

Multiple Correlatio n Coefficien t assuming variable "4" i.e Lending amount as dependent varable & other two variables ie variable "3" and variable "2" (i.e Lending rate & Deposit amount) as independen t variable s

$$R_{4.32} = \sqrt{\frac{(r_{34})^2 + (r_{24})^2 - 2r_{34}r_{24}r_{23}}{1-(r_{23})^2}}$$

$$= \sqrt{\frac{(-0.9528)^2 + (0.9732)^2 - 2X - 0.9528X\,0.9732X - 0.9496}{1-(-0.9496)^2}}$$

$$= \sqrt{\frac{0.09388}{0.09825}}$$

$$= \sqrt{0.95552}$$

$$= 0.9775$$

Coefficient of Multiple Determinat ion assuming variable "4" i.e Loan amount as dependent varable & other two variables ie variable "3" and variable "2" (i.e lending rate & Deposit amount) as independen t variable s.

$(R_{4.32})^2 = (0.9775)^2 = 0.9555$

This means that 95.55% change in Lending amount due to change in Lending rate and Deposit amount and Remaining 4.45% change due to other factors.

Test of Significance of Correlation Coefficient of HBL

T-Statistics under null hypothesis

$$t = \frac{r}{\sqrt{1-r^2}} X \sqrt{n-2}$$

Where,

$t = T - Statistics$ under null hypothesis

r = Correlatio n Coefficien between tw o variables

n = no. of observatio ns

(Note: value of t-statistics is only absolute value or positive value)

Thus,

T-Statistics between Deposit rate and Deposit amount

$$t = \frac{r_{12}}{\sqrt{1 - r_{12}^{\ 2}}} X \sqrt{n-2} = \frac{-0.935}{\sqrt{1-0.8742}} \sqrt{7-2} = \frac{-2.0907}{0.3546} = -5.896$$

T-Statistics between Lending rate and lending amount

$$t = \frac{r_{34}}{\sqrt{1 - r_{34}^{\ 2}}} X \sqrt{n-2} = \frac{-0.9528}{\sqrt{1-0.9078}} \sqrt{7-2} = \frac{-2.13}{0.3036} = -7.016$$

T-Statistics between Deposit rate and Lending rate

$$t = \frac{r_{13}}{\sqrt{1 - r_{13}^{\ 2}}} X \sqrt{n-2} = \frac{0.98899}{\sqrt{1-0.9781}} \sqrt{7-2} = \frac{2.21144}{0.1479} = 14.95$$

Analysis of NMB Bank Ltd.

Annexture-E6

Interest rate structure on deposit of NMBBL							
Deposit	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Savings	6.5	6	6	5.5	5.5	4.5	4.125
Fixed							
1 month	4.5	4	4	3.5	3.5	3.5	3.5
2 months							
3 months	6	5.5	5	4.5	4.5	4	4
6 months	6.5	6	5.5	5.5	5.5	4.5	4.5
1 year	8.5	7.5	7	7	6.5	4.75	4.75
2years/above	9	8	7.375	7.5	7	5	5
Total (∑X)	41	37	34.875	33.5	32.5	26.25	25.875
Mean(X) =Average of all deposits	6.833	6.167	5.813	5.583	5.417	4.375	4.313

Source: Annual Reports of NMB Bank Ltd.

Where,

$\sum X = Sumof$ all Values of Variables

N = No of Observations

X = V*ariables or D*eposit Rate

$$\text{MEAN}\left(\overline{X}_{2010/11}\right) = \frac{\sum X_{2010/11}}{N} = \frac{41}{6} = 6.833$$

$$\text{MEAN}\left(\overline{X}_{2011/12}\right) = \frac{\sum X_{2011/12}}{N} = \frac{37}{6} = 6.167$$

$$MEAN\left\{X_{2012/13}\right\} = \frac{\sum X_{2012/13}}{N} = \frac{34.875}{6} = 5.813$$

$$MEAN\left\{X_{2013/14}\right\} = \frac{\sum X_{2013/14}}{N} = \frac{33.5}{6} = 5.583$$

$$MEAN\left\{X_{2014/15}\right\} = \frac{\sum X_{2014/15}}{N} = \frac{32.5}{6} = 5.417$$

$$MEAN\left\{X_{2015/16}\right\} = \frac{\sum X_{2015/16}}{N} = \frac{26.25}{6} = 4.375$$

$$MEAN\left\{X_{2016/17}\right\} = \frac{\sum X_{2016/17}}{N} = \frac{25.875}{6} = 4.313$$

Calculation of Standard Deviation of Average Interest Rate on Deposit of NMBBL			
Year	Average Interest (X)	d	d^2
2010/11	6.833	1.333	1.777
2011/12	6.167	0.667	0.445
2012/13	5.813	0.313	0.098
2013/14	5.583	0.083	0.007
2014/15	5.417	(0.083)	0.007
2015/16	4.375	(1.125)	1.266
2016/17	4.313	(1.187)	1.409
	∑X = 38.501		∑d2 = 5.008

Where,

$$\bar{X} = Average \text{ of Average Deposit interest rate} = \frac{\sum X}{N} = \frac{38.501}{7} = 5.5$$

$$d = X - \bar{X} = X - 5.5$$

$$\text{Standard Deviation}(\sigma) = \sqrt{\frac{\sum\left(X - \bar{X}\right)^2}{n}} = \sqrt{\frac{5.008}{7}} = \sqrt{0.7154} = 0.846$$

$$\text{Coefficien t of Variation}(\text{CV}) = \frac{S.D}{Mean} X100\% = \frac{0.846}{5.5} X100\% = 15.38\%$$

ANNEXTURE – E7

Interest rate structure on Lending of NMBBL

Loan and Adv	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
Overdraft	15.75	14.75	14.25	14	13.75	12.5	
Export Credit	10.25	10	9.75	10.625	11.5	10.25	9.25
Import L/C	14.5	12.75	12.5			10.25	
Against FDR	11	10	9.375	9.5	9	7	
Against HMG bond	12.5	11	9	9	9	8.5	7.5
Against BG/CG	15	15	13	13	13	12	8
Industrial Loan	15.25	14.5	13	12.625	12.625		11
Commercial Loan	16	15	13.5	13.125	12.875		8.75
Priority Sector	13.5	13	13	13	13	11	10
Poorer Sector	12.5	12	12	12	12	10	9.5
Term Loan	14.75	14.5	13.5	13.5	13.25	11.5	
Hire purchase	16.25	14.5	14.25	14.25	14	11	9.5
Others	14	13.75	13	12.25	12	10	8.25
Total (∑X)	181.25	170.75	160.125	146.875	146	114	81.75
Mean (X)= Average of all Loan and Advance	13.94	13.13	12.32	12.24	12.17	10.36	9.08

Source: Annual Reports of NMB Bank Ltd.

$\sum X = Sum of$ all Values of Variables

$N = $ No of Observations

$X = V ariables\ or\ Lending Rate$

$\bar{X} = Average$ of All Variables

Where,

$$\text{MEAN}\left(\bar{X}_{2010/11}\right) = \frac{\sum X_{2010/11}}{N} = \frac{181.25}{13} = 13.94$$

$$\text{MEAN}\left(\bar{X}_{2011/12}\right) = \frac{\sum X_{2011/12}}{N} = \frac{170.75}{13} = 13.13$$

$$MEAN\{X_{2012/13}\} = \frac{\sum X_{2012/13}}{N} = \frac{160.125}{13} = 12.32$$

$$MEAN\{X_{2013/14}\} = \frac{\sum X_{2013/14}}{N} = \frac{146.875}{12} = 12.24$$

$$MEAN\{X_{2014/15}\} = \frac{\sum X_{2014/15}}{N} = \frac{146}{12} = 12.17$$

$$MEAN\{X_{2015/16}\} = \frac{\sum X_{2015/16}}{N} = \frac{114}{11} = 10.36$$

$$MEAN\{X_{2016/17}\} = \frac{\sum X_{2016/17}}{N} = \frac{81.75}{9} = 9.08$$

Calculation of Standard Deviation of Average Interest Rate on Lending of NMBBL			
Year	Average Interest (X)	d	d^2
2010/11	13.940	2.050	4.203
2011/12	13.130	1.240	1.538
2012/13	12.320	0.430	0.185
2013/14	12.240	0.350	0.123
2014/15	12.170	0.280	0.078
2015/16	10.360	(1.530)	2.341
2016/17	9.080	(2.810)	7.896
	∑X = 83.24		∑d2 = 16.363

Where,

$$\bar{X} = Average \text{ of Average Lending interest rate} = \frac{\sum X}{N} = \frac{83.24}{7} = 11.89$$

$$d = X - \bar{X} = X - 11.89$$

$$\text{Standard Deviation}(\sigma) = \sqrt{\frac{\sum\left(X - \bar{X}\right)^2}{n}} = \sqrt{\frac{16.363}{7}} = \sqrt{2.33757} = 1.53$$

$$\text{Coefficien t of Variation (CV)} = \frac{S.D}{Mean} X100\% = \frac{1.53}{11.89} X100\% = 12.86\%$$

(Note: Interest rate on deposit and lending is taken from Annex-E6 and Annex-E7 and deposit amount and Lending amount is taken from E2)

Correlatio n Coefficint between tw o Variables i.e (variable (x) and variable (y) = r_{xy}

$$r_{xy} = \frac{n\sum xy - \sum xX \sum y}{\sqrt{n\sum x^2 - \left(\sum x\right)^2}\sqrt{n\sum y^2 - \left(\sum y\right)^2}}$$

Where,

$n = no$ of fiscal year

But we have

Variable "1" = Deposit Rate

Variable "2" = Deposit amount (in millions)

Variable "3" = Lending rate

Variable "4" = Lending amount (in millions)

n = no of fiscal years = 7

$\sum 12$ = Sum of Variable "1" multiply v ariable "2" = 336326.3

$\sum 24$ = Sum of Variable "2" multiply v ariable "4" = 510789555.2

$\sum 13$ = Sum of Variable "1" multiply v ariable "3" = 466.59

$\sum 14$ = Sum of Variable "1" multiply v ariable "4" = 267876.97

$\sum 23$ = Sum of Variable "2" multiply v ariable "3" = 735219.02

$\sum 34$ = Sum of Variable "3" multiply v ariable "4" = 586068.78

$\sum 1$ = Sum of Variable "1" = 38.501

$\sum 2$ = Sum of Variable " 2" = 64114.4

$\sum 3$ = Sum of Variable "3" = 83.24

$\sum 4$ = Sum of Variable "4" = 50925.3

$\sum 1^2$ = Sum of Square of Variable "1" = 216.77

$\sum 2^2$ = Sum of Square of Variable "2" = 643751171.38

$\sum 3^2$ = Sum of Square of Variable "3" = 1006.21

$\sum 4^2$ = Sum of Square of Variable "4" =407107822.7

$\left(\sum 1\right)^2$ = Whole Square of sumation of Variable "1" = $\left(38.501\right)^2$ = 1482.327

$\left(\sum 2\right)^2$ = Whole Square of sumation of Variable "2" = $\left(64114.4\right)^2$ = 4110656287

$\left(\sum 3\right)^2$ = Whole Square of sumation of Variable "3" = $\left(83.24\right)^2$

$\left(\sum 4\right)^2$ = Whole Square of sumation of Variable "4" = $\left(50925.3\right)^2$

Correlatio n Coefficint between Deposit rate (1) and Deposit amount (2) = r_{12}

$$r_{12} = \frac{n\sum 12 - \sum 1X\sum 2}{\sqrt{n\sum 1^2 - \left(\sum 1\right)^2}\sqrt{n\sum 2^2 - \left(\sum 2\right)^2}}$$

$$= \frac{7X\,336326.3 - 38.501X\,64114.4}{\sqrt{7X\,216.77 - 1482.327}\ \sqrt{7X\,643751171.38 - 4110656287}}$$

$$= \frac{-114184.41}{5.9214X19889.74}$$

$$= -0.9695$$

Coefficient of Determinat ion between Deposit rate (1) Deposit amount(2)

$$(r_{12})^2 = (-0.9695)^2 = 0.94$$

Correlatio n Coefficint between Deposit rate (1) and Lending rate (3) = r_{13}

$$r_{13} = \frac{n\sum 13 - \sum 1X \sum 3}{\sqrt{n\sum 1^2 - (\sum 1)^2}\sqrt{n\sum 3^2 - (\sum 3)^2}}$$

$$= \frac{7X\,466.59 - 38.501X\,83.24}{\sqrt{7X\,216.77 - 1482.327}\ \sqrt{7X1006.21 - 6928.8976}}$$

$$= \frac{61.30676}{5.9214X10.7038}$$

$$= 0.967266$$

Coefficient of Determinat ion between Deposit rate (1) Lending rate (3)

$$(r_{13})^2 = (0.967266)^2 = 0.9356$$

Similarly,

Correlation Coefficien t between Deposit amount "2" and lending amount "4"

$$r_{24} = \frac{n\sum 24 - \sum 2X \sum 4}{\sqrt{n\sum 2^2 - (\sum 2)^2}\,X\sqrt{n\sum 4^2 - (\sum 4)^2}}$$

$$= \frac{7X\,510789555.2 - 64114.4X\,50925.3}{\sqrt{7X\,643751171.38 - (64114.4)^2}\ \sqrt{7X\,407107822.7 - (50925.3)^2}}$$

$$= \frac{310481832.1}{19889.74\text{X}16011.51}$$

$$= 0.9749$$

Coefficient of Determinat ion between Deposit amount (2) Lending amount(4)

$$(r_{24})^2 = (0.9749)^2 = 0.95043$$

Correlation Coefficien t between Deposit amount "1" and lending amount "4"

$$r_{14} = \frac{n\sum 14 - \sum 1X\sum 4}{\sqrt{n\sum 1^2 - \left(\sum 1\right)^2}\,X\,\sqrt{n\sum 4^2 - \left(\sum 4\right)^2}}$$

$$\frac{7X\,267876.97 - 38.501X\,50925.3}{\sqrt{7X\,216.77 - (38.501)^2}\,\sqrt{7X\,407107822.7 - (50925.3)^2}}$$

$$= \frac{-85536.1853}{5.921\,\text{X}16011.51}$$

$$= -0.9022$$

Coefficient of Determinat ion between Deposit amount (1) Lending amount(4)

$$(r_{14})^2 = (-0.9022)^2 = 0.81396$$

Correlation Coefficien t between Lending rate "3" and lending amount "4"

$$r_{34} = \frac{n\sum 34 - \sum 3X\sum 4}{\sqrt{n\sum 3^2 - \left(\sum 3\right)^2}\,X\,\sqrt{n\sum 4^2 - \left(\sum 4\right)^2}}$$

$$\frac{7X\,586068.78 - 83.24X\,50925.3}{\sqrt{7X1006.21 - (83.24)^2}\,\sqrt{7X\,407107822.7 - (50925.3)^2}}$$

$$= \frac{-136540.512}{10.703\,\text{X}16011.51}$$

$$= -0.79675$$

Coefficient of Determinat ion between Lending rate "3" Lending amount "4"

$$(r_{34})^2 = (-0.79675)^2 = 0.6348$$

Correlation Coefficien t between Deposit amount "2" and lending rate "3"

$$r_{23} = \frac{n\sum 23 - \sum 2X\sum 3}{\sqrt{n\sum 3^2 - \left(\sum 3\right)^2}\,X\,\sqrt{n\sum 2^2 - \left(\sum 2\right)^2}}$$

$$\frac{7X\,735219.02 - 64114.4X\,83.24}{\sqrt{7X1006.21 - (83.24)^2}\,\sqrt{7X\,643751171.38 - (64114.4)^2}}$$

$$= \frac{-190349.516}{10.7038\,\text{X}19889.74}$$

$$= -0.894$$

Coefficient of Determinat ion between Deposit amount "2" Lending rate "3"

$$(r_{23})^2 = (-0.894)^2 = 0.80$$

Now we have,

$r_{12} = -0.9695$

$r_{24} = 0.9749$

$r_{14} = -0.9022$

$r_{34} = -0.79675$

$r_{23} = -0.894$

$r_{13} = 0.967266$

Thus,

Multiple Correlatio n Coefficien t assuming variable "2" i.e Deposit amount as dependent varable & other two variables ie variable "1" and variable "4" (i.e deposit rate & Lending amount) as independen t variable s

$$R_{2.14} = \sqrt{\frac{(r_{12})^2 + (r_{24})^2 - 2r_{12}r_{24}r_{14}}{1-(r_{14})^2}}$$

$$= \sqrt{\frac{(-0.9695)^2 + (0.9749)^2 - 2X - 0.9695X\,0.9749X - 0.9022}{1-(-0.9022)^2}}$$

$$= \sqrt{\frac{0.1849}{0.186035}}$$

$$= \sqrt{0.993898997}$$

$$= 0.9969$$

Coefficient of Multiple Determinat ion assuming variable "2" i.e Deposit amount as dependent varable & other two variables ie variable "1" and variable "4" (i.e deposit rate & Lending amount) as independen t variable s.

$(R_{2.14})^2 = (0.9969)^2 = 0.993$

This means that 99.3 % change in Deposit amount due to change in Deposit rate and Loan amount and Remaining 0.70% change due to other factors.

Similarly,

Multiple Correlatio n Coefficien t assuming variable "4" i.e Lending amount as dependent varable & other two variables ie variable "3" and variable "2" (i.e Lending rate & Deposit amount) as independen t variable s

$$R_{4.32} = \sqrt{\frac{(r_{34})^2 + (r_{24})^2 - 2r_{34}r_{24}r_{23}}{1-(r_{23})^2}}$$

$$= \sqrt{\frac{(-0.79675)^2 + (0.9749)^2 - 2X - 0.79675X\,0.9749X - 0.894}{1-(-0.894)^2}}$$

$$= \sqrt{\frac{0.196408756}{0.200764}}$$

$$= \sqrt{0.97830}$$

$$= 0.9893$$

Coefficient of Multiple Determinat ion assuming variable "4" i.e Loan amount as dependent varable & other two variables ie variable "3" and variable "2" (i.e lending rate & Deposit amount) as independen t variable s.

$(R_{4.32})^2 = (0.9893)^2 = 0.98$

This means that 98% change in Lending amount due to change in Lending rate and Deposit amount and Remaining 2% change due to other factors.

Test of Significance of Correlation Coefficient of NMBBL

T-Statistics under null hypothesis

$$t = \frac{r}{\sqrt{1-r^2}} X \sqrt{n-2}$$

Where,

$t = T - Statistics$ under null hypothesis

r = Correlatio n Coefficien between tw o variables

n = no. of observatio ns

(Note: value of t-statistics is only absolute value or positive value)

Thus,

T-Statistics between Deposit rate and Deposit amount

$$t = \frac{r_{12}}{\sqrt{1 - r_{12}^{\ 2}}} X \sqrt{n-2} = \frac{-0.9695}{\sqrt{1-0.94}} \sqrt{7-2} = \frac{-2.167867}{0.24494} = -8.85$$

T-Statistics between Lending rate and lending amount

$$t = \frac{r_{34}}{\sqrt{1 - r_{34}^{\ 2}}} X \sqrt{n-2} = \frac{-0.79675}{\sqrt{1-0.63481}} \sqrt{7-2} = \frac{-1.781587}{0.6043} = -2.9481$$

T-Statistics between Deposit rate and Lending rate

$$t = \frac{r_{13}}{\sqrt{1 - r_{13}^{\ 2}}} X \sqrt{n-2} = \frac{0.9646}{\sqrt{1-0.9304}} \sqrt{7-2} = \frac{2.1569}{0.2638} = 8.17$$

Annexture-E9

Calculation the relationship of Inflation rate with lending rate and deposit rate of Commercial Banks

Year	Inflation rate (1)	Deposit rate (2)	Lending rate (3)	1X2	1X3	$(1)^2$	$(2)^2$	$(3)^2$
2010/11	11.4	7.35	13.7	83.79	156.18	129.96	54.02	187.69
2011/12	3.5	6.025	12.85	21.09	44.98	12.25	36.30	165.12
2012/13	2.4	5.375	11.95	12.90	28.68	5.76	28.89	142.80
2013/14	2.9	4.765	11.7	13.82	33.93	8.41	22.71	136.89
2014/15	4.8	4.625	11.45	22.20	54.96	23.04	21.39	131.10
2015/16	4	3.725	11.05	14.90	44.20	16	13.88	122.10
2016/17	4.5	3.505	10.225	15.77	46.01	20.25	12.29	104.55
	∑1=33.5	∑2=35.37	∑3=82.93	∑12=184.47	∑13=408.94	∑(1)2=215.67	∑(2)2=189.47	∑(3)2=990.26

Source: Annual Reports of Nepal Rastra Bank

Correlatio n Coefficint between tw o Variables i.e (variable (x) and variable (y) = r_{xy}

$$r_{xy} = \frac{n\sum xy - \sum xX \sum y}{\sqrt{n\sum x^2 - \left(\sum x\right)^2}\sqrt{n\sum y^2 - \left(\sum y\right)^2}}$$

Where,

$n = no$ of fiscal year

Now

we have,

Variable "1" = Infaltion Rate

Variable "2" = Deposit interest rate of Commercial Banks

Variable "3" = Lending rate of Commercial Banks

n = no of fiscal years = 7

$\sum 12$ = Sum of Variable "1" multiply v ariable "2" = 184.47

$\sum 13$ = Sum of Variable "1" multiply v ariable "3" = 408.94

$\sum 1$ = *Whole* Sumation of Variable "1" = 33.5

$\sum 2$ = *Whole* Sumation of Variable " 2"= 35.37

$\sum 3$ = *Whole* Sumation of Variable "3" = 82.93

$\sum 1^2$ = Sum of Square of Variable "1" = 215.67

$\sum 2^2$ = Sum of Square of Variable "2" = 189.47

$\sum 3^2$ = Sum of Square of Variable "3" = 990.26

Correlatio n Coefficint between Inflation rate and Deposit rate = r_{12}

$$r_{12} = \frac{n\sum 12 - \sum 1X \sum 2}{\sqrt{n\sum 1^2 - \left(\sum 1\right)^2}\sqrt{n\sum 2^2 - \left(\sum 2\right)^2}}$$

$$= \frac{7X184.47 - 33.5X35.37}{\sqrt{7X215.67 - 1122.25}\ \sqrt{7X189.47 - 1251.0369}}$$

$$= \frac{106.395}{19.68X8.675}$$

$$= 0.6232$$

Coefficient of Determinat ion between Inflation rate (1) Deposit rate (2)

$$(R_{12})^2 = (0.6232)^2 = 0.3883$$

Correlatio n Coefficint between Inflation rate and Lending rate = r_{13}

$$r_{13} = \frac{n\sum 13 - \sum 1X\sum 3}{\sqrt{n\sum 1^2 - (\sum 1)^2}\sqrt{n\sum 3^2 - (\sum 3)^2}}$$

$$= \frac{7X\,408.94 - 33.5X\,82.93}{\sqrt{7X\,215.67 - 1122.25}\ \sqrt{7X\,990.26 - 6877.3849}}$$

$$= \frac{84.425}{19.68X\,7.378}$$

$$= 0.58144$$

Coefficient of Determinat ion between Inflation rate (1) Deposit rate (2)

$$(R_{13})^2 = (0.58144)^2 = 0.338$$

Test of Significance of Correlation Coefficient

Under null hypothesis, t-statistics is calculated as below

T - Statistics between Inflation rate and deposit rate

$$t_{12} = \frac{r_{12}}{\sqrt{1 - r_{12}^{\ 2}}} X\sqrt{n-2} = \frac{0.6232}{\sqrt{1 - 0.38837}}\sqrt{7-2} = \frac{1.3935}{0.7820} = 1.782$$

T - Statistics between Inflation rate and Lending rate

$$t_{13} = \frac{r_{13}}{\sqrt{1 - r_{13}^{\ 2}}} X\sqrt{n-2} = \frac{0.58144}{\sqrt{1 - 0.338}}\sqrt{7-2} = \frac{1.300}{0.8136} = 1.5978$$

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