

# CHAPTER ONE

## INTRODUCTION

### 1.1 General Background

Nepal is basically an agricultural, mountainous and landlocked kingdom surrounded by two large, fast developing nations, China and India. More than 80% of the population is involve in the agricultural sector. The economic development of Nepal has been limited by the variety of geo-political and structural constraints. As such, country's land locked location; limited exportable resources, low economic growth, low savings, low income, higher rate of population growth, limited transportation facilities and infrastructure etc are the major factors that have proved obstacle in the economic development of the country.

As being developing country, Nepal is striving to develop and modernize her economy rapidly on rational and socially desired footings. But the structure of the economy has still remained primarily agricultural with very small manufacturing base. So it is essential to divert and modify agro based economy. Nepal has adopted mixed and liberal economic policy with the implicit objective to help the state and the private sector, on the ground of open and liberal eco-system. Especially after restoration of the democracy, the concept of the liberalization policies has been incorporated as directive principal and state policies. The continuing thrust to the development of nation has helped in establishing many company banks, financial institution and manufacturing industries. Thus these establishments helps the country for its development in some level but for actual economic development, capital formation and utilization are the two major things that should be essential for

the investment in a country. The formation and utilization of capital are shaped by many factors like prosperity of country, GDP of country, export-import of country, lending-deposit pattern, and interest rate and so on. In modern economy banks and financial institutions play the major role for capital generation and utilization. In other words they take part actively in funds mobilization. Keeping other factors constant, interest rate also plays the dominant role in borrowing and lending.

Financial institution collects funds mainly from deposits (time and saving deposits) which are ultimately used as a part of capital investment in country. Thus the problem of inadequate capital formulation is somehow wiped out by collecting more deposits from the savers (households, business and government). More precisely personal saving is the part of disposable income, which is not consumed. Saving equals income minus expenditure. The people having more income save more than the people having less income do. In general, household saves more than that of business and government. For household, saving equals to current income minus current expenditure. For business sector savings include current earnings retained inside business firms after payment of taxes, stockholder's dividend and other expenses. Government saving arises where there is a surplus of current revenue over expenditure. To induce more saving, financial institution can play a vital role by providing attractive interest rate and offer a different scheme. The people of the least developed countries are not much concerned about saving as most parts of earnings are spent in hand-to-mouth consumption. Even if some people are able to save their money, they show their interest to invest such surplus funds on non-productive sectors like gold, land, vehicles and so on. Banks and financial companies, as intermediaries, can attract savers to save more by providing them attractive interest rate and accept the deposit. Banks provide loans to borrowers who are in need of money from the money accumulated in

the form of deposit and capital of bank while granting loan. Bank charges a certain percentage of interest to the borrower and borrower has to pay that interest for using banks money. Interest on loan also varies according to the nature of loan, whether loan is of short term or long term. An appropriate interest rate structure greatly affects the collection of deposits, mobilization of saving (only in productive sector) and profit position of any financial institution, which in turn, affects the economic upliftment of the whole country.

## 1.2 Interest rate:

Interest rate is one of the important tools for shaping economy. It plays the dominant role in borrowing and lending. Simply, interest rate is defined as price a borrower must pay to secure scarce loanable funds from lender for an agreed-upon period. It is the price of credit. But unlike other prices in the economy, 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. The cost of borrowing money, measured in rupee per year per rupee borrowed, is the interest rate.<sup>1</sup> When we examine how money affects economic activity, we will focus on the interest rate, which is often called “The price of money”. Interest is rent paid for the use of money. In other words, people must pay for opportunity to borrow money. Financial institutions, as financial intermediaries, collect money from savers in the form of deposit and provide that for business sector in the form of loan. These institutions pay the interest to the depositors for the money borrowed from them and charge interest from the borrower for money lend to them. As any price is determine, theoretically, by the interplay of demand and

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<sup>1</sup> Samuelson, Paul A. & Nordhus, William D. “Economics”, Sixteen edition, Tata Mc Graw Hill Publishing Company Limited, New Delhi, P. 469

supply in a market economy, the price of money- the interest rate- plays a vital role in the allocation of resources and in the decision making of consumers and businesses. For example, an increase in the interest rate provides additional incentives to individuals and others to postpone current consumption (Save) and thereby free resources for investment. Interest rates send price signals to borrowers, lenders, and savers. Higher interests rates generally bring forth a greater volume of savings and stimulate the lending of fund i.e. ***Substitution effect***. Lower rate of interest, on the other hand, tends to reduce the volume of borrowing and capital investment, and lower rates stimulate borrowing and investment spending.<sup>2</sup> Investment is function of interest rate. The quality and flow of investment determines the income in the economy. Therefore, the impact of interest rate is on both the saving and investment in the economy. Further the borrowings and savings are always influenced by the interest rates. The cost of production, which depends upon the production function, is influenced by the interest rate, since the credit is also one of the components of production process. The saving in investment in the economy, which are influenced by the interest rates, are the real economic variables. The incomes and expenditures of the variable sectors of the economy result in excess savings or excess investment in each of the sectors.<sup>3</sup>

### 1.3 Interest rate structure in Nepal:

Before studying the relationship of interest rate and other factors, it is better to know average structure of interest rate that were prevailed in the country during the past four years. Though the detail about analysis about this are

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<sup>2</sup> Rose, Peter S.(1997), "Money and Capital Markets: Financial Institution and Instrumental in a Global Marketplace", Irwin, Chicago, 6<sup>th</sup> edition.

<sup>3</sup> Vaidya, Shakespeare, "Financial Market and Institution" Taleju prakashan, Kathmandu, p. 17

analyzed in chapter four, but the table no 1-1 below tries to give the glimpse of the lending rate and deposit rate of different financial institutions:

**Table: 1-1 Structure of Interest Rates (Percentage per Annum)**

	Mid-July			
	2009	2010	2011	2012
<b>Nepal Rastra Bank</b>				
Bank Rate	7.5	5.5	5.5	5.5
Refinance Rates	6.5-7.5	2.0-5.5	2.0-5.5	2.0-5.5
<b>Government Securities</b>				
Treasury Bills (91 days)	4.94	3.78	2.98	
National Saving Certificates	8.5-13.25	8.0-13.25	7.0-13.0	
Development Bonds	3.0-10.5	3.0-8.0	3.0-8.0	
<b>Inter bank Rate</b>	4.73	1.96	4.50	0.71
<b>Commercial Banks</b>				
<b>Deposit Rates</b>				
Saving Deposits	3.0 - 6.5	2.5 - 6.25	2.5 - 6.0	2.25 – 5.0
Time Deposits				
1 Months	--	2.0-4.5	2.0-5.5	2.0-3.5
3Months	2.5 -6.0	2.5-5.0	2.5-5.0	2.0-4.0
6Months	3.5-8.75	2.5-6.0	2.5-6.0	2.5-4.5
1 Years	4.5-7.75	3.5-7.0	3.0-7.0	2.75-6.0
2Years and above	4.25-8.5	3.25-8.0	3.25-7.5	3.0-6.5
<b>Lending Rates</b>				
Industry	7.0-15.0	7.0-14.0	8.5-14.0	8.5-13.5
Agriculture	12.5-14.5	12.0-14.0	10.5-14.5	10.5-13.0
Export Bills	7.0-16.0	6.5-12.0	4.0-12.5	4.0-11.5
Commercial Loans	7.0-16.0	7.0-16.0	7.5-16.0	9.0-14.5
Overdrafts	10.0-18.0	11.0-17.0	10.0-17.0	10.0-16.0
<b>Cash Reserve Ratio (CRR)</b>				
With NRB	7.0			
Cash in Vault	3.0	3.0	2.0	--

Source: Macroeconomics Indicators of Nepal, NRB, Research Department, Statistics Division, October 2004

[Note: The average lending rate of any sector is calculated by adding the two rates and divided it by 2 i.e. for example for industrial sector average lending rate it is calculated as  $(7\% + 15\%) \div 2 = 11\%$ ]

According to the structure of interest rate in presented in table 1-1, both lending and deposit rates are declining (except the National Saving Certificates) during the period of 2001 to 2004 mid-July. This may be due to the decline in the interest rate on government securities i.e. Treasury Bills. According to table, the interest rate of T-Bills has been drastically decreased from 4.94% per annum to 1.47%. As per principle, interest rates T-bills, are the bases for all kinds of interest rate, so decline in interest rate may leads to decline in interest rate of others. The interest rate of National Saving

Certificates remains less volatile than other during the four year periods. Similarly the interest rate of development bond remains almost same for the four periods.

The inter bank interest was 4.73% on 2001 mid-July but it decreased to 0.71% when it came during the Mid-July of 2004. It seems that Nepalese commercial banks have excess liquidity. The most of the commercial bank classified their deposits into two sections –Saving Deposits and Time Deposits and offered the different interest rates on them. Talking about saving deposits, the interest rate ranges from 3.0% to 6.5% in the year of 2001 but this rate declined to the range of 2.25% to 5% when it came to the year of 2004. If the mean is taken, then the average interest rate on 2001 is 4.75%, 4.375% in 2002, 4.25% in 2003 and 3.625% in 2004. This shows that the interest rate on saving deposit has decreasing tendency. In the same way, the interest rate on time deposits also shows the decreasing trend. In Nepalese economy, time deposits are classified in five categories: 1 month, 3 months, 6 months, 1 year and 2 years and above. In one month time deposits interest rate remains almost same. Though the table shows the decreasing in interest, but it shows that spread between maximum and minimum rates narrow down by 1% when it comes from 2002 to 2004. For 3 months time deposit rate, the maximum interest rate range was 2.5% to 6% in 2001 where as this rate reached to the range of 2% to 4%. Similarly the 6 months time deposit rates also shows the decreasing tendency. The lowest range was 3.5% at the beginning but it reached to and became stable at 2.5% up to 2004. In case of 1 year's rate, the lowest range rate fluctuates more than maximum range of same. From figure it is clear that, in 2001 the lowest range rate was 4.5% but this rate falls up to 2.75% when it was 2004. But there was less fluctuation in maximum range i.e. it fell to 6.0% from highest 7.75%. At last, for 2 years and above interest rate, maximum range fell by 2% where as the minimum range fell just by 1.25% during 4 years Period.

For lending also, the table shows that average interest also fell during the 4 years period. But in case of lending there was wide range in maximum and minimum range. The range or spread of maximum rate and minimum rate was low in case of deposit. The lending rate was categorized in five parts: Industry, Agriculture, Export Bills, Commercial Loans and Overdrafts. Among all, the highest rate was for overdrafts. It was up to 18% per annum similarly the lowest lending rate was on export bills. If the average of all is taken then industrial sector lending rate was 11%, 10.75%, 11.25%, 11% respectively. It shows that, on past four years the interest rate of industry was around 11% on average. Similarly for Agriculture sector the average interest rate was 13.5%, 13%, 12.5% and 11.75%. This shows that the industrial lending rate was cheaper when it reaches to 2004. For Export bills the average rate was 11.5%, 9.25%, 8.25% and 7.75%. For Commercial loans this average lending rate was 11.5%, 11.5%, 11.75% and 11.75%. For Overdrafts it was 14%, 14%, 13.55 and 13% respectively.

#### 1.4 Objectives of the study:

The major objective of the study is to investigate the relation of interest rate with other three variables viz, Deposit, Inflation and Credit (Lending) that are currently prevailing in Nepalese market. Similarly this study also aims to identify whether the theories that are taught in university courses are applicable or not in Nepalese context. To fulfill this main objective following sub-objectives have been formulated:

- 1) To explore the relation of interest rate with deposit amounts (existence of substitution effect) in Nepalese market. In other word, the objective is

to find out, whether the deposit amount (saving) increases with increase in interest rate or not. i.e. **Substitution effect**.

- 2) To identify the sensitivity of interest rate to the investment (borrowing). In other word, the objective is to find out whether the **inverse relation of interest rate and investment** is true or not.
- 3) To find out the relationship of interest rate with inflation in Nepalese market. In other word, other motive for this study is to access the applicability of “**Fisher’s effect**” of inflation in Nepal.
- 4) To suggest for the improvement on the basis of findings of the study.

### 1.5 Statement of the problems:

Interest has direct relation with economic growth and development. According to economic theory (other things remain constant), low interest rate is impetus for high investment. And this high investment leads to high production, high employment, more income and ultimately growth in economy. So by this study it is going to explore: Does decline in interest rate increases the lending activities? Or what is the actual condition on this regard in Nepalese financial market place? If the condition is not as per theory then - what are the possible causes for such effects? Focusing on the Nepalese context, the investment is low in productive sectors due to unavailability of sufficient finance, security and other factors. Nepal’s main export is basically raw materials. It means that Nepal is exporting raw materials instead of producing goods and services from these. If cheap financing is available, many factories could be established to reap benefits from utilization of resources, which would increase the employment, standard of living and status of country economy.

In same manner, market interest rate is the sum of real rate plus inflation premium. But this may or may not occur in real practice. So this study is going to identify: Is there any positive relation of interest rate and inflation as per theory? Similarly, high interest rate is stimulus for high savings (deposits) but this may not be the case in real world as people use to deposit more even in less interest rate due to security, convenience and other reasons. Thus through this thesis, it is going to discover: what is the relation of deposit and interest rate? Or Does substitution effect is truly applicable in Nepalese context. More specifically, this study seeks to solve the answer for following questions.

- 1) Does *substitution effect* is practical in the context of Nepal or not? In other words what is the effect of high interest rate on savings (deposits)?
- 2) Are borrowers of Nepalese market sensitive to the interest rate of credit? Alternately, what is the relationship between interest rate and borrowing amount?
- 3) What is the magnitude of correlation between interest rate and inflation? In other words, does inflation has high positive or negative relation with interest rate in Nepalese context?

## 1.6 Significance of the study:

Interest rates send price signals to borrowers, lenders, savers and investor. For example, higher interest rates generally bring forth a greater volume of savings and stimulate the lending of funds. Lower rates of interest on the other hand, tend to dampen the flow of savings and reduce lending activity but increases the demand for loan. Higher interest rates tend to reduce the volume of borrowing and capital investment and lower rates stimulate borrowing and

investment spending.<sup>4</sup> Hence economic growth depends upon circulation of money and financial system facilitates it.

Similarly inflation is also another important factors in the financial market. All countries in the world have some magnitude of inflation. While this study is being conducted, the existing inflation rate in our country is around 5%. According to Irving fisher, inflation rate is added to real rate of return to determine the market interest rate. So higher the inflation, higher will be the interest rate.

But in real world, the aforementioned theory may not come true, especially for developing country like Nepal because, most of the theories of financial markets are determined by the studies which had been conducted on developed countries like USA, Great Britain and so on. So it is quite necessary to develop some ideas about the interest rate and its impact upon deposits, credit and inflation in the Nepalese context. By doing so, more knowledge can be achieved about the true pictures of Nepalese market. This study is also considered to be useful to various parties such as further researchers, students, teachers, financial institutions, general individuals etc.

### 1.7 Research Hypothesis:

Testing of hypothesis is one of the most important aspects of the research study. It is the quantitative statement about the population parameter. In other words, it is an assumption that is made about the population parameter and then its validity is tested. By testing the hypothesis we can find out whether it deserves the acceptance or rejection of the hypothesis. The acceptance of hypothesis means there is no any sufficient evidence provided by the sample to reject it and does not necessarily imply that it is true. The main goal of testing

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<sup>4</sup> Rose, Peter S.(1997), "Money and Capital Markets: Financial Institution and Instrumental in a Global Marketplace", Irwin, Chicago, 6<sup>th</sup> edition

of hypothesis is to test the characteristics of hypothesized population parameter based on sample information whether the difference between the population parameter and sample statistic is significant or not.<sup>3</sup>

The hypotheses formulated for this study are as follows:

First Hypothesis:

**Null hypothesis  $H_0$ :**  $\rho = 0$ . That is, population correlation coefficient is zero. In other words, the variables (deposit interest rate and deposit amounts) are uncorrelated in Nepalese financial market.

**Alternative hypothesis  $H_1$ :**  $\rho \neq 0$ . That is population correlation coefficient is not equal to zero. In other words, the variables (deposit interest rate and deposit amounts) are correlated.

Second Hypothesis:

**Null hypothesis  $H_0$ :**  $\rho = 0$ . That is, population correlation coefficient is zero. In other words, the variables (Credit interest rate and credit or loan amounts) are not correlated in Nepalese financial market.

**Alternative hypothesis  $H_1$ :**  $\rho \neq 0$ . That is population correlation coefficient is not equal to zero. In other words, the credit interest rate and credit or loan amounts are correlated.

Third Hypothesis:

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<sup>3</sup> Sharma P. K. & Chaudhary A.K. "Statistical Methods," Khanal Books Prakashan, Katmandu, P.229

**Null hypothesis  $H_0$ :**  $= 0$ . That is, population correlation coefficient is zero. In other words, there does not exist any correlation between interest rate on deposit and interest rate on lending.

**Alternative hypothesis  $H_1$ :**  $\neq 0$ . That is population correlation coefficient is not equal to zero. In other words, there exist correlation between interest rate on deposit and interest rate on lending.

*Fourth Hypothesis:*

**Null hypothesis  $H_0$ :**  $= 0$ . Population correlation coefficient is zero. In other words, the variables in population (inflation and interest rate on deposit) in Nepalese financial market are not correlated.

**Alternative hypothesis  $H_1$ :**  $\neq 0$ . That is the variables in population (inflation rate and interest rate on deposit) in Nepalese financial market are correlated.

*Fifth Hypothesis:*

**Null hypothesis  $H_0$ :**  $= 0$ . The variables in population (inflation rate and interest rate on lending) in Nepalese financial market are not correlated.

**Alternative hypothesis  $H_1$ :**  $\neq 0$ . That is the variables in population (inflation rate and interest rate on lending) in Nepalese financial market are correlated.

## 1.8 Limitation Of the study:

As a master degree thesis this study certainly has limitation. This study is limited by followings:

- 1) Only one factors -interest rate- is taken for the study. Impact of other aspects (factors) besides interest has not been studied.

- 2) Stipulated time and resources also may have existed as limitation of this study.
- 3) Reliability of this study depends upon the accuracy of published data and the genuineness of respondent.
- 4) The samples have been drawn at random for convenience, so there may exit some sampling error. And the sample size may not be sufficient to generalize the findings.
- 5) This study covers only seven fiscal years.write (2006-2012)
- 6) The sample are taken only from 5(five)commercial banks Nepal BangladeshBank,HimalayanBank,AgricultueDevelopmentBank,NepalBankLimited,Rastra Banijay Bank and other financial intermediaries are not included in the study.

## 1.9 Introduction of Sample Organization Under study:

### **Nepal Bangladesh Bank (NBB)**

Nepal Bangladesh Bank Ltd. was established in June 1994 with an authorized capital of Rs. 240 million and paid up capital of Rs 60 million as a joint venture bank with IFIC of Bangladesh. Currently the bank has an authorized capital of Rs 359.9 millions. Its head office is situated at New Baneshwor, Bijuli Bazar, Kathmandu. The prime objective of this bank is to render banking services to the different sectors like industries, traders, businessmen, priority sector, small entrepreneurs and weaker section of the society and every other people who need banking services. During the period of 10 years of its operation it has been able to provide excellent services to its clients. The bank has introduced its first ATM facility at Kathmandu plaza, putalisadak branch to

give 24 hours 365 days banking services to their valued customers. The bank has earned the glory of providing the services to almost all the top business houses of the country and it occupies one of the leading positions among the joint venture banks in Nepal. The bank is still pursuing to accommodate as many clients as possible.

### **Himalayan Bank Limited (HBL)**

Himalayan Bank Limited was established in 1992 by the distinguished business personalities of Nepal in partnership with Habib Bank Limited, one of the largest commercial banks of Pakistan. Its operations were commenced from January 1993. It is the first commercial bank of Nepal with maximum shareholding by the Nepalese Private Sector. Besides commercial activities, the bank also offers industrial and merchant banking facilities. The bank at present has five branches in the Kathmandu valley and seven branches outside the valley. The bank is also operating a counter in the premises of the Royal Palace. The bank has a very aggressive plan of establishing more branches in different parts of the kingdom in the near future. The bank's policy is to extend quality and personalized service to its customers as promptly as possible. The bank, as far as possible, offers tailor-made facilities to its clients, based on their unique needs and requirements, to extend more efficient services to its customers. Himalayan Bank has been adopting innovative and latest banking technology. This has not only helped the bank to constantly improve its service level but has also kept it prepared for future adoption of new technology. HBL has been listed on the Nepal stock exchange since July 5, 1993. The share participation of the bank is 51% Nepalese Promoters, 14% Employees Provident Fund, 15% general public and 20% Habib Bank of Pakistan.

### **Agriculture Development Bank (ADB/N)**

ADB/N was established in 1968 under the Agriculture Development Bank Act 1967. The bank inherited the assets and liabilities of the cooperative bank, which was established in 1963. In 1973 the Land Reform and saving Corporation, a similar institution established in 1966 was merged with the bank. ADB/N is an autonomous organization under the supervision of the ministry of Finance of His Majesty's Government of Nepal. The bank has been working as a premier rural credit institution since last three decades contributing more than 80% shares in meeting institutional credit in Nepal.

Under The ADB/N act, the bank is entrusted with the responsibilities of initiating effective approaches for the development of agriculture. The Bank is committed to raise the economic condition of farmers by availing credits and capital inputs in easy and smooth manner. The subsequent amendments of the Act empowered the bank to finance small farmers on group liability and expand its scope of financing to promote cottage industries. The amendments of the Act also permitted the bank to engage in commercial banking activities for the mobilization of domestic resources.

The main functions of the Bank are to:

- ❖ Provide short, medium and long-term agricultural loans to individual farmers, group of farmers, corporate bodies and village committees.
- ❖ Provide loans and technical services for the purchase of inputs and capital items such as fertilizers, insecticides, feed, farm machinery, irrigation equipment, canal construction, boring of pump-sets and sprinklers.
- ❖ Provide loans for the purchase of livestock
- ❖ Finance for cottage small-scale industries.
- ❖ Finance for cold store, warehousing and other marketing facilities.

- ❖ Finance for the capital goods necessary for the development of alternative sources of energy.
- ❖ Supervise small farmers' development programs to uplift the socio-economic status of small farmers.
- ❖ Undertake commercial banking functions to generate resources.
- ❖ Provide training to the beneficiaries and the bank staff.

The ADB/N is only development Bank in Nepal which has been adopting a “Three window system” to operate its activities in the following areas 1) Development Financing Sector 2) Target group sector through Small Farmers Development Program and 3) Commercial banking sector.

### **Nepal Bank Limited (NBL):**

Nepal Bank Limited is the first bank to commence its business in Nepalese economy. After the enactment of “Nepal Bank Law” in B.S. 1994, this bank was established in 30 kartik, 1994 B.S. Most of the banking functions in Nepalese market are on track after the establishment of this bank. At the time of establishment, beside commercial functions, this bank performed all the other functions that should be done by Central bank of the country except issuing notes (money). But after the establishment of central bank, Nepal Rastra Bank, this bank transformed itself as a pure commercial bank. The government of Nepal, HMG, has 51% share and general public have 49% shares on this bank. Now this bank is passing with many twists and turns in present competition market. This bank is also one of the government owned bank having 116 branches (NRB Bulletin 2004, Mid-July) all over the country. With the foreign management team, this bank is now in the process of recovery.

### **Rastra Banijya Bank:**

Another government owned bank in Nepalese market is Rastra Banijya Bank. During this dissertation, this bank is also running by outsider foreign management. This bank was established in 10 Magh, 2022 B.S. on the ground of “Commercial Bank Act” 2021 B.S. This bank played a great role to uplift the agricultural, industrial and commercial sector of the country since its establishment. This is the largest commercial bank among all seventeen commercial bank in Nepal. It has 117 branches scattered all over the countryside. This bank has highest amount of deposit as well as granted highest amount of loan till this study. So this bank is important sample for this study.

# CHAPTER TWO

## REVIEW OF LITERATURE

### 2.1 Introduction:

A literature review is an essential part of all studies. It is a way to discover what other researchers have covered and left in the area. A critical review of the literature helps the researcher to develop a thorough understanding and insight into previous research works that relates to the present study. It is also a way to avoid investigation problems that have already been definitely answered. Thus a literature review is the process of locating, obtaining, reading and evaluating the research literature in the area of the student's interest<sup>1</sup>. The purpose of literature review is to find out what research studies have been conducted in one's chosen field of study and what remains to do. The primary purpose of literature review is to learn not to accumulate. It enables the researcher to know<sup>2</sup>.

- What research has been done in the subject?
- What others have been done in the study?
- What theories have been advanced?
- The approach taken by the other researchers
- Area of agreement or disagreement
- Whether there are gaps that can fill through the proposed research?

### 2.2 Theoretical Review

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<sup>1</sup> Howard K. Wolff and P.R. Pant (2005), Social Science research and Thesis writing, Buddha Academic publishing and distributors, Kathmandu, Nepal

<sup>2</sup> Ibid

### 2.2.1.1 Meaning of Interest:

The interest rate is the price of money; the price of renting the use of the resources that money commands for a specified by the free interplay of supply and demand in a market economy. The price of the money, the interest rate, plays a vital role in the allocation of resources and in the decision making of consumers and business. For example, an increase in the interest rate provides additional incentives for individuals and others to postpone current consumption (save) and thereby free resources for investment. Government policies intended to expand the volume of saving should aim at increasing the attractiveness of saving by increasing the return to saving – the interest rate.

### 2.2.1.2 Theories of Interest:

In financial markets there are numerous interest rates exists. These differences are due to the risk premium associated with the issuer. Even securities issued by the same borrowers often carry a variety of interest rates. In this section, we focus upon those basic forces that influence the level of different interest rates.

To uncover these basic rate-determination forces, however, we must make a simplifying assumption. We assume in this chapter that there is one fundamental interest rate in the economy known as the pure or real rate of interest which is the component of all interest rates. The closest approximation to this pure rate in the real world is the market yield on the government bonds minus inflation. The rate of interest on Treasury bond is called risk free rate of interest which consists of real rate of interest plus premium for inflation. It is a rate of return presenting no risk of financial loss to the investor and representing the opportunity cost of holding idle cash, because the investor can always invest in no risk bonds and earn this minimum rate of return. Once pure

rate of interest is determined, all other interest rates may be determined from it by examining the expected future inflation and special characteristics of the securities issued by individual borrowers. For example, only the government can borrow at risk-free interest rate; other borrowers pay higher rates that due to the greater risk of loss attached to their securities. Difference in liquidity, marketability and maturities are other important factors causing interest rate to differ from the pure or risk free rates<sup>3</sup>

In this study mainly four theories of interest are reviewed. They are:

## **THE CLASSICAL THEORIES OF INTEREST RATES<sup>4</sup>**

This is one of the oldest theories concerning the determinants of pure or risk-free interest rate. It was propounded during the 18<sup>th</sup> and 19<sup>th</sup> century by a number of British economists and elaborated by Irving Fisher in 1930. The classical theory argues that the rate of interest is determined by two forces: 1) the supply of savings, derived mainly from households and 2) the demand for investments capital coming mainly from the business sector.

### **Saving by Households:**

Generally most of the saving in modern industrialized economies is carried out by individual and families. 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

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<sup>3</sup> Rose, Peter S.(1997), "Money and Capital Markets: Financial Institution and Instrumental in a Global Marketplace", Irwin, Chicago, 6<sup>th</sup> edition.

<sup>4</sup> Ibid p.p. 193, 194, 195, 196

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 rate also plays an important role. Interest rates affect an individual's choice between saving and current consumption. The classical theory of interest assumes that individual 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 on current savings. If more were saving 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 as a reward for waiting the postponement of current consumption in favor of greater future consumption. Higher interest rate increase the attractiveness of 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. If the rate of interest in the financial markets rises from 5 to 10 percent, the volume of current savings by households is assumed to increase from \$ 100 to \$200 billion<sup>5</sup>

### **Saving by Business Firms:**

Not only households, but also businesses save and direct a portion of their savings into the financial markets to purchase securities and make loans. Most

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<sup>5</sup> Ibid p.p. 193

businesses hold savings balances in the form of retained earnings (as reflected in their equity or net worth accounts). In fact, the increase in retained earnings reported by business each year is a key measure of the volume of current business saving. And these retained earnings supply most of the money for annual investment spending by business firms. The volume of business 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. The critical element in determining the amount of business savings is then the level of business profits. 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 falls 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 a 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 encourage greater use of external funds from the money and capital markets.

### **Saving by Government**

Governments also save, though less frequently than households and businesses. In fact, most government saving (i.e. a budget surplus) appears to be

unintended saving that arises when 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. The total supply of fund is sum of above three elements as SS on figure no 2-1.

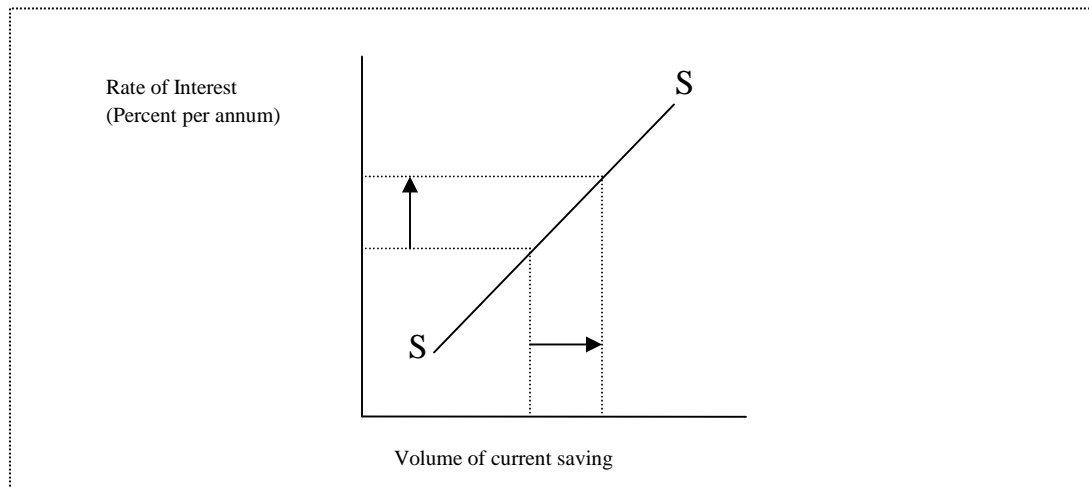


Fig No 2-1: The substitution effect relating saving and interest rates

### **The demand for investment funds:**

The savings made by business, government and households are important determinants of interest rate but they are only one side of determinants. The factor is investment spending, made by business firms, government and in some case households. Business requires huge amounts of funds each year to purchase equipment, machinery and inventories and to support the construction of new buildings and other physical facilities. The majority of business expenditures for these purposes consist of what economists call replacement investment. But according to the classical economist, interest rate and invest able fund have inverse relationship. At low rates of interest, more investment projects become economically viable. On the other hand, if the rate of interest rises to high levels, fewer investment projects will be pursued and fewer funds will be required from the financial markets as figure no 2-2.

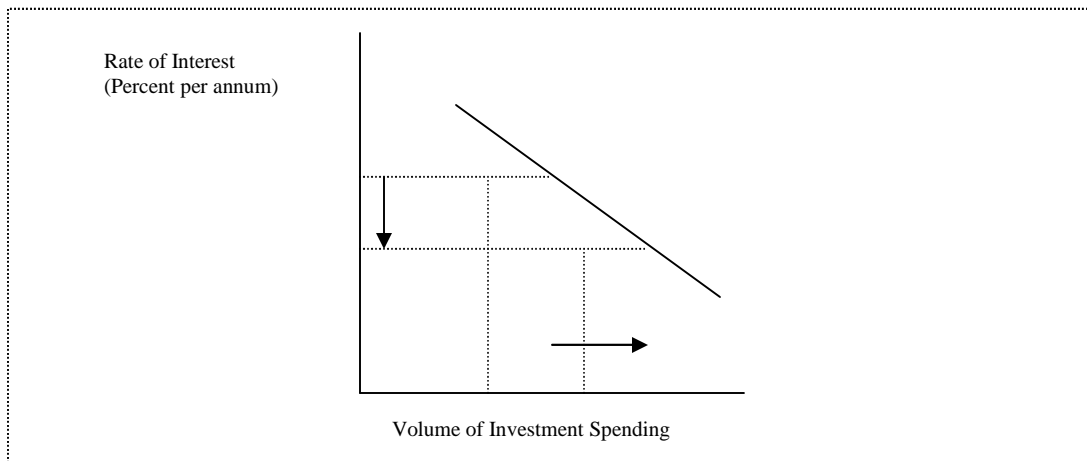


Fig No 2-2: The Investment Demand Schedule

### **The Equilibrium Rate of Interest in the Classical Theory of Interest:**

According to the classical economists, the interest rates in the financial markets were determined by the interplay of the supply of saving and the demand for investment. Specifically, the equilibrium rate of interest is determined at the point where the quantity of savings supplied to the market is exactly equal to the quantity of funds demanded for investment. To support this in figure no 2-3 this occurs at point E where the equilibrium rate of interest is  $i_E$  and the equilibrium quantity of capital funds traded in the financial markets is  $Q_E$ .

The market rate of interest moves towards its equilibrium level. However, supply and demand forces change so fast that the interest rate rarely has an opportunity to settle in at a specific equilibrium level. At any given time, the rate is probably above or below its true equilibrium level but moving towards that equilibrium. If the market rate is temporarily above equilibrium, the volume of savings exceeds the demand for investment capital creating an excess supply of savings. Savers will offer their fund at lower and lower rates until the market interest rate approaches equilibrium. Similarly, if the market rate is temporarily below equilibrium, investment demand exceeds the quantity

of savings available. Business firm will bid up interest rate until it approaches the level at which the quantity saved equals to quantity of funds demanded for investment purpose.

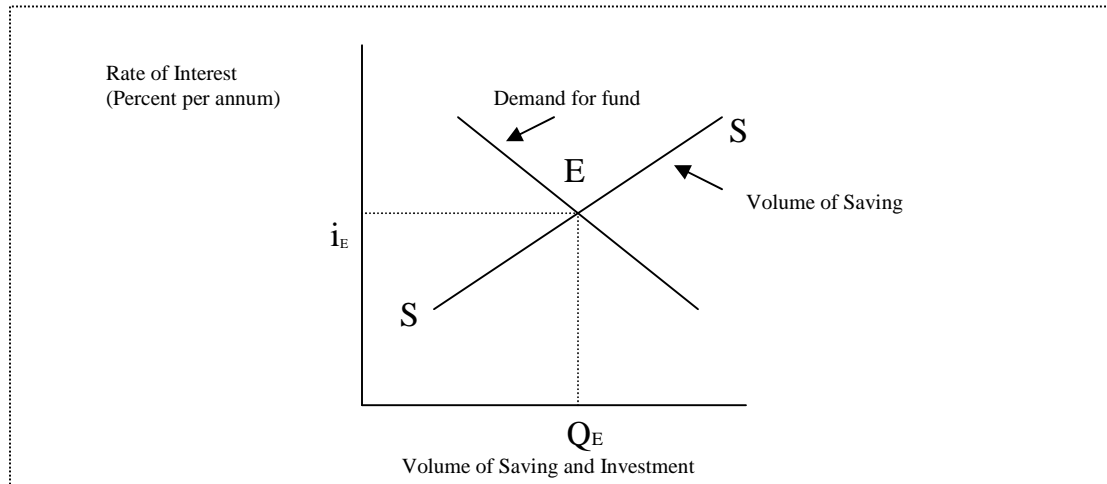


Fig No 2- 3: The Equilibrium rate of interest in the classical Theory

### **THE LONABLE FUND THEORY:**

In this theory, the main theme is the supply and demand for loanable funds (i.e. lending & borrowing) determines the interest rate. This explanation emphasizes the flow of funds by suppliers of loanable funds (lenders) and the flow of funds by the demanders of loanable funds (borrowers). It is a monetary theory of interest since it focuses on the financial factors that influence interest rates (i.e. borrowing and lending). In addition, the loanable fund theory is a short-run, partial equilibrium explanation in which some factor or factors produce a change in the interest rate, but there is no analysis of the long-run impact of this change in the interest rate on the level of employment, income, and production of the resulting impact of changes in employment, income and production on the interest rate. Rather, the loanable fund theory focuses on the factors that underlay the supply and demand schedules for loanable funds and on their interaction.

## **Supply of Loanable Funds:**

The major sources of supply of loanable fund are from two sources: 1) The amount of saving by households, business, governments and 2) The amount of new money created by the commercial banking system.

## **Saving:**

Saving refers to the postponement of current consumption. The decision to save is the decision to forgo current consumption in order to have a larger quantity of consumption in the future.<sup>6</sup> Individual or household save for a variety of reasons but there is little evidence to suggest that the quantity of loanable funds supplied through saving is clearly influenced by the level of the interest rate. A higher interest rate represents a greater reward to the saver for postponing current consumption and thus might be expected to produce a higher quantity of saving for some individuals. In general case, the quantity of savings supplied by individuals is principally determined by the level of income and it is influenced to a lesser degree by the level of interest rates.

Business saving refers to the net income after taxes of the firm, less any cash dividends i.e. retained earnings. There is little reason to believe that the volume of saving at business firm is strongly influenced by the level of interest rates.

For governments, the volume of saving is defined as the difference between revenues and expenditures such that saving exists when revenues exceed expenditures (a budget surplus).

To summarize, saving (the postponement of current consumption) may be done by households, business, and governments. The volume of saving of each of these units is influenced by a variety of factors of which the interest rate is one.

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<sup>6</sup> S. Kerry Cooper & Donald R. Fraser, (1983), The financial marketplace, Addison wesky publication p.160

As a result, we might expect that the relationship between the interest rate and the volume of saving. For example, at an interest rate of  $r$ , the volume of saving would be  $Q$ , whereas the higher interest rate of  $r'$ , the volume of saving would be only a slightly higher  $Q'$ . The responsiveness of saving to change in interest rates is quite small.

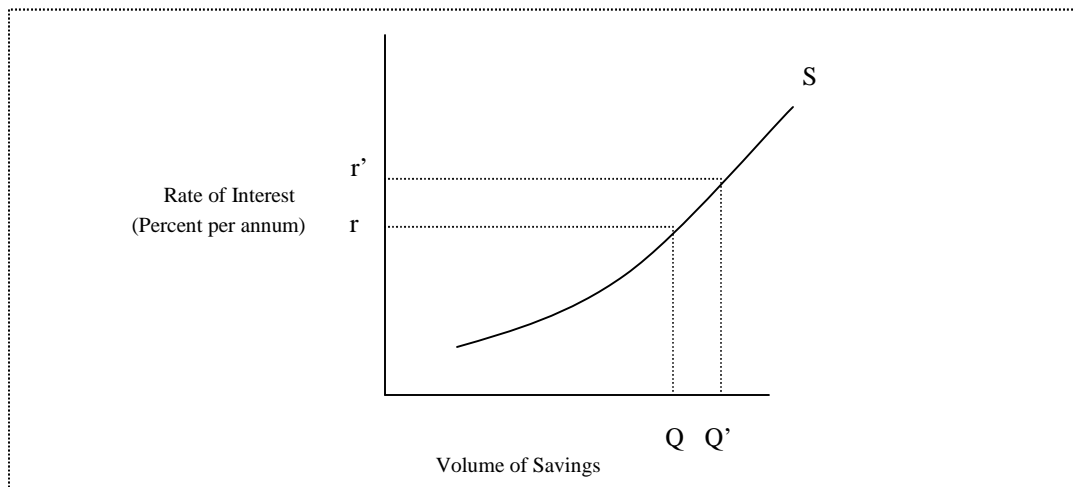


Fig no 2-4: The interest rate and volume of savings

### **New Money:**

Although the volume of saving is the principal source of loanable funds in financial markets, the supply of the loanable funds may be increased through the creation of new money beyond the amount made possible by current saving. The amount of new money created is determined jointly by the actions of the commercial banking system and the central bank. Commercial banks use any excess reserves to make loans and purchase securities and create money (demand deposits) through the credit creation process. However, the ability of commercial bank to create money is limited by the central bank through the use of its monetary policy tools like open-market operations, reserve requirement changes, and discount rate changes.

There is little evidence that either the central bank or commercial banks are substantially influenced in the money creation process by the level of interest

rates. The principal factor that determines the volume of new money created by the banking system is the amount of reserves, and the principal factors that determines the amount of reserve is central bank monetary policy. Neither of these factors should be directly influenced by the level of interest rates. We may therefore draw the relationship between the amount of new money created and interest rate as show in figure 2-4. The volume of new money supplied is  $Q$  and at the higher interest rate  $r'$ , the amount of new money created is the same  $Q$ . Essentially, change in the money supply are determined by factors other than the interest rate.

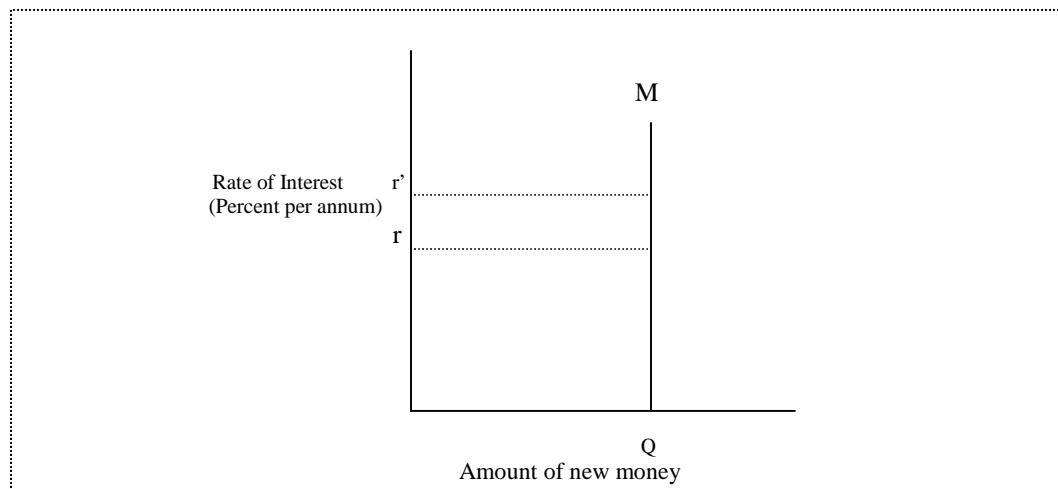


Fig No 2-5: The Supply of Loanable Funds

In summary, the supply of loanable fund is the sum of the supply of savings and the amount of new money created. This supply schedule of loanable fund may be increased by either an increase in the desire to save by business, households or governments or by the creation of more new money by commercial banking system. Conversely, the supply of loanable funds may fall because of a reduction in the desire to save of a reduction in the amount of new money created.

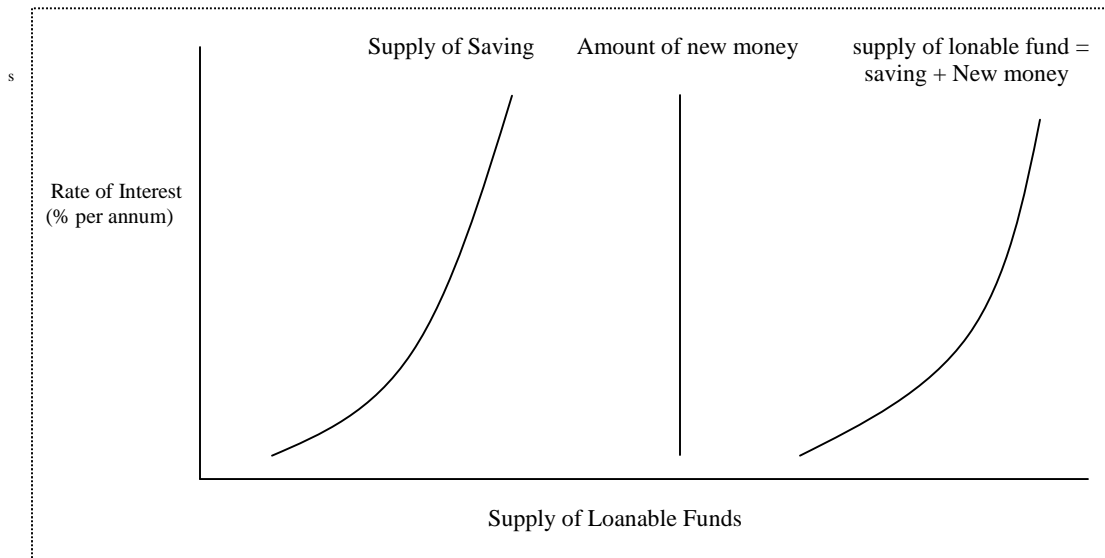


Fig No 2-6: Total Supply of Loanable Funds

### **The Demand for Loanable Fund:**

The demand for loanable fund is composed of the demand by individual, business and governments.

### **Consumer Demand:**

Domestic consumers demand loanable funds to purchase a wide variety of goods and service on credit. 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 a loan, such as the down payment, maturity and size or installment payments. This implies that consumer demand for credit is relatively inelastic with respect to the rate of interest. Certainly a rise in interest rate leads to some reduction in the quantity of consumer demand for loanable fund (particularly when home mortgage credit is involved) whereas a decline in interest rates stimulates some additional consumer borrowing. However, along the consumer's relatively inelastic demand

schedule, a substantial change in the rate of interest must occur before the quantity of consumer demand for funds changes significantly.

### **Domestic Business Demand:**

The credit demands of domestic business generally are more responsive to changes in the rate of interest than in consumer borrowing. Most business credit is for such investment purposes as the purchase of inventories and new plant and equipment. As noted earlier in our discussion of the classical theory of interest, a high interest rate eliminates some business investment projects from consideration because their expected rate of return is lower than the cost of funds. On the other hand, at lower rates of interest, many investment projects look profitable with their expected returns exceeding the cost of funds. Therefore the quantity of loanable funds demanded by the business sector increases as the rate of interest falls.

### **Government Demand:**

Government demand for loanable funds is a growing factor in the financial markets but doesn't depend significantly on the level of interest rates. Government decision on spending and borrowing depends in response to social needs and the public welfare, not the rate of interest. Moreover in case of central government, it has the power both to tax and to create money to pay its debts. State and local government demand on the other hand, is slightly interest elastic because many local governments are limited in their borrowing activities by legal interest rate ceilings. When open market rates rises above these ceilings, some state and local governments are prevented from offering their securities to the public.

## **Total Demand for Loanable Fund:**

The total demand for the loanable fund is the sum of domestic consumer, business and government credit demands. These demand curve slopes downward and to the right with respect to the rate of interest. Higher rate of interest lead some businesses, consumers and governments to curtail their borrowing plans; lower rates bring forth more credit demand.

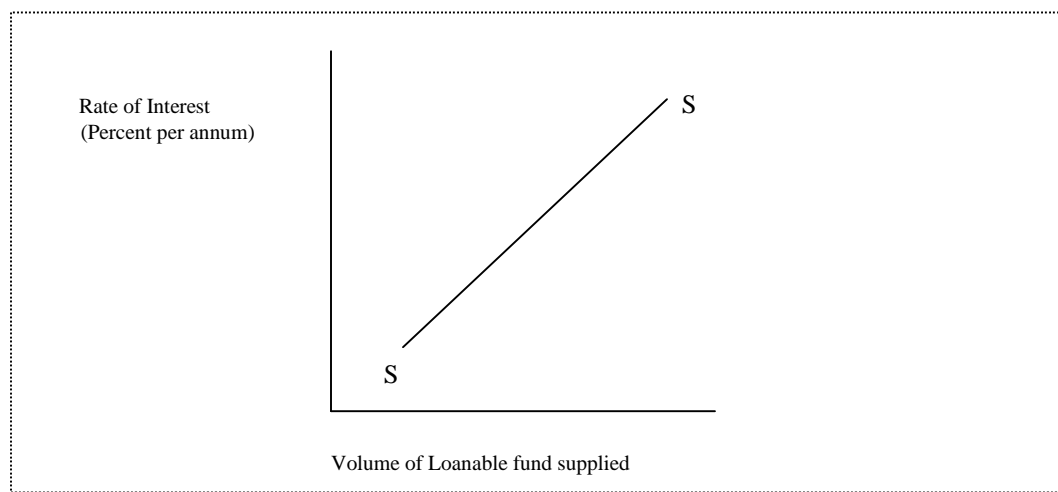


Fig No 2-7: The Supply of Loanable Funds

## **The Equilibrium Rate of Interest in the Loanable Funds Theory:**

Two forces of supply and demand for loanable funds determine not only the volume of lending and borrowing in the economy but also the rate of interest. The interest rate tends towards the equilibrium point at which the supply of loanable funds equals the demand for loanable funds. If the interest rate is temporarily above equilibrium, the quantity of loanable funds supplied by domestic savers and foreign lenders, by banking system, and from the dis- hoarding of money exceeds the total demand for loanable funds and the rate of interest will be bid down. On the other hand, if the interest rate is temporarily

below equilibrium, loanable funds demand will exceed the supply. The interest rate will be bid up by borrowers until it settles at equilibrium once again.

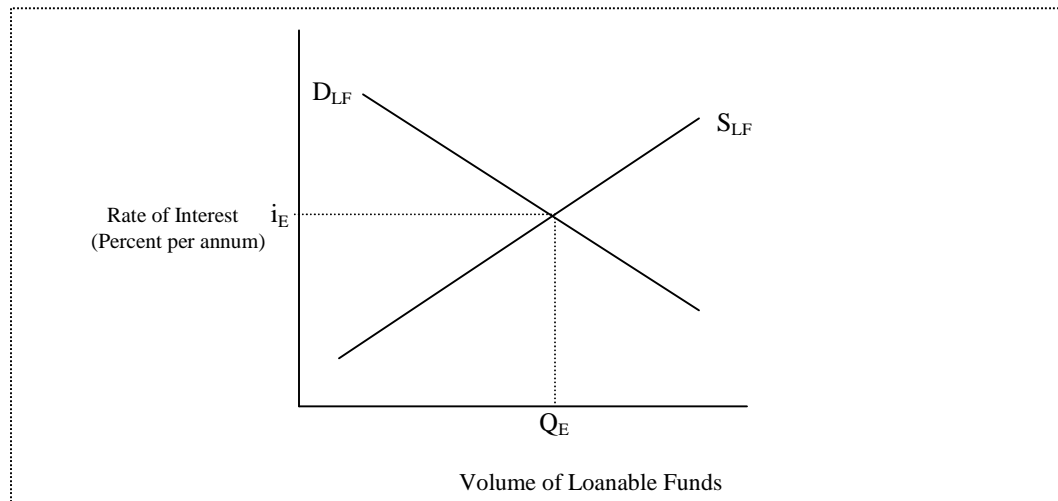


Fig No 2-8: Equilibrium rate of Interest in loanable funds theory

## **THE LIQUIDITY PREFERENCE THEORY OF INTEREST RATE:**

The loanable funds approach to interest rate determination focuses on supply and demand for loanable fund. An alternative approach the liquidity preference view focuses instead on the supply and demand for money. It is assumed that individuals inherently prefer money among all financial assets since money can be used to make payments and is thus the most liquid assets. Wealth holders are persuaded to hold financial assets other than money only because these non-money assets offer an interest return greater than between the yields by money. Further, the greater the spread between the yields on non money financial assets and money, less the demand for money holdings and greater the demand for other financial assets and vice versa. The demand schedule for money can thus be depicted as a function of the rate of interest as shown in figure 2-9.

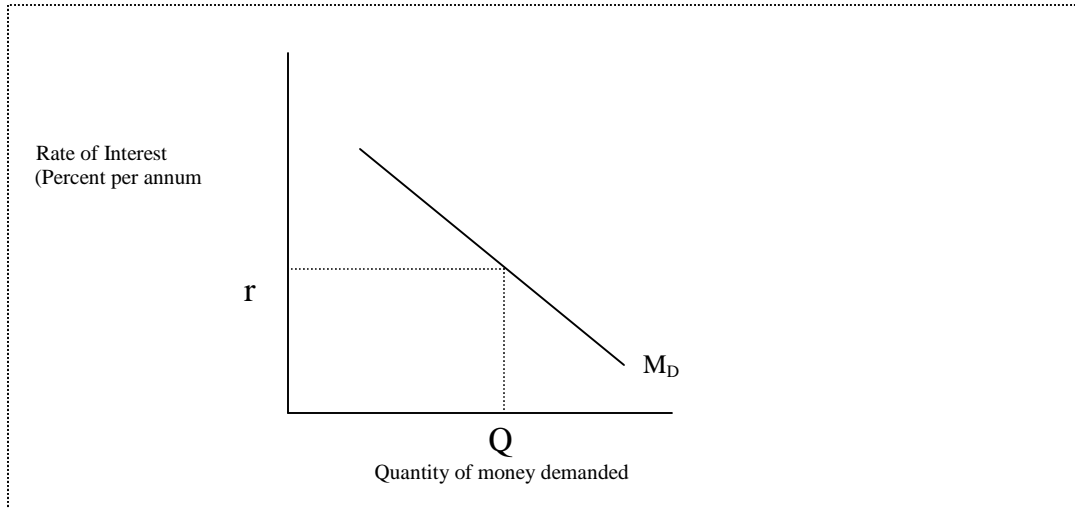


Fig No 2-9 The demand for money ( $M_D$ ) as a function of the rate of interest

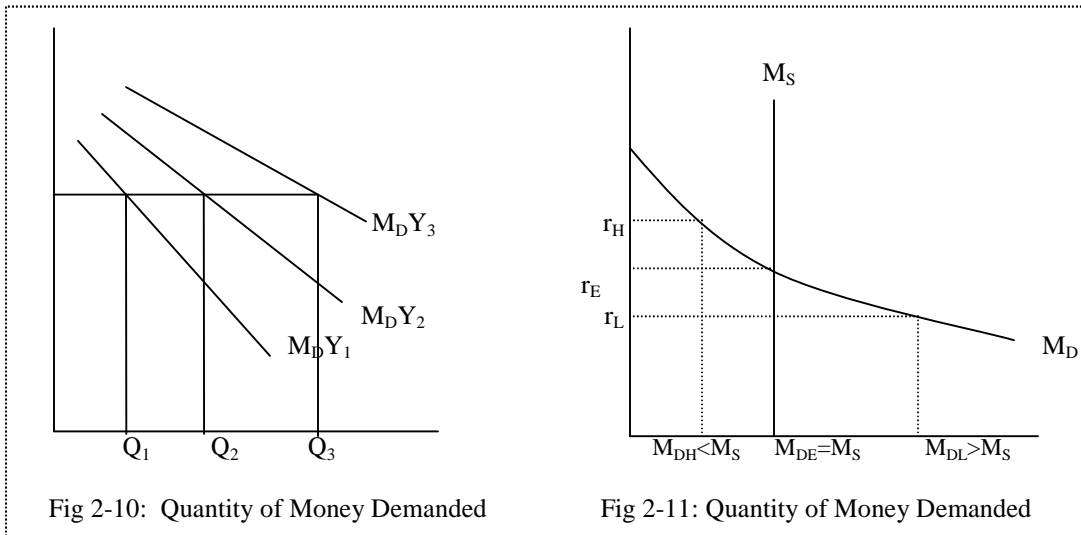
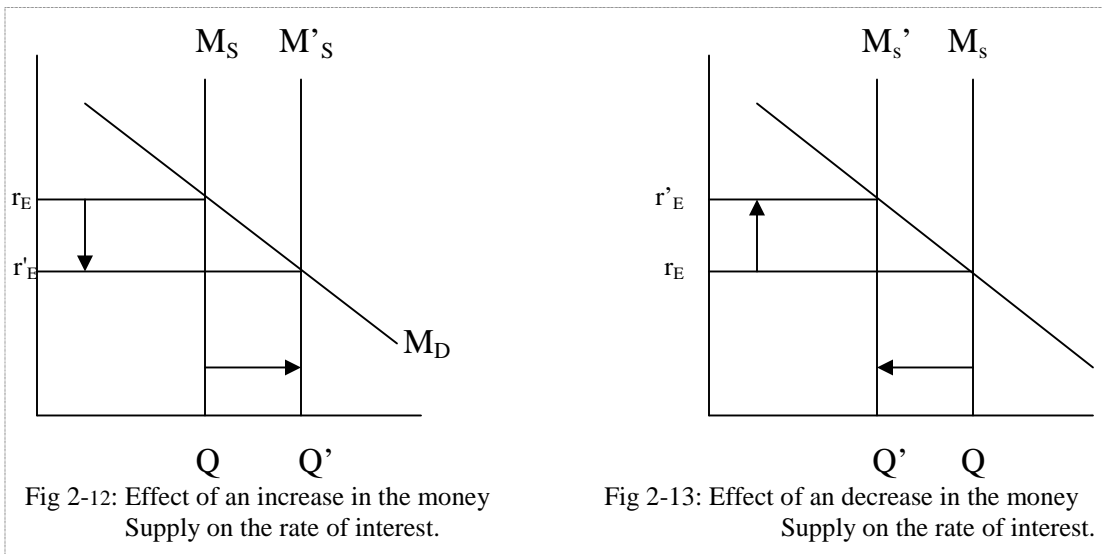


Fig 2-10: Quantity of Money Demanded

Fig 2-11: Quantity of Money Demanded

Thus the greater the income, the greater will be the quantity of money demanded at a given rate of interest and vice versa. The relationship is depicted in figure number 2-10 where  $M_D Y_1$ ,  $M_D Y_2$ ,  $M_D Y_3$  represent the demand for money at the successively higher income level  $Y_1$ ,  $Y_2$  and  $Y_3$ . Thus for a given income level, say  $Y_2$  and a given money supply the rate of interest ( $r_E$ ) is viewed as determined by the supply-demand equilibrium depicted in fig 2-11 where  $M_S$  is the supply of money. The equilibrium interest rate  $r_E$  is obtained by action of individuals seeking to maintain desired levels of cash balances.

Since the amount of desired money holdings is a function of the rate of interest, there is only one rate of interest at which the demand for money balances is the same as the amount of the money supply. At a rate of interest higher than  $r_E$ , say  $r_H$  in fig no 2-11 individual in the aggregate will be holding more money ( $M_S$ ) than they desire  $M_{DH}$  at that rate of interest (the total supply of money must be held by the public.) To rid themselves of “excess” cash, individual purchase interest-bearing financial assets, driving their prices up and their interest rate down. This occurs until the rate of interest falls to  $r_E$  at which  $M_{DE} = M_S$



The outcome of course, is that public still holds, in the aggregate, the same amount of money but at the lower rate of interest, this is now the desired amount. On the other hand, if the interest rate is lower than  $r_E$  say  $r_L$  in figure no 2-11 the public will be holding smaller money balance( $M_S$ ) that they desire ( $M_{DL}$ ) at that rate of interest. As a result, in order to obtain more cash in this situation individuals sell interest-bearing securities, the aggregate effect of which is lower security prices and higher interest rates. The interest rate will thus rise to  $r_E$  at which point desired cash holdings equal the supply of cash.

A principal aspect of the liquidity preference model is that changes in the money supply affect the rate of interest. In the liquidity preference framework, with income and the price level assumed to be constant, an increase in the money supply will lower  $r_E$  the equilibrium rate of interest (fig 2-12) and a decrease in the money supply will raise  $r_E$  (fig 2-13).

In summary, when the money supply is  $MS_1$  the rate of interest is  $r_1$ . As the money supply expands to  $MS_2$  and  $MS_3$ , the rate of interest falls to  $r_2$  and  $r_3$  respectively. The process by which interest rates falls as  $M_3$  expands can again be interpreted in terms of public preference for money holding relative to other financial assets such as interest bearing securities. For example, as in figure 2-14, when the money supply expands from  $MS_1$  to  $MS_2$  individual find themselves holding larger cash balance than they desire at interest rate  $r_1$ . As they seek to reduce money holdings by purchase of security, security price rise and interest rate fall until a new equilibrium is established at interest rate  $r_2$  where  $M_D=M_S$ .

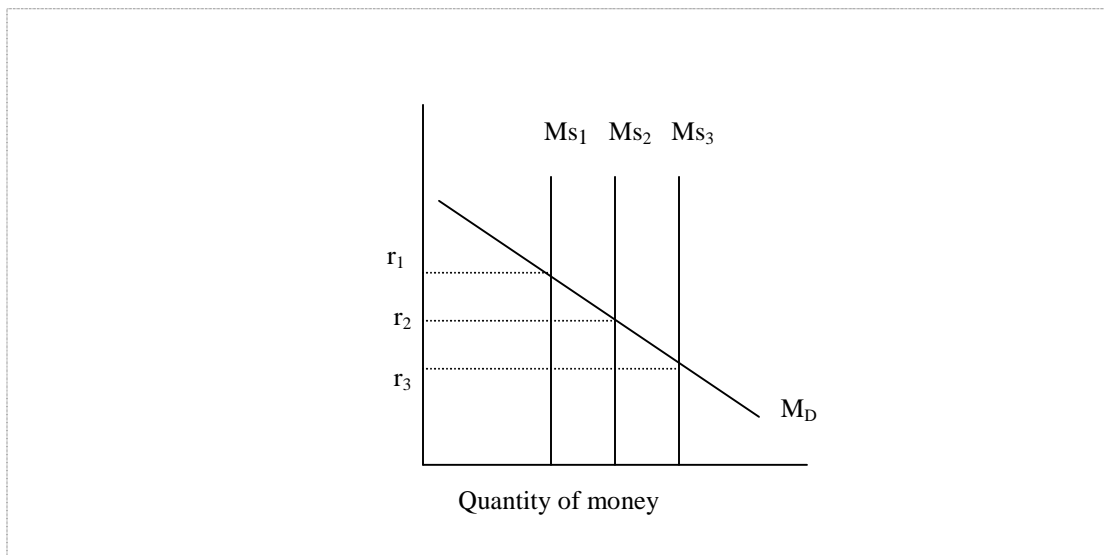


Fig- 2-14: Money supply and interest rate

## **THE RATIONAL EXPECTATION THEORY:**

This theory is new to the financial market so it is in still development stage. The main theme of this theory is that “money and capital markets are highly efficient institutions in digesting new information affecting interest rates and security prices.”<sup>7</sup> This theory assumes that equilibrium interest rate depends upon the change in investor’s expectation regarding future security prices and return. Investor’s decision towards the borrowing and lending funds come from the availability of new information. When new information appears about investment, saving or the money supply, investors begin immediately to translate that new information into decision to borrow and lend funds. So rapid is the process of the market digesting new information that security prices and interest rates presumably impound the new data from virtually the moment they appear. In the absence of new information, next period’s interest rate will be equal to current periods interest rate. In other words, the knowledge of past interest rate will not be a reliable forecast of future interest rate. In a perfect efficient market it is impossible to win excess returns continuously by trading on publicly available information.

The important assumptions and conclusions of the rational expectation theory are that<sup>8</sup> 1) the price of securities and interest rates should reflect all available information and the market uses all this information to establish a probability distribution of expected future prices and interest rates 2) change in rates and security prices are correlated only with unanticipated information 3) the correlation between rates of return in successive time periods is zero 4) no unexploited opportunities for profit can be found in the securities’ markets 5)

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<sup>7</sup> Rose, Peter S.(1997), “Money and Capital Markets: Financial Institution and Instrumental in a Global Marketplace”, Irwin, Chicago, 6<sup>th</sup> edition p. 211

<sup>8</sup> I.bid. P. 211

transaction and storage costs for securities are negligible and information costs are small relative to the value of securities traded and 6) expectation concerning future security prices and interest rates are formed rationally and efficiently.

If the money and capital markets are highly efficient in the way we have described, this implies that interest rates will always be at or very near their equilibrium levels. Any deviation from equilibrium rate dictated by demand and supply forces will almost instantly eliminate security trader who hope to consistently earn windfall profits from correctly guessing whether interest rate are “too high” (and therefore will probably rise) are unlikely to be successful in the long run. Interest rates fluctuations around equilibrium are likely to be random and momentary. If market participants were expecting increased demand for credit (with supply unchanged), an unexpected announcement of reduced credit demand implies lower interest rates in the future. Similarly, a market expectation of less credit demand in the future (with supply unchanged) when confronted with an unexpected announcement of higher credit demand, implies that interest rate will rise.

We can illustrate the foregoing points about the rational expectation theory of interest by modifying the loanable funds theory of interest so that its demand and supply schedules reflect not just actual demand and supply but also the expected demand for and supply of loanable funds. The figure no 2-15 depicts the equilibrium rate of interest under rational expectation theory. ‘ $D_o$ ’ and ‘ $S_o$ ’ reflect the actual demand and supply of loanable funds in current period, while ‘ $D_f$ ’ reflects the actual demand for loanable funds that will prevail in the next future time period. The supply of loanable funds is assumed to be the same in both time periods, ( $S_o=S_f$ ).

Now imagine that during the current period, the government makes an unexpected announcement of its increased need to borrow more money in future period 'F' but as viewed by borrowers and lenders today in time period '0'. In this case, the equilibrium interest rate in the current period will not be 'I<sub>0</sub>', but rather 'I<sub>e</sub>', where the expected demand curve 'D<sub>e</sub>' intersects the actual supply curve 'S<sub>0</sub>'. The equilibrium quantity of loanable funds traded in the current period then will be 'C<sub>e</sub>' not 'C<sub>0</sub>'. This is because, according to the rational expectation theory, borrowers and lenders will act as rational agents, using all the information they possess (including expected events) to price financial assets today. When the future period arrives, the equilibrium interest rate will rise to rate 'I<sub>f</sub>' then quantity of loanable funds traded will be 'D<sub>f</sub>'. The equilibrium rate moves upward because the demand for loanable funds in period 'f' is more than the expected future loanable-funds in period 'F' is more than the expected further loanable-funds demanded as seen by market participants in period 'o'. Suppose, on the other hand, the actual loanable-funds demanded in period 'F' increases upward and beyond 'D<sub>o</sub>' but by a smaller amount than was anticipated by investors in the market in period 'o'.

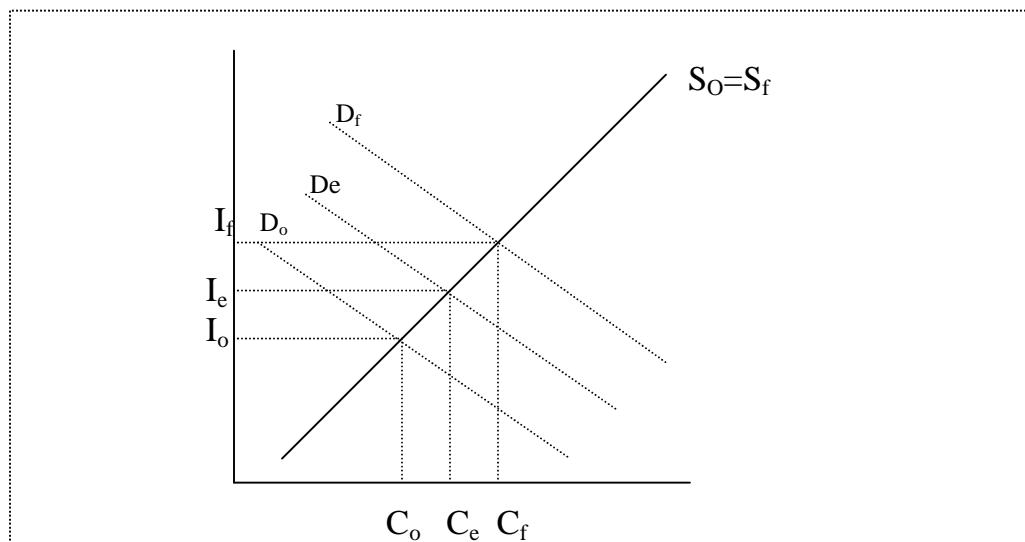


Figure 2-15: Equilibrium interest rates under rational expectation theory

Demand schedule 'D<sub>f</sub>' would then fall somewhere between 'D<sub>o</sub>' and 'D<sub>e</sub>'. The equilibrium interest (with supply curve unchanged) would be lower than i.e. laying somewhere between 'I<sub>o</sub>' and 'I<sub>e</sub>'

### **2.2.1.3. Functions of Interest rate in the economy:**

The interest rate has opposite relation with the value of financial assets. It means that if the interest rate increases, the value of assets decreases and vice versa. This concept is very useful for the valuation of the investable securities. Besides this there are some important functions that interest plays in the economy.<sup>9</sup>

- ❖ It helps guarantee that current savings will flow into investment to promote economic growth.
- ❖ It rations the available supply of credit, generally providing loanable funds to those investment projects with the highest expected returns.
- ❖ It brings into balance the supply of money with the public's demand for money.
- ❖ It is also important tool of government policy to stimulate or discourage saving and investment through its influence on the volume of saving and investment. If the economy is growing too slowly and unemployment is rising, the government can use its policy tools to lower interest rates in order to stimulate borrowing and investment. On the other hand, an economy experiencing rapid inflation has traditionally called for a government policy of higher interest rates to slow both borrowing and spending.

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<sup>9</sup> I. bid p 193

#### **2.2.1.4 Change in interest & its effect upon value of an asset:**

The price of the security and its yield (rate of interest) has inverse relationship. It means that a rise in yield implies a decline in price; conversely, a fall in yield is associated with a rise in the security's price.

The investing funds in financing assets can be viewed from two different perspectives, the borrowing and lending of money or the buying and selling of securities. Similarly the equilibrium rate of interest from the lending of funds can be determined by the interaction of the supply of loanable funds and the demand for loanable funds. Demanders of loanable funds (borrowers) supply securities to the financial marketplace and suppliers of loanable funds (lenders) demand securities as an investment. Therefore, the equilibrium rate of return or yield on a security and the equilibrium price of that security are determined at one and the same instant and are simply different aspects of the same phenomenon, the borrowing and lending of loanable funds.

This can be cleared with the help of figure. The fig 2-16 and 2-17 show the demand and supply curves for both the rate of interest and the price of securities. The supply of loanable funds curve (representing lending) in the interest rate diagram 2-16 is analogous to the demand for securities curve (also representing lending) in the price of securities diagram 2-17. Similarly the demand for loanable funds curve (representing borrowing) in the interest diagram is analogous to the supply of securities curve (also representing borrowing) in the price of securities diagram.

We note in figure 2-17 the borrowers are assumed to issue a larger volume of securities at a higher price and that lenders will demand more securities at a lower price. In figure 2-16, on the other hand, borrowers demand a smaller

quantity of loanable funds at a higher interest rate, while the lenders supply fewer loanable funds at a lower interest rate. The equilibrium interest rate in

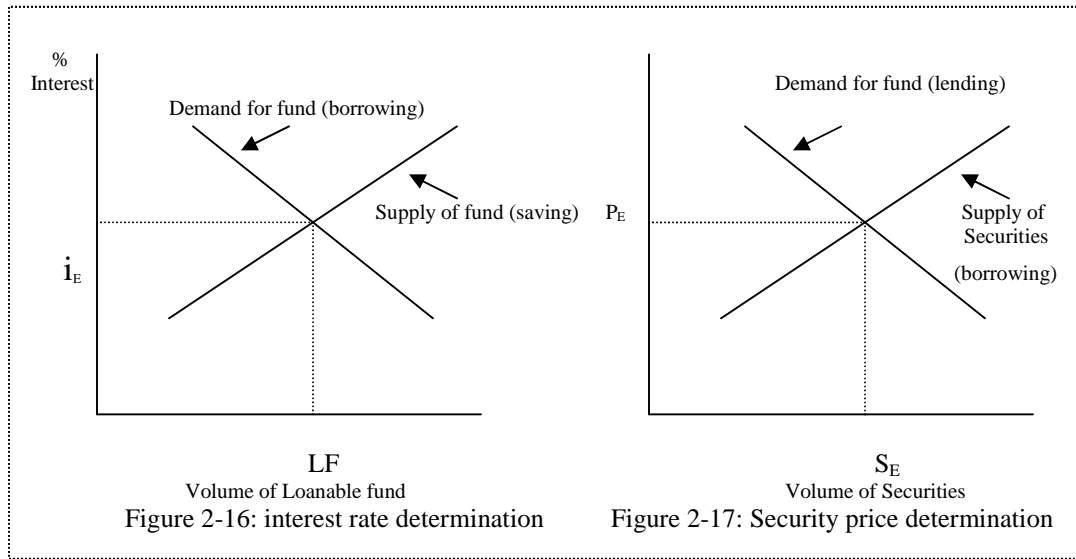


figure number 2-16 is determined at a point  $i_E$  where the demand for loanable funds equals the supply of loanable funds. Similarly, in figure 2-17, the equilibrium price for securities lies at point  $p_E$  where the demand for and supply of securities are equal. Only at the equilibrium interest rate and equilibrium security price will both borrowers and lenders be content with the volume of lending and borrowing taking place in the financial system.

The inverse relationship between interest rates and security prices can be seen quite clearly when we allow the supply and demand curves of figure 2-16 and 2-17 to change. For example, suppose that in the face of continuing inflation, consumers and business firms accelerate their borrowings, increasing the demand for loanable funds. The demand for loanable curve slides upward and to the right with the supply of loanable funds unchanged. This increasing demand for loanable funds also means that the supply of securities must expand by a shift in the supply curve. Both a new loanable equilibrium price for securities and a higher equilibrium interest rate for loanable funds result.

Conversely, suppose that consumers decide to save more, expanding the supply of loanable funds. Then the supply of loanable funds curve slide downward. But with more savings, the demand for securities curve must rise, sliding upward as those added savings are invested in securities. The result is a rise in the equilibrium price of securities and a decline in the equilibrium interest rate.

### **2.2.1.5 Factors influencing the difference in interest rates:**

Though it is assumed deposit increases as interest increases but interest rate is affected by numerous factors. In real world, different financial institution quotes different interest rate. It means that the same types of instrument carries different interest rate so there is presence of interest spread. For this difference there are numbers of factors influencing the difference in interest rates.<sup>10</sup>

- 1) Credit or default risk
- 2) Marketability or liquidity risk
- 3) Call or prepayment risk
- 4) Servicing costs
- 5) Exchange rate risk
- 6) Taxability

#### **1) Credit of Default Risk:**

Credit or default risk involves the potential that a saver will receive less principal and interest on the financial claim that the contract specifies. Default risk is related to the probability that some or all of the initial investment will not be returned. The degree of default risk is closely related to the financial

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<sup>10</sup> Thygeson, Kenneth J. (1993) Financial markets and institutions, Harper college publisher, New York, p.38

condition of the company.<sup>11</sup> Credit risk requires making estimates of the potential for loss. This probability is then converted into an interest rate premium, the credit or default risk premium and added to the saver's required nominal yield. Typically, the securities issued by the government, (esp. T-bills), are considered to be credit risk free.

## **2) Marketability Risk:**

Marketability is the capability of being sold quickly at low transaction cost.<sup>12</sup> Marketability risk deals with the degree of difficulty in being able to convert a financial claim into cash at its most recent transaction price or very close to it. Savers who purchase investments with poor marketability expect to be compensated for the lack of marketability. This represents an additional interest spread and is referred to as the marketability or liquidity risk premium.

## **3) Call or prepayment Risk:**

Some financial claims offer the borrower the right to repay the principal debt prior to maturity, on financial claims like bond, these provision are referred to as call provision. On financial claims such as home mortgage and installment auto loans, they are called pre-payment provisions. These provisions are options. The borrower has the option to call or prepay the debt. The investor in the financial claim that is callable or subject to repayment accepts risk. The risk is that if interest rates fall, the borrower will call the bond or prepay the mortgage. The investor receiving the cash funds that he or she cannot reinvest it at an interest rate as high as the rate on the previous investment. This risk is

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<sup>11</sup> Cheney, John M & Moses, Edward A., Fundamental of Investment, West publishing company, New York. P 38

<sup>12</sup> Kohn, Meir, (1999) Financial Institution and markets, Tata McGraw Hill publishing, New Delhi, P. 174

called a call or prepayment risk. The compensation that investors demand to accept this risk is an additional interest spread reoffered to as the call option premium.

#### **4) Servicing cost:**

Some financial claims are difficult to service. This means that the process of collecting interest and principal payments providing accurate records or monitoring the ongoing credit position of the borrowing involves considerable operating costs. Lenders must be compensated for the servicing costs. This cost is included in the interest rate charged and is referred to as the servicing cost<sup>13</sup>

#### **5) Exchange Rate Risk:**

As our financial markets have become more global, there has been a significant growth in the borrowing and investing in foreign denominated financial claims. A Nepalese company establishing a manufacturing facility in Belgium might be inclined to issue bonds denominated in Belgium francs rather than Nepali Rupees. Investors also have available to them many investments that are denominated in foreign currencies. This transaction involves exchange rate risk. This risk relates to the potential that the rate of exchange between the domestic currency and foreign denominated currency will change as a result of any number of factors. The primary risk for the borrower is that the value of the domestic currency. This results in an unexpected cost on the international loan. Since the loan would have to be repaid in the foreign currency that has risen in value relative to the domestic currency. This potential change in currency values must be reflected in computing the cost of borrowing.

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<sup>13</sup> Thygerson, Jenneth J, P 40

## **6) Taxability:**

The final factor influencing the change in interest rate is taxability. Financial claim income is typically subject to taxation. Since the value of a financial claim is based on its anticipated cash flow, taxation acts to reduce those cash flows. Not all incomes are taxable equally.

### **2.2.2.1 Concept of Deposit:**

Deposit is a sum of money lodged with a bank, discount house or other financial institution<sup>14</sup>. Deposit is nothing more than the assets of an individual which is given to the bank for safe-keeping with an obligation to get something (interest) from it. To a bank these deposits are liabilities. Commercial bank Act 2031 (1974) defines “Deposits” as the amount deposited in a current, savings or fixed accounts of a bank or financial institution.<sup>15</sup> The deposits are subject to withdrawals by means of cheques or on a short notice by customers. There are several restrictions on these deposits, regarding the amount of deposit, number of withdrawal etc. They are used more as investments and hence they earn some interest. The rate of interest varies depending on the nature of the deposits. The bank attracts deposits from customers by offering different rates of interest and different kinds of facilities. Though the bank plays an important role in influencing the customer to part with his funds and open deposit accounts with it, it is ultimately the customer who decides whether s/he should deposit his surplus funds in current deposit a/c, saving deposits or fixed/time deposit a/c. Bank deposits arise in two ways. When the banker receives cash, it credits the customer’s account, it is known as a primary or a simple deposit. People deposit cash in the banking system and thereby convert one form of

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<sup>14</sup> Shrestha Manohar K & Bhandari, Dipak B, Financial Markets and Institutions, Asmita Books Publishers & Distributors, putalisadak, Kathmandu, P. 281

<sup>15</sup> Bhandari, Dilli Raj, (2003), Banking and Insurance Principle & Practice, Aayush Publictation, Kathmandu, p. 73

money, cash, into another form, bank money. They prefer to keep their money in deposit accounts and issue cheques against them to their creditors. Deposits also arise when customers are granted accommodation in the form of loans. When a bank grants a loan to a customer it doesn't usually pay cash but simply credits the customer's account with the amount of loan. Of course, there is nothing that prevents the borrower from withdrawing the entire amount of borrowing in cash but quite often s/he retains the amount with the bank in a deposit.

#### **2.2.2.2 Types of Deposit**

There are different types of deposits. But for this study, major three types of deposit are taken. They are:

##### **Current Deposit:**

A current deposit is a running account with amounts being paid into and drawn out of the account continuously. These accounts are also called demand deposits or demand liabilities since the banker is under an obligation to pay money in such deposits on demand. The account never becomes time barred, because the limitation does not run until a demand is made by the customer on the bank for the payment of deposit. These accounts are generally opened by business houses, public institutions, corporate bodies and other organizations whose banking transactions are numerous and frequent. As these deposits are payable on demand, banker is obliged to keep larger cash reserves than are needed in the case of fixed and savings deposits. This type of account is just a facility offered by the bank to its customers. So such deposit doesn't yield any interest return.

The deposit in which an amount is immediately paid at the time of any account holder's demand is called demand deposit.<sup>16</sup> Its transaction is continual & a very small portion of such deposit can be invested in the productive sector. Though the bank cannot gain significant profit by investing it in new sector, this is one of the facilities given to the customer. Therefore, the bank doesn't give interest on this account. For this study this types of deposit is not suitable.

### **Saving Deposit:**

According to Commercial Bank Act 2031 (1974) saving account means "An account of amounts deposited in a bank for savings purposes." The saving deposit bears the features of both of the current and fixed period's deposits. Saving accounts are mainly meant for non-trading customers who have some potential for saving and who don't have numerous transactions entering their account. While opening the account the minimum compensating balance differ according to the banks rule. Similarly there is also divergence as to how much amount of money can be withdrawn. But if the customers want to withdraw more money from the bank which is not allowed by it but if s/he gives pre-information to the banks, s/he can withdraw more money. The bank fixes the minimum and maximum amount of withdraw able through a cheque from this deposit. If the bank goes into liquidation, priority is given to the saving deposit than current and fixed deposits while repaying the liabilities.

### **Fixed Deposit:**

Fixed deposits constitute a very important resource for banks as bank need not keep greater reserve in respect of such deposits. Under the commercial Bank Act 2031 (1974), "Fixed account means as account of amounts deposited in a bank for certain period of time." The customers opening such account deposit

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<sup>16</sup> I.bid

their money in the account for a fixed period. Usually, only the person or institution who wants to gain more interest opens such type of account. High interest rate is paid to this deposit as compare to saving deposits. The bank and the customer can take benefit from this deposit. The bank invests this money on the productive sector and gains profit and the customer too can be made his financial transaction stronger by getting more interest from this deposit. The principal amount with interest must be returned to the customer after expiry of fixed time.

In England these deposits are repayable subject to a period of notice and hence known as time deposit or time liabilities means that these are withdraw able subject to a period of notice and not on demand.<sup>17</sup> Fixed deposit receipt is not transferable by endorsement and certainly not negotiable. However the debt covered by the fixed deposit receipts can be assigned. Bank generally gives loans up to 90% of the deposit against the security of the deposit. For this bank charge some interest higher than the interest allowed on the deposit.

### **2.2.2.3 Importance of Deposit:**

Deposit arises from saving. An individual's income equals consumption plus saving. S/he deposits the saved part of income in the bank and gets interest from it. Banks in turn lend this money and earn profit by charging high interest rates. And the borrowers from banks, invests this fund in productive sectors yielding more return than the borrowed interest. This investment leads to create new employment opportunity in the economy. Ultimately due to new employment the purchasing power of the economy increases and finally GDP and growth of the country occurs. It means that the deposit has very important role in the economy. There is a direct relationship between deposit of banks

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<sup>17</sup> Radhaswamy, M. & VasuDevan S. V, (1979), Text book of bank, S chand & company Ltd, New Delhi, P.72

and the investment in the economy. If the volume of deposit is low, the investment in the economy also lags behind due to lack of resources. The deposit of banks is the accumulated capital which can directly be invested. There is a great need of such deposit in the developing countries. Deposit includes the idle money of the public, bank being the inter-mediator to accept this sort of money and help to channelize this in productive sector. So the importance of banks and financial intermediaries is larger in present context.

### **2.2.3.1 Concept of Lending (Credit):**

Another important function of commercial bank is to provide different types of loans or credit. The word 'credit' means 'trusting'. In credit transaction the lender (or banks) must have confidence in the borrower that s/he will be able to repay the money. In credit transactions, the creditor turns over to the debtor to repay an equivalent amount usually money in future plus an added sum called interest. In other words the commercial bank earns profit by lending the amount in terms of loan or credit and in return it gets interests. Banks loans are classified as: A) Loans and advances, b) Overdrafts c) cash credit d) discounting of bills and so on.<sup>18</sup> But besides this, the other forms of credit are: Bills of Exchange, cheques, Drafts, Promissory Note, Letter of Credit (LC), Travelers' cheque, Treasury Bills (T-Bills), Book Credit e.t.c.

If credit is made to the government the credit is known as public credit and if credit is transacted by the private for his own purposes the credit becomes private. There are certain distinctions between public and private credit. Bank credit refers to the credit taken by the banks. Bank is the major source of credit

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<sup>18</sup> Shrestha Manohar K & Bhandari, Dipak B, Financial Markets and Institutions, Asmita Books Publishers & Distributors, Putalisadak, Kathmandu, P 255

to both private and public debtor. Sometimes bank also take credit. There is another type of credit know as investment credit and commercial credit which can be divided according to the purposes of using credit. The former refers to the credit which is used for investment and the latter for trade purposes. Similarly, another classification is consumer's credit and producers' credit. The latter type of credit is the advances made to individuals firms, companies and governments, which are used to facilitate the carrying on of the various branches of utility creation.

### **2.2.3.2 Factors affecting the volume of Lending.**

The volume of credit within a country depends upon different factors. For this study only the effect of interest rate is taken into consideration and other factors are not considered. Some of the factors affecting the volume of credit are as follows:

#### **1) Credit (Lending) Rate:**

If the bank credit rate is very high then, the volume of credit expansion is less and vice versa. It means that volume of credit and interest rate of credit has inverse relation. People invest very little in productive sectors when the interest rate is high in the market economy.

#### **2) Rate of Return:**

If the rate of return is high people inclined to invest more. People earn more profit and they become able to afford higher rate of interest along with timely repayment of loan.

### **3) Investment Opportunity:**

If the investment opportunity within the country is high, the volume of credit becomes high. The basic thing for investment stimulation is easy and cheap credit etc.

### **4) Pace of Financial Development:**

If there are enough banking facilities to provide loans in easy terms, the volume of credit may be high. It is due to the lack of cheap money lenders that rural people are deprived of loan. If the banking facilities within the nation is expanded, the volume of credit rises.

### **5) Basic Infrastructure:**

Like transportation, marketability, availability of raw materials also plays an important role in raising the volume of credit in the country.

### **6) Political Condition:**

Political condition, especially political in-stability, is also one of the major causes of low volume of credit. In such a case none would like to risk his capital in new ventures. The present condition of the country is the glaring example of this.

In addition to aforementioned point, other factors like trade condition, currency condition are also the factors affecting the volume of credit.

### 2.2.4.1 Concept of Inflation:

Inflation in common sense is increment in general or average price level in the whole economy. It means that it is the increase in general price level, not the increase in individual prices. Inflation is not a temporary fluctuation in price but it is a sustained and appreciable increase in price<sup>19</sup>. Due to the increase in general level in price, the value of purchasing power of money declines as there is an inverse relationship between the general level of price and value of money. According to Economist Crowther “Inflation means a state in which the value of money is falling i.e. prices are increasing.” Inflation is a general rise in prices across the economy. This is distinct from a rise in the price of a particular good or service. Individual prices rise and fall all the time in a market economy, reflecting consumer choices and preferences, and changing costs. If the price of one item - say a particular model of car - increases because demand for it is high, we do not think of this as inflation. Inflation occurs when most prices are rising by some degree across the whole economy<sup>20</sup>.

During inflation, the cost of living increases rapidly, so inflation severely hurts the people who depend on the income from fixed income securities like bonds, and preferred stock. Similarly as purchasing power of money falls as well as the **debtors** gain, and the **creditor** loses.

Inflation has severe social, political and economic effects. Hence, some like to call it ‘worst than taxes’ and ‘legal robbery.’ During last 30- 40 years, almost all countries of the world have experienced some degree of inflation. For example, Germany, Russia, Austria in 1920s and Hungary, Romania, China

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<sup>19</sup> Joshi, Shyam, (2056), Micro and macro Economic Analysis, Taleju Pustak Bitarak, Kathmandu, p. 364

<sup>20</sup> <http://www.bankofengland.co.uk/targettwopointzero/inflation/whatsInflation.htm>

and again Germany in 1940s had experienced the strain of hyper-inflation. Inflation brings political instability. According to Milton Friedman the rise of Hitler was due to hyper-inflation. Today each and every nation of the world is suffering from the economic evil of inflation. The trend of rising prices has the general phenomenon of every country. The most developed and industrialized countries have adopted various method like credit control via bank interest rate, checking money supply and various other price control policies yet they have not been able to remain aloof from this disease. On the other hand the developing nations who have much less sufficient type of economy are suffering severely from both domestic as well as imported inflation.

If the rate of increase in money incomes overcomes the rate of increase in production, there is excess purchasing power in the hands of public. Inflation is reflected in high prices and increased imports.

There are many theories regarding how inflation occurs in an economy. Some of these theories are demand-pull inflation, cost-push inflation, wage-push inflation etc. similarly there are various methods of checking inflation, such as, government spending, taxes which lie under fiscal tool of checking inflation and higher reserve requirements, open market operation etc. which lie under the monetary method of checking inflation. But these are not going to be discussed here because these are not the concern of our present study.

#### Inflation in Nepal:

According to the “National Urban Consumer Price Index”, published by Research Department of Nepal Rastra Bank, the inflation rate on different fiscal years are as follows (Table 2-1).

**Table no 2-1: CPI and Inflation Rate during last eight FY**

FY	Food & Beverage		Non-food & Services		Overall Index	
	Index	% Change	Index	% Change	Index	% Change
2004/05	108.2	8.2	108.0	8.0	108.1	8.1
2005/06	116.6	7.8	117.8	9.1	117.1	8.3
2006/07	135.5	16.2	124.6	5.8	130.4	11.4
2007/08	136.1	0.4	133.4	7.1	134.9	3.5
2008/09	133.0	-2.3	144.2	8.1	138.1	2.4
2009/10	137.9	3.7	147.2	2.1	142.1	2.9
2010/11	144.0	4.4	154.6	5.0	148.9	4.8
2011/12	148.8	3.3	161.8	4.7	154.8	4.0

Source: NRB Research Department.

#### 2.2.4.2 Inflation and Interest Rates:

Inflation occurs when the average price level in the economy rises. Interest rates represent the “price” of credit. Are they also affected by inflation? The answer is yes. There is positive correlation between interest rates and inflation. In other words, increase in inflation increases the interest rates. But the exact effect of inflation on interest rate is not identified yet. On this regards, there are many theories. Here in this case, mainly two theories are going to be discussed.

#### The Nominal and Real Interest rates:

Before exploring the **relationship between inflation and interest rates**, several key terms must be understood. In this connection one should be familiar with nominal rate and real rate of interest. The **nominal rate** is published or quoted interest rate on a security or loan. These rates are the actual rates that are used to transact with the customers. In other words, “nominal rate of return are money rates of return that are not adjusted for the effect of inflation”<sup>21</sup> For

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<sup>21</sup> Francis, Jack Clark, Investment analysis and management, eleventh edition, post graduate publication, p 438.

example an announcement in the financial press that major commercial banks have raised their prime lending rate to 10 percent per annum indicates what nominal interest rate is now being quoted by banks to their best customers.<sup>22</sup>. Similarly, the real interest rate is the return to the lender or investor measured in terms of its actual purchasing power. In a period of inflation, of course, the real rate will be lower than the nominal rate. An investment's real rate of interest during some period is calculated by removing the rate of inflation from the nominal return i.e. by using following equation:

$$(1+rr) = \frac{(1+r)}{(1+q)}$$

Where

rr = real rate of return

r = nominal rate of return

q = inflation rate

### **The Fisher Effect:**

Economic theory tells us that interest rates reflect expectations about likely future inflation rates. In countries where inflation is expected to be high, interest rate also will be high, because investors want compensation for the decline in the value of the money. This relationship was first formalized by economist Irvin Fisher and is referred to as the Fisher effect.<sup>23</sup> According to Fisher effect, nominal interest rate is related to the real rate by the following equation:

$$\text{Nominal interest rate} = \text{Expected real rate} + \text{Inflation Premium} + (\text{Expected real rate} \times \text{Inflation Premium})$$

<sup>22</sup> Rose, Peter S.(1997), "Money and Capital Markets: Financial Institution and Instrumental in a Global Marketplace", Irwin, Chicago, 6<sup>th</sup> edition p. 240

<sup>23</sup> Shrestha Manohar K & Bhandari, Dipak B, Financial Markets and Institutions, Asmita Books Publishers & Distributors, putalisadak, Kathmandu, P 176

According to Fisher, the cross-product term in the above equation (i.e. Expected real rate  $\times$  Inflation Premium) is often eliminated because it is usually quite small except in countries experiencing severe inflation. So the Fisher's equation can be written as

$$\text{Nominal Interest Rate} = \text{Expected real rate} + \text{Inflation Premium}$$

Clearly, if the expected real interest rate is held fixed, changes in nominal rate will reflect shifting inflation premium. It means that if inflation premium increases then nominal rate also increases. But this does not necessarily mean that an increase in expected inflation automatically increases nominal interest rates. There are several different views on this matter but according to Fisher expected rate of return tends to be relatively stable over time because it depends on such long term factors as the productivity of capital and the volume of savings in the economy. Therefore, a change in the inflation premium is likely to influence only the nominal interest rate, at least in the short run. The nominal rate will rise by the full amount of the expected increase in the real rate of inflation.

If this view, known today as the Fisher effect, is correct, it suggests a method of judging the direction of future interest rate changes. To the extent that a rise in the actual rate of inflation causes investors to expect greater inflation in the future, higher nominal interest rates will soon result. Conversely, a decline in the actual rate of inflation may cause investors to revise downward their expectations of future inflation, leading to lower nominal rates. This will happen because, in an efficient market, investors will be compensated for the risk of expected changes in the purchasing power of their money.

## The Harrod-Keynes Effect of Inflation:

There is another view about **inflation-interest rate relationship** propounded originally by British economist Sir Roy Harrod. This view conflict with that of Fisher's effect. It is based upon the Keynesian liquidity preference theory of interest rate. Harrod argues that the real rate will be affected by inflation but the nominal rate need not be. Following the liquidity preference theory, the nominal interest rate is determined by the demand for and supply of money. Therefore unless inflation affects either the demand for and supply of money, the nominal rate must remain unchanged regardless of what happens to inflationary expectations. According to this principle, Harrod argues that a rise in inflationary expectations will lower the real rate of interest. In liquidity preference theory, the real rate measures the inflation-adjusted return on bonds. However, conventional bonds, like money, are not a hedge against inflation, because their rate of return is fixed by contract. Therefore, a rise in the expected rate of inflation lowers investors' expected real return from holding bonds. If the nominal rate of return on bonds remains unchanged, the expected real rate must be squeezed by expectations of rising prices.

### **2.2.4.3 Tools to measure Inflation:**

There is no completely satisfactory way to summarize the price changes that have occurred over a given time period for the large number of goods and services available in the country. Nevertheless, the government has attempted to do so by measuring the cost of specific mix of major items (a basket of goods, consisting of specified quantities and qualities of various items of food, clothing, housing and health care products bought by the average urban

household.<sup>24</sup>) at various point of time. The “overall” price level computed for this representative combination of items is termed as cost-of-living index. The percentage change in this index over a given time period can be viewed as a measure of the inflation that took place from the beginning of the period to the end of the period.<sup>25</sup>

Similarly most governments compute a number of alternative price indices in order provide a wider choice for analysis. Nevertheless, many people tend to focus on one index as an indicator of the price level .Generally, in most of the countries, Consumer price Index, CPI, is used as this tools to calculate the inflation rate. The percentage change in the CPI over time measures the rate of inflation, as shown below in equation. The inflation rate is denoted by q.

$$q = \frac{CPI_1 - CPI_0}{CPI_0}$$

Where  $CPI_1$  = Consumer price index of period 1

$CPI_0$  = Consumer price index of period 0

Nepal Rastra Bank too, uses CPI as the tools to measure inflation in the country taking 1995/96 fiscal year as base index.

### **2.3 Review of Unpublished Thesis:**

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<sup>24</sup> Francis, Jack Clark, Investment analysis and management, eleventh edition, post graduate publication, p 438

<sup>25</sup> Sharpe W.F., Alexander G.J., Bailey J.V. Investments, sixth edition, Prentice Hall of India, New Delhi, 2003, p. 322

Prior to this study, there are very few thesis and research papers submitted to the libraries of Tribhuvan University and its wing colleges on the same topics. But beside this, there are some other theses which are related to this study to some extents. The review and the extract from them are presented in this section.

A study by **Kishore Khatri Chettri's** on "Interest rate structure and its relation with deposits, inflation and credits in Nepal"<sup>26</sup>, 1980, tried to identify the relationship of interest rate with three other factors, deposit, credit and inflation. Though this study has similar topic as of Mr. Chettri's but some of his objectives were different than this study. According that thesis, the objectives were:

- To present a concrete picture of the interest rate structure in Nepal.
- To predict the relationship between interest rate and other economic variables like deposit, inflation and credit flow in Nepal.
- To analyze the impact and implementation of the policy of interest rate of Nepal Rastra Bank.
- To provide suggestions and recommendations for improvement in the rate structure in Nepal.

Keeping above mentioned objectives, Mr. Chettri found that interest rate is the important explanatory variables to influence the volume of real deposits and the variables like inflation and the real income are not significant variable to influence the volume of real deposits.

Similarly, he found that rate of interest is directly affected by the rate of inflation. For loan rate of interest and loan amount, he found that loan rate of interest also affects the credit flows. It means that they have inverse

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<sup>26</sup> Chettri, Kishor khatri, "Interest rate structure and its relation with deposits, inflation and credit in Nepal", an unpublished M.A. thesis, T.U. Kathmandu.

relationship but rate of interest doesn't have so much influence upon credit flows like that of deposit rates on deposits.

Finally in his conclusion, he found that deposit depends upon numerous factors besides income, inflation and interest rates. If other variables are kept constant, the institutional interest rate is the important explanatory variable to influence the volume of deposit in Nepal. It means that, at the time of disseminators study, i.e. during 1980s, increase in the deposit interest rates increases the volume of deposit. Similarly the relationship with income and inflation could not come significant. According to him, the fixation of attractive interest rates on deposits has been responsible for the substantial growth in the volume of deposits in recent years. In the same manner for inflation, he has concluded:

“The inflation within the country is very high since few years. In fact the prices in Nepal are affected by the movement in Indian price level than by domestic monetary expansion. Prices in Nepal are linked with Indian because of the 500 miles open boarder and the availability of Indian goods and currency. There is no consolidated type of money and capital markets in Nepal. Commercial bank branches are concentrated in the urban areas. Regarding deposit mobilization in the present context the urban area has occupied more than 80% and the flow of credit is also centralized only in urban areas. On the other hand, the volume of deposits have overcome the volume of credit which means to say that banks are not getting new investment opportunities.”

Finally the relationship between credit flow and loan rates was found out to be negative. If the loan rate of interest is concessional, there is the possibility of raising investment and thus the volume of credit.

Another study was made by **Sashi Bhatta** on 2004 in the topic “Interest Rate and its effect on Deposit and Lending”<sup>27</sup>. In this study, the disseminator tries to portrait the relation of interest rate with deposit and lending amount. Her findings and the findings made by Mr chettri are seems to be different. According to Mr chettri's finding, all the relation matches with the theory but

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<sup>27</sup> Bhatta, Sashi, “Interest Rate and its effect on Deposit and Lending”, an unpublished M.B.S thesis, T.U. Kathmandu.

Mrs Bhatta's finding on deposit was not as per theory. But other matters are same as Mr Chettri's. The conclusion drawn by Mrs Bhatta is:

- Deposit rates of all sample banks under study are in decreasing trend; meaning that every year deposit rates of sample banks under study have decreased.
- Lending rates of all sample banks under study are also in decreasing trend; means that every year lending rates of sample banks under study have decreased.
- Analysis shows that interest rates on lending are far higher than deposit rates of sample banks. The correlation coefficient between these two variables, (deposit rate and lending rate) of sample banks comes highly positive.
- The simple correlation coefficient between deposit rate and deposit amount of sample banks were highly negative. But out of them, correlation coefficient analysis of one sample bank is found to be negative. It means that in that case the theory doesn't match the analysis. So writer conclude that the result appears in that study was different than the theory.
- The correlation analysis between lending rate and lending amount of all sample banks under study comes highly negative. This relation between two variables (lending rate and lending amount) of sample banks matches with the theory which says with the increase in lending rate, lending amount decreases and vice-versa. So she concluded that lending rate is the most important determinant of loan and advances of all commercial banks. This makes clear that borrower's seem more interest conscious.

Finally her conclusion about her study, in her own words, as follow:

“There is significant relationship between deposit rate and deposit amount and lending rate and lending amount of almost all commercial banks except one. Test of significance

for correlation coefficient between inflation rate and deposit and lending rate shows that these variables are not correlated.”

A study made on the topics “Determinants of Interest Rates in Nepalese Financial Markets”<sup>28</sup>, by **Mr. Jhabindra Pokharel** (2012) also give some ideas about the interest rates in Nepalese markets. Though, this thesis tried to identify the factors that shape the interest rates in Nepalese markets, it also tried to explore the relationship between the interest rate, deposits, credit rates and inflation. Among different objectives, some objectives that match to this study are:

- To show the relationship between the liquidity position and interest rate on deposit and lending.
- To identify the effect of inflation on interest rate charged and offered by various Nepalese financial institutions.
- To identify the different methods used by Nepalese financial institutions to calculate interest on lending.

During the study, Mr. Pokharel found similar result as discovered by the Mrs. Bhatta. According to Mr. Pokharel, the major findings of the study are:

The correlation coefficient between interest rate on deposit and amount of deposit collected of all sample organizations were highly negative. It means that, deposit amount of all sample banks are found to increase even if the interest rate of deposit, the attracting factors for deposit, is decreasing. This is against the theory. According to theory, there must be positive relationship. Similarly in case of lending rate and lending amount, Mr. Pokharel found the

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<sup>28</sup> Pokharel, Jhabindra, “Determinants of Interest Rates in Nepalese Financial Markets”, an unpublished M.B.S thesis, T.U. Kathmandu.

result as suggested by the theory. It means, the correlation coefficient between amount loaned and interest rate on lending of 10 sample bank is found to be highly negative. In other words, negative coefficient of other organizations means that more amounts is demanded at lower interest which means that when demand increases, price (interest rate on lending) also increases.

Similarly considering about the relationship between interest rate on deposit and on lending for all sample banks, disseminator found it to be highly positive correlated. In his own words, it is “Variation in one rate also brings variation in another rate in same direction.” Therefore it is concluded both interest rate are determining factor of each other.

In same manner, the researcher explored that the relation between interest rate on deposit and inflation rate is little positive. Theoretically there should be positive correlation between these two variables. Due to little positive correlation, it is concluded that the interest rate in Nepalese Financial market is affected by inflation rate to some extent. Similarly the same result is obtained when it is tried to explore the relationship between lending rate and inflation rate. It means, theoretically there should be a positive and perfect relationship between them. Practically, the researcher found it but the degree of positive correlation is somewhat less. So on this the researcher concluded that “Interest rate on lending in Nepalese Financial Market is affected by inflation only to some extent.” Finally, the relationship of interest rate on lending with risk-free rate is both positive and negative. It means that interest rate on lending in Nepalese Financial Markets in not affected by risk-free rate of interest.

**Narendra Bahadur Rajbhandary**, 1978, conducted a study on “The Interest Rate Structure of Commercial Banks in Nepal”<sup>29</sup>. The objective of his study was to show the relation of interest rate with saving and fixed deposits; with loans and advances and with interest earning (i.e. interest received on loan minus interest paid on deposits.)

His analysis concludes that the time deposits are positively and significantly correlated with the interest rates. There is significant correlation between the saving deposits and the rate of interest. Fixed deposit is more sensitive to the interest rate revision done by NRB. The correlation between the growth of fixed deposits and the interest rate particularly from 1974 to 1977 is most significant. But the relation between the interest rates and the loan and advances is less significant. Among all the sectors, the private sector seems most sensitive to interest rate change. Most of the loans too correlated positively if absolute cumulative figures are taken. But the growth rate of total loans and advances except investment on HMG securities is negatively correlated more with the weighted average rate of interest since 1973. The growth of loans to private sector is also negatively correlated with interest rate since 1971. Negative correlation between loans and interest rate meant that loans decrease at higher interest rate and vice-versa.

The net interest earning is depended upon interest coverage. The total interest received and the total interest paid significantly correlated in the case of both of the banks i.e. Nepal Bank Limited and Rastriya Banijya Bank, the sample organizations of the study. He is in view that NRB can well monitor the credit flow and profits of the commercial banks in Nepal by manipulating the rates of interest. It can also manipulate the demand for and supply of money.

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<sup>29</sup> Rajbhandary, Narendra B., “The Interest Rate Structure of Commercial Banks in Nepal”, an unpublished M.A thesis, T.U. Kathmandu.

Another study conducted by **Shree Krishna Shrestha** in 1979 upon the title of “Interest Rate and its Impact upon Resource Mobilization and Utilization”<sup>30</sup> is also seems to be relevant to review here. Since his study is too old, interest rate at that time was purely the central bank’s phenomenon. In this study, it has concluded that the frequent change in interest rates was disliked by customers except changing the interest rates as directed by NRB. Shrestha suggested the commercial banks to quote stable rates as far as possible. He also recommended that the method of calculating interest should be used in such a way that the previous customers and depositors who are already involved in banking transaction should not be affected adversely. He also suggested to charge high interest rate on loan to luxurious goods as in unproductive sectors and a lower rate on productive and small scale industries.

6) **Deepak Raj Bhandari**, 1998, in his study entitled “The Impact of Interest Rate Structure on Investment Portfolio of Commercial Banks of Nepal”<sup>31</sup> has concluded followings:

- i) Rates of commercial banks have been fluctuating. Deposits and lending rates were increased immediately after liberalization of the interest rate on August 31, 1989 but however, started to decline which have helped in increasing the credit flow.
- ii) Interest rate structure has direct influence on profitability of commercial banks. Decreasing lending rate helps to increase the profitability through increasing the credit.
- iii) Deposits are more interest rate conscious and positively co-related.

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<sup>30</sup> Shrestha Shree Krishan, “Interest Rate and its Impact Upon Resource Mobilization and Utilization” an unpublished M.A thesis, T.U. Kathmandu.

<sup>31</sup> Bhandari Deepak Raj, “The Impact Of Interest Rate Structure on Investment Portfolio of Commercial Banks of Nepal” an unpublished M.B.A thesis, T.U. Kathmandu.

- iv) Loans and advances of commercial banks have been found to be continuously increasing with the decline in interest rates.
- v) Effective interest rate structure helps in proper utilization of resources as measured by loan to deposit ratio.
- vi) Most of the banks are having similar interest rate structure which lessens the importance of liberalization of interest rate.

Another Study conducted by **Neeta Dangol** in 2003 on the “Impact of Interest Rate on Financial Performance of Commercial Banks”<sup>32</sup> concludes:

- i) Most of the commercial banks contradict the general financial theories.
- ii) The relation between amount of deposits and interest rate on deposit, in general concept, must be positive. But deposits are increasing despite the decrease in the general level of interest. The result of such phenomenon is that there are fewer investment opportunities for the banking sectors as well as general investors.
- iii) The relation between total amount of loan and the lending rate is negative and significant. However, the change in the total amount of loan flow is not proportionate with the change in the lending rate.
- iv) Correlation between interest rate and inflation is not significant.
- v) Not only interest rate is responsible to shape the profitability of banks but also the operating efficiency also has major influence on it.

8) **Yam Lal Bhoosal**, carried out a study entitled “An Analysis of Causes of Inflation in Nepal”<sup>33</sup> in 1995. He has shown the relationship of inflation with

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<sup>32</sup> Dangol, Neeta, “Impact of Interest Rate on Financial Performance of Commercial Banks” an unpublished M.B.S thesis, T.U. Kathmandu.

various factors like growth rate, Indian Inflation and price level, income level, cost of holding money, deficit financing. But all of these, he didn't mentioned any relationship of inflation with interest rate.

## 2.4 International Articles Related to this Subject:

### **Inflation: Inflation and Interest Rates**<sup>34</sup>

Whenever it is hear the latest inflation update on the news, chances are that interest rates are mentioned in the same breath. In the United States, interest rates are decided by the Federal Reserve. The Fed meets eight times a year to set short-term interest rate targets. During these meetings, the CPI is one significant factors in the Fed's decision. Interest rates directly affect the credit market (loans) because higher interest rates make borrowing more costly. By changing interest rates, the Fed tries to achieve maximum employment, stable prices, and a good level growth. As interest rates drop, consumer spending increases and this in turn stimulates economic growth.

Contrary to popular belief, excessive economic growth can in fact be very detrimental. At one extreme, an economy that is growing too fast can experience hyperinflation, resulting in the problems already mentioned earlier. At the other extreme, an economy with no inflation has essentially stagnated. The right level of economic growth, and thus inflation, is somewhere in the middle. It's the Fed's job to maintain that delicate balance. A tightening, or rate increase, attempts to head off future inflation. An easing, or rate decrease, aims to spur on economic growth.

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<sup>33</sup> Bhoosal, Yam Lal, "An Analysis of Causes of Inflation in Nepal" an unpublished M.A. thesis, T.U. Kathmandu.

<sup>34</sup> <http://www.investopedia.com/pdf/tutorials/inflation.pdf>

While inflation is a major issue, it is not the only factor informing the Fed's decisions on interest rates. For example, the Fed might ease interest rates during a financial crisis to provide liquidity (flexibility to get out of investments) to U.S. financial markets, thus preventing a market meltdown.

**Inflation and Investment:** When it comes to inflation, the question on many investors' minds is: "How will it affect my investments?" This is an especially important issue for people living on a fixed income, such as retirees. The impact of inflation on your portfolio depends on the type of securities you hold. If you invest only in stocks, worrying about inflation shouldn't keep you up at night. Over the long run, a company's revenue and earnings should increase at the same pace as inflation. The exception to this is stagflation. The combination of a bad economy with an increase in costs is bad for stocks. Also, a company is in the same situation as a normal consumer -- the more cash it carries, the more its purchasing power decreases with increases in inflation. The main problem with stocks and inflation is that a company's returns tend to be overstated. In times of high inflation, a company may look like it's prospering, but in reality inflation is the reason behind the growth. When analyzing financial statements, it is also important to remember that inflation can wreak havoc on earnings depending on what technique the company is using to value inventory. We discuss this in detail in our article, "Inventory Valuation for Investors: FIFO and LIFO." Fixed-income investors are the hardest hit by inflation. Suppose that a year ago you invested \$1,000 in a T-bill that yielded 10%. You are about to collect the \$1,100 owed to you. Is your \$100 (10%) return real? Of course not! Assuming inflation was positive for the year; your purchasing power has fallen, and thus so has your real return. We have to take into account the chunk inflation has taken out of your return. If inflation was 4%, then your return is really 6%. This example highlights the

difference between nominal interest rates and real interest rates. The nominal interest rate is the growth rate of your money, while the real interest rate is the growth of your purchasing power. In other words, the real rate of interest is the nominal rate reduced by the rate of inflation. In our example, the nominal rate is 10% and the real rate is 6% ( $10\% - 4\% = 6\%$ ). As an investor, you must look at your real rate of return. Unfortunately, investors often look only at the nominal return and forget about their purchasing power altogether.

### **Real Interest Rates and the Fisher Equation<sup>35</sup>**

A common use of this measure of inflation is to add an inflation premium to interest rates to allow for expectations about future inflation. As stated above inflation erodes the **purchasing power** of money over time. Individual lending money in an inflationary environment will be repaid in dollars which possess less purchasing power upon maturity of the debt contract. An inflation premium is often built in to **nominal interest rates** to protect against this loss of purchasing power. However, at the time the debt contract is developed the inflation premium is based on expected rates of future inflation. If these expectations differ from actual inflation rates during the life of the debt contract either the lender or borrower can be adversely affected.

The inflation premium represents the difference between nominal market interest rates ' $i_{\text{market}}$ ' (i.e., those interest rates published in the paper or posted on the wall at a bank) and the desired real rate of interest ' $r^*$ ' which usually reflects the rate of **real economic growth** (the amount of reward that should accrue to the lender for lending to a productive economy). Thus the nominal rate of interest (holding risk constant) on a short-term debt contract (one year or less) is developed as follows:

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<sup>35</sup> [http://www.digitaleconomist.com/inf\\_4020.html](http://www.digitaleconomist.com/inf_4020.html)

$$i_{\text{market}} = r^* + E[\pi_t] \quad (5)$$

where 'E[ $\pi_t$ ]' represents the expected rate of inflation.

At the termination of the debt contract an ex-post **real rate of interest** 'r' can be developed as follows:

$$r = i_{\text{market}} - \pi_t \quad (6)$$

Thus the **Real Interest Rate** represents the real return to lenders measured in terms of the **purchasing power** of interest paid.

If E[ $\pi_t$ ] is greater than  $\pi_t$  then 'r' will exceed 'r\*' to the benefit of lenders (real returns to lending greater than desired and perhaps greater than the rate of real economic growth) as shown by the following operation -- substituting (5) into (6) we have:

$$r = r^* + E[\pi_t] - \pi_t$$

If the opposite is true, then benefits will accrue to the borrower.

During the 1980's, many economists have felt that the real rate of interest was abnormally high (i.e., in excess of 2.5-3%). This may be explained in part due to the inflationary expectations that built up in the late 1970's and early 1980's. Nominal interest rates have taken these expectations into account. The effects of these inflationary expectations differing from the actual rate of inflation can be seen in the table no 2-2 where the annualized 6-month **T-bill rate** is used as a measure of the market interest rate:

Over time, changes in market interest rates may be attributed to changes either in the real desired rate 'r\*' or due to changes in inflationary expectations. Changes in the desired real rate reflect the behavior in the market for loanable

**Table 2-2: Relationship between T-bill rate, real rate and CPI**

Year	T-Bill Rate	r* (desired)	E[ $\pi$ ]	% (CPI)	r (actual)
1978	7.57	4.5	3.07	9	-1.43
1980	11.37	2	117	12.5	-1.13
1982	11.08	1.5	9.58	3.8	7.28
1984	9.8	4	5.8	3.9	5.9
1986	6.03	3.5	2.53	1.1	4.93
1988	6.92	3.5	3.42	4.4	2.52
1990	7.47	1.2	6.27	6.1	1.37
1992	3.57	2.7	0.87	2.9	0.67
1994	4.66	3.5	1.16	2.7	1.96
1996	5.09	2.8	2.29	3.3	1.79
1998	4.85	4.4	0.45	1.6	3.25
2000	5.92	4.3	1.62	3.4	2.52

Source: Economic Report of the President 2002

*Note the anticipated real rate of interest ( $r^*$ ) is based on an average of the actual rate of real economic growth over the previous three years.*

funds. If the supply of these funds (public and private savings) exceeds the demand for these funds (public and private borrowing) then the desired rate should fall in reaction to a surplus of these funds. In periods of economic growth the opposite is true. The growing economy is sustained in part by increased borrowing activity for inventory investment and investment in new capital stock to allow for increased production to meet growth in aggregate demand.

Changes in inflationary expectations tend to be a more complicated matter. One may hypothesize that current inflationary expectations are based on the history of past actual rates of inflation. A formal model that may help in understanding the development of these expectations is that of the **Adaptive Expectations** model. This model is based on the notion that economic agents slowly adapt to a changing inflationary environment. This may have been the case in the late 1960's and early 1970's. During the 1960's, the inflation rate was relatively low in the 2-4% range. Basically, during this period time

inflation was not considered to be a major economic problem. Thus in the next decade when actual inflation began to creep up towards the double-digits, many individuals and institutions were surprised. Forecasts of future inflation (based on recent historical experience) consistently lagged behind an accelerating actual rate of inflation.

In the early to mid-1980 the actual rate of inflation was de-accelerating, a phenomenon known as **disinflation**. During this period, economic agents' expected rates of inflation were greater than what actually occurred. These agents were slow to adapt thus putting upward pressure on ex-post real interest rates.

## **2.5 NRB Directives and Interest rate in Nepal.**

Taking the reference of history on interest rates, we observe different changes in interest rate. The sole controller for regulating interest rate in Nepal is central bank, Nepal Rastra Bank. In the beginning, the interest rate charged and offered by banks and financial institutions was mentioned at a lower level with a view to stimulate real income and employment. However, dramatic change had been made time to time. Regulation of interest rate by Nepal Rastra Bank is made in the early stage of financial market development taking the period from 1955 to 1965. But NRB gradually began to liberalize the determination of interest rate on a phase-wise basis according to compatibility of the banks and the financial institutions that have developed in the country. In the early mid 1980's the country has adapted liberal economic policy. Number of finance companies and commercial banks began to develop and government made the liberal policy in maintaining the interest rate were encouraged for commercial banks, established under joint venture in association with foreign banks in

private sectors. Similarly, deregulated of interest rate was applied to under financial companies established finance company acts. Likewise other financial institutions like development banks, micro financial institutions. NGOs and licensed cooperative under, NRB were also made competitive in the determination of interest. The central bank, the sole institution authorized to determine the interest rate as per NRB act. There are full discretions to NRB in determining interest rate structure of banks and financial institutions taking from the period 1960 to 1975.

On 16 November 1984 government had provided autonomy in offering the interest rate on saving and time deposit to the extent of 1.5% and 1% points respectively above the prevailing rates. In 1986 financial institutions got freedom in fixing their interest rates in their deposits and loans. In addition, there was also limitation on the interest rate on different loans provided for the productive and priority and full deprived sector. However there was limitation imposed on certain sectors of lending such as the rate of maximum of 15% on the priority sectors loan. And for other kinds of loans financial institutions were given freedom to maintain the interest rate structure. In this way government provided freedom as well as limitation on the determination of interest rate.

On August 22, 1992, Nepal Rastra Bank issued some directives to commercial banks and financial institutions to clearly spell out the interest rate on deposits. Nepal Rastra Bank also instructed the bank and financial institutions to limit their interest rate spread on deposit and credit at 6 percent within the mid-December 1993. A further instruction to banks and financial institutions was issued in 2002, and now the interest rate spread required to be maintained by commercial banks and financial institutions has also been removed.

The interest rate regime in Nepalese perspective change from rigid control and monopoly of NRB from 1960-1980 to that of ultimate deregulation of interest rate and removal of spread from 1986 to 2002. At present there is complete freedom to have competitive system an important part of government's financial liberalization policy. In this way, the interest rate became a market determined phenomena rather than a regulated phenomena. The process of interest rate deregulation became a major indicative factor of the financial sector reform in the country.

The following table no 2-3 shows the development of interest rate in the Nepalese Financial Markets:<sup>36</sup>

***Table No. 2-3: Phase-wise development of Interest rate.***

1960	Sole monopoly of NRB to fix interest rate on deposit and loans.
1976	NRB empowered to determine interest rate.
1980	Process continued for NRB to fix interest rate and banks and financial institution to follow it.
1986	Freedom to commercial banks to offer higher interest rates from the minimum level of interest rate fixed by NRB
1989	Interest rate fully deregulated.
1992	Issue directive to commercial banks to spell out interest rate policy encouraging competition in interest rate.
1993	Spread not to exceed 6 percent.
1999	Decrease spread to 5 percent.
2002	Removal of spread restriction.

Source: Financial Markets and Institutions, Dr. Manohar K. Shrestha and Dipak B. Bhandari

<sup>36</sup> Shrestha Manohar K & Bhandari, Dipak B, Financial Markets and Institutions, Asmita Books Publishers & Distributors, putalisadak, Kathmandu, P 173

# CHAPTER THREE

## RESEARCH METHODOLOGY

### 3.1 Introduction:

Research methodology is a systematic way to solve the research problem. In other words, research methodology describes the methods and process applied in the entire aspect of the study. Research methodology refers to the various sequential steps (along with a rationale of each step) to be adopted by a researcher in studying a problem with certain objectives in view.<sup>1</sup> Thus the overall approach to the research is presented in this chapter. This chapter consists of research design, sample size and selection process, data collection procedure and data processing techniques and tools.

### 3.2 Research Design

A research design is the specification of methods and procedures for acquiring the information needed. It is the overall operational pattern or framework for the project that stipulates what information is to be collected, from which sources and by what procedures.<sup>2</sup> Thus a research design is a plan for the collection and analysis of data. For research there exist different types of research design like; Historical research, Descriptive research, Case study research, Field study research, analytical research, True experimental research and so on. This study is mainly concerned with historical research. If applicable, sometime descriptive and analytical approach may also be used. But generally,

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<sup>1</sup> Kothari, C.R., (1994), "Research Methodology, Methods and Techniques", Vikash Publication House Pvt. Ltd, New Delhi, p. 9

<sup>2</sup> Paul, E. Green and Donald. S. Till; Research for Marketing Decisions.

to show the relationship of interest rate with deposit amount, lending (credit) amount and inflation rate, past historical data are used. The relevant and needed data has been collected from various publications of different commercial banks and Nepal Rastra Bank.

### 3.3 Population and Samples:

The term “population” or universe for research means the universe of research study in which the research is based.<sup>3</sup> Since the research topic is about interest rate, all the lending and depository institution of Nepal are the member of population study. The population for the study comprises 33 commercial banks, 17 development banks, 57 finance companies, 34 saving and credit co-operatives, one employee provident fund and other 40 non-government financial organizations.<sup>6</sup> Among the total population only some selected institutions are taken as sample on random basis. Similarly, due to unavailability of data from all sectors, only commercial banks are chosen for this study. So precisely saying, all 33 commercial banks are the population of this study and among them, only 5 commercial banks are chosen as samples from total population. For selecting the samples, simple random sampling method is used here among different methods. Organization under study are as follows, whose general introduction and major objectives are presented in chapter one.

- ) Nepal Bank Limited.
- ) Rastriya Banijya Bank.
- ) Agriculture Development Bank/Nepal
- ) Himalayan Bank limited

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<sup>3</sup> Wolf, Howard K. & Pant, P.R. (2000), “Social Science Research & Thesis Writing” second edition, Buddha Academic Enterprises Pvt. Ltd, Kathmandu, p. 75

<sup>6</sup> Pokharel, Jhapindra, “Determination of interest rates in Nepalese Financial Market”, an unpublished MBS thesis, TU. Kathmandu.

) Nepal Bangladesh Bank.

### 3.4 Sources of data and Collection Procedure:

For this study, mainly secondary data are used. These secondary data are collected mainly from published sources like annual report, prospectus, balance sheet, newspaper, journal, Internet and other sources. Besides this in some case, if needed, primary data can also be used. They can be collected through direct interview and observation.

Secondary data published on annual reports of concerning organizations, like interest rate as well as amount and their organizational profiles are collected through personal visit of respective organization as well as from their web sites. Some secondary data like source and use of funds of respective bank, comparative study, and inflation rates are collected from Nepal Rastra Bank.

### 3.5 Data Processing and Presentation:

The information or data obtained from the different sources are in raw form. From that information, direct presentation is not possible. So it is necessary to process data and converts it into required form. After then only, the data are presented for this study. This process is called data processing. For this study, only required data are taken from the secondary source (bank's publication) and presented in this study. For presentation, different tables are used. Similarly, in some case graphical presentation is also made. For reference, the photocopies of raw data are attached in the last portion of this thesis. So far as the computation is concerned, it has been done with the help of scientific calculator and computer software program.

### 3.6 Data Analysis Tools:

In order to get the concrete results from this research, data are analyzed by using different types of tools. As per topic requirements, emphasis is given on statistical tools rather than financial tools. So for this study following statistical tools are going to use.

#### **Arithmetic Mean:**

It is the sum of all the observations divided by the number of observations. In such a case all the items are equally important.<sup>4</sup> As arithmetic mean is most common and popular tools for data analysis, here in this study also, arithmetic mean is used. It is computed by using following formula:

$$\text{Mean } (\bar{X}) = \frac{X}{n}$$

Where  $\bar{X}$  = Mean

X = Sum of all the Variable X

n = Variables involved

#### **Standard Deviation:**

The standard deviation is the best tools to study fluctuation in any data. It is usually denoted by the letter sigma (  $\sigma$  ). Karl Pearson suggested it as a widely used measure of dispersion and is defined as the positive square root of their arithmetic mean of squares of the deviation of the given observations from their arithmetic mean of a set of value.<sup>5</sup> It can be computed by using following formula.

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<sup>4</sup> Pant, G.D. & Chaudhary, A.K. (1999), "Business Statistics and Mathematics," Bhandupuran Prakashan, Kathmandu, P. 91

<sup>5</sup> Gupta, S.C. "Fundamental of Statistics," Himalyan Publishing House, Bombay, P.380

$$S.D \sigma_X = \sqrt{\frac{1}{n} \sum f_X Z \bar{X}^2}$$

Greater the magnitude of standard deviation, higher will be the fluctuation and vice versa.

### **Coefficient of Correlation:**

By this statistical tool, the degree of relationship between two variables is identified. In other words, this tool is used to describe the degree to which one variable is linearly related to other variables. Two or more variables are said to be correlated if change in the value of one variable appears to be linked with the change in the other variables. The correlation analysis refers to the closeness of the relationship between the variables.<sup>6</sup> Correlation may be positive or negative and ranges from -1 to +1. Simple correlation between interest rate and deposit amount, interest rate and credit or lending amount and interest rate (both deposit rate and lending rate) and inflation is computed in this thesis. For example, let's say that the correlation between interest rate and inflation is positive. It indicates that when inflation increases, interest rate also increases in the same direction and vice versa. For our study following reference is used<sup>7</sup>

) Correlation may be positive or negative and ranges from -1 to +1. When  $r = +1$ , there is positive perfect correlation; when  $r = -1$ , there is perfect negative correlation; when  $r = 0$ , there is no correlation and when  $r < 0.5$  then there is low degree of correlation.

<sup>6</sup> Sharma, P.K. and Chaudhary, A.K. (2000), "Statistical Methods," Khanal Books Prakashan, Kathmandu, P. 420

<sup>7</sup> Pant, G.D. and Chaudhary A.K. (2053)"Statistics and Quantitative Techniques" 2<sup>nd</sup> edition, Nepal Sahitya Prakashan Kendra, Kathmandu, P.306

- ) 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 a moderate degree of correlation.

The simple correlation coefficient, r, is calculated by using following formula:

$$\text{Simple Correlation Coefficient (r)} = \frac{n\phi X_1 X_2 \text{ Z}(\phi X_1)(\phi X_2)}{\sqrt{n\phi X_1^2 \text{ Z}(\phi X_1)^2} \sqrt{n\phi X_2^2 \text{ Z}(\phi X_2)^2}}$$

Alternately,

$$r = \frac{\text{Cov}(X_1 X_2)}{\text{Var}X_1, \text{Var}X_2}$$

Where,

$$\text{Covariance (X}_1, \text{X}_2) = \frac{1}{n} (X_1 \text{ Z} \bar{X}_1)(X_2 \text{ Z} \bar{X}_2)$$

n = Total number of observations.

X<sub>1</sub> and X<sub>2</sub> = two variables, correlation between them are calculated.

$$\text{Multiple Correlation Coefficient (R}_{1.23}) = \sqrt{\frac{r_{12}^2 \Gamma r_{13}^2 \text{ Z} 2r_{12} r_{13} r_{23}}{1 \text{ Z} r_{23}^2}}$$

Where r<sub>12</sub> = correlation coefficient between variables one and two.

r<sub>23</sub> = correlation coefficient between variables two and three.

r<sub>13</sub> = correlation coefficient between variables one and three.

Multiple correlation is used for the measure of degree of association between one variable and a group of other variables as the independent variable. It lies between 0 and 1. The close it is to '1', the better the linear relationship between the variables. The closer it is to '0', the worse is the linear relationship.<sup>8</sup>

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<sup>8</sup> Gupta, S.P (2000), "Statistical Methods," Sultan Chand & Sons Educational Publishers, New Delhi, p 1115

### Coefficient of Multiple Determination:

The square of the multiple correlation coefficients is called coefficient of multiple determination. It is very useful tools to intreprete the value of multiple correlation coefficients. The main significance of the coefficient of multiple determinations is to represent the portion of total variation sin the dependent variable which is explained by the variations in the two independent variables.

$$\text{Coefficient of multiple determination} = R_{1,23}^2$$

t-test for significance of sample correlation coefficient:

If 'r' is the observed sample correlation coefficient of 'n' pairs of observations from bivariate normal population, the test statistics for significance of correlation under null hypothesis is given by

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

i.e. t follows t-distribution with n-2 degree of freedom (d.f.), 'n' being the sample.

The (1- ) % confidence limits for estimating population correlation coefficient ( ) are given by

$$\begin{aligned} & r \pm t_{(n-2)} \times \text{S.E. (r)} \\ & = r \pm t_{(n-2)} \times \frac{r \sqrt{1 - r^2}}{\sqrt{n}} \end{aligned}$$

# CHAPTER FOUR

## DATA PRESENTATION AND ANALYSIS

### 4.1 Introduction:

This is the section where, the filtered data are presented and analyzed. This is the one of the major chapter of this study because it includes detail analysis and interpretation of data from which concrete result of Nepalese market can be obtained. In this chapter, the relevant data and information necessary for the study are presented and analyzed keeping the objectives set in mind. This chapter consists of various calculation made for the analysis of interest rate and its effects on deposit amount lending amount, and inflation rate for the sample banks. To make our study effective and precise as well as easily understandable, this chapter is categorized in three parts; presentation, analysis and interpretation. The analysis is fully based on secondary data available. In presentation section data are presented in terms of table, graph chart of figures, according to need. The presented data are then analyzed using different statistical tools mentioned in chapter three. At last the results of analysis are interpreted. Though there is no distinct line of demarcation for each section (like presentation section, analysis section & interpretation section) but the arrangement of writing is made by aforementioned way. Similarly it is also noted that almost all data used for analysis are of secondary type.

For our simplicity, in this thesis, presentation analysis and interpretation of data are made according to the nature. In other words, at first relationship of deposit and interest rate of all 5 sample banks are analyzed. After then, the relationship between interest rate and credit (lending) amount is made. Lastly the relationship between interest rate and inflation is presented. While analyzing,

different statistical tools like correlation coefficient, coefficient of determination, t-statistics for significance are employed.

## 4.2 Analysis of Deposit and Interest Rate:

In this section, detail study is made about deposit amount and interest rate of various banks. For this study only saving and fixed deposits are considered because current deposit doesn't earn any interest.

### 4.2.1 Rastra Banijya Bank:

Prior to entering into the main topics, it is preferable to take a glance on the interest rate structure on different types of deposits. This is essential because the interest rates are generally different in magnitude for every sample banks. These differences are due to the numerous factors like maturity period, policy of bank, goodwill of organization and so on. In real world government owned bank and banks with high reputation and goodwill have lower deposit rates. Similarly, finance companies, co-operative & development bank quotes higher interest rate on deposits than commercial banks do.

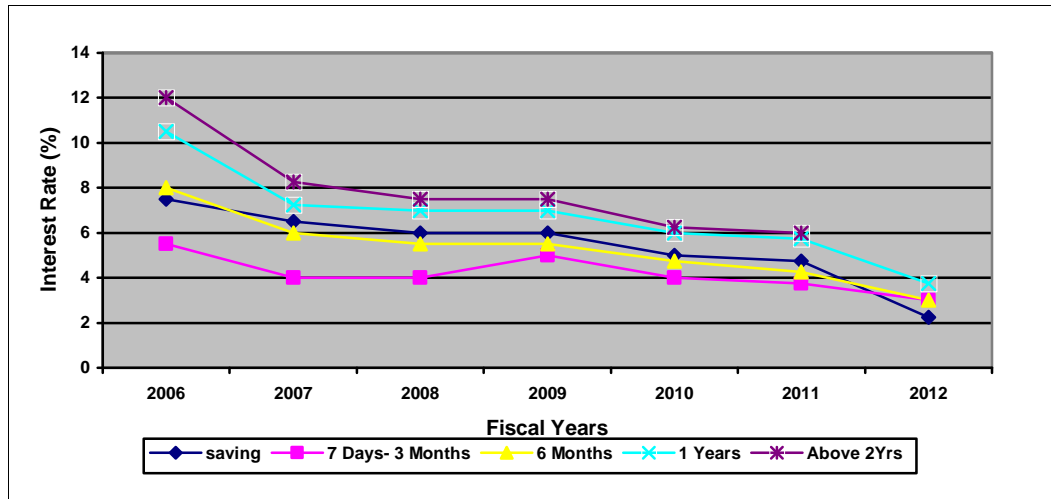
**Table no 4-1: Interest rate structure on deposit of RBB as on Mid-July**

Deposit	2006	2007	2008	2009	2010	2011	2012
Savings	7.5%	6.50%	6.00%	6.00%	5.00%	4.75%	2.25%
<b>Fixed</b>							
7 Days	4.00	-	-	-	-	-	-
14 Days	5.00	-	-	-	-	-	-
1 Months	6.00	-	-	-	-	-	-
3 Months	7.00	4.00	4.00	5.00	4.00	3.75	3.00
6 Months	8.00	6.00	5.50	5.50	4.75	4.25	3.00
1 Years	10.5	7.50	7.00	7.00	6.00	5.75	3.75
Above 2Yrs	12	8.25	7.50	7.50	6.25	6.00	-
<b>Whole Mean</b>	<b>7.5</b>	<b>6.45</b>	<b>6</b>	<b>6.2</b>	<b>5.20</b>	<b>4.90</b>	<b>3.25</b>
<b>Fixed Deposit Mean</b>	<b>7.5</b>	<b>6.43</b>	<b>6</b>	<b>6.25</b>	<b>5.25</b>	<b>4.94</b>	<b>3</b>
<b>Std. Deviation</b>	<b>1.35%</b>						

Source: Banking and Financial Statistics, No: 38-43, NRB

Table no 4-1 shows the deposit interest rate of RBB in 7 different FY. For this study 2006 is taken as initial year & 2012 as final years. The table portrays the interest rate that were prevailed in the Nepalese financial markets during last past 7 FYs. The data shows the decreasing tendency of interest rate. The interest rate on saving deposit in the beginning year was 7.5% and decreased to 2.75% in 2012. This is 63.33% reduction during the 5 years period. In same manner, the bank used to quote the interest rate of fixed deposit in different short term period like 7 days, 14 days, 1 months, 2 months, 3 months and so on. For the graph purpose, in this study the average of 7 days to 3 months is taken to make the figure clearer. For other periods also the fixed deposit rate was in decreasing trend. During the 5 year period the decline percentage is 62.5%, 64.28% and 50% respectively for 6 months, 1 years and 2 years period. The decreasing tendency is high for longer period interest rate. If the mean is taken of all (both fixed and saving) then average interest rate on deposit was 7.5% for 2006, 6.45% for 2007, 6% for 2008, 6.20% for 2009, 5.20% for 2010, 4.90% for 2011 and 3.25% for 2012. Similarly if average of fixed deposits of different period is taken, then the result is almost similar with “whole average”. It means the average interest rate for fixed deposit only was 7.5%, 6.43%, 6%, 6.25%, 5.25%, 4.94% and 3% respectively for the year 2006, 2007, 2008, 2009, 2010, 2011 and 2012. The average figures also show the decreasing tendency in interest rate except in the year 2009. At that period, the interest rate was slightly higher than year 2010 but ultimately felled to the 5.20% in the 2011. All the above described matters can be shown on figure 4-1 as follows. The graph 4-1 reveals that, all the period interest rates are on declining trend. Saving interest rate falls every years But for fixed deposit, interest rate remain constant from the period 2008 to 2009 for 6 months, 1 year and Above 2 years. For other years, the fixed interest rate declined by some percentage every year.

***Figure No 4-1: Interest Rate of RBB on Deposits during Different FY***



### Correlation Coefficient, Coefficient of Determination and t-statistics of RBB

**Table No 4-2: Relationship between Interest Rate and Deposit amount of RBB**

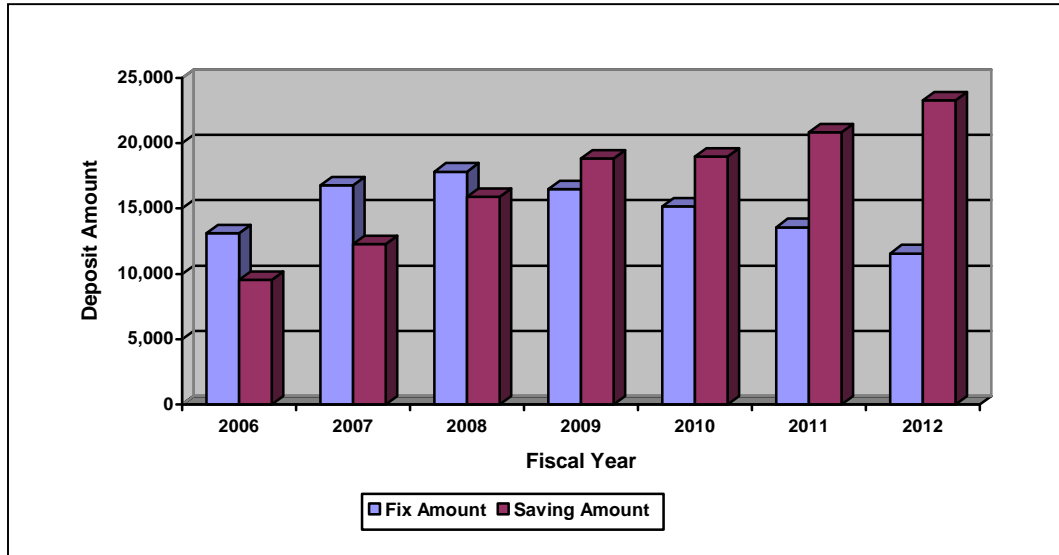
Year (1)	Saving Deposit Interest Rate (2)	Saving Deposits Amounts (3)	Fixed Deposit Interest Rate(4)	Fixed Deposit Amounts (5)		
2006	7.50	9546.2	7.50	13,093.5		
2007	6.50	12,297.4	6.43	16,793.1		
2008	6.00	15,904.8	6.00	17,836.4		
2009	6.00	18,822.1	6.25	16,477.2		
2010	5.00	18,997.2	5.25	15,166.6		
2011	4.75	20,861.2	4.94	13,579.5		
2012	2.25	23,288.9	3.00	11,572.8		
Correlation	$r_{23} = -0.894$		$r_{45} = 0.503$			
Coefficient of determination	$r^2_{23} = 0.799$		$r^2_{45} = 0.253$			
t-statistic	t-cal= 4.460	t-tab= 2.571	significant	t-cal= 1.302	t-tab= 2.571	Insignificant

Source: Banking and Financial Statistics, No: 38-43, NRB

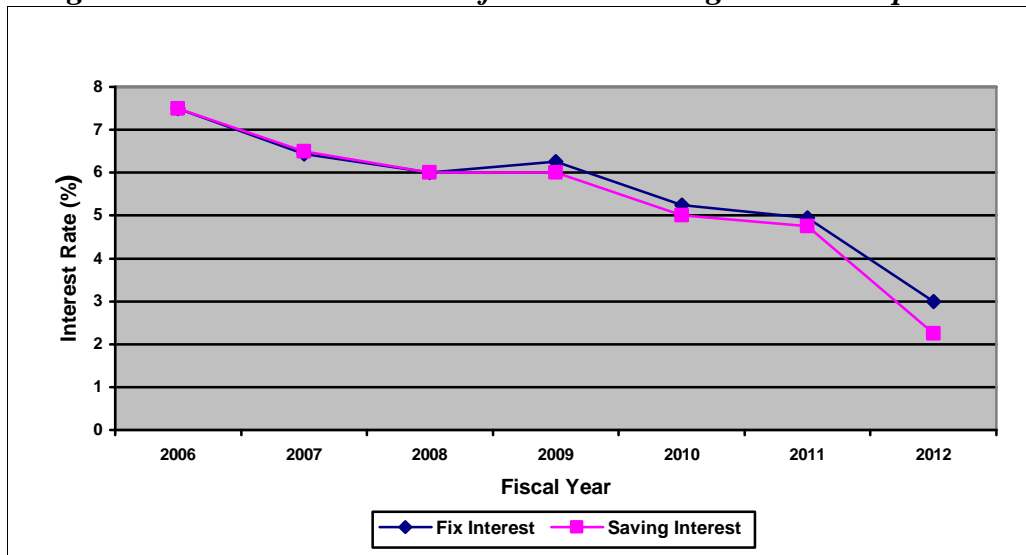
The table 4-2 shows the total amount of fixed deposit and saving deposits and the interest rates offered on such deposits by RBB on seven fiscal years starting from FY 2006 to FY 2012. The table portrays that the both interest rate has been decreased by greater magnitude. Deposit amount has been increased by more than 2.43 times during the study period. It means they move in opposite direction i.e. decrease in interest rate increases the amount of deposit and vice

versa. Therefore they should have negative relationship. It can be quantified by calculating correlation coefficient between them. This relationship can also be shown in graph as shown in figures 4-2 and 4-3.

**Figure No: 4-2 Deposit Amount of RBB during different FY**



**Figure No:4- 3 Interest Rates of RBB on Saving and Fix Deposit**



According to table no 4-2, the interest rate on saving deposit has been decreased from 7.50% to 2.25% during 7 FYs. The declining tendency is little. In same period the deposit amount was Rs 9546.2 millions but this amount increases to

Rs. 23,288.9 millions. It means interest rates fell by 63.33%, where as deposit amount rises by 143.95% within the period of seven years.

Similarly, for fixed deposit the table 4-2 shows that total amount of fixed deposit and interest rate on fixed deposit offered by RBB on seven consequent FY started from 2006 to FY 2012. The table reveals that average fixed interest rate has been decreased drastically during the seven FYs. At the FY 2006 the average interest rate was 7.5% on fixed deposit but later on every year this interest rate started to decrease by 1% per annum and at 2012 it remained at 3.5% per annum on average. On effect of this decline, the amount of fixed deposit also declined, the amount of fixed deposit also started to decrease in some respect. The table shows that up to the FY 2008, there is no effect on fixed deposit amount by the declination of interest rate but after the FY 2008, decrease in interest rate also decreases the fixed deposit amount. In this regards, the substitution effect holds true in the case of fixed deposit.

To verify the above trend, it is necessary to calculate the correlation coefficient and t-statistics. If correlation coefficient is calculated for saving deposit and deposit amount, then it is  $(r_{23}) = -0.894$ . This high negative correlation coefficient indicates that they have inverse relationship among each other. Decrease in interest rate is followed by an increase in saving deposit amount and vice-versa. This shows that the substitution effect in case of RBB for saving account is not applicable. The coefficient of determination between these two variables is  $r^2_{23} = 0.799$ , which means that total variation in dependent variable (saving deposit amount) has been explained by independent variable (interest rate) to the extent of 79.90% and remaining is the effect of other factors. The t-value for testing the significance of the correlation coefficient between variables is  $-4.46$  ( $|t| = 4.46$ ). Since the tabulated t-value at 5% level of significance for 5 degree of freedom ( $t_{\text{tab}} = 2.571$ ) is less than calculated value

( $t_{\text{cal}} = 4.46$ ), the correlation coefficient is significant. This means the variables mentioned (interest rate on saving deposit & amount of saving deposit) for RBB are significantly correlated and an increase (decrease) in the amount of deposit brings a decrement (increment) in interest rate on saving deposit.

In the same manner, the correlation coefficient between interest rate on fixed deposit and fixed deposit amount ( $r_{45}$ ) is 0.5034. This means that these two variables are moderately co-correlated when interest rate on fixed deposit decreases (increases) the deposit amount also decreases (increases). This is exactly the matter what the theory (substitution effects) says. The coefficient of determination between these two variables is  $r^2_{45} = 0.2534$ , which means 25.34% of total variables in dependent variables (deposit unit) is explained by the independent variable (deposit rate) & remaining is due to the effect of other factors. Similarly test of significance of correlation coefficient between deposit rate and deposit amount gives the value of  $t = 1.3027$ . The tabulated value at 5% significant level with d.f. 5 is 2.571 (i.e.  $t_{\text{tab}} = 2.571$ ). Here  $t_{\text{cal}} < t_{\text{tab}}$  so  $H_0$  is accepted i.e. there is no significant relation between two variables. Though the correlation coefficient indicates that the both variables have moderate level of relationship but the t-statistics clarifies that their relationship is not so significant.

#### 4.2.2 Nepal Bank Limited:

The general structure of deposit interest rate of Nepal Bank Limited (NBL) is shown below on table no 4-3.

The table shows the interest rate of NBL during the last seven FYs. The trend of interest rate shows that it is in decreasing trend. It is similar with that of RBB. The interest rate on saving deposit shows that it was 7.5% during the period of 1998 and decreases by 1% on average every year up to 2008. But after 2008AD

there was some stagnancy in interest rate because it was fell by only 0.5% up to 2011, i.e. interest rate decreased to 4.75%. But at 2012 there was sharp fall on interest rate because interest rate of 2011 (4.75%) fall to 2.5% when it passes one year (2012). Similarly the interest rate on fixed deposit also fell during the seven fiscal years by almost half. The interest rate fell by large spread in first few years but on later years, the falling spread was little as compared to the previous years.

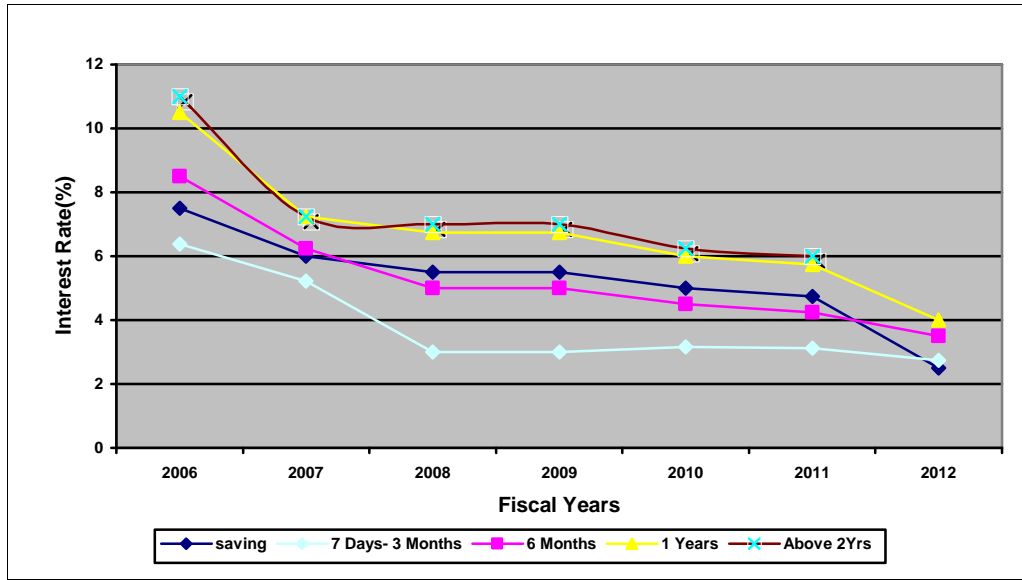
**Figure 4-3: Interest rate structure on deposit of NBL on Mid-July**

Deposit	2006	2007	2008	2009	2010	2011	2012
Savings	7.5%	6.00%	5.50%	5.50%	5.00%	4.75%	2.5%
<b>Fixed</b>							
7 Days	5.00	4.40	2.00	2.00	2.00	2.00	-
14 Days	6.00	5.00	2.50	2.50	-	-	-
1 Months	6.50	5.50	3.50	3.50	3.50	3.25	2.50
2 Months	-	-	-	-	-	3.50	2.75
3 Months	8.00	6.00	4.00	4.00	4.00	3.75	3.00
6 Months	8.50	6.25	5.00	5.00	4.50	4.25	3.50
1 Years	10.5	7.25	6.75	6.75	6.00	5.75	4.00
Above 2Yrs	11.00	7.25	7.00	7.00	6.25	6.00	-
<b>Whole Mean</b>	<b>7.86</b>	<b>5.96</b>	<b>4.54</b>	<b>4.54</b>	<b>4.46</b>	<b>4.16</b>	<b>3.05</b>
<b>Fixed Deposit Mean</b>	<b>7.92</b>	<b>5.95</b>	<b>4.39</b>	<b>4.39</b>	<b>4.38</b>	<b>4.07</b>	<b>3.15</b>
<b>Std. Deviation</b>	<b>1.543%</b>						

Source: Banking and Financial Statistics, No: 38-43, NRB

It is also clear that the falling gap for long term fixed deposit is large where as for short term deposit the falling gap is little. In other words, both long term and short term interest rate's falling rate is similar in later year but in previous year the falling rate is fast for long term fixed deposit where as falling rate was slow for short term fixed deposit. These tendencies can also be shown in graph no 4-4 as follows:

**Figure No 4-4: Interest Rate of NBL on Deposits during Different FY**



By graph 4-4 also it is clear that declining tendency is high in former period than in later periods. Similarly, lower periodic rate remains almost constant in later years.

**Correlation Coefficient, Coefficient of Determination and t-statistics of NBL**

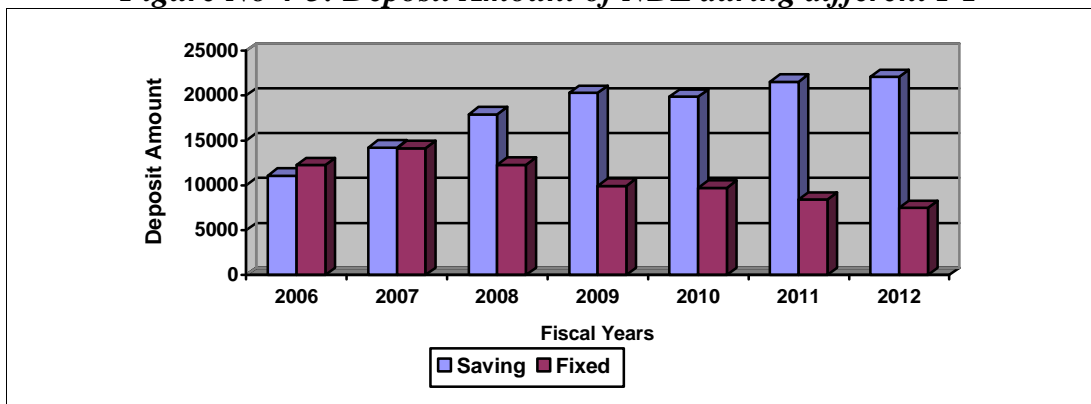
**Table No 4-4: Relationship between Interest Rate and Deposit amount of NBL**

Year (1)	Saving Deposit Interest Rate (2)	Saving Deposits Amounts (3)	Fixed Deposit Interest Rate(4)	Fixed Deposit Amounts (5)		
2006	7.50	11074.7	7.92	12261.2		
2007	6.00	14214.8	5.95	14154.7		
2008	5.50	17888.4	4.39	12275.8		
2009	5.50	20281.6	4.39	9921.8		
2010	5.00	19851.5	4.38	9731.8		
2011	4.75	21534.5	4.07	8396.9		
2012	2.50	22063.0	3.15	7481.0		
Correlation	$r_{23} = -0.8482444$		$r_{45} = 0.7131867$			
Coefficient of determination	$r^2_{23} = 0.7195185$		$r^2_{45} = 0.5086352$			
t-statistic	t-cal=3.581	t-tab=2.571	Significant	t-cal=2.27	t-tab=2.571	Insignificant

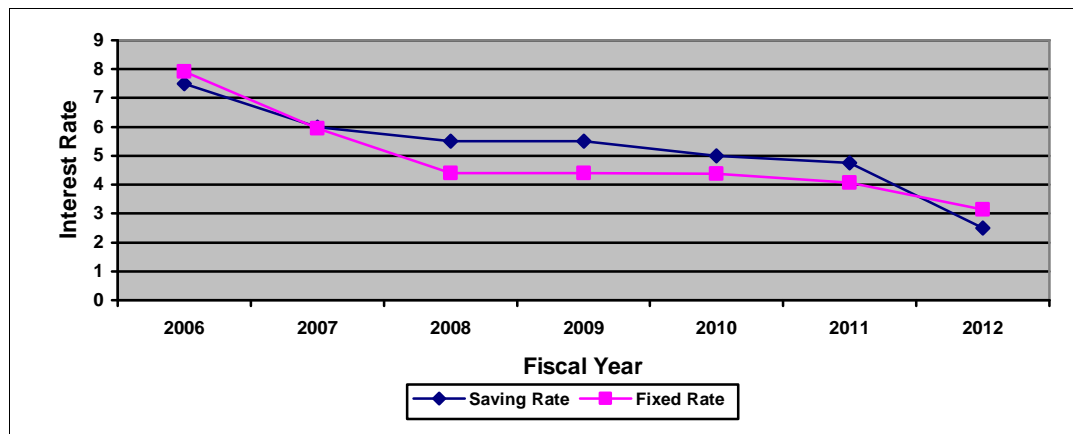
In table no 4-4 saving amount and deposit rates are arranged in systematic order. The outlook of the table shows that the interest has been falling since

2006 on both saving and fixed deposits. But the amount of saving deposit has not been in decreasing trend. It is increasing every year. This indicates that the condition for NBL is opposite to the substitution theory. The case is same for fixed deposit too. But the pictures for fixed deposit are somewhat different. Up to 2008 the deposit amount had been increased with little amount. But after 2008 this deposit amount has been in decreasing trend. It indicates that with decrease in interest rate, fixed deposit amount also decreases. But the declining speed of interest rate is quite higher than that of declining speed of deposit amount. This suggest that they may have positive relationship but to determine the magnitude of relation, correlation coefficient should be calculated and to identify the strong ness or weakness of relationship it is necessary to calculate the t-test. But prior to all it is clear if we show these relations on graph 4-5 & 4-6.

**Figure No 4-5: Deposit Amount of NBL during different FY**



**Figure No 4-6: Interest Rates of NBL on Saving and Fix Deposit**



The correlation coefficient (using excel program) for saving interest rate and deposit amount,  $r_{23}$ , is found to be negative of  $-0.8482$ . This value indicates that they two have very high negative or inverse relationship. Increase in one variables lead to decrease in other variables. This is extremely against the theory suggested by the “substitution effect”. Similarly, the coefficient of determination between two variables,  $r^2_{23}$ , is  $0.7195$  which means that total variation in interest rate on deposit has been explained by supply of deposits to the extent of  $71.95$  percent and remaining is the effect of other factors. The t-value for testing the significance of the correlation coefficient between variables is  $3.581$  ( $t\text{-cal}=3.581$ ), which is significantly greater than tabulated t value ( $t\text{-tab} = 2.571$ ) at  $5$  percent level of significance with  $5$  degree of freedom. Since the calculated value is significantly greater than table value, the conclusion is drawn that correlation coefficient between variables is significant. This means that the interest rate on saving deposit and deposit amount of NBL are significantly correlated and increase in the supply of fund (deposit) brings the decrease in interest rate on deposit. That is the substitution theory is not applicable for the saving deposit of NBL.

Similarly, correlation coefficient for fixed deposit interest rate and fixed deposit amount,  $r_{45}$ , is found to be  $0.7131$ . This shows that they have positive correlation. It means that the increase in deposit interest rate stimulates saving on fixed deposit. This relation can be clearly explained by the coefficient of determination, which is  $0.5086$ , means that total variation in interest rate on fixed deposit has been explained by supply of deposits to the extent of  $50.86$  percent and remaining  $49.14$  percent is the effect of other variables. The t-value for testing the significance of the correlation coefficient between variables is  $2.27$  ( $t\text{-cal}=2.27$ ), which is significantly lesser than tabulated t value ( $t\text{-tab} = 2.571$ ) at  $5$  percent level of significance with  $5$  degree of freedom. Since the calculated value is significantly less than tabulated value, the conclusion can be

drawn that correlation coefficient between variables is insignificant. This means that though the correlation between interest rate on saving deposit and deposit amount of NBL shows the very less positive correlation, the t-test indicates that there is no significant correlation between them.

#### 4.2.3 Agriculture Development Bank/ Nepal

The general interest rate structure of ADB/N for last fiscal years is given on the table 4-5. Though the ADB/N has transaction on both agriculture sector and non- agriculture (commercial) sectors, here for this study only the interest rate of commercial sector is taken in consideration.

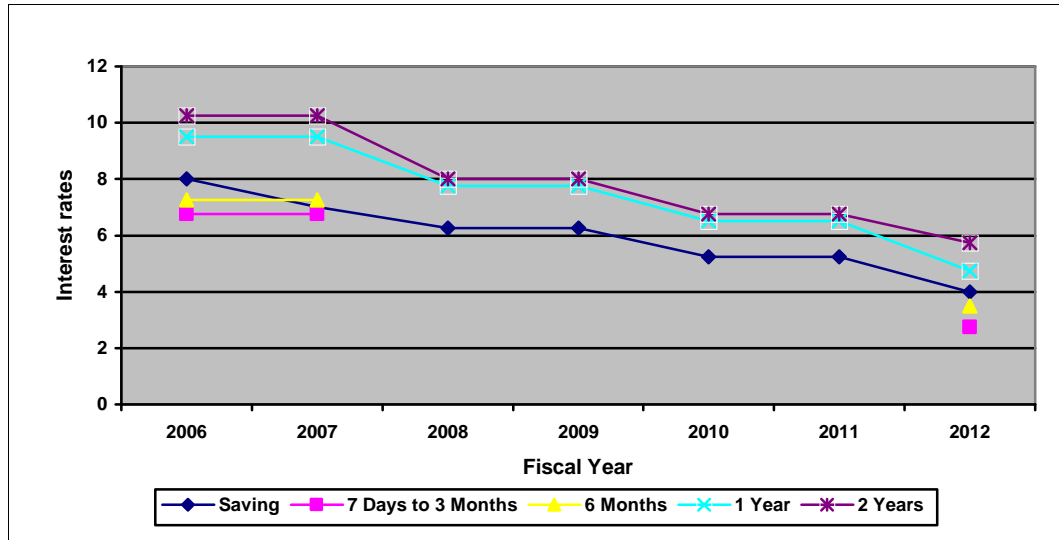
**Table no 4-5: Interest rate structure on deposit of ADB/N as on Mid-July**

Deposit	2006	2007	2008	2009	2010	2011	2012
Savings	8.00	7.00	6.25	6.25	5.25	5.25	4.00
<b>Fixed</b>							
7 Days	-	-	-	-	-	-	-
14 Days	-	-	-	-	-	-	-
1 Months	-	-	-	-	-	-	2.50
2 Months	-	-	-	-	-	-	-
3 Months	6.75	6.75	-	-	-	-	3.00
6 Months	7.25	7.25	-	-	-	-	3.50
1 Years	9.50	9.50	7.75	7.75	6.50	6.50	4.75
Above 2Yrs	10.25	10.25	8	8	6.75	6.75	5.75
<b>Whole Mean</b>	8.35	8.15	6.50	6.50	6.50	6.50	6.50
<b>Fixed Deposit Mean</b>	8.44	8.44	7.88	7.88	6.63	6.63	5.25
<b>Std. Deviation</b>	0.855%						

Source: Banking and Financial Statistics, No: 38-43, NRB

The table 4-5 shows the interest rate structure of ADB/N on saving deposits and fixed deposits. The deposit rates are also in decreasing trends. For saving deposit, it is found that the interest rate has been declined by 50% during the last seven FYs. Each year there was around 1 percent declination but in constant rate. This can be illustrated on graph as figure no 4-7:

**Figure No 7: Interest Rate of ADB/N on Deposits during Different FY**



The figure no 4-7 shows that all interest rates are in declining condition, but one uniqueness is seen in the graph. That is the interest rate remained constant for at least one year before it started to fall. Saving interest rate and 1 year fixed deposit interest rate remains less volatile than other categories interest.

**Correlation Coefficient, Coefficient of Determination and t-statistics of ADB/N**

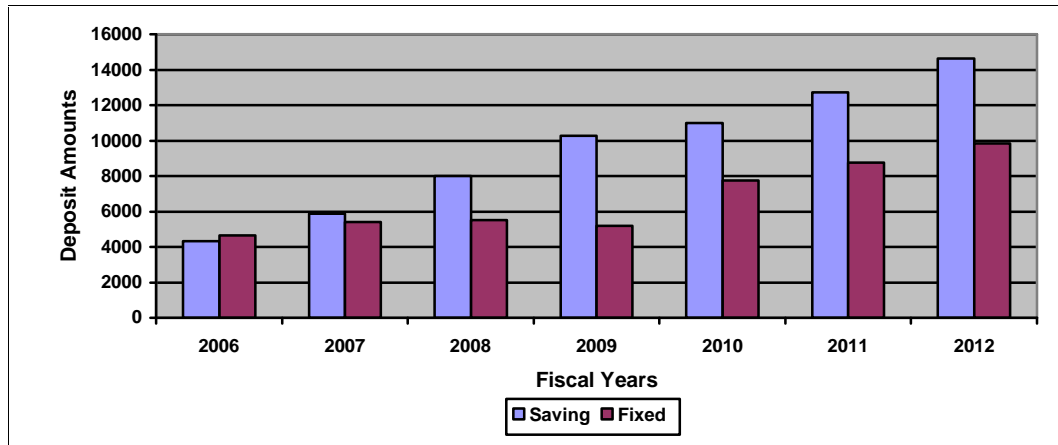
**Table No 4-6: Relationship between Interest Rate and Deposit amount of ADB/N**

Year (1)	Saving Deposit Interest Rate (2)	Saving Deposits Amounts (3)	Fixed Deposit Interest Rate(4)	Fixed Deposit Amounts (5)		
2006	8.00	4312.8	8.44	4646.5		
2007	7.00	5872.9	8.44	5405.6		
2008	6.25	8016.9	7.88	5498.4		
2009	6.25	10257.3	7.88	5182.3		
2010	5.25	11002.9	6.63	7754.3		
2011	5.25	12732.2	6.63	8756.2		
2012	4.00	14632.6	5.25	9846.8		
Correlation	$r_{23} = -0.9665524$		$r_{45} = -0.9652713$			
Coefficient of determination	$r^2_{23} = 0.9342235$		$r^2_{45} = 0.9317486$			
t-statistic	t-cal=8.427	t-tab=2.571	Significant	t-cal=8.261	t-tab=2.571	Significant

Source: Banking and Financial Statistics, No: 38-43, NRB

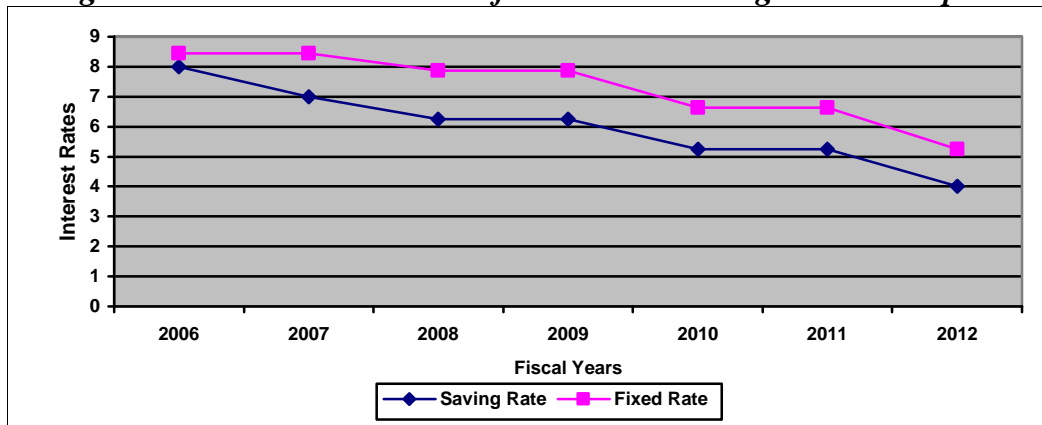
Table no 4-6 shows that interest rate and deposit amount are moving in opposite direction. To get the exact relation it is necessary to calculate the correlation coefficient and t-test. Here the data shows that both saving and fixed deposits are out of substitution effect. To verify it, the value of correlation and t-statistics is necessary. But prior to this it is effective if tabular value can be shown on graph as figure 4-8.

**Figure No 4-8: Deposit Amount of ADB/N during different FY**



Similarly the relationship between interest rate of saving and fixed deposit can be shown in figure no 4-9 as:

**Figure No 4-9: Interest Rates of ADB/N on Saving and Fix Deposit**



The figure no 4-8 shows that the deposit amount of ADB/N is in increasing trend. The increasing tendency is high for saving deposit but for fixed deposit,

the trend is increasing slowly. Similarly figure 4-9 shows that both the interest rate of fixed and saving deposits are in decreasing tendency. Their fluctuating pattern is almost similar which can be seen clearly on the graph no 4-9.

The correlation coefficient for saving deposit and its interest rate is found to be  $r_{23} = -0.9665524$  which means that deposit amount and its interest rate have higher degree of negative correlation. It means increase in one variable result the decrease in other variables. Similarly the coefficient of determination,  $r^2_{23} = 0.9342235$  which means that the value of dependent variables is dependent on independent variables to the extent of 93.42 percent. Similarly the t-test for same shows that the calculated value of t is 8.4270 (t-cal = 8.4270). This value is very greater than the t-tabulated value (t-tab = 2.571) at 5 degree of freedom and 5% level of significance. Therefore when t-cal > t-tab, then  $H_1$  or alternative hypothesis is accepted i.e. the variables are significantly correlated or their relationship is significant.

Similarly for fixed deposit, the coefficient of correlation ( $r_{45}$ ) is -0.9652713, which is negative with high degree of inverse relationship. This is the extremely opposite case as compare to the correlation coefficient of RBB and NBL. The t-statistics for fixed deposit shows that its calculated value for t is 8.26, which is higher than the tabulated value of t i.e. t-cal > t-tab. In such case alternative hypothesis is accepted and null hypothesis is rejected. This indicates that the two variables are correlated or their relationship is significantly correlated.

The analysis of ADB/N also shows that substitution effect is not applicable for bank. That is the case is similar for all three government owned banks, meaning that there is no substitution effect for all three banks- RBB, NBL and ADB/N.

#### 4.2.4 Himalayan Bank Limited (HBL):

The general interest rate structure for HBL for saving deposit and fixed deposits during past seven fiscal years is as follows:

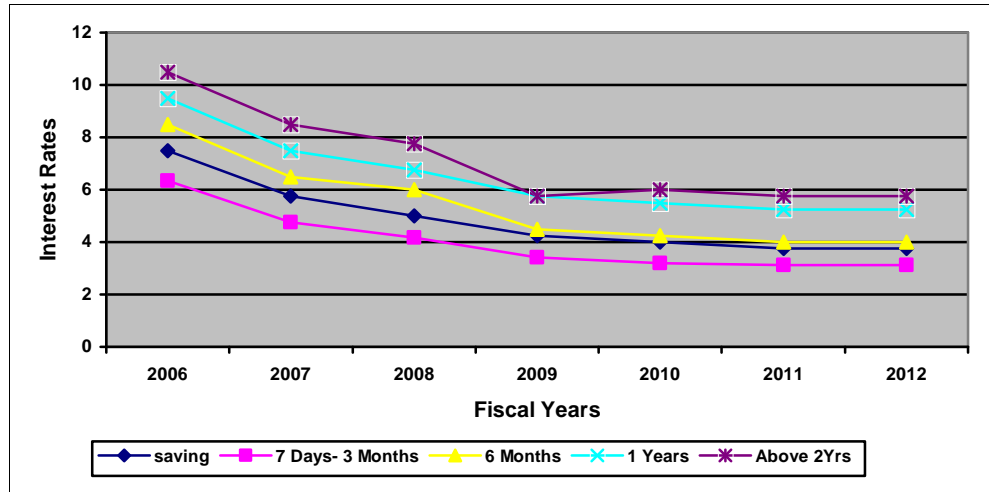
**Table no 4-7: Interest rate structure on deposit of HBL as on Mid-July**

Deposit	2006	2007	2008	2009	2010	2011	2012
Savings	7.50	5.75	5	4.25	4	3.75	3.75
<b>Fixed</b>							
7 Days	-	-	-	-	-	-	-
14 Days	4.50	3.5	3	2.5	2.3	2.3	2.3
1 Months	6.50	5	4.5	3.5	3.3	3.3	3.3
2 Months	-	-	-	-	-	-	-
3 Months	8.00	5.75	5	4.25	4	3.75	3.75
6 Months	8.50	6.5	6	4.5	4.25	4	4
1 Years	9.50	7.5	6.75	5.75	5.5	5.25	5.25
Above 2Yrs	10.50	8.50	7.75	5.75	6.00	5.75	5.75
<b>Whole Mean</b>	<b>7.86</b>	<b>6.07</b>	<b>5.42</b>	<b>4.35</b>	<b>4.20</b>	<b>4.02</b>	<b>4.01</b>
<b>Fixed Deposit Mean</b>	<b>7.92</b>	<b>6.13</b>	<b>5.5</b>	<b>4.38</b>	<b>4.23</b>	<b>4.06</b>	<b>4.05</b>
<b>Std. Deviation</b>	1.436%						

Source: Banking and Financial Statistics, No: 38-43, NRB

From table 4-7 it is clear that the interest rate on deposit of HBL is also in decreasing trend. But during last fiscal year the declining rate shows the unique features. During the first period out of seven FYs, the declining rate of average interest rate is fast, around one percentage point every year, but after 2009 the declining speed is very slow i.e. decline in decimal only. The whole average interest rate is 4.35% in 2009 but it was 4.20%, 4.02% and 4.01% in FY 2010, 2011, and 2012 respectively. Similarly the average fixed deposit rate is 4.38%, 4.23%, 4.06% and 4.05% in FY 2009, 2010, 2011, and 2012 respectively. It means that decline speed of deposit interest rate of HBL slowed down after FY 2009 because it declined by only decimal each year up to 2012. This phenomenon can be portrayed in the graph as figure no 4-10.

**Figure No 4-10: Interest Rate of HBL on Deposits during Different FY**



The graph no 10 also shows that up to FY 2001 the declining rate is high but after FY 2001 the declination speed is very slow.

**Correlation Coefficient, Coefficient of Determination and t-statistics of HBL**

**Table No 4-8: Relationship between Interest Rate and Deposit amount of HBL**

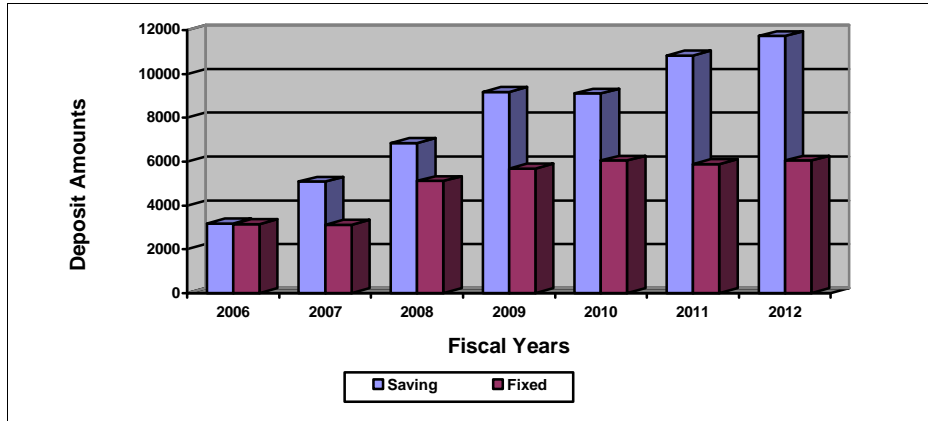
Year (1)	Saving Deposit Interest Rate (2)	Saving Deposits Amounts (3)	Fixed Deposit Interest Rate(4)	Fixed Deposit Amounts (5)		
2006	7.5	3175.6	7.92	3144.4		
2007	5.75	5084.4	6.13	3106.8		
2008	5.00	6844.3	5.5	5109.4		
2009	4.25	9164.1	4.38	5668.1		
2010	4.00	9102.8	4.23	6044.9		
2011	3.75	10840.8	4.06	5880.7		
2012	3.75	11719.7	4.05	6043.7		
Correlation	$r_{23} = -0.95542$		$r_{45} = -0.91943$			
Coefficient of determination	$r^2_{23} = 0.912821$		$r^2_{45} = 0.845359$			
t-statistic	t-cal= 7.235	t-tab= 2.571	Significant	t-cal= 5.228	t-tab= 2.571	Significant

Source: Banking and Financial Statistics, No: 38-43, NRB

The table 4-8 shows the amount of saving deposit and its interest rate as well as amount of fixed deposit and its interest rate for seven fiscal year. The table indicates that, in one hand deposit rates are declining where as in other hand

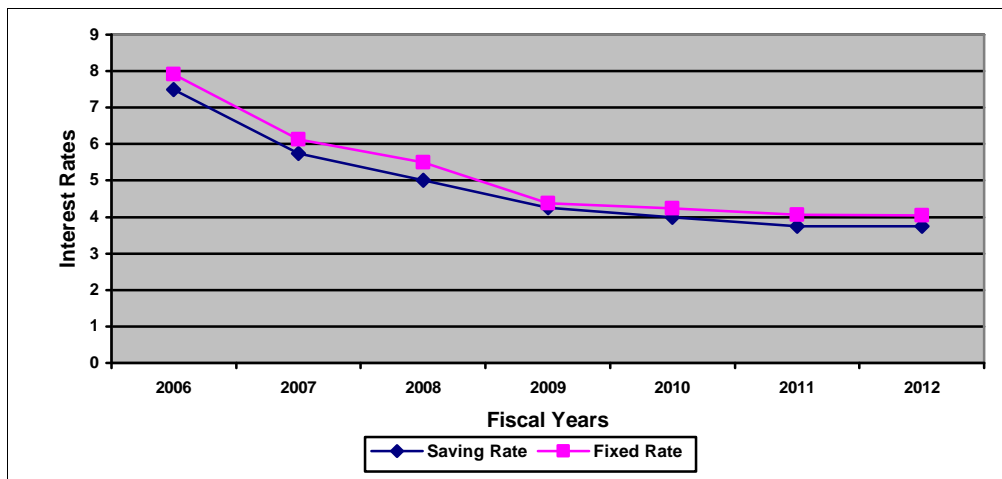
deposit amount is increasing in each fiscal year. This suggests that interest rate and deposit amount may have negative relationship, i.e. when one variable is found to be increased, other variable is found to be decreased and vice versa. This situation can be revealed in graph as figure no 4-11 in following ways:

**Figure No 4-11: Deposit Amount of HBL during different FY**



The graph 4-11 shows saving deposit amount is continuously rising each year but fixed deposit amount is seems to grow each year with some fluctuation. It means that there is rise and fall for fixed deposit amount. Similarly the interest rate of fixed deposit and saving deposit can also be shown on figure 4-12 as:

**Figure No 4-12: Interest Rates of HBL on Saving and Fix Deposit**



To quantify the exact relationship between interest rate and deposit amount, it is necessary to calculate the co-relation coefficient. The correlation coefficient of saving deposit amount and its interest rate is -0.95542. It means that these two variables have very high negative relationship. Though the two variables don't have direct relationship but correlation coefficient tells that increase in one variable result the decrease in other variables. The case is similar to fixed deposit also. The correlation coefficient for fixed deposit rate and amount is -0.91943 ( $r_{23} = -0.95542$ ), which is also very high negative correlation. Therefore for both saving and fixed deposit, the case is against the substitution effect. The coefficient of determination of correlation coefficient of saving deposit is 0.912821 ( $r^2_{23} = 0.912821$ ) which indicates that the relation between deposit and interest rate is tied up to the level of 91.28 percent and remaining other percentage by other factors. In same manner for fixed deposit the value of coefficient of determination is 0.845359.

The value of t-statistics for saving deposit and saving interest is found to be 7.2355 ( $t\text{-cal} = 7.2355$ ). The tabulated value for this condition at 5% level of significance with 5 degree of freedom is 2.571. It means that in this case t-calculated is greater than t-tabulated. So alternative hypothesis is accepted, which means that there is significant correlation between saving deposit and interest rate. Similarly for fixed deposit, the calculated value for t is 5.228 ( $t\text{-cal} = 5.228$ ). This value is also greater than t-tabulated. So in this case also the magnitude of correlation coefficient is highly significant.

Thus from both case (saving and fixed deposit) it is clear that there is no substitution effect in the context of HBL.

#### 4.2.5 Nepal Bangladesh Bank (NBB):

As similar to previous part, it is better to present the general interest rate structure before entering to the main analysis. The interest rate structure for

NBB on saving and fixed deposits for past seven FYs are as presented on table 4-9.

**Table no 4-9: Interest rate structure on deposit of NBB as on Mid-July**

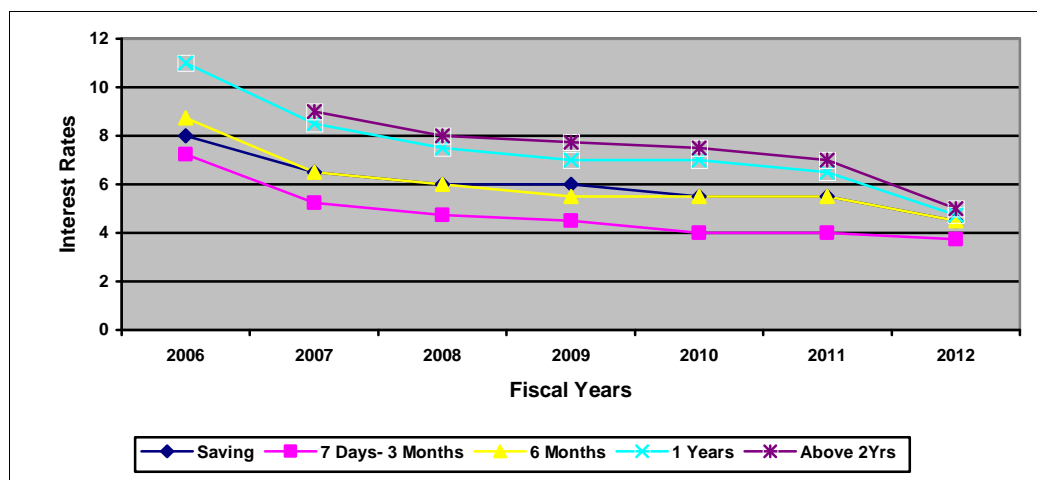
Deposit	2006	2007	2008	2009	2010	2011	2012
Savings	8.00	6.50	6.00	6.00	5.50	5.50	4.50
<b>Fixed</b>							
7 Days	-	-	-	-	-	-	-
14 Days	-	-	-	-	-	-	-
1 Months	6.50	4.50	4.00	4.00	3.50	3.50	3.50
2 Months	-	-	-	-	-	-	-
3 Months	8.00	6.00	5.50	5.00	4.50	4.50	4.00
6 Months	8.75	6.50	6.00	5.50	5.50	5.50	4.50
1 Years	11.00	8.50	7.50	7.00	7.00	6.50	4.75
Above 2Yrs	Nego	9.00	8.00	7.75	7.50	7.00	5.00
<b>Whole Mean</b>	<b>8.45</b>	<b>6.84</b>	<b>6.17</b>	<b>5.88</b>	<b>5.59</b>	<b>5.42</b>	<b>4.38</b>
<b>Fixed Deposit Mean</b>	<b>8.57</b>	<b>6.90</b>	<b>6.20</b>	<b>5.85</b>	<b>5.60</b>	<b>5.40</b>	<b>4.35</b>
<b>Std. Deviation</b>	1.278%						

Source: Banking and Financial Statistics, No: 38-43, NRB

The table 4-9 portrays the interest rate of NBB on saving deposit and fixed deposits. All the interest rate on deposit is on decreasing trend. But the tendency towards decrement is similar to HBL because interest rates on first few FY were decreasing on large gap. But after 2009 the falling pace was very slow as they fell on gap of decimals. But this case doesn't not match with the government owned bank; RBB, NBL & ADB/N. On these three banks, the declination rate was almost similar for all periods.

In the seven years fiscal periods, the interest rate is decline by almost half. This can be shown clearly if average of all interest rate is taken. The average interest rate for whole (both fixed and saving) account is 8.45%, 6.84%, 6.17%, 5.88%, 5.59%, 5.42% & 4.38% for the year 2006, 2007, 2008, 2009, 2010, 2011 & 2012 respectively. This tendency can be exhibited in the pictorial form as in figure no 4-13 as follows.

**Figure No 4-13: Interest Rate of NBB on Deposits during Different FY**



The figure 4-13 shows that during 2006 the spread between interests rate on different term period is in uniform pattern. The interest rate lied in between 7% to 11%. This uniformity of spread is maintained up to the FY 2011 but after the FY 2011 the range of all interest rate narrowed down as in figure and all interest lied in between 4 percentage point to 6 percentage point. The overall figure shows that the interest rate is on decreasing trend.

### **Correlation Coefficient, Coefficient of Determination and t-statistics of NBB**

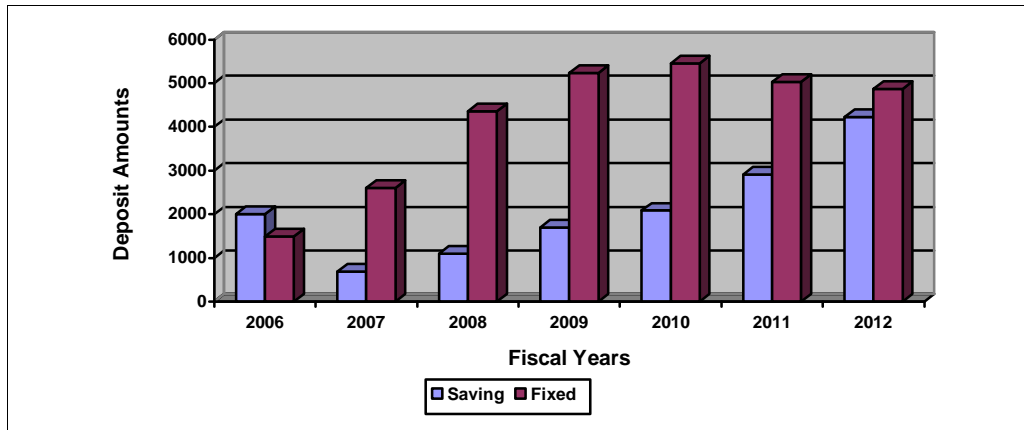
**Table No 4-10: Relationship between Interest Rate and Deposit amount of NBB**

Year (1)	Saving Deposit Interest Rate (2)	Saving Deposits Amounts (3)	Fixed Deposit Interest Rate(4)	Fixed Deposit Amounts (5)		
2006	8.00	358.9	8.57	1497.9		
2007	6.50	684.7	6.90	2608.1		
2008	6.00	1101.9	6.20	4356.5		
2009	6.00	1694.9	5.85	5236.8		
2010	5.50	2086.9	5.60	5453.6		
2011	5.50	2913.6	5.40	5031.6		
2012	4.50	4225.9	4.35	4875.7		
r	$r_{23} = -0.8866818$		$r_{45} = -0.878992$			
$r^2$	$r^2_{23} = 0.786204$		$r^2_{45} = 0.7726276$			
t-statistic	t-cal= 4.287	t-tab= 2.571	Significant	t-cal= 4.121	t-tab= 2.571	Significant

Source: Banking and Financial Statistics, No: 38-43, NRB

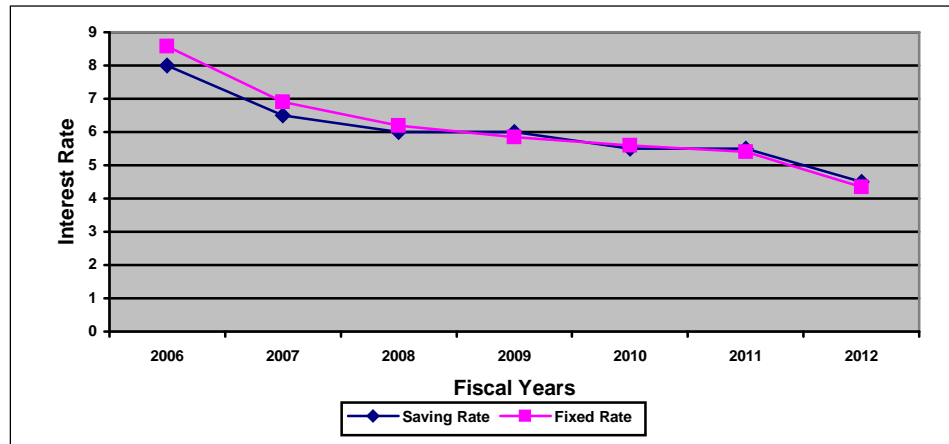
The table 4-10 also shows both deposit amount are in increasing trend though the interest rate of both of them is in declining trend. It means interest rate and deposit amount have inverse relationship. But to find exact quantity of inverse relationship it is necessary to compute the correlation coefficient. Prior to this it is helpful if the data are presented on graph no 4-14.

**Figure No 4-14: Deposit Amount of NBB during different FY**



The graph shows that NBB collected more funds on fixed deposit than saving deposits in last seven FYs. But this case was opposite in other banks. Similarly the relationship of saving interest rate and deposit interest rate can be shown on figure no 4-15 as follow.

**Figure No 4-15: Interest Rates on Saving and Fix Deposit of NB**



If the excel sheet is used to compute the correlation coefficient, then the value for correlation between saving deposit and interest rate is 0.8866 ( $r_{23} = -0.8866818$ ). This is high degree of negative correlation. It means that during the last seven fiscal years, there was sharp increase in saving deposit amount even though there was sharp decline in saving interest rates. The coefficient of determination  $r^2_{23} = 0.786204$ . Similarly the calculated value for t is 4.2875 for saving account. The value of tabulated t at 5 d.f. and 5% level of significance is only 2.571. So for saving account  $t\text{-cal} > t\text{-tab}$ , and hence alternative hypothesis is accepted. It means that there is significant relationship between two variables (deposit amount and interest rate).

In same manner for fixed deposit, the value of correlation coefficient is  $r_{45} = -0.878992$ , which indicates that the two variables have very high negative relationship. In other words, when increment occurs on one variable occur then there occur decrement on other variables. To identify the significance or insignificance of this correlation, it is necessary to calculate the value of t-statistics. The calculated value of t is 4.121. Similarly the tabulated value for t is 2.571, which is less than calculated t. As a result null hypothesis is rejected and alternate hypothesis is accepted. It means that the correlation coefficient is

highly significant. Thus from the both study it reveals that substitution effect is not applicable for NBB.

### 4.3 Analysis of Lending and Interest Rate:

This is second area of the analysis where mainly the relationship between lending interest rate and its effect upon lending amount is measured. Generally, when there is higher interest rate (esp. lending or credit rate) in the economy, people normally borrow lesser amount than the period when lending interest rate is low. According to theory, when there is low lending rate, then there should be higher amount of borrowing. Higher amount of borrowing indicates higher investment in the country or higher transaction in trade. This is necessary for the growth of the economy. So this study tries to explore the relationship between lending rate and lending amount in Nepalese context.

#### 4.3.1 Rastra Banijya Bank:

The sector where RBB grant its credit during last seven FYs and their corresponding interest rate, average interest rate and lending amount are presented in the table 4-11 below.

**Table 4-11: Lending Rate of RBB on Different Sectors during Seven FYs.**

Sector	2006	2007	2008	2009	2010	2011	2012
Overdraft	19.00	17.50	16.50	13.50	11.75	11.25	12.20
Export Credit	16.00	15.00	15.00	12.00	11.50	10.00	9.50
Import LC	15.00	15.00	12.00	13.00	12.00	10.00	10.00
HMG Bond	14.50	14.00	11.00	14.00	10.50	10.0	7.00
BG/CG	19.00	-	-	10.50	10.00	9.25	9.25
Other Guarantee	-	-	15.00	10.50	-	-	-
Industrial Loan	16.50	15.50	15.50	15.00	14.50	11.75	12.00
Commercial Loan	17.50	17.50	16.50	15.50	15.00	-	-
Priority Sector Loan	16.00	15.00	14.00	14.00	13.00	12.00	12.00
Working Capital	-	14.50	14.00	14.50	13.75	12.50	11.00
Hire Purchase	17.00	17.00	16.00	14.00	13.50	12.00	12.00
Others	19.00	17.50	16.50	15.5	15.00	12.00	12.00
<b>Average Int. Rate(1)</b>	<b>16.95</b>	<b>15.85</b>	<b>14.73</b>	<b>13.5</b>	<b>12.78</b>	<b>11.08</b>	<b>10.70</b>
Lending Amount(2)	22404.8	26340.4	29140.6	28424.7	28576	28258.9	26781.87

Correlation ( $r_{12}$ )	-0.56761		
Coefficient of determination ( $r_{12}^2$ )	0.322185		
<b>t-statistics</b>	t-cal = 1.5416	t-tab = 2.571	Insignificant.
<b>Std. Deviation</b>	2.35%		

Source: Banking and Financial Statistics, No: 38-43, NRB

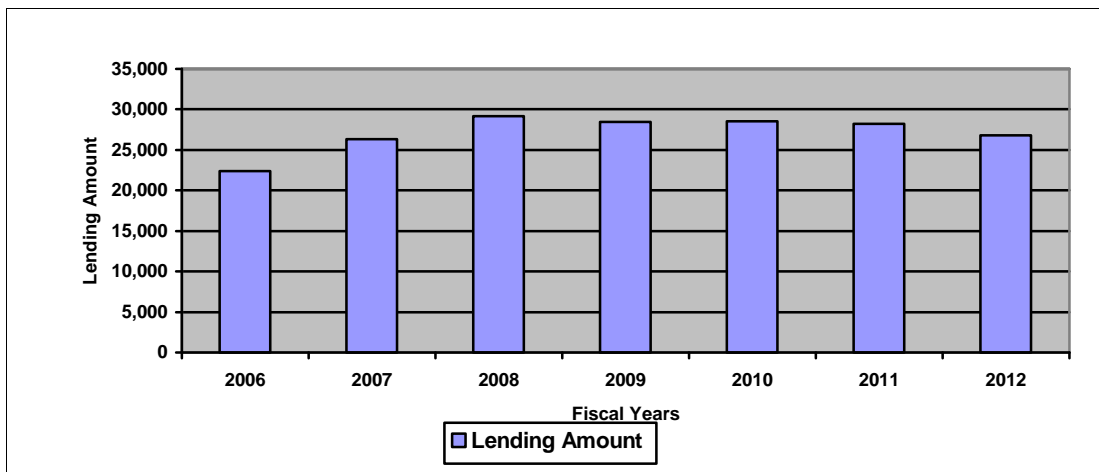
[Note: For all case, the higher ceiling of interest rate is taken from the table, as per suggestion of NRB research department.]

Lending activity of commercial banks can be diversified into different sectors. But according to the publication of Nepal Rastra Bank- Banking & Financial statistics- the loan of commercial banks are classified in different sub-sectors like overdraft, export credit, Import LC, commercial loan and so on. Besides this there are other section (area) when bank provides loan and these areas are placed in the topic of “others”. For this study, lending area are categorized as classified by NRB.

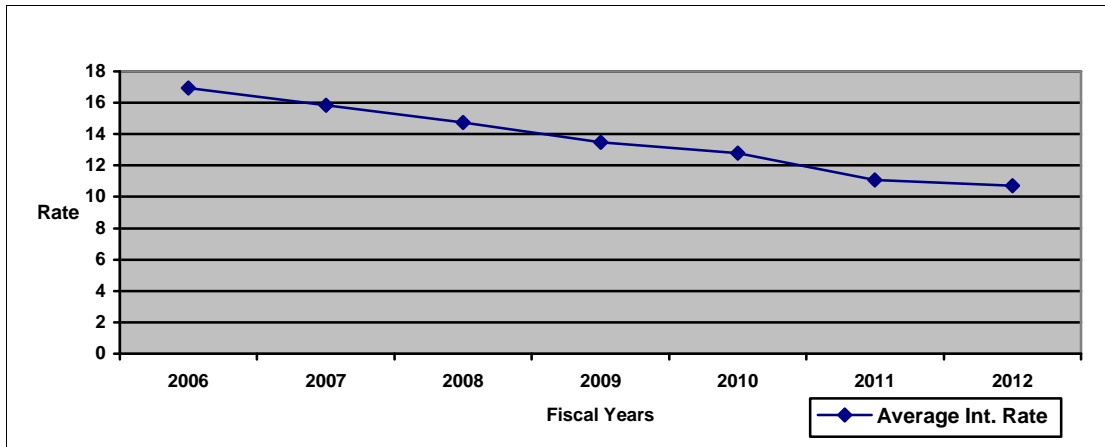
According to table 4-11 it shows that interest rate on lending on different area are in declining stage. The table shows that the maximum interest rate is 19% in FY 2006 and, minimum rate is 7% on FY 2012. This shows that the interest rate was decline drastically during the seven FYs periods. Generally the productive sector loan rate (like commercial loan, industrial loan, priority sector loan, working capital rate and so on) decline less in magnitude than non-productive sector loan like overdraft, loan against government bond, BG/CG rate and so on. For example during the last seven FYs declination of BG/CG rate was by 9.75%. In same manner, the declining magnitudes were 6.8%, 7%, and 5% for overdraft, other and hire purchase. The declining percentage for productive sectors were 2.5%, 3.5%, 4%, and 4.5% in commercial loan, working capital, priority sector loan, and industrial loan rate respectively. According to theory, in order to induce the investment in the country or expansion of trade, the productive sector loan should be available at cheaper rate. But the figure shows that these sectors loan were some what costlier than other non productive loan.

If the average of each fiscal year is taken, then it shows average lending interest rate was 16.95 (2006), 15.85 % ( 2007), 14.73 % ( 2008), 13.5 % ( 2009), 12.77% (2010), 11.08 % ( 2011), & 10.7% (2012). The standard deviation for average interest rate was 2.35%, which shows the deviation from mean return. The average rate is also in decreasing trend. The decreasing tendency was not smooth. It means the rate declined each year with different rate. In preceding year the declination was quite fast where as the declining tendency was little in later year. This concludes that interest rate on lending is also in decreasing tendency for past few years. With harmony to interest rate, the lending amount of RBB is also seen to be in decreasing tendency but with some fluctuation. These can also be present in figure no 4-16 and 4-17.

***Figure no 4-16: Lending Amount Of RBB During Different FYs.***



***Figure no 4-17: Average Lending Rate of RBB during Different FYs***



### **Correlation Coefficient, Coefficient of Determination and t-Statistics of RBB**

From table 4-11 the correlation coefficient (simple correlation) between lending rate and lending amount ( $r_{23}$ ) is  $-0.56761$ . According to our classification, this negative correlation is “moderate degree” correlation. In this case it is clear that interest rate on lending & lending amount has inverse relationship. It means they move in opposite direction i.e. increase in lending rate result decrease in total lending amount. This situation matches with the actual theory. According to the theoretical concept of lending rate and lending amount, people prefer or use more money when the market interest rate is low in the market. So the case is true for RBB also. The simple determination of correlation coefficient ( $r_{12}^2$ ) is  $0.322$ . When total lending amount is taken as dependent variable and lending rate as independent variables, then  $32.2\%$  of total variation in dependent variable is explained by lending rate and remaining percentage is due to the effect of other variables in the economy. Test of significance of correlation coefficient between lending rate and lending amount also verify the fact. The calculated value of t-statistics is  $1.5416$  ( $t\text{-cal} = 1.5416$ ). This value is less than tabulated value,  $t\text{-tab} = 2.571$  with level of significance  $5\%$  and d.f.  $5$ . In this condition,  $H_0$  is accepted. It means that there is no significant correlation between the two variables. In other words their relation is insignificant. Though

the correlation coefficient shows that these two variables have moderate level of correlation, but t-statistics verify that their relation is insignificant. In conclusion, the inverse relationship between lending rate and lending amount is not exactly applicable for RBB

#### 4.3.2 Nepal Bank Limited:

The sector where NBL grant its credit during last seven FYs and their corresponding interest rate, average interest rate and lending amount are presented in the table 4-12 below.

Table 4-12 shows the lending interest rate structure of NBL on different sectors. This interest rate is somewhat lower in value as compare to interest rate of RBB (table 4-11). It means that there was some difference in interest rate between the two government run banks. For example in overdraft the RBB quoted the interest rate 19% per annum on FY 2006 where as in same period the NBL quoted the interest rate of 17.50% per annum for overdraft. In same manner the figure18 and figure19 indicates that the lending interest rate of NBL was lesser the lending interest rate of RBB. The average interest rate with standard deviation 2.05% also verifies the above statement about two banks' lending interest rate.

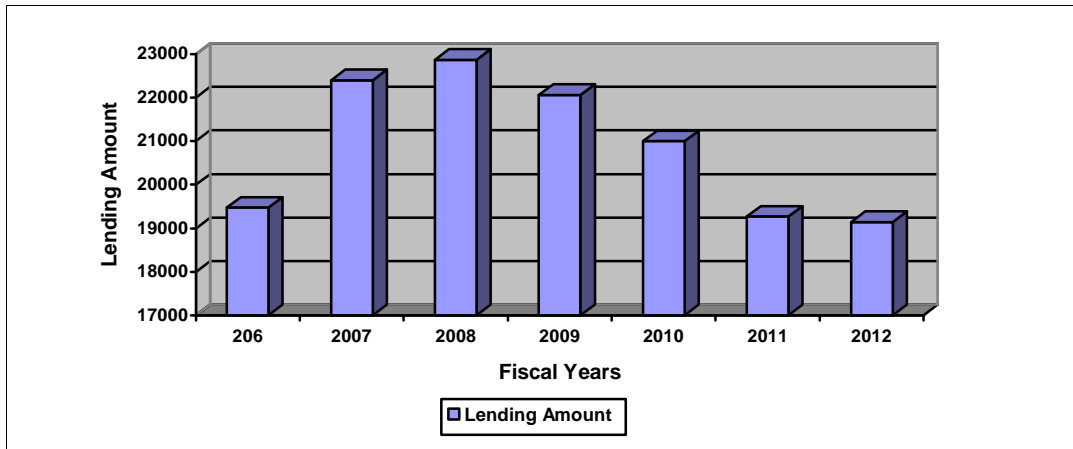
**Table 4-12: Lending Rate NBL on Different Sectors during Seven FYs.**

Sector	2006	2007	2008	2009	2010	2011	2012
Overdraft	17.50	17.00	15.00	15.00	14.00	10.00	10.00
Export Credit	14.50	12.00	11.00	11.00	11.00	8.50	8.50
Import LC	15.50	13.50	11.00	11.00	11.00	8.50	-
HMG Bond	13.00	10.00	8.00	8.00	7.00	7.00	7.00
BG/CG	16.00	13.00	10.00	10.00	10.00	8.75	8.75
Industrial Loan	15.00	13.50	14.00	14.00	13.00	13.00	-
Commercial Loan	15.50	14.50	14.50	14.50	13.50	13.50	-
Priority Sector Loan	14.50	14.00	14.00	14.00	13.50	10.50	10.50
Poorer Sector Loan	12.00	11.50	10.50	10.50	10.00	8.00	8.00
Working Capital	15.50	14.25	14.00	14.00	13.00	10.00	10.00
Hire Purchase	18.00	16.00	14.00	14.00	14.00	11.00	11.00

Others	17.00	17.00	16.00	16.00	14.00	11.00	12.00
<b>Average Rate(1) Int.</b>	<b>15.34</b>	<b>13.86</b>	<b>12.67</b>	<b>12.67</b>	<b>12</b>	<b>9.98</b>	<b>9.53</b>
<b>Lending Amount(2)</b>	<b>19472.2</b>	<b>22394.6</b>	<b>22863.7</b>	<b>22062.3</b>	<b>20997.5</b>	<b>19266.1</b>	<b>19141.7</b>
Correlation ( $r_{12}$ )	0.39780108						
Coefficient of determination ( $r_{12}^2$ )	0.158245699						
<b>t-statistics</b>	t-cal = 0.9695		t-tab = 2.571		Insignificant.		
<b>Std. Deviation</b>	2.05%						

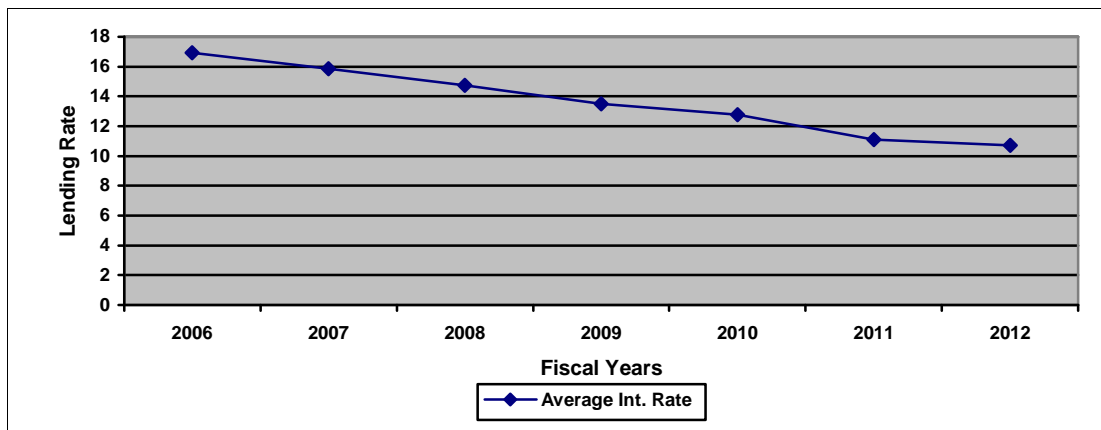
According to the table 4-12, it is clear that all the lending interest rate fell by 1.50% to 7% within the seven FYs. During first phase of seven FYs, the average interest rate declined quite fastly with greater magnitude but in middle of the FY it remained stagnant. Again after middle year the momentum of speed rises up. During the period especially hire purchase rate, against government bond rate, BG/CG rate, import L/C rate, and overdraft lending rate fell drastically. They fell by 5% to 7% on average. Whereas other sector lending rate of NBL also fell but their magnitude was less. It means that commercial sector loan rate, industrial loan rate were not decreased by large percentage. So it can be said that only non-productive sector loan rates were reduce drastically during the seven FYs as compare to productive sector loan. The case is similar with the RBB. With rhythm to lending interest rate, the study of lending amount shows that, it is also in decreasing trend. The trend shows that it is fluctuating. In other words, up to the FY 2008, the lending amount was in increasing tendency but after 2008 onward the amount seems to be decreasing. This may happen because after FY 2008, the interest rate declines by faster speed. The average lending rate of each FY and their corresponding lending rate can be exhibited in the figures 4-18 and figure 4-19 as follows:

***Figure no 4-18: Lending Amount Of NBL during Different FYs.***



Similarly the graph of average interest rate of last seven FYs is

**Figure no 4-19: Average Lending Rate of NBL during Different FY**



### **Correlation Coefficient, Coefficient of Determination and t-Statistics of NBL**

To find the exact relationship between the lending interest rate and lending amount, it is necessary to use some of the statistical tools like correlation coefficient, coefficient of determination. Similarly, to verify the correlation coefficient, student t-statistics is applied. For this case, the correlation coefficient between NBL's average interest rate and lending amount is 0.39780108 ( $r_{12} = 0.3978$ ). It means that, according to our classification, this is low degree of positive correlation. Increase in one variable result the increase in other variables but in low magnitude. In other words, if one variable increases

by one percentage, then other variable increases by 0.39%. The result of correlation is against the theory. Because according to theory there should negative correlation. In other word, decrease in interest rate should be followed by increase in lending amount. But this case doesn't happen for NBL. The coefficient of determination  $r_{12}^2 = 0.1582$ , which means that the relationship between two variable (lending amount and rate) is defined up to 15.82% only. Similarly, the calculation of t statistics gives the value to t as 0.9695 i.e. t-cal = 0.9695. The tabulated value for t at 5 d.f. and 5% level of significance is 2.571. Therefore, in this case t-calculated is less than t-tabulated. Hence, null hypothesis is accepted. It indicates that the relationship shown by correlation coefficient is not significant.

In conclusion, it can be said that the lending interest rate and lending amount don't have inverse relationship. This is not as per theory suggests.

#### 4.3.3 Agriculture Development Bank/Nepal (ADB/N):

As previously mentioned, ADB/N grants the loan broadly in two sectors; agricultural and non-agricultural (commercial) sectors. But for this study only the lending of commercial sector is focused. The general lending interest rate, lending area, average lending rate and lending amount during the seven fiscal years are presented in the figure 4-13.

**Table 4-13: Lending Rate ADB/N on Different Sectors during Seven FYs.**

<b>Sector</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
Overdraft	20.00	19.00	18.00	18.00	17.00	17.00	16.00
Export Credit	-	-	-	-	-	-	-
Import LC	-	-	-	-	-	-	-
HMG Bond	-	-	-	-	-	-	-
BG/CG	-	-	-	-	-	-	-
Industrial Loan	17.00	17.00	15.00	15.00	14.00	14.00	13.00
Commercial Loan	18.00	17.00	16.00	16.00	15.50	15.50	14.00
Priority Sector Loan	-	-	-	-	-	-	-
Poorer Sector Loan	-	-	-	-	-	-	-
Working Capital	-	-	-	-	-	-	-
Hire Purchase	18.00	17.00	16.00	16.00	15.00	15.00	13.00
Others	18.00	17.00	16.00	16.00	15.00	15.00	13.50
<b>Average Int. Rate(1)</b>	<b>18.2</b>	<b>17.40</b>	<b>16.20</b>	<b>16.20</b>	<b>15.30</b>	<b>15.30</b>	<b>13.90</b>
<b>Lending Amount(2)</b>	<b>3528.3</b>	<b>3891.9</b>	<b>4590.4</b>	<b>5700.5</b>	<b>6847.8</b>	<b>8794.7</b>	<b>9221.2</b>
Correlation ( $r_{12}$ )	-0.921478973						
Coefficient of determination ( $r_{12}^2$ )	0.849123498						
<b>t-statistics</b>	t-cal = 5.3042		t-tab = 2.571		Significant.		
<b>Std. Deviation</b>	1.43%						

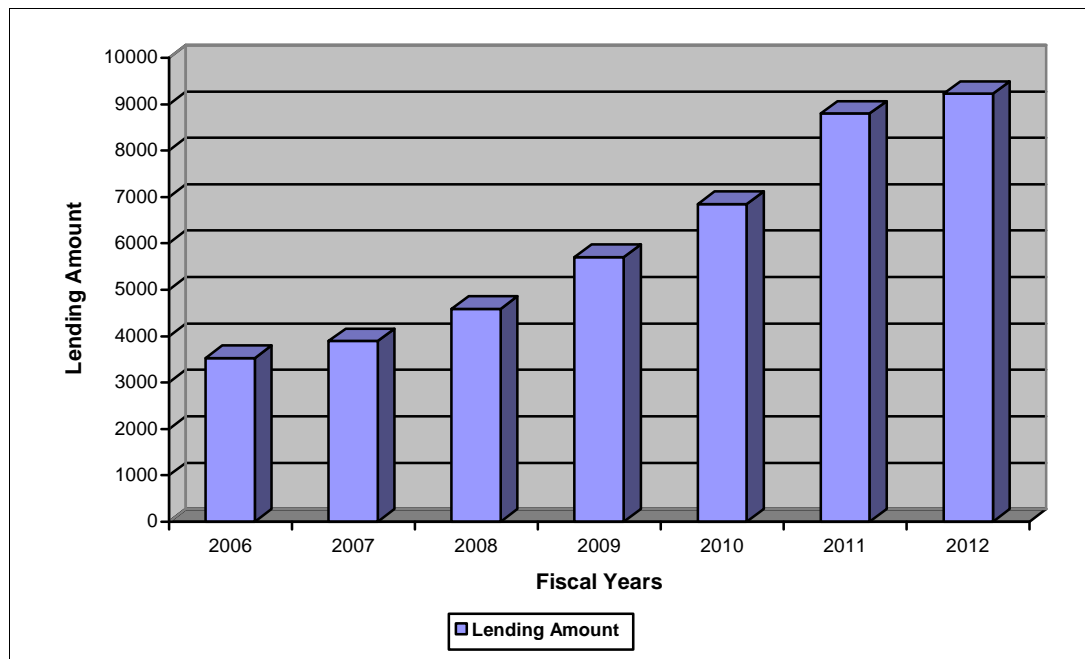
Source: Banking and Financial Statistics, No: 38-43, NRB

The table 4-13 shows the lending interest rate of ADB/N on different sectors in different FY. It is also notable matter that for commercial purpose, ADB/N had granted credit only on certain sectors in past FY. They are shown on the table 4-13. Comparing the lending rate of three banks, RBB, NBL and ADB/N it is found that ADB/N had the highest lending interest rate among all. After this RBB had second highest interest rate and NBL had the least interest rate. Even though the interest rate on lending of ADB/N is high in first period of seven FYs, on later years interest rate gradually starts to decrease. Every year interest rate is decline by almost one percentage point. For the case of ADB/N in all sectors declining rate was similar. It means that there was equal fall in interest rate on each loan sector. But this is not the case for RBB and NBL because in those banks, there was rapid fall on non productive sector and less fall on non-productive sectors. In past seven FYs the highest interest rate was 20% on overdraft. This is the maximum rate among all. Later within seven FYs this rate

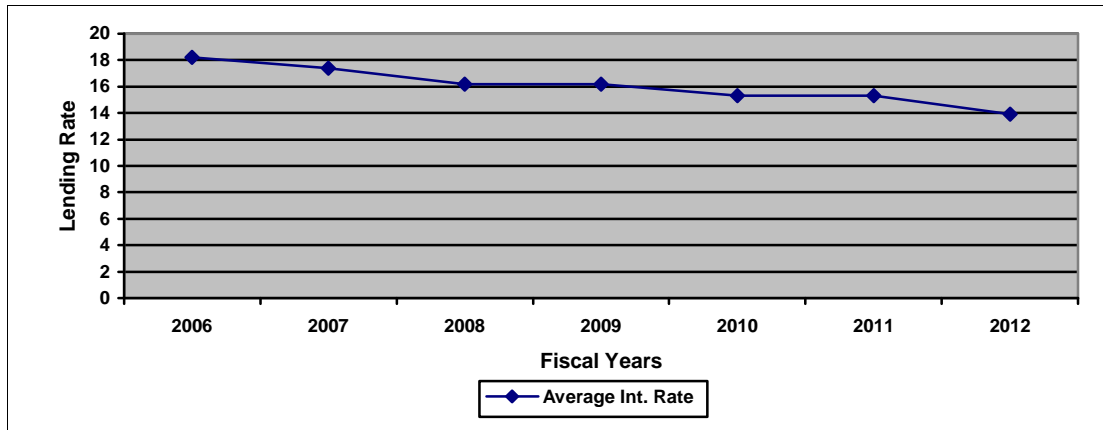
fell to 16% p.a. when it approached to FY 2012. In same manner most of the rate fell by on average 4% from the previous lending rate. To see the position, it is better to give glance on average lending rate during last seven FYs. The average interest rate was 18.2%, 17.4%, 16.2%, 16.2%, 15.3%, 15.3% and 13.9% in FY 2006, 2007, 2008, 2009, 2010, 2011 and 2012 respectively.

In effect of decline in interest rate, the lending amount of ADB/N is also found to be increasing drastically during the seven fiscal years. During the period of seven years, the lending amount was tripled. This is what the theory says. But to know the exact relationship it is necessary to compute the correlation coefficient. Prior to all it is rational if the data on the table 4-13 are present on the graph no 4-20.

**Figure no 4-20: Lending Amount Of ADB/N During Different FYs.**



**Figure no 4-21: Average Lending Rate of ADB/N during Different FY**



### **Correlation Coefficient, Coefficient of Determination and t-Statistics of ADB/N**

By using excel spread sheet, correlation coefficient, average, standard deviation and other necessary statistics can be calculated. The correlation coefficient between lending rate and lending amount for ADB/N is -0.9214. This is very high degree of correlation. The negative sign indicates that, the two variables have opposite or inverse relationship, meaning decrease in one variables leads to increase in other variables. For this case, decrease in interest rate stimulates the lending amount or vice versa. The coefficient of determination for correlation coefficient is 0.8491. It indicates that lending amount depends upon lending amount by 84.91%. In other words, the relationship between one variable is defined by another is up to the level of 84.91%.

To verify the correlation coefficient statistically, it is better if t-statistics is used. The calculated value for t is 5.3042 i.e.  $t\text{-cal} = 5.3042$ . Similarly the tabulated value for t at 5 degree of freedom with 5% level of significance is 2.571 i.e.  $t\text{-tab} = 2.571$ . Comparing  $t\text{-cal}$  and  $t\text{-tab}$ , it is found that  $t\text{-cal} > t\text{-tab}$  so in such case alternate hypothesis is accepted meaning the relation shown by the correlation coefficient is highly significant. In other words, two variables are significantly correlated or the increase in lending amount is due to the decrease in lending rate. Lending rate is significant factor for that.

From this analysis, it is verify that theory matches with the lending case of ADB/N.

#### 4.3.4. Himalayan Bank Limited (HBL):

HBL also grant credit on different area like commercial loan, industrial loan, overdraft, working capital and so on. These rates on the different fiscal years are as follows:

**Table 4-14: Lending Rate HBL on Different Sectors during Seven FYs.**

Sector	2006	2007	2008	2009	2010	2011	2012
Overdraft	16.00	15.00	14.50	13.00	13.75	13.25	13.25
Export Credit	14.00	11.50	11.00	9.50	9.50	9.50	9.50
Import LC	15.00	13.00	13.50	13.00	12.75	12.25	12.25
HMG Bond	14.00	10.50	10.00	8.50	8.00	8.00	8.00
BG/CG	14.00	11.50	11.00	9.50	10.50	10.50	10.50
Industrial Loan	-	15.00	15.50	14.00	13.50	13.00	13.00
Commercial Loan	16.00	15.00	15.50	14.00	13.75	13.25	13.25
Priority Sector Loan	15.50	15.00	14.50	14.00	13.00	13.00	13.00
Poorer Sector Loan	12.00	10.00	9.00	8.50	8.50	8.50	8.50
Term Loan	16.00	15.00	15.00	13.50	13.50	13.00	13.00
Working Capital	16.00	14.50	14.00	13.20	13.25	13.00	13.00
Hire Purchase	18.00	16.00	15.50	13.00	13.00	13.00	13.00
Others	19.00	17.50	17.50	16.25	16.25	15.75	15.75
<b>Average Int. Rate(1)</b>	<b>15.46</b>	<b>13.81</b>	<b>13.58</b>	<b>12.30</b>	<b>12.25</b>	<b>12.00</b>	<b>12.00</b>
<b>Lending Amount(2)</b>	<b>4275.5</b>	<b>5372</b>	<b>7423.2</b>	<b>9176.9</b>	<b>9673.5</b>	<b>11074.2</b>	<b>13081.7</b>
Correlation ( $r_{12}$ )	-0.91255						
Coefficient of determination( $R_{12}^2$ )	0.83275						
<b>t-statistics</b>	t-cal = 4.99		t-tab = 2.571		Significant.		
<b>Std. Deviation</b>	1.295%						

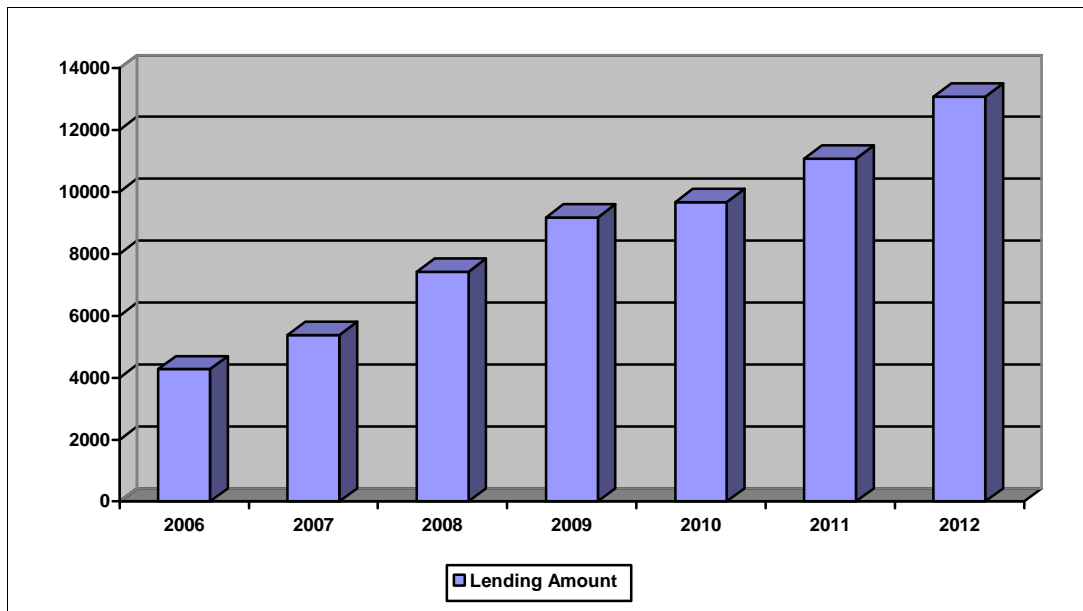
Source: Banking and Financial Statistics, No: 38-43, NRB

The table 4-14 shows the interest rate of HBL on lending on seven fiscal years granted in different sectors. With comparison to above aforementioned bank, HBL lending rate was somewhat lower than quoted by those above bank. This may be due to the competition because those aforementioned banks are government owned bank where as HBL is private sector leading commercial bank. The maximum interest rate quoted by the HBL during seven FYs was

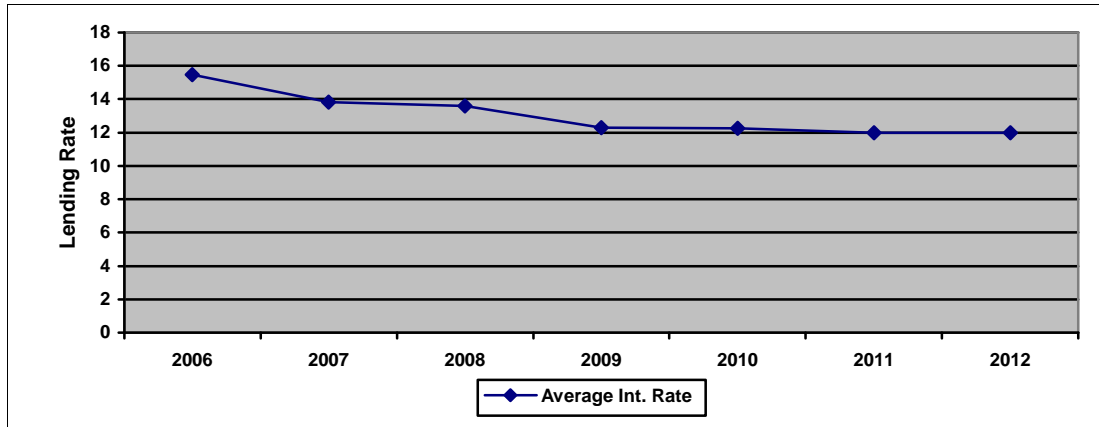
19% on “other” categories. The interest rate of HBL is also in decreasing trend. But the decreasing magnitude is very little. This is so because, the interest rate of HBL during FY 2006 was very low as compare to other three banks. It means that at 2006 the average interest rate of HBL was 15.46% where as other banks had average lending rate more than 16%. During seven years period the interest rate falls to 12% on average. It means that interest rate falls by only 3.46% on average. Conversely, the lending amount of HBL is seen to be in increasing trend. With compare to 2006 lending, lending of 2012 is three times more. So it can be said that lending of HBL was expanded rapidly within that seven fiscal periods. These phenomenon shows that lending interest rate and lending amount have inverse relationship.

To quantify this relationship, it is necessary to calculate correlation coefficient and t-statistics. But prior to this it is fruitful if the trend of lending interest rate and lending amount is shown in the figure as in figure no 4-22.

**Figure no 4-22: Lending Amount Of HBL During Different FYs.**



*Figure no 4-23: Average Lending Rate of HBL during Different FY*



The figure 4-23 shows that interest rate of lending falls rapidly up to FY 2009. It falls from average 16% to average 12%. But after FY 2009, the falling speed was very slow. It means the interest rate falls only by decimal percentage point.

### **Correlation Coefficient, Coefficient of determination and t-Statistics of HBL**

The correlation coefficient of HBL between lending amount and lending rate is -0.91255. It is high degree negative correlation. It indicates that increment in one variable result the decrement in other variables or vice versa. In this case decrease in lending interest rate increases the lending amount. People preferred more credit from the HBL when bank reduced the lending interest rate. This is similar with the saying of theory. Similarly the coefficient of determination between two variable ( $r^2_{12}$ ) = 0.83275. It means that the relationship between dependent variable and independent variable is defined up to the extent of 83.27%. In other words, the increase in lending amount by decrease in interest rate is defined up to the extent of 83.27% where as remaining percentage is due to other factors.

Similarly the t-statistics for HBL is 4.99 (i.e. t-cal = 4.99). The tabulated value at 5% level of significance with 5 d.f. is 2.571. Comparing the t-tab and t-cal, it

is clear that  $t\text{-cal} > t\text{-tab}$ , so alternative hypothesis is accepted and null hypothesis is rejected. It means that the relation shown by correlation coefficient is highly significant. That is, the inverse relation shown by two variables – lending rate & lending amount – is strong. The increase in demand of lending amount is due to the decrease in lending rate. Therefore, according to t-statistics, the lending rate is also another strong as well as important factor that shape the lending amount. In conclusion the inverse relation of HBL on two variables is accordance with theory.

#### 4.3.5 Nepal Bangladesh Bank (NBB):

At last, another bank for analysis is Nepal Bangladesh Bank. This bank also grants the credit to its customers in different sectors. But according the NRB bulletin “Banking and Financial Statistics” the bank provided the loan to its customers on following sectors.

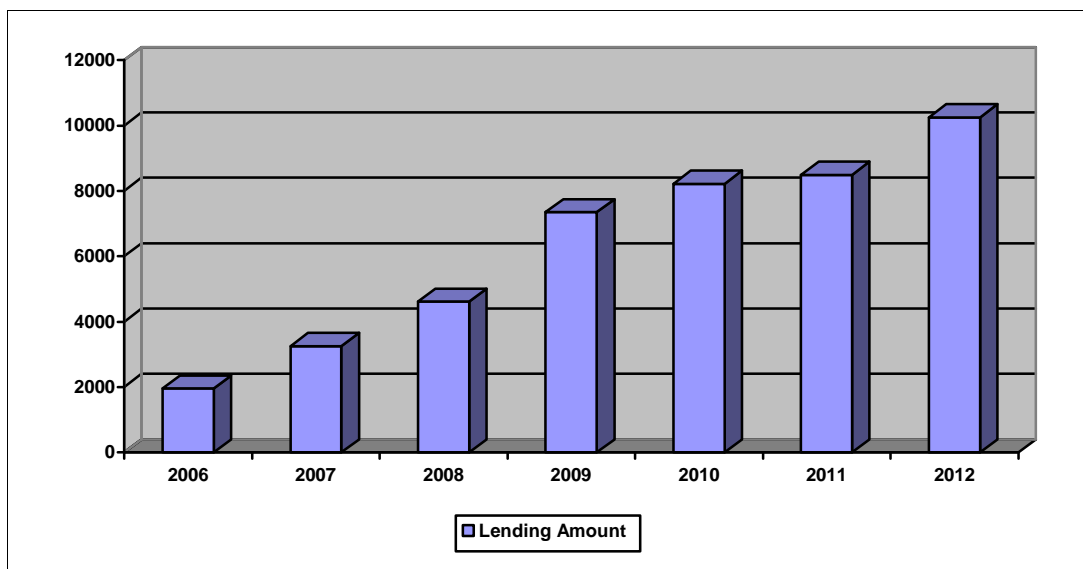
**Table 4-15: Lending Rate NBB on Different Sectors during Seven FYs.**

Sector	2006	2007	2008	2009	2010	2011	2012
Overdraft	18.00	16.00	15.5	15.00	14.50	14.00	13.00
Export Credit	16.50	13.00	12.50	12.00	11.75	11.75	10.50
Import LC	17.50	15.00	13.50	-	-	-	10.50
HMG Bond	16.50	12.50	11.00	9.00	9.00	9.00	8.50
BG/CG	16.50	15.00	15.00	13.00	13.00	13.00	12.00
Industrial Loan	17.00	16.00	15.00	14.50	14.00	14.00	-
Commercial Loan	18.00	16.50	15.50	15.00	14.50	14.00	-
Priority Sector Loan	15.50	13.50	13.00	13.00	13.00	13.00	11.00
Poorer Sector Loan	15.00	12.50	12.00	12.00	12.00	12.00	10.00
Term Loan	17.50	15.00	15.00	14.00	14.00	13.50	12.00
Working Capital	18.00	-	-	-	-	-	-
Hire Purchase	18.50	16.50	15.00	14.50	14.50	14.00	12.50
Others	18.50	17.00	16.50	15.00	14.50	14.00	13.00
<b>Average Int. Rate(1)</b>	<b>17.15</b>	<b>14.88</b>	<b>14.13</b>	<b>13.36</b>	<b>13.16</b>	<b>12.93</b>	<b>11.30</b>
<b>Lending Amount(2)</b>	<b>1957.6</b>	<b>3258.7</b>	<b>4611.8</b>	<b>7347.4</b>	<b>8222.1</b>	<b>8491.9</b>	<b>10253.6</b>
Correlation ( $r_{12}$ )	<b>-0.948052</b>						
Coefficient of determination ( $r_{12}^2$ )	<b>0.89880</b>						
<b>t-statistics</b>	t-cal = 6.66		t-tab = 2.571		Significant.		
<b>Std. Deviation</b>	1.83%						

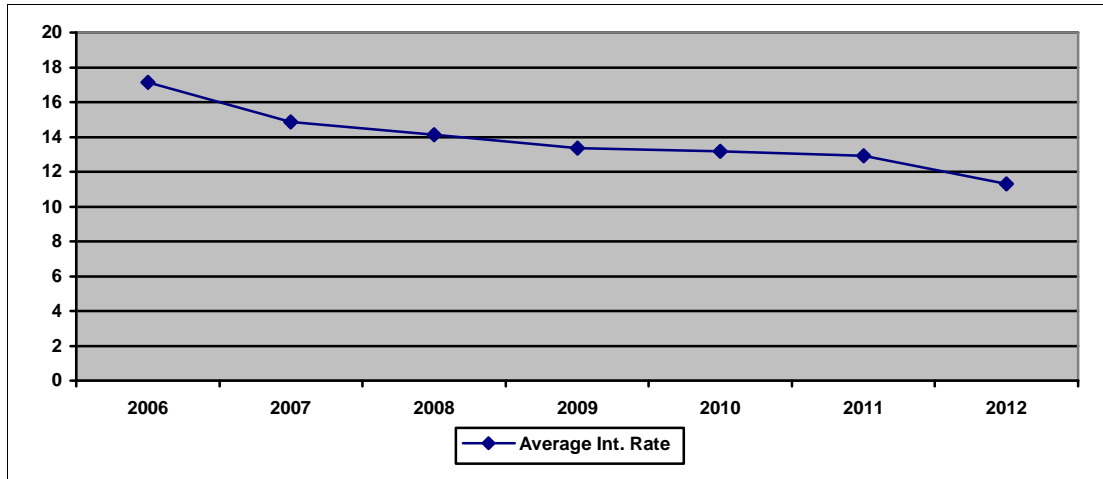
Source: Banking and Financial Statistics, No: 38-43, NRB

The table 4-15 shows the lending interest rate structure of NBB on seven FYs on different sectors. From table it is clear that the interest rates of NBB are in falling stage. During the first phase of FY the interest rate fell by large gap. But in later year the falling speed was low. This phenomenon can be seen clearly with the study of average interest rate. The average interest rate for FY 2006, 2007, 2008, 2009, 2010, 2011 and 2012 are 17.15%, 14.88%, 14.13%, 13.36%, 13.16%, 12.93% and 11.30% respectively. The average interest rate shows that the interest jump by high percentage gap and later on fell with little gap. In this bank also, lending interest of non productive loan falls more than lending interest of productive sector loan. In same manner, for lending amount, the lending amount of NBB increased each year. During the last FY the lending amount rises by more that 9 times. This is very significant figures among these 5 aforementioned sample banks. This shows that the lending amount and interest have negative relationship. But to get the exact numerical result of relationship correlation should be necessary to calculate. The figure for changing trend of interest rate and lending amount is given on figure no 4-24 and figure no 4-25.

**Figure no 4-24: Lending Amount Of NBB During Different FYs.**



*Figure no 4-25: Average Lending Rate of NBB during Different FY*



### **Correlation Coefficient, Coefficient of Determination and t-Statistics of NBB**

The correlation coefficient of NBB between lending amount and lending rate is -0.94805. It is high degree negative correlation. It indicates that increment in one variable result the decrement in other variables or vice versa. Decrement in lending interest rate increases the lending amount because people preferred more credit from the HBL when bank reduced the lending interest rate. This condition matches with the theory. Similarly the coefficient of determination between two variable ( $r^2_{12}$ ) = 0.83275. It means that the relationship between dependent variable and independent variable is defined up to the extent of 83.27%. The remaining percentage is due to other factors.

Similarly the calculate value for NBB is 4.99 (i.e. t-cal = 4.99). The tabulated value of t-statistics at 5% level of significance with 5 d.f. is 2.571. Comparing the t-tab and t-cal, it is clear that t-cal > t-tab, so alternative hypothesis is accepted and null hypothesis is rejected. It means that the relation shown by correlation coefficient is highly significant. That is the inverse relation shown by two variables – lending rate & lending amount – is strong. In conclusion the inverse relation of NBB on two variables is accordance with theory.

## 4.4 Analysis of Inflation and Interest Rate (Deposit & Lending Rate)

Another variable that affects the interest rate in the economy is the inflation. In general condition, inflation and interest rate have positive effect. It means that, when inflation increases in the economy, the interest rate also increases. On this ground, different theory has been propounded like Fisher effect, Harrod-Keynes effect and so on. This all phenomenon have been already explained in the chapter two. To measure the actual relationship, the prevailing situation of each bank is going to observe.

### 4.4.1 Rastra Banijya Bank (RBB):

The interest rate on deposit, interest rate on lending of RBB and inflation of the country during the seven FYs were tabulated on table 4-16.

**Table no 4-16: Inflation Rate and Interest Rate of RBB**

<b>Fiscal Year</b>	<b>CPI (1)</b>	<b>Inflation (2) %</b>	<b>Deposit Rate(3)</b>	<b>Lending Rate (4)</b>
2006	117.1	8.3	7.50	16.95
2007	130.4	11.4	6.45	15.85
2008	134.9	3.5	6.00	14.73
2009	138.1	2.4	6.20	13.50
2010	142.1	2.9	5.20	12.78
2011	148.9	4.8	4.90	11.08
2012	154.8	4.0	3.25	10.70
Correlation coefficient. $r_{23}$		<b>0.4757</b>	Coefficient of Determination	
Correlation coefficient. $r_{24}$		<b>0.6240</b>	Coefficient of Determination	
<b>t-statistics</b>	<b>t-cal (Deposit) =1.209</b>		<b>t-tab = 2.571</b>	<b>Insignificant</b>
	<b>t-cal (Lending) =1.785</b>		<b>t-tab = 2.571</b>	<b>Insignificant</b>

Source: NRB, Research Department

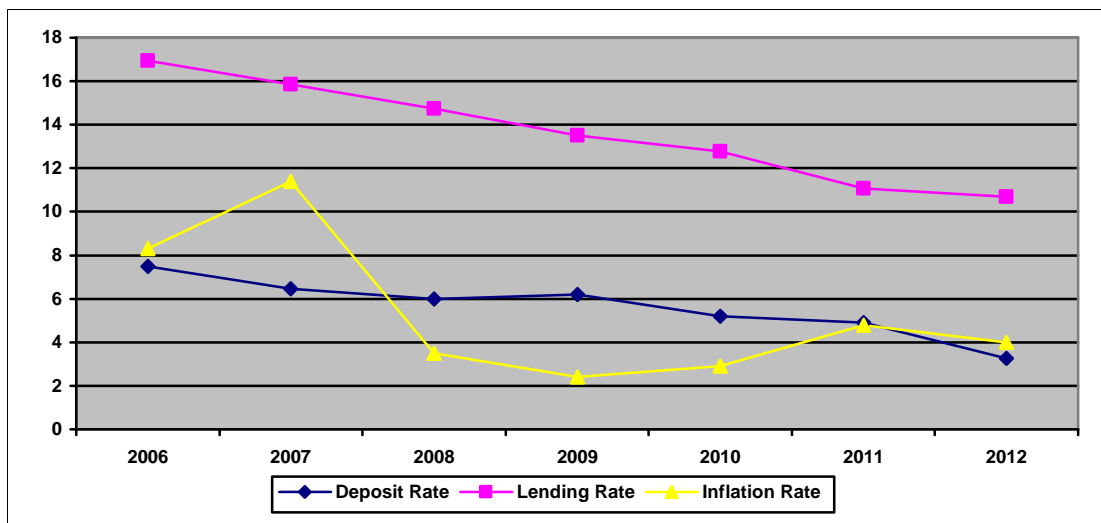
Note: The average interest rate of deposit and lending is taken from “Whole Mean” and “average lending rate” respectively. (For this case, values are taken from table4-1 and table 4-11)

From table 4-16 it is clear that the inflation rate during the last seven FYs was in fluctuating trend. Though it seems to decreasing but it has some variation.

With similar to declining inflation, the interest rate of both lending and deposit are seems to be declining. The relationship among these three elements can be portrayed in the figure no 4-26 as follows.

From figure no 4-26, it is clear that during the FY 2006 the inflation rate, 8.3%, was higher than deposit interest rate, 7.50%. This inflation rate increases to 11.4% during 2007 and after that started to decline. In the middle of 2007 the inflation decreases below the deposit rate. In same manner, during the FY 2011 inflation rate and deposit rate was almost similar. But after 2011 the inflation started to rise and at FY 2012 inflation remains slightly above the deposit rate. These all indicates that the actual earning or real rate or return for the deposit holder was negative. In those periods, when inflation rate exceed the deposit rate, the deposit holder loosed their income rather than earn. But for the case of lending rate, it was very much higher than the inflation rate. So bankers don't lose their income as compare to deposit holder. Due to this the interest spread between the deposit and lending was very high during the first part of the seven FYs.

**Figure No 4-26: Inflation Rate, Deposit Rate and Lending Rate of RBB**



If correlation coefficient of between deposit and inflation is taken, the value of  $r$  is 0.4757 i.e.  $r_{23}=0.4757$ . This positive correlation indicates that the deposit rate and inflation have moderate level of similar relationship. Increase in inflation increases the deposit interest rate but very little in magnitude.

In order to verify the strong ness or weakness of relationship, calculation of t-statistics is necessary. The calculated value of t for given correlation coefficient is 1.209. The tabulated value for it with 5% level of significance with 5 d.f. is 2.571. Here in this case tabulated value of t is greater than calculated value of t. in such case, alternative hypothesis is accepted which means that the correlation coefficient between deposit and lending is not significance. In other words, the deposit rate of RBB is not correlated with the inflation rate and movement in inflation rate does not affect the interest rate on deposit significantly.

In same manner, the correlation between lending rate and inflation is found to be 0.624. ( $r_{24} = 0.6240$ ) This is also moderate level correlation. It means the two variables move in same direction but not in similar manner. Their movement is weak In order to verify the significance of correlation coefficient, t-statistic is calculated. The calculated value of t is 1.785 and tabulated value is 2.571. Here the case is similar with deposit. It means that, whatever the correlation coefficient reveals for the relationship of two variables, but the two variables are not significantly correlated.

This concludes that fisher effect is not practically applicable for RBB.

#### 4.4.2 Nepal Bank Limited (NBL):

The interest rate on deposit, interest rate on lending of NBL and inflation of the country during the seven FYs were tabulated on table no 4-17.

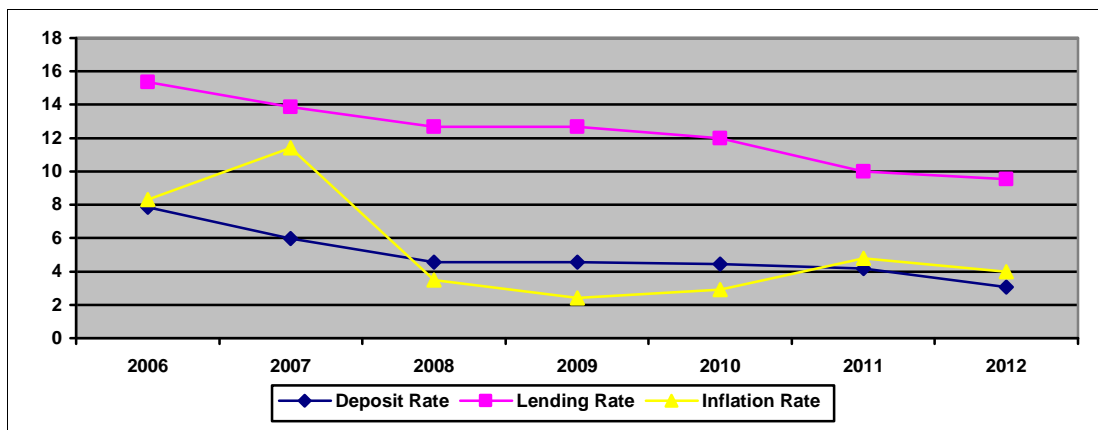
**Table no 4-17: Inflation Rate and Interest Rate of NBL**

Fiscal Year	CPI (1)	Inflation (2) %	Deposit Rate(3)	Lending Rate (4)
2006	117.1	8.3	7.86	15.34
2007	130.4	11.4	5.96	13.86
2008	134.9	3.5	4.54	12.67
2009	138.1	2.4	4.54	12.67
2010	142.1	2.9	4.46	12.00
2011	148.9	4.8	4.16	9.98
2012	154.8	4.0	3.05	9.53
Correlation coefficient. $r_{23}$		<b>0.6814</b>	Coefficient of Determination	
Correlation coefficient. $r_{24}$		<b>0.5517</b>	Coefficient of Determination	
<b>t-statistics</b>	<b>t-cal (Deposit) =2.081</b>		<b>t-tab = 2.571</b>	<b>Insignificant</b>
	<b>t-cal (Lending) =1.479</b>		<b>t-tab = 2.571</b>	<b>Insignificant</b>

Source: NRB, Research Department

The relationship that is shown on table can be presented on the graph no 4-27. According to graph it is clear that, during the beginning of the period, the inflation rate was higher than the deposit rate but at the middle of the 1999 the inflation of the country decline down below the deposit rate. In same manner, the inflation rate again rose in the end of FY 2010 and remains above the deposit rate till that date. But the rate of lending was very higher than inflation during the seven FYs. In both case it is similar with RBB.

**Figure No 4-27: Inflation Rate, Deposit Rate and Lending Rate of NBL**



Similarly, the correlation coefficient between deposit interest rate and inflation,  $r_{23}$ , is found to be 0.6814 and correlation coefficient between lending rate and inflation,  $r_{24}$ , is 0.55177. It indicates that they both have positive correlation between inflation rates. But their level of correlation is moderate. In other words, when inflation rises, then both interest rates rise. To find out the strongness or weakness of relationship, t-statistics is necessary.

The calculated value of t is 2.081 for deposit and 1.479 for lending. They both are lesser than the tabulated value of t at 5% level of significance with 5 d.f. In such condition null hypothesis is rejected and alternative hypothesis is accepted. That is coefficient of correlation is statistically insignificant. It can be inferred that the variables, both interest rate and inflation are not correlated even if analysis shows the positive correlation coefficient of 0.6814 and 0.55177 for deposit and lending respectively.

#### 4.4.3 Agriculture Development Bank/Nepal (ADB/N):

The inflation rate during the last seven fiscal years, deposit rate of ADB/N, lending rate of ADB/N are tabulated in table no 4-18

**Table no 4-18: Inflation Rate and Interest Rate of ADB/N**

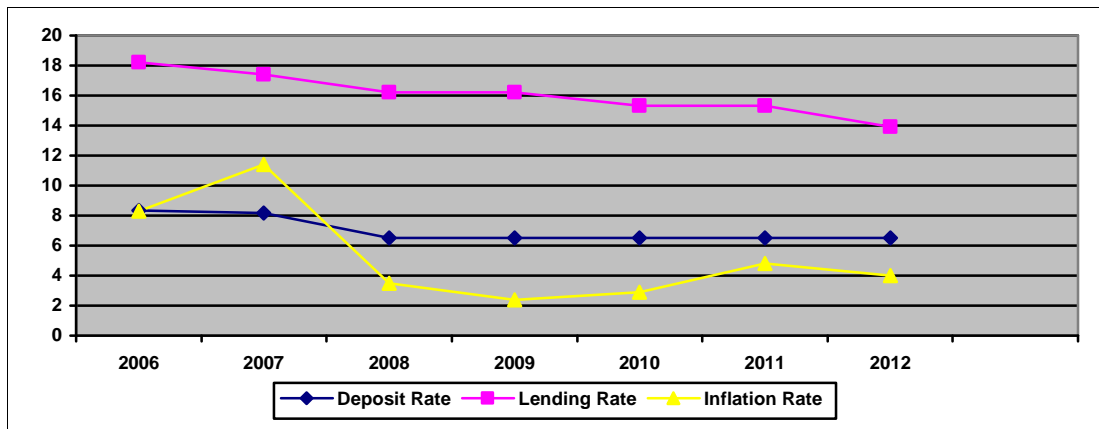
<b>Fiscal Year</b>	<b>CPI (1)</b>	<b>Inflation (2) %</b>	<b>Deposit Rate(3)</b>	<b>Lending Rate (4)</b>
2006	117.1	8.3	8.35	18.20
2007	130.4	11.4	8.15	17.40
2008	134.9	3.5	6.50	16.20
2009	138.1	2.4	6.50	16.20
2010	142.1	2.9	6.50	15.30
2011	148.9	4.8	6.50	15.30
2012	154.8	4.0	6.50	13.90
Correlation coefficient. $r_{23}$		<b>0.9140</b>	Coefficient of Determination	
Correlation coefficient. $r_{24}$		<b>0.6689</b>	Coefficient of Determination	
<b>t-statistics</b>	<b>t-cal (Deposit) =5.037</b>		<b>t-tab = 2.571</b>	<b>Significant</b>
	<b>t-cal (Lending) =2.012</b>		<b>t-tab = 2.571</b>	<b>Insignificant</b>

Source: NRB, Research Department

According to the table 4-18 the average interest rate (average of both fixed and saving deposit) was 8.35% in 2006 and 8.15% in 2007. But after FY 2007 onward the deposit interest remains fixed for whole period. On comparing the deposit rate and inflation, deposit remained above or higher than inflation rate except in FY 2007. This situation increases the deposit holders earning position. Similarly the lending rate declined from FY 2006 but the declination occurred with some stagnancy in each year. As similar with other banks, the lending rate of last seven FYs was higher than inflation rate. To make more precise, it is benefit, if the above table are plot on the graph as figure no 4-28.

The graph no 4-28 shows that the fisher effect was applicable for the interest rate of ADB/N because both the interest rate increases with the increase with inflation and decrease with the decrease in inflation. The inflation started to rise after the year 2010 but in very little pace.

**Figure No 4-28: Inflation Rate, Deposit Rate and Lending Rate of ADB/N**



The correlation coefficient between deposit interest rate and inflation for the case of ADB/N is found to be very high positive number i.e.  $r_{23} = 0.9140$ . This indicates that whenever inflation rise in the country the ADB/N also raised its deposit rate and vice versa. In this manner, the depositor holders of ADB/N never get negative real return during the last seven fiscal years except FY 1999.

To verify this, if the value of t-statistics is calculated then it is 5.037. The tabulated value for same at 5% level of significance and 5 d.f. is 2.571. So in this case t-calculated is greater than t-tabulated. This indicate that the relationship between two i.e. correlation coefficient is significant.

For lending rate and inflation rate, the correlation coefficient is 0.66899. This is moderate level of correlation. Similarly the value of t-calculated is 2.012. Since the value of t-calculated is less than tabulated value at 5% level of significance and 5 d.f. it can be said that the correlation coefficient is insignificant.

Thus it can be inferred that for ADB/N the deposit interest rate and inflation have positive relationship as suggested by Fisher but for the lending interest rate and inflation don't have the relationship as suggested by Fisher.

#### 4.4.4 Himalayan Bank Limited (HBL):

The interest rate on deposit, interest rate on lending of HBL and inflation of the country during the seven FYs were tabulated on table 4-19.

The table 4-19 shows that the interest rate of deposit was fallen below the inflation rate on FY 2006, 2007 and 2011. At FY 2012, the depositor gets the interest rate equal to the inflation rate. It means that during these periods, the depositor's actual earning position didn't increase. Except FY 2009, 2010 & 2011 the depositor's real return was negative because inflation rate was higher than average deposit rate. Similarly, it is also seen that the lending rate was higher than inflation rate in every FY. But in FY 2007 the inflation rate and lending rate was nearly equal. This situation protects the lender but hurt the borrower. Because nominal rate (market rate) is computed by adding inflation premium to real rate of return. So when inflation rate is greater than market rate then real rate is negative.

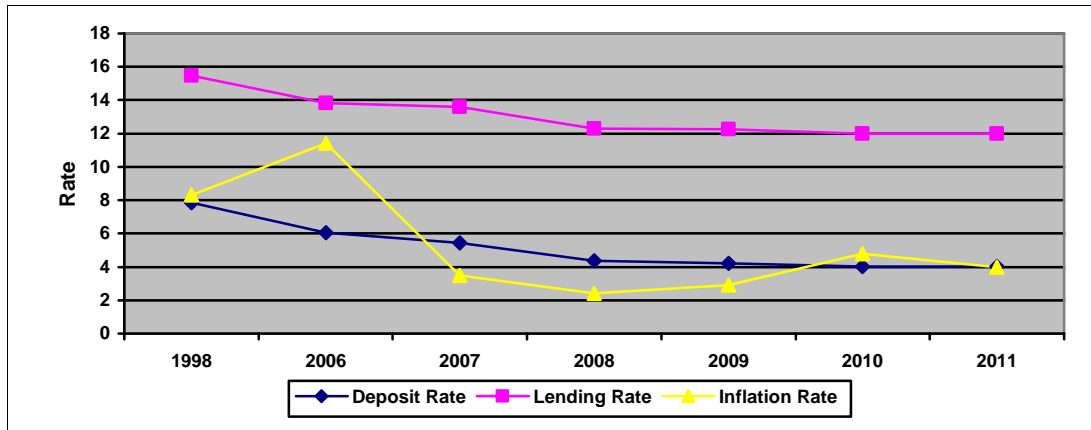
**Table no 4-19: Inflation Rate and Interest Rate of HBL**

Fiscal Year	CPI (1)	Inflation (2) %	Deposit Rate(3)	Lending Rate (4)
2006	117.1	8.3	7.86	15.46
2007	130.4	11.4	6.07	13.81
2008	134.9	3.5	5.42	13.58
2009	138.1	2.4	4.35	12.30
2010	142.1	2.9	4.20	12.25
2011	148.9	4.8	4.02	12.00
2012	154.8	4.0	4.01	12.00
Correlation coefficient. $r_{23}$		<b>0.6987</b>	Coefficient of Determination	
Correlation coefficient. $r_{24}$		<b>0.6574</b>	Coefficient of Determination	
t-statistics	t-cal (Deposit) =2.18		t-tab = 2.571	Insignificant
	t-cal (Lending) =1.95		t-tab = 2.571	Insignificant

Source: NRB, Research Department

The same phenomenon can be expressed by the help of graph 4-29.

**Figure No 4-29: Inflation Rate, Deposit Rate and Lending Rate of HBL**



The correlation coefficient between interest rate on deposit and inflation rate,  $r_{23}$  is 0.6987 which means that these two variables are positively correlated. An increment in inflation brings increment in interest rate on deposit and vice-versa. In general concept also, there is positive correlation between these variables. The coefficient of determination  $r^2_{23} = 0.4881$  means that of the total variation in dependent variable (deposit interest rate); only 48.81% has been explained by the variation in independent variable (inflation rate). Similarly the t-value for testing the significance of the correlation coefficient is 2.18 which is

less than the tabulated t-value for the 5 degree of freedom at 5 percent level of significance, 2.571. Since the calculated value is less than the tabulated value the correlation coefficient is not significant which means that interest rate on deposit of HBL is not correlated with the inflation rate and movement in inflation rates doesn't affect the interest rate on deposit significantly.

Similarly the relationship of interest rate on lending of HBL with inflation has also been examined. The coefficient of correlation between inflation and interest rate on lending,  $r_{24}$  is 0.6574 which shows that the variables are positively correlated. Movement in inflation rate leads movement in interest rate on lending in same direction. The t-value for testing the significance of correlation coefficient is 1.95. Since the calculated t-value is smaller than the tabulated t-value for 5 degree of freedom at 5 percent level of significance 2.57, the variables are not correlated significantly. This means that the lending rate of HBL is not significantly correlated with the inflation rate.

#### 4.4.5 Nepal Bangladesh Bank (NBB):

The inflation rate during the last seven fiscal years, deposit rate of ADB/N and lending rate of NBB are tabulated in table no 4-20.

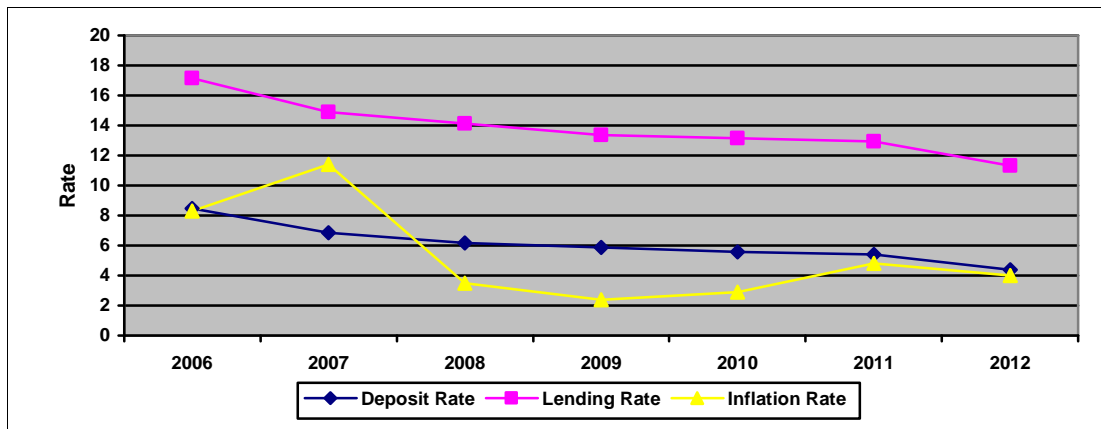
The table shows the structure of inflation, deposit rate and lending rate. During the seven FYs, inflation rate exceed the deposit rate only on the FY 2007 where inflation rate was 11.4% and deposit rate was 6.84%. Besides this, in other FY the deposit rate of NBB exceeded the inflation rate. Similarly for lending rate, in all years, interest rate of lending exceeds the inflation rate. The entire three rates were in decreasing trend but inflation was in decreasing trend with little bit fluctuation. If the value of the table 4-20 is plotted in the graph then it will be seen like figure no 4-30.

**Table no 4-20: Inflation Rate and Interest Rate of NBB**

Fiscal Year	CPI (1)	Inflation (2) %	Deposit Rate(3)	Lending Rate (4)
2006	117.1	8.3	8.45	17.15
2007	130.4	11.4	6.84	14.88
2008	134.9	3.5	6.17	14.13
2009	138.1	2.4	5.88	13.36
2010	142.1	2.9	5.59	13.16
2011	148.9	4.8	5.42	12.93
2012	154.8	4.0	4.38	11.30
Correlation coefficient. $r_{23}$		<b>0.62619</b>	Coefficient of Determination	
Correlation coefficient. $r_{24}$		<b>0.62082</b>	Coefficient of Determination	
t-statistics	t-cal (Deposit) =1.795		t-tab = 2.571	Insignificant
	t-cal (Lending) =1.770		t-tab = 2.571	Insignificant

Source: NRB, Research Department

**Figure No 4-30: Inflation Rate, Deposit Rate and Lending Rate of NBB**



The correlation coefficient between interest rate on deposit and inflation rate,  $r_{23}$  is 0.6219 which shows that there is positive correlation between these two variables. When inflation increases, the interest rate on deposit offered by NBB also increases. The coefficient of determination,  $r^2_{23}$  is 0.3867 means that, of the total variation in dependent variable (interest rate on deposit) is explained by the variation in independent variable (inflation rate) to the extent of 38.67 percent and other variables are responsible for remaining variation. The value of t for testing the significance of the correlation coefficient is 1.795 which is smaller than the table value. Since the calculated value is smaller than the

tabulated value at 5 d.f. and 5% level of significance, 2.571, the variables are not significantly correlated. Even though there exists positive correlation, but it is statistically not significant. So we can say that change in inflation has not any significant impact on interest rate on deposit of NBB.

In same manner the correlation coefficient between inflation and interest rate on deposit  $r_{24}$  shows that the variables are correlated and relationship is positive. Increase in inflation causes increase in interest rate on lending. But in similar manner the t-value for testing significance of correlation coefficient (t-cal = 1.7707) is smaller than the tabulated value at 5 d.f and 5% level of significance (t-tab = 2.571). As the calculated value is smaller than the tabulated value, the correlation coefficient is insignificant which means that the variables, interest rate on lending and inflation rate, are not correlated even if the analysis shows a positive coefficient of 0.62082.

#### 4.5 Findings of this Study:

This study is conducted to identify the practical applicability of some of the theories in the context of Nepal that are taught on the University and colleges. With this motive, this study is mainly focused on three objectives. First one is to determine the actual situation of substitution effect in the context of Nepalese financial markets. Similarly, next objective is to determine the relationship between lending rate and corresponding lending amount. And lastly, the next objective is to explore the actual relationship of inflation rate and interest rate.

From the study, the three major findings are obtained. They are:

- ) The analysis of substitution effect for both fixed and saving deposit shows that substitution effect does not work for all sample banks. This means that, people are oriented to deposit more amounts even if the

interest rates on deposit are falling every year. The increasing deposit amount clarifies this fact.

) According to theory, lending interest rate and lending amount should have inverse relationship. From this study, it is found that all sample banks except NBL have inverse relationship. But among them, three banks have strong relationship as required by theory. The increment in demand of loanable fund for NBB, HBL and ADB/N is due to the decline in lending rate because they have very high value of t-statistics. But for RBB, increase in lending amount is not due to the decrease in lending rate but due to other factors, as it has lower t-calculated value than tabulated value.

) For fixed and saving deposits, it is found that all sample banks except ADB/N have moderate correlation with inflation rate. Similarly, all t-test values are insignificant except ADB/N. This shows that deposit rate and inflation rate are not related significantly though the Fisher theory suggest there should be positive relationship. The case is same for lending rate and Inflation rate too.

# CHAPTER FIVE

## SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter is the important chapter for the research because this chapter is the extracts of all the previously discussed chapters. This chapter consists of mainly three parts: Summary, conclusion and recommendation. In summary part, revision or summary of all four chapters is made. In conclusion part, the result from the research is summed up and in recommendation part, suggestion and recommendation is made based on the result and experience of thesis. Recommendation is made for improving the present situation to the concerned parties as well as for further research.

### 5.1 Summary

Nepal is orienting towards the development. Natural resources of the country remain unused and unutilized due to the lack of financing and technical know-how. In order to mobilize the limited capital, the government of Nepal adopted the liberalization policy. As result up to now 33 commercial banks, 14 development banks, 5 rural development banks, 6 micro credit development banks, 58 finance companies, 34 saving and co-operatives and 44 financial NGOs are established within the financial system of Nepal. Financial system is hoped to develop the economy and help to raise the living standard of the people. Financial intermediaries mobilize the fund by collecting the scattered resources from the savers and provide the collected funds to the users. The intermediaries of financial systems sustain by lending the fund on higher interest rate and paying the deposit holder a little interest. It means that such organization survive by making profit through a large interest spread on

deposit and lending. The decision made to charge and provide interest on lending and deposit affects the profit position of the organization. Depositors are generally attracted by offering the higher interest rates. Similarly high credit rates de-motivate the investors as a result investment in the country shrinks down. Though there are various factors in the economy that affects the deposit amount and lending amount; interest rate is one of the major factor that affect deposit and lending amount. With the major objective of showing relationship between deposit rate and deposit amount i.e. substitution effect, lending rate and lending amount, inflation and interest rate, this study is undertaken.

After the liberal policy adopted by the government, NRB slowly loosen the rigid ness to fixed the interest rate that financial intermediaries charge and offer. But time to time, NRB use to issue directives regarding overall performance of the financial institutions. Therefore, in past few years back, banks and other financial institutions get freedom to quote the interest rate on lending and deposit. This creates the competition in the Nepalese economy. In this sense, this study is conducted to identify whether some of the theories of finance and economics are applicable or not in the Nepalese financial markets. These major theories are like substitution effect, fisher effect and inverse relationship between interest rate and lending amount. For this purpose brief introduction about Nepalese economy, interest rate, sample organizations, statement of problem, significance of the study, research hypothesis, and so on are made in the first chapter of this dissertation.

In second chapter, theoretical review as well as review of previous research has been made. Different views about interest, function of interest, theories of interest, factors affecting interest rate and so on are reviewed on that chapter. On the theories of interest, mainly four theories- The Classical Theory, Liquidity Preference Theory, Loanable Fund Theory and Rational

Expectancies Theory - are reviewed. Similarly the factor affecting interest rate like default risk, marketability risk, exchange rate risk and so on are explained. Similarly, the in order to identify the relationship of interest rate and inflation, Fisher effect, Harrod-Keynes effect are also studied on the second chapter.

Research design used is mainly analytical. Out of the total financial system, five commercial banks are chosen for sample purpose; mainly secondary data are used for the analysis. These all are made on third chapter. Lastly on fourth chapter, collected data are presented in tabular and graphic form and analyzed using various statistical tools like mean, standard deviation, correlation coefficient and t-statistics.

## 5.2 Conclusion

From the presentation and analysis of data; using different financial tools the major findings can be tabulated as follows:

**Table No 5-1: Unified (Integrated) results of all data analysis.**

Particulars		RBB	NBL	ADB/N	HBL	NBB
Substitution Effect (Deposit and Interest Rate)	r (Saving rate & Deposit)	-0.894	-0.842	-0.966	-0.955	-0.886
	r (Fixed rate and Deposit)	0.503	0.713	-0.965	-0.919	-0.878
	t-cal (Saving & Deposit)	4.460	3.581	8.427	7.235	4.287
	t-cal (Fixed & Deposit)	1.302	2.270	8.261	5.228	4.121
Lending and Interest	r (lending)	-0.561	0.397	-0.921	-0.912	-0.948
	t-cal (lending)	1.541	0.969	5.304	4.990	6.660
Inflation and Interest Rate. (Fisher Effects.)	r (inflation & deposit)	0.475	0.681	0.914	0.698	0.626
	r (inflation & lending)	0.624	0.551	0.668	0.657	0.620
	t-cal (inflation & deposit)	1.209	2.081	5.037	2.18	1.795
	t-cal (inflation & lending)	1.785	1.479	2.012	1.950	1.770

) The interest rates on both deposit and lending of all sample banks are found to be in decreasing trend. But contrary to this, deposit amount and lending amount is increasing every year except on fixed deposit of RBB

and NBL. The government run bank's fixed deposit is found to be decreasing every year.

) The saving deposit amount and saving interest rate have negative relationship ranging from 0.848 to -0.966. It means that they have highly inverse relationship, if one variable increases, other variable decreases and vice-versa. This case is against the theory of substitution effect. This may be due to the fact that, in last seven FYs, people accumulated most of their funds on saving accounts though they don't get appropriate interest on it. It may be just because of unavailability of other acceptable investment opportunity, in which a separate study can be made. Similarly, the convenience of using saving accounts provokes the investor to deposit more on saving account. Similarly the excess supply of loanable fund (saving deposit) reduces the cost of fund (interest rate of saving account.)

) To clarify the aforementioned conclusion, the t-statistic of negative correlation between saving deposit amount and saving interest rate is significant. It means that they have strong negative relationship. Therefore it is concluded that for saving deposit, there is no substitution effect.

) Analysis of fixed deposit amount and fixed interest rate shows negative relationship except RBB and NBL. The correlation coefficient for RBB and NBL is 0.503 and 0.7131. The RBB has moderate level of correlation where as NBL has high degree of correlation. According to correlation coefficient, the substitution effects occur for both RBB and NBL in case of fixed deposit. But for other three banks - ADB/N, HBL and NBB – the correlation coefficient is negative meaning people

deposit more money even if the bank offer the lower yield rate on fixed deposit. The magnitude of correlation is very high negative value for three banks.

) Even though, the correlation coefficient of RBB and NBL for fixed deposit amount and fixed deposit interest rate is positive, the t-statistics clarify that their relationship is not strong. The calculated value of t is found to be less than the tabulated value of t, so t-test indicates that there is no significant relationship between those two variables. Thus the decrease in deposit is not due to the decrease in interest rate but due to the other reasons. Therefore it is concluded that for fixed deposit also, there is no substitution effect at all.

) One of the variables that affect the demand of fund (lending activity) is lending interest rate. Theoretically, there is negative relationship between lending interest rate and lending amount. In this study for the 5 sample bank, it is found that all sample banks except NBL have negative correlation between these two variables. By using correlation tools, it can be inferred that all the sample banks except NBL have inverse relationship as suggest by theory.

) The t-test for correlation coefficient of each sample banks for negative relationship between lending interest rate and lending amount shows that the t value for RBB is insignificant which means that though the correlation coefficient shows the moderate relationship but their relationship is not strong i.e. not significant relationship. So Increase in lending amount is not due to the decrease in lending interest rate but due to the other reason. But for other banks except NBL the t value is significant meaning that the one of the factor to increase the lending

amount is decline in interest rates. So it can be concluded that lending interest rate is also an important factor for expansion or contraction of lending amount.

) The relationship between interest rate on deposit and inflation rate is positive. It ranges from 0.4757 to 0.914. The correlation coefficient for ADB/N is statistically significant but correlation coefficient of other sample organization is statistically insignificant. According to Fisher effect, there should be positive correlation between these two variables but the interest rate in Nepalese financial market is affected by inflation rate to some extent only. In conclusion it can be said that, the Fisher effect is not properly applicable in Nepalese financial market.

) The correlation between interest rate on lending and inflation rate is found to be moderately positive. The correlation coefficient among sample banks lies between 0.5517 to 0.6689. For all samples, the correlation coefficients are insignificant because their value lies below the tabulated value of t. So it can be said that lending interest rate in Nepalese financial market is affected by inflation only to some extent even though the theory says to exit a positive relationship.

) The real rate of return is found to be negative in some years. The negative real return indicates that depositor, instead of earning money, they loose their money in real sense, if they deposit in the bank paying certain percentage of interest. This is due to deposit interest rate lower than inflation rate. This condition hurts the depositors.

) During the study period, it is found that, there exist the high spread between deposit interest rate and lending interest rate. In the beginning

of the seven FY this spread was large but on later years, the spread declined to some extent.

) It is also found that, lending interest rate of the productive sector loan such as commercial loan, industrial loan, trade credit, working capital loan were decreased lesser in magnitude in comparison to the non productive sector loan.

### **5.3 Recommendation**

Based on the analysis, interpretation & conclusions, certain recommendation can be made here so that the concerned authorities, future researchers, academicians, bankers can get some insights on the present conditions on above topics. It is considered that this research will fruitful for them to improve the present condition as well as for further research. The major recommendations after this study are:

- ❖ In order to generate more capital for the development of the economy, more deposit need to be collected by the financial institutions. For this the financial institutions are suggested to quote higher deposit interest rate as far as possible. Though this situation reduces their profit opportunities, but it will enhance the economic condition of the country in the long run.
- ❖ The high spread between deposit interest rate and lending interest rate is another factor to be considered. Higher spread merely increases the profit figures of the banks but at the same time it reduces the deposit collection and investment in the country. So the financial institutions are suggested to reduce the interest spread as minimum as possible.

- ❖ As the central bank of the country, NRB has power to specify the range or spread between lending rate and deposit rate. So NRB is suggested to specify the spread when ever there is higher gap between two interest rates in the country.
- ❖ Though the interest rate in free market is determined by the interplay of demand and supply, the concerned parties who fixed the interest rates are suggested to include the inflation premium as far as possible while fixing the interest rates. If the rate of inflation is not considered & real rate comes out to be negative then depositors may withdraw their money and utilize it on non-productive sectors.
- ❖ While reducing the lending rate, it is suggested to reduce more on productive sectors than non-productive sectors. If not possible then bankers can reduce the rate of all sectors proportionately.
- ❖ The lending rates of same bank on same sector are found to be different i.e. quoted on range. These types of inconsistency may bring misconception about that organization. So banks are suggested to quote one consistent rate than on range.
- ❖ Lending institutions are suggested to invest on new areas as well as to introduce competitive customer oriented schemes on lending and borrowing so that more lending and borrowing can be promoted and over liquidity problem may be solved.
- ❖ From the experience of collecting the secondary data, it is suggested that NRB should pay special attention to publish detail information on

timely manner. The untimely publication of the bulletins handicaps the research workers and students

- ❖ Sample institutions are also suggested to include their interest rate structure in their annual report as well as kindly requested for the co-operation and sincere support to the research students.
- ❖ As this research is made by highlighting only one variable- interest rate, it is suggested for further research.

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## ANNEX

### Calculation of Average Interest Rate on Deposit of RBB

Deposit	2006	2007	2008	2009	2010	2011	2012
Savings	7.5%	6.50%	6.00%	6.00%	5.00%	4.75%	2.25%
<b>Fixed</b>							
7 Days	4.00	-	-	-	-	-	-
14 Days	5.00	-	-	-	-	-	-
1 Months	6.00	-	-	-	-	-	-
3 Months	7.00	4.00	4.00	5.00	4.00	3.75	3.00
6 Months	8.00	6.00	5.50	5.50	4.75	4.25	3.00
1 Years	10.5	7.50	7.00	7.00	6.00	5.75	3.75
Above 2Yrs	12	8.25	7.50	7.50	6.25	6.00	-
<b>Whole Mean</b>	<b>7.5</b>	<b>6.45</b>	<b>6</b>	<b>6.2</b>	<b>5.20</b>	<b>4.90</b>	<b>3.25</b>
<b>Fixed Deposit Mean</b>	<b>7.5</b>	<b>6.43</b>	<b>6</b>	<b>6.25</b>	<b>5.25</b>	<b>4.94</b>	<b>3</b>
<b>Std. Deviation</b>	<b>1.3%</b>						

$$\text{Mean } (\bar{X}) = \frac{\sum X}{n}$$

$$\text{Whole Mean} = \frac{\sum (7.5 + 4 + 5 + 6 + 7 + 8 + 10.5 + 12)}{8} = 7.5\%$$

$$\text{Fixed Deposit Mean} = \frac{\sum (4 + 5 + 6 + 7 + 8 + 10.5 + 12)}{7} = 7.5\% \text{ and so on.}$$

### Calculation of Standard Deviation:

$$S.D(u) = \sqrt{\frac{1}{n} \sum (X - \bar{X})^2} = \sqrt{\frac{10.99}{5.64}} = 1.3\%$$

#### Standard Deviation for RBB

Year	Average Interest(X)	(X - $\bar{X}$ )	(X - $\bar{X}$ ) <sup>2</sup>
2006	7.5	1.86	3.45
2007	6.45	0.81	0.65
2008	6	0.36	0.129
2009	6.2	0.56	0.313
2010	5.20	-0.44	0.193
2011	4.90	-0.74	0.547
2012	3.25	-2.39	5.72
	$\bar{X} = 5.64\%$		(X - $\bar{X}$ ) <sup>2</sup> = 10.99

## Credit of RBB

Sector	2006	2007	2008	2009	2010	2011	2012
Overdraft	19.00	17.50	16.50	13.50	11.75	11.25	12.20
Export Credit	16.00	15.00	15.00	12.00	11.50	10.00	9.50
Import LC	15.00	15.00	12.00	13.00	12.00	10.00	10.00
HMG Bond	14.50	14.00	11.00	14.00	10.50	10.0	7.00
BG/CG	19.00	-	-	10.50	10.00	9.25	9.25
Other Guarantee	-	-	15.00	10.50	-	-	-
Industrial Loan	16.50	15.50	15.50	15.00	14.50	11.75	12.00
Commercial Loan	17.50	17.50	16.50	15.50	15.00	-	-
Priority Sector Loan	16.00	15.00	14.00	14.00	13.00	12.00	12.00
Working Capital	-	14.50	14.00	14.50	13.75	12.50	11.00
Hire Purchase	17.00	17.00	16.00	14.00	13.50	12.00	12.00
Others	19.00	17.50	16.50	15.5	15.00	12.00	12.00
<b>Average Int. Rate(1)</b>	<b>16.95</b>	<b>15.85</b>	<b>14.73</b>	<b>13.5</b>	<b>12.78</b>	<b>11.08</b>	<b>10.70</b>
Lending Amount(2)	22404.8	26340.4	29140.6	28424.7	28576	28258.9	26781.87
Correlation ( $r_{12}$ )	-0.56761						
Coefficient of determination ( $r_{12}^2$ )	0.322185						
<b>t-statistics</b>	t-cal = 1.5416		t-tab = 2.571		Insignificant.		
<b>Std. Deviation</b>	2.35%						

$$\text{Simple Correlation Coefficient (r)} = \frac{n\sum X_1 X_2 - (\sum X_1)(\sum X_2)}{\sqrt{n\sum X_1^2 - (\sum X_1)^2} \sqrt{n\sum X_2^2 - (\sum X_2)^2}}$$

Year	Lending Rate $X_1$	Lending Amt $X_2$	$X_1 X_2$	$X_1^2$	$X_2^2$
2006	16.95	22404.8	<b>379761.36</b>	<b>287.3025</b>	<b>501975063</b>
2007	15.85	26340.4	<b>417495.34</b>	<b>251.2225</b>	<b>693816672</b>
2008	14.73	29140.6	<b>429241.038</b>	<b>216.9729</b>	<b>849174568</b>
2009	13.5	28424.7	<b>383733.45</b>	<b>182.25</b>	<b>807963570</b>
2010	12.78	28576	<b>365201.28</b>	<b>163.3284</b>	<b>816587776</b>
2011	11.08	28258.9	<b>313108.612</b>	<b>122.7664</b>	<b>798565429</b>
2012	10.7	26781.87	<b>286566.009</b>	<b>114.49</b>	<b>717268561</b>
Sum	95.59	189927.3	<b>2575107.09</b>	<b>1338.333</b>	<b>5185351640</b>

$$r = \frac{7 \times 2575107.09 - 95.59 \times 189927.3}{\sqrt{7 \times 1338.33 - (95.59)^2} \sqrt{7 \times 5185351640 - (189927.3)^2}} = -0.56761$$

### Student t-statistics for hypothesis test:

Formula to compute t-calculation

$$t = \frac{r}{\sqrt{1-r_{12}^2}} \times \sqrt{n-2}$$

For RBB t-calculation for lending rate and lending amount is

$$t = \frac{-0.56761}{\sqrt{1-(-0.56761)^2}} \times \sqrt{7-2}$$

$$= 1.5416$$

**Note: In this dissertation calculation are made by using both calculator (formula) and excel worksheet. So, for all case, every calculation are not shown here.**