

AN ANALYSIS OF MONEY SUPPLY AND INTEREST RATE STRUCTURE IN NEPAL

A Dissertation Submitted to The Faculty of Humanities and
Social Sciences, Central Department of Economics for
The Partial Fulfillment of The Requirements for
The Degree of Master of Arts in Economics

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LETTER OF RECOMMENDATION

This dissertation entitled "An Analysis of Money Supply and Interest Rate Structure in Nepal" is prepared by Mr. Damaru Ballabha Paudel under my supervision as a partial fulfillment of the requirements for the Degree of Master of Arts in Economics. I forward it with recommendation for approval.

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Dated: 25 September, 2001

APPROVAL LETTER

This dissertation entitled "An Analysis of Money Supply and Interest Rate Structure in Nepal" submitted by Mr. Damaru Ballabha Paudel has been accepted as a partial fulfillment of the requirements for the Degree of Master of Arts in Economics.

Dissertation Committee

Chairman:

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I. CHAPTER1 : INTRODUCTION

1.1 Background

Nepal is a small landlocked country with underdeveloped economy. The country is mainly based on agriculture. Agricultural sector provides employment to about 75% of the country's labor force and contributes approximately 42% of the GDP. One third of the agricultural GDP is contributed by the income obtained from livestock. Nepal remains in general poverty with very low per capita income about 210 US dollars (WDR, 1998/99). Very low productivity and heavy population pressure (population growth rate 2.1%) are still dominant features of the Nepalese economy. Factors of production are of poor quality. The economy is characterized by redundant unskilled labor and acute shortage of skilled manpower and specialized capital. There is lack of entrepreneurship talent because caste, religion, sex etc. govern entrepreneur class and economic activities are performed based on prescription not on ascription. The economic scenario suggests a paradoxical case in that there is dearth of financial resources on the one hand and the existence of underutilization of available factors of production on the other hand. Even the small industrial capacity whatever exists is not fully utilized. The managerial and administrative capabilities are yet to be standardized in the formal sectors of the economy as well. The paces of technological innovation in all spheres of economic activities are yet to be enhanced.

Nepal has already undertaken four and half decades of planned development efforts. Eight periodic plans are completed and now we are running in the ninth plan. In the past eight plans, we have done some progress on the field of infrastructure like transport, power, communication, education and health sectors. However, this progress is not sufficient and Nepal has yet to achieve a favorable record of economic management. For this, the resources raised domestically, received in aid from international agencies and friendly countries should be put to the best use.

The main problem of underdeveloped countries like Nepal is to achieve economic stability and to accelerate economic development. For economic development, we should have both fiscal and monetary measures. As the agricultural country, Nepal has many unutilized resources because of the lack of adequate capital, infrastructures and modern technology. Therefore, the necessity is those traditional ideas and techniques should be replaced by new ideas and inventions.

Fiscal as well as monetary measures are important for running the pace of economic development. Fiscal measures indicate the government revenue, expenditure, budgeting, deficit finance, tax structure, debt policy etc. and monetary measures emphasize the activities related to the central bank, commercial banks, financial institutions, development banks, Co-operatives etc. The objective of both fiscal and monetary policies is the economic stability and development in the country. The research focuses mainly on the monetary policy and it will give attention to the study of change in money supply and variations of interest rate in Nepal.

"In the context of liberal economic policy pursued by the country, it is essential that fiscal and monetary policy should be liberal and sound to create a competitive environment. On the one hand, economic stability has to be attained along with high economic growth rate and on the other hand, careful attention has to be paid on income distribution and poverty alleviation"(The Ninth Plan, 1997-2002, P 139). Thus the main objective of monetary policy in present situation is to focus towards strengthening the balance of payment situation, reducing unequal distribution of income, assisting in poverty alleviation, promoting the mobilization of savings through positive interest rate policy, keeping interest rate on borrowing at a minimum level and creating an environment of confidence for foreign investment. Therefore, keeping the money supply within a desirable limit, price should be made stable and interest rate should be maintained to international level.

After the establishment of Nepal Bank Limited in 1937 A. D., the banking system started in Nepal. The Central Bank of Nepal, Nepal Rastra Bank was established in 1956 A. D. under the Nepal Rastra Bank act 1955. As the Central Bank, it does the various functions, which come under the monetary measures, and it is responsible for the development of financial institutions in the country. It controls the monetary sector and adopts the suitable monetary policy according to the situation prevailing in the country. Money supply is controlled by Nepal Rastra Bank while interest rate used to be administered by it before 1990 and since 1990, it is determined by commercial banks.

1.2 Statement of the Problem

Before 1990, the country was under the controlled economic system and it started economic liberalization in 1990. Before 1990, the monetary authority (i.e. NRB) used to fix the interest rates and effective August 31, 1989; interest rates of banks and financial institutions were completely liberalized. Commercial banks and financial institutions were granted autonomy in fixing their own deposit and lending rates. Interest rate liberalization, however could not fully meet the objectives behind this step. The oligopolistic nature of the commercial banking system produced cartelling in interest rate determination. As a result, the lending rates increased faster than the deposit rates resulting in wider spread between lending and deposit rates. In Nepal, high interest rate is one of the main complaints of the investors. The interest rate charged on loan by commercial banks and financial institution is high in comparison with the level of interest rate in the international market and even in many countries of South Asia. Due to the high interest rate and high operating costs, interest rate on credit is also high. As a result, industrial ventures utilizing the bank credit have been unable to produce output at a low cost. Unless such situation is improved, Nepal's pace of industrialization cannot be expedited. Money supply and its components are also responsible for the variation of interest rate. The regular increase in money supply will thus help to determine the interest rates position. Therefore the problem is - to identify the effectiveness of the monetary variables in determining the interest rate in Nepalese economy. Therefore, it is necessary to study about the money supply and its impact on interest rate in Nepalese

context. Before 1990 A.D., the monetary authority of the country administered the interest rates and there is no net impact of money supply on interest rates. Therefore, the impact of money supply on interest rates during the economic liberalization (i.e.1980-19999) is studied in this dissertation.

1.3 Objectives

The main objectives of this research work are:

1. To study and analyze the trend of money supply in Nepal for the period 1980 to 1999.
2. To analyze the determining factors of money supply.
3. To study and analyze the interest rate structure of Nepal.
4. To find out the possible measures to solve the high spread between lending and deposit rates in Nepal.
5. To study the impact of money supply on interest rates during liberalized economy (1990 to 1999).
6. To see the relative effectiveness of monetary and fiscal policies in Nepal.

1.4 Significance of the study

This research work will study the impact of money supply on interest rate, in Nepal, after the autonomy of commercial banks that is since 1990 onwards. How monetary measures interplay in the economy will be studied in Nepalese context. By this research work, the other research workers and concerned persons will be beneficial and planners and policy makers will get information about money supply and interest rate structure of Nepal to adopt suitable policy.

1.5 Hypothesis

The main purpose of this study is to see the relationship of money supply and interest rate in Nepal on the assumption of *ceteris paribus* (other factors are assumed to be constant). Therefore, this study will attempt to test the following hypothesis empirically in the context of Nepal:

1. There is strong impact of NFA and NCG on high-powered money.
2. High-powered money is a significant determinant of money supply.
3. The money supply has significant impact on loaning out interest rates.
4. The money supply has significant impact on deposit interest rates.
5. In Nepalese Economy, the effect of monetary policy is stronger than fiscal policy.

1.6 Limitations

This research work is an attempt to establish relationship between money supply and interest rate structure of Nepal. There are many other factors that can have significant effect on interest rate however, they are not considered in this study.

The data used in this study are secondary. The money supply and interest rate structure in only a single country (i.e., Nepal) will be studied and only in the time

horizon of 1980 to 1999 (20 years). Due to some difficulties, the researcher has not been able to take all the data that are available on this topic. In spite of these limitations, this study has tried to give in a concrete form.

1.7 Chapter Scheme

Chapter 1 will be the introduction, which is the main framework and the basis of the study. Chapter 2 provides review of relevant literatures. In chapter 3, research methodology is discussed. Chapter 4 is the theoretical discussion in Nepalese context in which the money supply, factors responsible for it, the monetary and fiscal policies, interest rate structure, the interest spread etc. are mentioned. In chapter 5, the analysis is done on the basis of data, the relationship of money, interest rate and other related variables are mentioned and analyzed. In chapter 6, summary, conclusions and recommendations of the study are given. Bibliography and appendices will be at the end of the study.

II. CHAPTER 2: REVIEW OF LITERATURE

This research work is concerned to money supply and interest rate, so the theoretical developments and empirical readings in the related subject have been reviewed below.

2.1 Money Supply and Interest: Theoretical Developments

The theoretical developments in the field of money and interest are summarized here. The views as given by different school of economists such as: classical view, neo-classical view, Keynesian view and Post-Keynesian view etc. are discussed below in brief.

2.1.1 Classical View

The economists like: Ricardo, J.S.Mill, Marshall, Fisher, J.B. Say etc. developed the classical concept. The classical economic analysis is based on the belief that money is neutral or money is veil or money does not matter. Say's law of market and quantity theory of money are the two basic pillars of the classical economics. The former states that supply creates its own demand and the latter tells that the quantity of money is the main determinant of the price level. According to Fisher, other things remaining unchanged, as the quantity of money in circulation increases, the price level also increases in direct proportion and the value of money decreases and vice versa. It can be expressed as:

$$MV = PT$$

Where, M = the total quantity of money in circulation

V = the velocity of circulation of money

P = price level

T = transaction performed by money

In this equation, V and T are assumed to be constant and are independent of changes in M but in the short run determined by structural and institutional factors. Thus, the effect of change in money stock is fully reflected to the change in the price level. For classical economists money is used only for transaction purpose and they did not recognize the store of value function of money.

For classical economists interest is the reward paid for the use of capital. The classical theory of interest is also known as the capital theory of interest or the saving investment theory of interest or the real theory of interest. According to this theory, interest is a real phenomenon and the rate of interest is determined exclusively by the real factors, i.e., the supply of and demand for capital under perfect competition. Assuming the income level to be given, the rate of interest is determined by the intersection of the investment and saving curves.

The classicists were of the view that interest is not a purely monetary phenomenon, though it is paid in money terms on money loans and assets. The level of interest has nothing to do with level of money supply.

2.1.2 Neo-Classical View

The economists like: Pigou, Patinkin, Brunner, Meltzer etc. developed the neo-classical concept. These economists attempted to rehabilitate the classical theory. The monetary issues on which the neo-classical economists mainly focused are: neutrality of money, dichotomisation of real and monetary sectors and real balance effect. Don Patinkin, a member of neo-classical school, integrates the money market and goods market of the economy, which depends both on relative prices and real balances. Real balances mean the real purchasing power of the stock of cash holdings of the people. When price level changes, it affects the purchasing power of people's cash holdings that in turn, affects the demand and supply of goods, which is the real balance effect. Real balance effect is the essential force through which equilibrium is established in the money market. The neo-classical economists recognized the store of value function as well as medium of exchange function of money.

The neo-classical economists developed the loanable funds theory of interest, which is an improved version of the classical theory of interest. For them interest is a real-cum-monetary phenomenon. According to neo-classical economists, interest is reward for the use of loanable funds and the equilibrium rate of interest is determined when the supply of loanable funds and the demand for loanable funds are equal. The neo-classical economists believed that money supply is interest elastic.

2.1.3 Keynesian View

J. M. Keynes, in his book, *General Theory of Employment, Interest and Money*, has developed a monetary theory of interest, which is known as liquidity preference theory of interest, in opposition to the classical real theory of interest. For Keynes interest is purely a monetary phenomenon and the equilibrium rate of interest is determined by the intersection of the demand for money function and the supply of money function. He has followed the transmission mechanism to explain the relationship of money supply, prices, interest rate and output. According to him, an increase in the money supply initially shows impact on the interest rate by lowering it. The marginal efficiency of capital remaining unchanged, there is an increase in the investment demand and it raises the level of aggregate income, employment and output. As these rise, price also begins to rise due to the various causes as increase in the labor cost resulting an increase in the bargaining power of workers as employment increases and also due to the law of diminishing returns that operates in the industry. Therefore, to him, money changes will affect output or prices only through its effects and convectional yields on the market interest rate of small group of financial assets such as government bonds. To Keynes monetary impulses are thus transmitted in the economy by the play of interest rates over the vast array of assets.

Keynes attacked the classical view in the ground that money is demanded only for transactions purpose. He mentioned that money is demanded for various motives such as: transactions, precautionary and speculative motives. They are discussed below in brief.

2.1.3.1 Transactions Motive

The transaction demand for money arises from the medium of exchange function of money in making regular payments for goods and services. The demand for money for transaction motive mainly depends on the size of money income. The higher the level of money income, the greater the demand for transactions motive and vice versa. The transactions demand for money is not influenced by the rate of interest. Symbolically the transaction demand for money (L_t) can be stated to be the function of money income (Y).

$$L_t = k (Y)$$

Where k = proportion of income which is kept for transactions purposes.

2.1.3.2 Precautionary Motive

People hold additional amount of cash in order to meet emergencies and unexpected contingencies such as: sickness, accidents, unemployment etc. The precautionary demand for money depends upon the uncertainty of the future. The precautionary demand for money (L_p), like the transactions demand is also a function of the level of money income (Y) and is insensitive to the changes in the rate of interest. Symbolically,

$$L_p = k (Y)$$

Where k = proportion of income which is kept for precautionary purposes.

2.1.3.3 Speculative Motive

This refers to the demand for holding certain amount of cash in reserves to make speculative gains out of the purchase and sale of bonds and securities through future changes in the rate of interest. There is inverse relation between the interest rate and bond prices. The demand for money for speculative motive (L_s) is highly sensitive to and is a negative function of the rate of interest (r). As the current rate of interest rises, the demand for money for speculative motive decreases and vice versa. Symbolically,

$$L_s = f (r)$$

Where f = functional relationship between L_s and r .

The total demand for money (M_d) = $k (Y) + f (r)$

For equilibrium condition, Demand for money (M_d) = Supply of money (M_s)

Thus, the total supply of money (M_s) = $k (Y) + f (r)$

According to Keynes, given the liquidity preference curve, higher the rate of interest lower will be the speculative demand for money. At a very low rate of interest, the liquidity preference curve becomes perfectly elastic and the speculative demand for money is infinitely elastic. This is known as liquidity trap situation. The monetary

authority cannot influence the rate of interest even by following a cheap money policy in a liquidity trap situation. It means that rate of interest cannot fall to zero. To Keynes, money supply is determined and controlled by the government or the monetary authority of the country and it is interest inelastic.

The Keynesians, such as: Tobin, Samuelson, Ackley, Modigliani etc. are modern followers of J. M. Keynes who formulated his original ideas. They held the view that money does not matter and regarded the money supply as a passive factor in the economic system. They believe that fiscal policy is more effective than the monetary policy.

2.1.4 Post-Keynesian View

Prof. Milton Friedman and his colleagues at the University of Chicago made the new and important contribution to monetary theory and policy. They are known as the monetarists who strongly opposed the views of Keynesians and traced their lineage to the classical and neo-classical roots. They held the view that only money matters and money supply plays a crucial role in affecting the nominal macro variables. Monetarists rejected the Keynesian transmission mechanism and liquidity preference theory of interest. They followed the transmission mechanism at which an increase in money stock may directly affect expenditure, prices and yields on physical assets. They suggest that money may be substituted not only for bonds but also for other assets. When money is used to purchase the physical assets, the interest rate effect no longer precedes the price effect because it is only through an increase in the price of assets that the reduction in yield is effected. In a period of rising prices, inflationary expectations raise the cost of holding money and the public has an incentive to reduce the quantity of desired real balances by increasing expenditures.

According to monetarists, the central bank cannot influence interest rate through changes in the supply of money. If it tries to reduce the interest rate by releasing large quantity of money, this will only cause inflation since the economy is already at near - full employment level. In fact, this will reduce the real money supply and increase interest rate.

The post-Keynesian economists like Hicks, Hansen and Lerner have formulated a determinate theory of interest by integrating the neo-classical loanable funds theory and the Keynesian liquidity preference theory. This theory is known as the neo-Keynesian synthesis or the modern theory of interest. The loanable funds theory gives stress on the real factors like saving and investment and underestimates the role of monetary factors. On the contrary, the liquidity preference theory emphasizes the monetary factors i.e., demand for and supply of money and ignores the real factors. According to modern theory of interest, a complete and determinate theory of interest must take into consideration both real and monetary factors. There are four determinants of rate of interest: the saving function, the investment function, the money demand function and the money supply function. In modern theory of interest, the equilibrium level of

interest and equilibrium level of income are determined simultaneously at the point of intersection between the IS and LM curves.

2.2 Money Supply and Interest: Empirical Readings

A. In the concerned title, some of the books, articles and dissertations have been written. The writers and researchers have presented their own opinions that may be helpful for this study also which are presented below.

B.

2.2.1 Books Review

Fry (1977) has given a report to NRB about the interest rate policy in Nepal. Taking time series data covering the period of 1957 – 1978, his purposes were to analyze the effects of interest rate, to recommend measures for interest rate policy and to give suggestions for accelerating the rate of domestic resource mobilization in Nepal. The suggestions given by him were as follows:

1. Suggestions for Rational Interest Rate Structure

- a. Abolish all existing time deposits.
- b. Introduce new one year time deposits with resale to banks at 1% discount yielding 13% interest.
- c. Make all interest earned on deposits free from tax (at least the first Rs.5, 000).

2. Suggestions for Rational Loan Rates

- a. Allow financial institutions to make additional changes to cover differing costs and risk premium on all types of loans.
- b. Maintain present commercial loan rate but enact negotiable instrument act and legislation for effective hypothecation immediately.
- c. Drastically change personnel policies of the commercial banks.
- d. Pay interest on all bank deposits with NRB, except those held as penalties.
- e. Reduce registration fees it should cover costs only.
- f. Abolish the liquidity ratio, but maintain the reserve (cash) ratio.
- g. Increase government borrowing interest rates.
- h. Change loan rates on existing loans from their original level.

Finally, he concluded that it is very doubtful whether any reduction in loan rate is warranted at present. Unwanted capital inflow will be checked by the deposit rate reform, the banks' profitability restored by paying interest on their deposits with NRB, time deposit reform, abolition of the liquidity ratio and higher development bond rates. That some non-institutional interest rates may be lower than the present commercial bank loan rate, which is irrelevant.

Pant (1983) has studied about the interest rate policy of Nepal using the time series data covering the period 1965 to 1980. His purpose of study was to evaluate the significant macro-economic and sectoral aspects of the interest rate policy in a way that can be of direct use for policy formulation and implementation. The demand function for real money balances (M_d/P) used in his model is the dependent variable that is the traditional one, containing real income (y) and the nominal interest rate on one year

fixed deposits (r) as the explanatory variables. He estimated the equations using narrow money (M₁) and broad money (M₂) in the demand function. The form of tested regression equations were:

(1) The regression estimation between M₁/P (dependent variable) and y and r (independent variables) in the log-linear form is:

$$\text{Log (M}_1\text{/P)} = 5.01 + 1.10 \log y - 0.007 \log r$$

(3.92) (7.30) (0.80)

$$R^2 = 0.953, D-W = 1.65$$

In this equation, the coefficients have the expected sign and y is significant at 5% level but r is not significant. The demand for narrow money is responsive only to change in real income and the income elasticity is 1.10. The rate of interest has no significant influence on holdings of money balance.

(2) The regression estimation between M₂/P (dependent variable) and y and r (independent variables) in the log-linear form.

$$\text{Log (M}_2\text{/P)} = -2.48 + 1.40 \log y - 0.029 \log r$$

(-0.15) (7.50) (-0.50)

$$R^2 = 0.953, D-W = 1.78$$

In this equation also, all the coefficients have the expected sign and y is significant at 5% level but r is found to be statistically insignificant.

Pant concluded that the change in interest rate will increase time deposits through the route of balance of payments but the magnitude of effect will depend on the interest elasticity of money demand function. The real rate of interest has the expected influence on money demand, or the velocity of money, but it is statistically insignificant.

Sharma (1987) studied the monetary structure of the Nepalese economy using the time series data covering the period of 19 years from 1964 to 1982. The objectives of his study were: to study the historical nature of the monetary control techniques used in Nepal, to examine the money supply process in Nepal, to estimate the relationship of money with other economic variable such as GDP, ASP etc. and to examine efficiency of domestic control measures in the face of openness of her economy and to derive monetary policy prescription for the future. The explanatory variables used in his model are: net foreign assets with monetary authorities (NFAM), commercial bank borrowing from the NRB (BBC), government fiscal deficit (FD), gross domestic product at constant (1964) prices (GDP /P), interest rate on one year time deposits (r₁₂) while the dependent variables are reserve money (RM), demand for interest bearing assets with commercial banks at constant (1964) prices (D₂ /P)^D. He has estimated the following regression equations.

(1) The regression estimation between RM (dependent variable) and NFAM and BBC (independent variables).

$$\log RM_t = 0.359 + 0.791NFAM_t + 0.136BBC_t$$

(1.99) (8.53) (5.16)

$$SEE = 0.073, F\text{-value } 0.073, R^2 = 0.943, \bar{R}^2 = 0.940, D-W = 1.416$$

In this model, data covered the period 1965-82. Here t-values of the coefficients of explanatory variable are significant at 1% level while t –value of intercept is significant at 5% level.

(2) The regression estimation between RM (dependent variable) and NFAM, FD and BBC (independent variables).

$$\log RM_t = 0.559 + 0.492 \ln NFAM_t + 0.238 \ln FD_t + 0.150 \ln BBC_t$$

(4.27) (5.12) (3.6) (5.43)

$$SEE = 0.049, F\text{-value} = 122.34, R^2 = 0.968, \bar{R}^2 = 0.963, D.W. = 1.70$$

In this model, data covered the period 1965–80. Here t-values of explanatory variables and intercept are significant at 1% levels.

The high-powered money ($H = RM$) in Nepal is without doubt, a dominant function of the foreign asset reserves held by the monetary authority. When the constant elasticity of high-powered money with respect to the NFAM is between 0.49 and 0.79 (above results) and the elasticity at mean comes around 0.62. These however do not mean that other sources are unimportant. The RM equation in both the systems, show how other variables hold an equally important place while explaining high powered money from the sources side. This is shown by the coefficients of BBC and FD, which are highly significant. The constant elasticity of RM with respect to BBC is around 0.14 whereas its elasticity with respect to FD is 0.238. According to Sharma, there are a couple of determinants of high-powered money through whose regulation the NRB can exert a direct pressure on money supply. Given the balance of payments, and the monetary deficit of the government, NRB can control credit supply (a source of M_s) to banking and private sectors, not only to regulate its volume and sectoral distribution, but also to offset the adverse effects, if any, which are felt exogenously. As a complementary factor, the offsetting role of money multiplier in the effect of reserve money also serves as a very important mechanism to keep the growth of money supply always to suit the needs of the domestic economy.

(3) The regression estimation between D_2^D / P (dependent variable) and GDP / P and r_{12} (independent variables).

$$\log (D_{2t} / P_t)^D = -12.28 + 4.41 GDP_t / P_t + 1.2 r_{12t}$$

(-2.58) (2.47) (3.2)

$$SEE = 0.16, F\text{-value} = 57.97, R^2 = 0.982, \bar{R}^2 = 0.885, D-W = 1.27$$

In this model, the data covered the period 1964-80. Here t-values of coefficients of explanatory variable are significant at 5 % and 1% level while t –value of intercept is significant at 10% levels. The interest bearing deposits in Nepal is quite a distinct variable than the money proper. With the help of above results, the estimate for the demand for interest bearing assets with commercial banks (D_2^D) is extremely good. If the elasticity of $(D_2/P)^D$ with respect to r_{12} is greater than unity, it is unitary with respect to GDP/P . This means when demand deposits held by public (D_1) in Nepal is demanded for transaction purpose, interest bearing assets with commercial banks ($D_2 =$ saving deposits + time deposits) is a special kind of financial savings.

Sharma concluded that the only autonomous source of high-powered money in Nepal could be the NRB credit to commercial banks and private sector. The NFAM are endogenously determined by the balance of payments while the fiscal deficit of the government is out of central bank control. Therefore, the only policy variable left with NRB is the credit to commercial banks and the private sector. He adds that the expansionary monetary policy in Nepal has resulted in an excessive growth of money supply in relation to the growth of real income. Since the economy has not been able to raise its productivity in real terms, the ultimate consequence of the excess money supply has been a spurt in prices. He further mentions about interest rate structure: it also appears that the monetary authorities, while changing the interest rate structure, have correctly perceived the painful sacrifice of income earners, but they have wrongly perceived the efficiency of the supply side of economy, or the profitability of investment in the real sector. This is because generally banks have held excessive resources even if the object of changing the rate of interest by authorities is to increase the flow of financial funds to the real sector.

2.2.2 Articles Review

Gibson (1975) has investigated about the interest rates and monetary policy using monthly and quarterly time series data for USA. He observed the relation between the money stock and current and past interest rates for the period 1947-1966 with the help of simple regression equation. He concluded that change in the money stock produces an immediate negative liquidity effect on market interest rates, but also produces (only a little later) positive effects that tend to offset the initial negative influence. Liquidity effects are fully offset by the end of the third month following the month in which M_1 is changed and by the end of the fifth month after M_2 is changed. Some implications of these findings suggest that increasing the money stock can lower interest rates, but this act also produces forces which will offset the lowering within several months. This process will produce increases in nominal income that may be a goal of monetary policy. Since, income increases due to an increase in money stock which will be accompanied by higher interest rates. Interest rates may reflect an easier or a tighter monetary policy. Moreover, to maintain lower interest rates it is necessary to increase money stocks continuously. But this act itself generates expectations of rising prices that tend to raise interest rates.

Eisner (1975) has studied the factors affecting the level of interest rates in USA. He has found that the monetary authority could raise interest rates or allow them to rise in the short run. This is not without effect on the economy, although much more at the non-aggregate level, involving transfer of resources from these with poorer access of credit to those with better access. When depression destroys investment demand, interest rate will fall. When an expanding war calls for resources at a faster rate than a growing economy will freely grant them, interest rates rise. Purely monetary resources to cope with such developments are limited in effectiveness and sometimes so selective

in their impact as to offend seriously our sense of equity and in some instances, the efficient working of economy.

According to Hendershott and Horwich (1975), the ideal monetary policy is one in which the central bank, starting at a position of full employment, acts immediately to equate the market rate of interest to the natural rate of interest. At the same time the fiscal authority manipulates the natural rate of interest by tax and expenditure policies so as to keep it within a politically acceptable range. The fiscal authority is also responsible for taking action against disturbances that do not involve changes in the market or natural rates destabilizing direct movements between money and commodities. This leaves both the treasury and the central bank with a clean and clear understanding of what must do.

Holmes (1975), economist at the Federal Bank of New York is of the opinion that the interest rate variations would be greater with money supply as a guideline than they have been while the system was using multiple guidelines involving both monetary aggregates and interest rates. How great interest rate variations would be, would depend very much on how rigid the guideline was and how short the time horizon in which it was supposed to operate might be. The question of how great variations might be can probably never be resolved in the absence of any concrete experience. Some exponents of the monetary school, however, seem to imply that interest rate variations make no difference at all. It seems that there are serious risks in the assumption that the financial markets of the real world can handle any range of interest rate variation. Pushing too hard on money supply control in the face of rapid interest rate adjustment could wind up by destroying the very financial mechanism that the monetary authority must use if it expects to have any impact on the real economy.

Mr. Gunanidhi Sharma, in his article, writes about interest rates of Nepal as: "In a market regulated economy as of today, rate of interest should indicate the profit, or the productivity levels across sectors and activities. As its height is governed by the efficiency of the fund invested in each sector, Nepal's economic performance measured in terms of the inverse of the sectoral ICOR's should not be that disappointing. But since the profit rate, or the productivity growth is affected by so many other risk and uncertainty factors with their domestic as well as foreign origin and when the profit or the productivity rate is not explained by capital efficiency alone, it is quit difficult to reach a definite conclusion on the built-in economic nature and the structure of the natural rate and the effect of it on investment decision". He further emphasizes, "The size of the influence on the rate, on the other hand, from outside the economy and of the long run and expectancy consideration is further unknown in the absence of information generated through research exercises. Still we may conclude that the structure, height, behaviour and the Co-existence to the rates are quite enough in indicating the stages of economic development known popularly as backward and advanced ones, from this point of view, Nepal, obviously, belongs to the former category" (Sharma, 1993).

Mr. Se-Il Ahn and Mr. Soo-Nam Oho write about the interest rate in Korea as "In order to introduce interest rate utilization, the monetary policy environment should be

improved. The current conditions for using interest rate as an operational target are not adequate due to institutional constraints and the currency crisis. But the time will come sooner than might be expected, provided restructuring process satisfactorily and the financial markets settle down. Therefore, we have to prepare energetically for its introduction. For this, firstly the call rate's representativeness Vis a Vis the reserve market should be increased; secondly the instruments to adjust the call rates should be diversified; thirdly a new transmission mechanism should be enhanced. In order to diversify the instruments available to adjust the call rates, we should, at first, increase the central bank lending rate to market levels, so that it may have a signaling effect. At the second stage, it is recommended that the current aggregates ceiling credit system under which individual banks' quotas are allocated on the basis of policy lending performance be changed to a new loan limit system under which banks would be able to borrow on a commercial basis. In order to establish an interest rate transmission mechanism, there is an urgent need to develop short and long term financial markets by increasing the range of financial instruments and abolishing many explicit and implicit regulations" (Se-Il Ahn and Soo-Nam Oho, 1998).

2.2.3 Dissertations Review

Neupane (1977) tried to analyze how monetary measures can provide additional capital for financial development through change in money supply and institutional interest rates in his M. A. dissertation. Covering the data for the period 1967-1976, he has made theoretical attempt and has not presented any mathematical terms in his study. He is of the view that the problem of lack of capital can be solved when the available capital diverts into the real productive sectors. Money supply is a factor providing additional capital by expanding banking facility in rural areas and to mobilize the resources of rural areas into productive sectors. The volume of money supply should be increased by increasing demand deposits and net currency from banking sector. In the opinion of Neupane, the institutional rate of interest has seemed to be cheaper in our country that had created imbalances between demand and supply of credit. Due to this reason real people are not getting enough credit facility, on the other hand, commercial banks are providing credit facility on trade and commerce which has hit the traditional sector. So, that to mobilize the resources and to divert them into productive work, institutional interest should be made higher.

Pandey (1979) tested the impact of interest rates on money supply in the context of Nepal in her M. A. dissertation. She took narrowly defined money supply (M_1) as dependent variable and NIDC's loan rate (r^{NIDC}), development bond's interest rate (r^D), the difference between development bonds interest rate and fixed deposits interest rate ($r^D - r^F$) and GDP at constant prices (Y) were treated separately as explanatory variables. Her empirical findings covering the period 1968 to 1978 (11 years) were:

- (1) The regression estimation between narrow money supply (M_1) and NIDC's loan rate (r^{NIDC})

$$M_1 = 5.5649 + 1.2031 r^{NIDC}$$

$$(7.2030) \quad (2.2165)$$

$$R^2 = 0.8384$$

With the help of above result, it can be said that there is highly positive correlation between M_1 and r^{NIDC} . The value of R^2 is 0.84, which indicates that they are statistically significant.

- (2) The regression estimation between narrow money supply (M_1) and development bond's interest rates (r^D) is as follows:

$$M_1 = -219.867 + 3.2144 r^D$$

$$(3.4777) \quad (-1.8978)$$

$$R^2 = 0.5474$$

The regression coefficient in this equation also shows positive correlation between M_1 and r^D . The value of R^2 is 0.55, which indicates that they are statistically significant but less than that of former one.

- (3) The regression estimation between narrow money supply (M_1), GDP at constant prices (Y) and the difference between development bonds interest rate and fixed deposits interest rate ($r^D - r^F$).

$$M_1 = -546470 + 2.0084 Y - 0.0205(r^D - r^F)$$

$$(4.5423) \quad (2.7163) \quad (-1.9125)$$

$$R^2 = 0.4538$$

The above equation shows positive correlation between M_1 , Y and ($r^D - r^F$). The value of R^2 is 0.45, which indicates that they are statistically significant but less than that of former two.

Finally, she concludes that the supply of money should be lowered than the present situation because if the production of goods within the country is not increased at that of the increase in money supply, its only effect will be a change in the balance of payments position with India. The deposit rates as well as the loan rates of commercial banks and financial institutions should be made high. Low rate of interest should be provided to the industries producing necessary goods and a small gap should provide between the deposit rates and lending rates of commercial banks.

Khatriwada (1994) has studied about the money supply in Nepal in his Ph. D. dissertation "Some Aspects of Monetary Policy in Nepal". Taking the time series data, his study covers the period of 1966-1990 (25 years). The purpose of his study was to analyze the role of changes in the quantity of money in economic activity, prices and balance of payments in Nepal. The form of tested regression equations Were:

(1) The regression between M_1 and DH in the linear form.

Here he took disposable high-powered money (DH) in simple linear form and in first derivative linear form as explanatory variable and narrow money supply (M_1) as dependent variable.

$$M_1 = -78.04 + 1.311DH$$

$$(-1.90)^{**} (104.6)^*$$

$$R^2 = 0.999, D-W = 1.59, \rho = 0.18, N = 25$$

$$\Delta M_1 = -5.12 + 1.356 \Delta DH$$

$$(-0.15) (20.9)^*$$

$$R^2 = 0.947, D-W = 2, N = 25$$

[Figures in parenthesis are respective t-ratios, * indicates significant at 5% level, ** indicates significant at 10% level, ρ indicates autocorrelation coefficient]

The fit of both of these equations is excellent and DH explains almost all the change in M_1 . The marginal money multiplier in the first equation shows that one rupee change in DH causes a 1.31 rupee change in M_1 . However, estimation of the equation in simple linear form of the series indicated the existence of serial correlation in the residuals. The estimated equation in first derivative linear form of the series also has a good fit and there is no autocorrelation in the residuals.

(2) The regression between C/DD and Q, BO, R^{12} and T in the linear form.

Here he took currency ratio (C/DD) as dependent variable and real income (Q), expansion of bank branches (BO), one year fixed deposit interest rate (R^{12}) and trend variable (T) as explanatory variables.

$$C/DD = 2.78 + 0.00016 Q + 0.006 BO - 0.093 R^{12} - 0.24 T$$

$$(3.8)^* (2.8)^* (1.6) (-3.1)^* (-3.8)^*$$

$$R^2 = 0.897, F = 42.8, D-W = 1.62, \rho = 0.35, N = 25$$

[Figures in parenthesis are respective t-ratios, * indicates significant at 5% level, ρ indicates autocorrelation coefficient]

In this equation, all the coefficients have the expected sign at 5% level of significance. The result of this equation is not satisfactory and shows that only real income and the expansion of bank branches have very little impact on currency ratio.

Finally, Khatiwada concludes that the changes in the stock of money are a stable function of the changes in disposable high-powered money and the authority can attain desired changes in money stock by means of proper high-powered money management. He further mentions that currency ratio is, to some extent, affected by interest rate, time deposits and excess reserve ratios being not affected by it and that the currency ratio makes only a small contribution to the money multiplier which implies that the money supply is almost independent of interest rate changes. Hence single equation estimation of the demand for money function in which interest rate enters as one of the arguments are not likely to suffer from simultaneity problem. Further, as bank rate and commercial bank branch expansion have very little effect on money multiplier, monetary policy instruments such as bank rate and forced bank branch expansion are not likely to significantly affect the money multiplier.

Among the above reviewed literature, no one has studied the impact of money supply on interest rate after The Central Bank has given the autonomy to commercial banks for interest rate determination and investment management by themselves in the early 1990s. Therefore, this research mainly focuses the period 1980-1999 and aims to study the impact of money supply on interest rate for the period 1990-1999 in Nepalese context.

III. CHAPTER 3: RESEARCH METHODOLOGY

IV.

The methodology used in this research work is inductive method. Qualitative as well as quantitative method of reasoning is used to analyze the data. The variables used in this study are specified and the models are fitted. The data source, method of data calculations and processing, the range of the data etc. are mentioned below in brief.

3.1 Qualitative Method

In this research work, the qualitative method is used for the analysis of time series data. Based on the actual data, the analysis is done with the help of percentage, average, ratio, graph, situation of data etc.

3.1.1 Presentation of Actual Data in Percent

The composition of the monetary variables such as money supply, reserve money are presented in percent, the growth rates of the monetary aggregates such as money supply and its components are presented in percent.

3.1.2 Finding of Average of Actual Data

The average is calculated whatever it is necessary. The average share of reserve money in money supply, the average interest spread etc. are calculated.

3.1.3 Finding of Ratio of Actual Data

The money multiplier and its determinants such as currency ratio, reserve ratio, other deposit ratio, time deposit ratio etc. are presented in ratio form.

3.1.4 Graphical Representation of Actual Data

The trend of monetary aggregates such as: currency, demand deposits, time deposits, reserve money, narrow money supply and broad money supply is analyzed with the help of graph.

3.1.5 Situation Analysis of Actual Data

The interest rates, the deposits and loans of commercial banks etc. are analyzed observing their increasing and decreasing situations.

3.2 Quantitative Method

The quantitative method is used to know the impact of money supply on interest rates and to find the relative effectiveness of monetary and fiscal policies in Nepal.

3.2.1 Basic concept

The following statistical and econometric tools will be used for processing and analyzing the data to get empirical results:

- (1) The Simple correlation coefficient is computed between the concerned variables and if it exists our attempt further proceeds.
- (2) The regression analysis is used for analyzing the data. The ordinary least square (OLS) method of estimation is used where it is suitable.
- (3) The significance of regression parameter is conformed to t-statistics, F-statistics etc.
- (4) The explanatory power of the explanatory variable is found out with the help of the coefficient of determination (R^2) and adjusted coefficient of determination ($\bar{R}^2$).
- (5) To know the autocorrelation between the error terms the Durbin-Watson (D-W) test is done.
- (6) The F (Chow)- test statistics is performed to test the stability of the parameters of two sub-sample periods.

3.2.2 The Variables

In this study, the empirical relationships are tested with the help of statistical and economical tools. The relationships are developed using many variables. The values of the variables are in time series data. Two types of variables are used in this research. They are dependent variables and independent variables.

A) Dependent Variables

The variable whose value is influenced by other variable is called dependent variable. The dependent variable is also known as regressed or explained variable. The following are the dependent variables used in the study.

I) Interest Rate on Commercial Loans (r^{CL})

The interest rate charged by the commercial banks against commercial loans is taken as dependent variable to know the impact of both types of money supply on commercial loans interest rate.

II) Interest Rate on Industrial Loans (r^{IL})

The interest rate charged by the commercial banks against industrial loans is taken as dependent variable to know the impact of both types of money supply on industrial loans interest rate.

III) Interest Rate on One-Year Time Deposits (r^{1Y})

The interest rate given by the commercial banks to their customers on one-year time deposits is taken as dependent variable while testing the impact of both types of money supply on it.

IV) Interest Rate on Two-Year and Above Time Deposits (r^{2YA})

The interest rate given by the commercial banks to their customers on two-year and above time deposits is taken as dependent variable while testing the impact of both types of money supply on it.

V) Real Gross Domestic Product (GDP or Y)

GDP is known as the total money value of goods and services produced in a country during a specified period, especially one year. Real GDP means GDP expressed in terms of constant prices. In the study, Real GDP at factor cost based on the constant prices of 1974/75 is used as the dependent variable while comparing the relative effectiveness of monetary policy with fiscal policy on real income determination.

B) Independent Variable

The variable, which influences the other variable, is called independent variable. The independent variable is also known as regressor or explanatory variable.

I) Narrow Money Supply (M_1)

Narrow money supply is the sum total amount of currency held by the public and demand deposits held at commercial banks. M_1 is used as explanatory variable when it is used to know the impact of narrow money supply on different types of interest rates and to compare the relative effectiveness of monetary policy with fiscal policy on real income determination.

II) Broad Money Supply (M_2)

Broad money supply is the sum total amount of currency held by the public, demand deposits held at commercial banks and time deposits with commercial banks. Further time deposit consists of saving deposits, fixed deposits and margin deposits with commercial banks. M_2 is taken as explanatory variable when it is used to know the impact of broad money supply on different types of interest rates.

III) The Total Government Expenditure (GE)

The government expenditure means the current spending and investment by central government and local authorities on the provision of social goods and services, marketed goods and services and transfer payments. In the circular flow of income model, transfer payments are excluded from government expenditure because these are not made in return for productive services. Government expenditure is financed by taxation and borrowings.

Government expenditure is an important component of aggregate demand in the circular flow of income/expenditure model and is used as an instrument of fiscal policy in regulating the level of spending in the economy. It is used as explanatory variable in the model while comparing the relative effectiveness of monetary policy with fiscal policy on real income determination.

3.2.3 The Correlation Coefficient Between The Variables

The correlation is a statistical tool, which measures the amount of similarity, i.e., the degree of association between the series of observations of two or more variables. The degree of relationship existing between two variables is called simple correlation whereas it is multiple correlations when it shows the relationship between three or more variables. In this study, we use simple correlation. The correlation between the variables is measured with the help of correlation coefficient.

The correlation coefficient between two variables X and Y, usually denoted by r_{xy} is a numerical measure of linear relationship between them and it is defined as:

$$r_{xy} = \frac{N \sum XY - \sum X \sum Y}{\sqrt{[N \sum X^2 - (\sum X)^2] [N \sum Y^2 - (\sum Y)^2]}}$$

(Where, $-1 < r_{xy} < +1$)

If $r = -1$, there exists perfect negative correlation between the variables.

If $r = 0$, there exists no correlation between the variables.

If $r = +1$, there exists perfect positive correlation between the variables.

If the value of correlation coefficient is nearer to unity, high degree of correlation exists and if it is nearer to zero, low degree of correlation exists.

3.2.4 The Regression Analysis Between The Variables

Regression analysis is a mathematical measure of the average relationship between two or more variables in terms of the original units of data. It is the estimation of unknown values or prediction of one variable from known values of other variables. Simple linear regression involves a relationship between two variables but multiple regression analysis consists of three or more variables. All of the economic concepts, policy issues and forecasting problems consider the relationship between two or more economic variables. These relationships are not exact but attempt to measure the degree of relationship only.

In regression analysis, there are two types of variable. They are dependent variable and independent variable. The linear regression equation between the variables X and Y can be written in the usual form of a straight-line equation as:

$$Y = a + bX$$

Where, Y = Dependent variable

X = Independent variable

a = Constant term

b = Elasticity coefficient of X

By using the principle of least square method, we can estimate the value of dependent variable when the value of independent variable is known.

3.2.5 The Coefficient of Determination

The coefficient of determination is a statistical number and denoted by R^2 . It is computed with the help of sample data and represents the percentage of the total variation of the dependent variable being explained by the changes on the independent variables. The coefficient of determination is calculated to test the explanatory power of the model. If the value of R^2 is high, the explanatory power of the model will also be high and vice versa. The coefficient of determination is calculated by using the following formula.

$$R^2 = 1 - \frac{\sum e_t^2}{\sum (Y_t - \bar{Y})^2}$$

Where, $e = Y_t - \hat{Y}_t$

When the coefficient of determination is adjusted to the degrees of freedom, the adjusted coefficient of determination, $\bar{R}^2$ is calculated as:

$$\bar{R}^2 = 1 - \frac{\sum e_t^2 / (N-K)}{\sum (Y_t - \bar{Y})^2 / N-1} = 1 - (1 - R^2) \frac{N-1}{N-K}$$

Where, N = number of observations

K = Number of parameters

3.2.6 The Autocorrelation Test

Autocorrelation refers to the relationship between the successive values of the error terms. Error terms are not included in the model and they link to each other with certain functional relationship. Durbin and Watson have suggested a test for testing the first order autocorrelation. In this study, we use the first order autocorrelation, ie, DW-statistics.

The Durbin- Watson (DW) test statistics is defined by the following formula:

$$d = \frac{\sum_{t=2}^n (e_t - e_{t-1})^2}{\sum_{t=1}^n e_t^2}$$

(0 ≤ d ≤ 4)

Where,

$e_t = (Y_t - \hat{Y}_t)$ at time t

Y_t = Dependent variable at time t

$\hat{Y}_t$ = Estimated value of dependent variable at time t

Durbin and Watson have suggested examining a lower bound (d_L) and an upper bound (d_U) such that if the computed d lies outside these critical values, a decision can

be made regarding the presence of positive or negative autocorrelation. The theoretical upper and lower limits are found in a certain level of significance depending upon the number of observations and the number of explanatory variables used in the study.

The decisions are made as follows:

$d = 0$	$\Rightarrow$ Perfect positive autocorrelation
$0 < d < d_L$	$\Rightarrow$ Positive autocorrelation
$d = 4$	$\Rightarrow$ Perfect negative autocorrelation
$4 - d_L < d < 4$	$\Rightarrow$ Negative autocorrelation
$d_U < d < 4 - d_U$	$\Rightarrow$ Neither positive nor negative autocorrelation
$d_L \leq d \leq d_U$ and $4 - d_U \leq d \leq 4 - d_L$	$\Rightarrow$ Indecisive Regions, i.e. no decision can be made when d statistics lies in the given ranges.

3.2.7 The F-Test Statistics

The F-test is used to test the overall significance of the regression model at a given level of statistical significance. F-test shows whether the movement in the dependent variable is significantly explained or not with the change in independent variables.

The F-test statistics is computed by the following formula:

$$F = \frac{R^2 (K-1)}{(1-R^2) (N-K)}$$

Where, R^2 = Coefficient of determination

K = Number of estimated parameters (including constant)

N = Number of observations

$(K-1, N-K)$ = Degree of freedom

The following hypothesis is used to compute the F-test statistics.

Null Hypothesis:- $H_0: a = 0$, i.e., there is no linear relationship between dependent and explanatory variables.

Alternative Hypothesis:- $H_1: a \neq 0$, i.e., there exists linear relationship between dependent and explanatory variables.

When the calculated value of F is greater than tabulated value at $(K-1, N-K)$ degree of freedom and the given level of significance, the null hypothesis is rejected and it is concluded that there is significant linear relationship between dependent and explanatory variables and vice versa.

3.2.8 The t-Test Statistics

The t-test is used to examine the statistical significance of the individual parameters at the given level of significance. It shows the degree of confidence in the validity of estimates.

The t-test statistics is calculated by the following formula:

$$t = \frac{a}{SE(a)}$$
$$\text{Where, } SE(a) = \sqrt{\frac{\sigma_u^2}{\sum(X-X)^2}}$$
$$\sigma_u^2 = \frac{\sum e^2}{(N-K)}$$

σ_u^2 = an unbiased estimator of true σ_u^2
(N-K) = Degree of freedom

The following hypothesis is used to compute the t-test statistics.

Null Hypothesis:- $H_0: a = 0$, i.e., the regression parameter is not significant.

Alternative Hypothesis:- $H_1: a \neq 0$, i.e., the regression parameter is significant.

When the calculated value of t is greater than tabulated value at (N-K) degree of freedom and the given level of significance, the null hypothesis is rejected and it is concluded that the regression parameters are significant and vice versa.

3.2.9 The Stability Test

In the present study, the whole period is divided into two sub-sample periods viz. 1980-1989 and 1990-1999. The economic system of the country during the first sub-sample period (i.e.1980-1989) was controlled by the government but the economic system was liberalized during the second sub-sample period (i.e.1990-1999). For the stability test 1989 is taken as break point.

When the linear regression models are used to represent an economic relationship, it is necessary to know, whether the relationship remains stable in the two periods or not. Here we prefer to do the stability test to know the effectiveness of liberalization policy also. There are various tests one of which is the F (Chow)-test.

The F (Chow)-Test Statistics

G. C. Chow suggests a test for the equality between the coefficients obtained from different samples. It is a popular method of testing the stability of the regression equation and the parameters. The F-test suggested by Chow may be performed as follows:

$$F(\text{Chow}) = \frac{[\sum e_p^2 - (\sum e_1^2 + \sum e_2^2)] / K}{\dots}$$

$$(\sum e_1^2 + \sum e_2^2) / (n_1 + n_2 - 2K)$$

Where, $\sum e^2$ = Residual sum of squares of the regression estimates

K = Number of estimated parameters (including constant)

n_1 = Number of observations of first sub-sample period

n_2 = Number of observations of second sub-sample period

$[K, (n_1 + n_2 - 2K)]$ = Degree of freedom

The subscripts p, 1 and 2 are pooled, sample 1 and sample 2 periods respectively

The following hypothesis is used to compute the F (Chow)-test statistics.

Null Hypothesis: - $H_0: a_1 = a_2$, i.e., the coefficients of two sub-sample periods do not differ significantly.

Alternative Hypothesis: - $H_1: a_1 \neq a_2$, i.e., the coefficients of two sub-sample periods differ significantly.

When the calculated value of F (Chow)-test statistics is greater than tabulated value at $[K, (n_1+n_2-2K)]$ degree of freedom and some certain level of significance, the null hypothesis is rejected and it is concluded that the coefficients of two sub-sample periods differ significantly and vice versa.

3.2.10 The Models

To fulfill the objectives of this research work, the following models are used.

(I) The impact of money supply (M_t) on interest rate (r)

$$r = a_0 + a_1 M_t + U \quad (3.1)$$

Where, r = Interest rate

M_t = Money supply at time t

a_0 = Constant term

a_1 = Elasticity coefficient of M_t

U = Error term

(II) The Relative Effectiveness of Monetary and Fiscal Policies

$$Y_t = a_0 + a_1 M_t + a_2 F_t + U \quad (3.2)$$

Where, Y_t = Real GDP at time t

M_t = Monetary variable at time t

F_t = Fiscal variable at time t

a_0 = Constant

a_1 and a_2 = Coefficients of M_t and F_t

U = Error term

The above equations (3.1) and (3.2) are treated with log-linear versions to get the empirical results. The estimating equations in terms of log-linear form are as follows:

$$\ln r = \ln a_0 + a_1 \ln M_t + U \quad (3.3)$$

$$\ln Y_t = \ln a_0 + a_1 \ln M_t + a_2 \ln F_t + U \quad (3.4)$$

Where, $\ln r$ = Interest rate in terms of natural logarithms

$\ln M_t$ = Money supply at time t in terms of natural logarithms

$\ln Y_t$ = Real GDP at time t in terms of natural logarithms

$\ln F_t$ = Fiscal variable at time t in terms of natural logarithms

a_0 s are constants

a_1 s and a_2 are regression parameters

U s are error terms

Regarding the equation (3.3), by introducing the different types of interest rates and different definitions of money supply, we estimate the following regression equations.

$$\ln r^{CL} = \ln a_0 + a_1 \ln M_{1t} + U \quad (3.5)$$

$$\ln r^{CL} = \ln b_0 + b_1 \ln M_{2t} + U \quad (3.6)$$

$$\ln r^{IL} = \ln a_0 + a_1 \ln M_{1t} + U \quad (3.7)$$

$$\ln r^{IL} = \ln b_0 + b_1 \ln M_{2t} + U \quad (3.8)$$

$$\ln r^{1Y} = \ln a_0 + a_1 \ln M_{1t} + U \quad (3.9)$$

$$\ln r^{1Y} = \ln b_0 + b_1 \ln M_{2t} + U \quad (3.10)$$

$$\ln r^{2YA} = \ln a_0 + a_1 \ln M_{1t} + U \quad (3.11)$$

$$\ln r^{2YA} = \ln b_0 + b_1 \ln M_{2t} + U \quad (3.12)$$

Where, r^{CL} = Interest rate on commercial loans

r^{IL} = Interest rate on industrial loans

r^{1Y} = Interest rate on one-year time deposits

r^{2YA} = Interest rate on two-years and above time deposits

M_{1t} = Narrow money supply at time t

M_{2t} = Broad money supply at time t

a_0 s and b_0 s are constants

a_1 s and b_1 s are magnitude of parameters

U s are error terms

When introducing the monetary and fiscal variables in (3.4), following equation is estimated.

$$\ln Y_t = \ln a_0 + a_1 \ln M_{1t} + a_2 \ln(GE)_t + U \quad (3.13)$$

Where, Y_t = Real GDP at time t

M_{1t} = Narrow money supply at time t

$(GE)_t$ = Government expenditure at time t

a_0 = Constant

a_1 and a_2 = Coefficients of M_{1t} and $(GE)_t$

U = Error term

With the help of the above mentioned regression equations we test the hypothesis and find the empirical results in the coming chapter.

3.3 The Range of The Study Period

The range of the study period is 1980-1999, which covers the period of 20 years. To know the relative effectiveness of monetary and fiscal policies in controlled and liberalized economy, this whole period is further divided into two sub-sample periods, viz, 1980-1989 and 1990-1999. For this purpose the empirical analysis of the study is done in three different time spans including the whole period. To know the impact of money supply on different types of interest rates only the second sub-sample is used because in the first sub-sample period the interest rates were administered and controlled by the Nepal Rastra Bank, so there is no need for interest rate estimation in this period but in the second sub-sample period interest rates of banks and financial institutions were completely liberalized and commercial banks and financial institutions were granted autonomy in fixing their own deposit and lending rates. Therefore, interest rate is estimated estimation with the help of money supply in this period.

3.4 The Sources of Data

The main sources of data are secondary sources. The secondary data are taken from various bulletins, publications and official records. The major sources of the data used in this research are: - Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues from 1980-1999), Nepal Rastra Bank, *Economic Report* (various issues from 1980-1999), Ministry of Finance, *Economic Survey*, 1998/99, HMG/N and Other sources are Economic Review of NRB and Research Department of NRB etc.

3.5 The Methods of Data Processing

In this research work, the log-linear method is used for data processing. The log-linear method changes absolute level figures into log versions. The natural logarithms having a base of e (2.718) is chosen as appropriate method of data processing.

3.6 The Device for Data Calculation

The calculations are done with the help of computer. The programs such as *SPSS 10.0* and *EVIIEWS 3.1* are used to estimate the regression equation and to perform the various statistical tests as well.

V. THEORETICAL DISCUSSION IN VI. NEPALESE CONTEXT

This chapter is further divided into three parts. The first part deals about the money supply, the second part deals about interest rate structure and the third part deals about the monetary and fiscal policies in Nepal.

4.1 Money Supply

In this part, money supply, its components and its affecting factors are defined in the Nepalese context.

4.1.1 Basic Concept

Different economists have defined money differently. It is sometimes defined in terms of the job it does. Money serves as a medium of exchange, a unite of account, a store of value, a standard of deferred payments and a means of paying off debt. Money may also be defined according to its physical properties such as coin, paper currency, checking deposits and many other forms. Crowther defines money as: anything that is generally acceptable as a means of exchange and at the same time acts as a measure and store of value. Robertson defines money as: anything, which is widely accepted in payment for goods or in discharge of other kinds of business obligations is called money. Most suitable definition of money is one that focuses on the primary use to which money is put in a modern economy, i.e., money is anything generally acceptable as means of payment and it must have stable purchasing power in order to retain the public faith.

Money supply means the amount of money in circulation in an economy. It refers to the total stock of money held by the public in spendable form. The cash balances held by the central government, the central bank and the commercial banks do not form money supply because they are not in actual circulation. Money supply is a stock as well as a flow concept. At a point of time, it is a stock and over a period, it is flow. Money supply at a particular moment of time is the stock of money held by the public. It includes the total currency notes, coins and demand deposits with the banks held by the public. Over a period, money supply becomes a flow concept. It may be spent many times during a period. The average number of times a unit of money passing from one hand to another during a given period is called the velocity of circulation of money.

4.1.2 Money Supply Process in Nepal

Nepal uses two types of the definitions of money supply namely narrow money supply (M_1) and broad money supply (M_2).

I) Narrow Money Supply

The narrow money supply consists of currency held by the public (C) and demand deposits held at commercial banks (DD). Symbolically:

$$M_1 = C + DD$$

II) Broad Money Supply

The Broad money supply includes currency held by the public (C), demand deposits held at commercial banks (DD) and Time deposits with commercial banks (TD). TD includes saving deposits, fixed deposits and margin deposits with commercial banks. Symbolically:

$$M_2 = C + DD + TD = M_1 + TD$$

a)

b) 4.1. 3 The Multiplier Theory of Money Supply

The money multiplier is a major component of the money supply process. It determines the stock of money supply from a given level of reserve money or monetary base (also called high powered money). The money multiplier theory of money supply states that money supply (M) is composed of money multiplier (m) and reserve money (RM), such that:

$$M = m \text{ RM}$$

According to this theory, there are mainly two determinants of money supply, which are the stock of reserve money and money multiplier. RM is said to be determined by the monetary authority. So, if the value of money multiplier is stable, the money supply can be controlled with the controlling of reserve money by the monetary authority of the country.

The specification of the money multiplier theory of money supply for M_1 and M_2 is as:

$$M_1 = m_1 \text{ RM}$$

$$M_2 = m_2 \text{ RM}$$

Where, m_1 and m_2 are money multipliers for narrow and broad money supply respectively.

$$m_1 = M_1 / \text{RM} = (CC + DD) / (CC + R + OD)$$

Dividing the right side of the above equation by DD, we get

$$m_1 = (CC/DD + DD/DD) / (CC/DD + R/DD + OD/DD)$$

This equation can be written as:

$$m_1 = (c + 1) / (c + r + d)$$

Similarly, $m_2 = M_2 / \text{RM} = (CC + DD + TD) / (CC + R + OD)$

Dividing the right side of the above equation by DD, we get

$$m_2 = (CC/DD + DD/DD + TD/DD) / (CC/DD + R/DD + OD/DD)$$

This equation can be written as:

$$m_2 = (c + 1 + t) / (c + r + d)$$

Further, the money multipliers for narrow and broad money supply are expressed as:

$$m_1 = \frac{(1 + c)}{(c + r + d)}$$

$$\text{and, } m_2 = \frac{(1 + c + t)}{(c + r + d)}$$

Where, c = currency to demand deposit ratio

r = required reserve to demand deposit ratio

d = other deposit to demand deposit ratio

t = time deposit to demand deposit ratio (t).

So, the above equations can be written as:

$$M_1 = \left[\frac{(1+c)}{(c+r+d)} \right] RM$$

$$M_2 = \left[\frac{(1+c+t)}{(c+r+d)} \right] RM$$

4.1. 4 Determinants of money supply

The main determinants of the money supply are: monetary base and the money multiplier. These two broad determinants of money supply are, in turn, influenced by a number of other factors. The determinants of money supply are discussed briefly below.

4.1.4.1 The monetary base (The size of RM)

The monetary base or the reserve money is defined as the sum total of currency held by public (C), reserves of commercial banks with Nepal Rastra Bank (NRB) along with in their vaults (R) and other deposits held at the NRB (OD). Symbolically Reserve money is given as:

$$RM = C + R + OD.$$

The magnitude of the monetary base or reserve money (RM) is said to be the significant determinant of the size of money supply. Money supply is directly proportional to the change in monetary base. Monetary base refers to the supply of funds available for use either as cash or reserves of commercial banks with the central bank. The policy of government and the value of money can influence the monetary base.

The Determining Factors of Monetary Base

In Nepal, the main determining factors of monetary base are net foreign asset (NFA) and Net domestic asset (NDA). Net domestic asset (NDA) is also positive summation of net credit to government (NCG), credit to government enterprises (CGE), credit to commercial banks (CCB), credit to public sector (CPS) and negative summation of net non-monetary liabilities (NNML).

A) Net Foreign Asset (NFA)

Net foreign assets (NFA) means foreign assets minus foreign liabilities. The changes in NFA are due to the foreign exchange transaction with the rest of the world.

B) Net Credit to Government (NCG)

Credit to government minus government deposit is known as net credit to government (NCG). NRB credit to government further consists of purchase of government treasury bills, development bonds, promissory notes, coins (issued by the government) in circulation, special kinds of bonds, order-draft used by the government from NRB etc. The government borrows from the NRB and there is some deposit amount of government in the NRB. Therefore, the deduction of deposit of government to NRB from her credit to government gives the NCG.

C) Credit to Government Enterprises (CGE)

The government enterprises such as: Nepal Industrial Development Corporation (NIDC), Agricultural Development Bank of Nepal (ADB/N), Nepal Food Corporation (NFC), National Trading Limited (NTL) etc. also borrow from Nepal Rastra Bank. The credit of NRB to these government enterprises is also one of the reasons for increase in RM in the country.

D) Credit to Commercial Banks (CCB)

The NRB has also credit to the commercial banks. NRB gives direct loans and advances to commercial banks and the lending against government securities is included in it.

E) Credit to Private Sector (CPS)

There is very small contribution of credit to private sector (CPS) for the change in RM. NRB's credit to private sector is due to the purchase of bills, loans and advances to the private organizations and individuals. The activities played by the private sector have negligible effect on RM.

F) Net Non-Monetary Liabilities (NNML)

Net Non-Monetary Liabilities (NNML) plays negative role for the increase in RM. The NNML is the excess of other liabilities of NRB over other assets. The other liabilities are capital, development fund, NRB employees' provident fund, staff welfare fund, reserve fund, medical facility fund etc. and the other assets are buildings, furniture, sundry creditors a/c, non-monetary gold etc.

4.1.4.2 The Money Multiplier

The Money Multiplier (m) has positive impact on money supply. An increase in the size of money multiplier will increase in the money supply and vice versa. The money multiplier is determined with the help of many other factors.

The Determinants of Money Multiplier

The determinants of money multiplier are: currency ratio (c), reserve ratio (r), other deposit ratio (d) and time deposit ratio (t).

A) Currency Ratio(c)

Currency ratio (c) is a behavioral ratio that represents the ratio of currency demanded to the demand deposits. As c enters both as a numerator and denominator in the money multiplier expression, so the effect of the currency ratio cannot be clearly recognized.

B) Reserve Ratio(r)

Reserve ratio is considered as an important determinant of money multiplier and hence money supply. The smaller cash reserve ratio enables for the greater expansion in the credit by the banks and thus increases the money multiplier and vice versa. The greater cash reserve ratio decreases the money supply. Reserve ratio is often broken down into its two component parts: (a) Excess reserve ratio, which is the ratio of excess reserve to the demand deposit ratio ($r_e = ER/DD$) and (b) Required reserve ratio, which is the ratio of required reserves to demand deposits ($r_r = RR/DD$). Thus $r = r_e + r_r$. The central bank legally fixes the required reserve ratio; the excess reserve ratio depends on the market rate of interest.

C) Other Deposits Ratio (d)

Other deposits ratio is the ratio of other deposits to demand deposits. The smaller the other deposit ratio, the higher will be the money supply and vice versa.

D) Time Deposits Ratio (t)

Time deposit ratio is the ratio of time deposits to the demand deposits. It has positive effect on the broad money multiplier and thus on the broad money supply.

4.2 The Interest Rate Structure

In this part the interest rate structure, the interest spread and the Nepal Rastra Bank and the interest rates are mentioned.

4.2.1 Basic Concept

Interest is a payment made by the borrower to the lender for the use of capital. Interest is expressed as a rate percent per year. Interest is also known as reward for risk. Greater the risk involved in a loan, higher will be the rate of interest and vice versa. Most of the developing countries of the world face the problem of scarcity of domestic capital in relation to the size of investment required achieving high and self-sustaining economic growth. The amount of additional capital is needed at each increasing level of income for economic development. For the use of existing natural and other resources, financial sector should direct the investors into those fields where the expected rate of return is higher than any other sector. They can calculate the rate of return by comprising with the institutional interest rate for the fund, which they had borrowed. So

that the interest rate of the existing banks and financial institutions is the guideline for the investors.

The monetary authority determines the institutional interest rate after analyzing the economic system adopted by the country. Interest rate depends upon economic activities and existing policies of the nation. In every economy, we find the inverse relationship between interest rate and investment and direct relationship between interest rate and saving. Interest rate plays very important role in developing countries like Nepal where the demand of capital is increasing day by day. An appropriate interest rate can divert investment in proper and targeted field. For sound financial development and to mobilize the available resources interest rate should be positive. The interest rate is an effective rationing device for the allocation of scarce resources between alternative investments. It can provide a social discount rate, for decisions to save and invest. Here it acts as a market-clearing device, influencing in an optional manner the choice of what to produce and how to produce it.

4.2.2 Interest Rate Structure in Nepal

In Nepal, there are two kinds of sectors in which interest rate prevails. The first is unorganized sector and the second is organized sector. Let us discuss them one by one.

4.2.2.1 Unorganized Sector

The unorganized rural credit is prevailing in the rural areas of Nepal where about 88% of the total population live. The unorganized rural financiers are the traditional and important source of rural credit in Nepal. In the unorganized sector, the credit suppliers are indigenous bankers and traditional money lenders. The traditional money lenders try to keep the peasants and the poor people permanently in debt. At present situation also the traditional money lenders are in existence in every part of the country. In the rural areas, the private savers such as village money lenders, property owners, merchants, traders, friends, relatives etc. supply major part of the credit. The aim of these moneylenders is to hold money and lend to needy persons in order to earn the higher rate of interest. The interest rate they charge varies from place to place and it also depends upon the need and condition of the credit that have to borrow. The lenders take high interest rate to the persons who go to the foreign countries for earning purpose.

The rate of interest mostly on these kinds of loans is 24% to 36% or above. Sometimes it is 50%, however it is not the same for the different places and situations. This type of high interest rate mainly prevails in the hilly regions, which shows that hilly people are not aware of the legally permissible rate. In some of the hilly areas the interest is paid in the form of rice, corns etc.

A study conducted by Nepal Rastra Bank in 1994 revealed that only 20% of the rural borrowers have access to organized sector for arranging a certain part of their total financial requirements. Dominance of the unorganized sector in the economy requires to be gradually reduced by increasing both number of financial institutions and financial

instruments. In the unorganized sector, there is a lack of adequate and authentic data so that the discussion of interest rate is only focused on the organized sector.

4.2.2.2 Organized Sector

For the study of interest rate, we take the central bank (in context of Nepal NRB), commercial banks and other financial institutions as the organized sector of the economy. The interest rate prevailing in the organized sector is very low comparing to that prevailing in the unorganized one.

The following types of interests are found in the organized sector of Nepal.

A) Interest on Government Securities

The government fixes certain interest rate on the government securities. The government securities are of different maturing periods and the interest is given in the six-month installment. There are three types of government securities, which are:

- I) Treasury Bills
- II) National Saving Certificates
- III) Development Bonds

B) Interest of Nepal Rastra Bank

Nepal Rastra Bank, the monetary authority of the country is non-profit making organization and it promotes the investment of commercial banks by increasing or decreasing the bank rate. There are two types of interests operated by Nepal Rastra Bank, which are:

- I) Refinance Rate
- II) NRB Bonds Rate

C) Interest of Commercial Banks

The commercial banks are profit-making organizations and they give loans in high interest rate and accept deposit in low interest rate. There are two types of Interest operated by commercial banks, which are:

- I) Deposit Rates
- II) Lending Rates

D) Interest of Financial Institutions

The Agricultural Development Bank of Nepal (AND/N) and the Nepal Industrial Development Corporation (NIDC) flow the loans to the various sectors of the economy with the aim of promoting their investment. They provide loans and charge certain interest to cooperative and other institutions.

4.2.3 The Interest Spread

The interest given on deposits and the interest charged on loans both are collectively known as interest rate. The interest spread is defined as the difference between the lending interest rate and deposit interest rate.

i.e., The interest spread = The lending interest rate - The deposit interest rate.

The high interest rate given on deposits attracts the customers for more and more saving and depositing it in the banks while the low lending rate decreases the cost of capital promoting investment. Therefore, the good banking system is that which balances between the deposits and loans rate properly.

In the developed countries, the interest spread seems to be within the limit of 1-2% while in the developing countries, it is found to be about 5-6% in maximum but in Nepal it exceeds that limit also.

4.2.4 Nepal Rastra Bank and Interest Rate Determination

Interest rate is a monetary phenomenon and the matter of concern of the monetary authority. In case of Nepal, the monetary authority, NRB is responsible for the policy measures, which are adopted to maintain and change the interest rate structure of the country.

4.2.4.1 NRB and Controlled Interest Rates

Nepal Rastra Bank had controlled the interest rates for commercial banks and financial institutions for a long time. Before the deregulation of May 1986, there were about 20 controlled lending rates differentiated between sectors, use of funds and types of collateral. Further, the interest rate structure was not very rationale and the central bank was determining the whole set of deposit rates and instruments. The interest rates had not changed much over time, although a significant and a historical upward revision in interest rate structure took place in 1975. The direct control of lending rates provided an easy mechanism for credit allocation by differentiating between priority and non-priority sectors in which the former received concessionary interest rates. The direct control of deposit rates before the deregulatory moves initiation of 26th may 1986 was considered a potentially effective instrument for mobilizing domestic savings.

Some of the inconsistencies, existing in the financial system under the controlled interest rate regime, induced NRB to move towards partial deregulation of the financial system. The non-flexibility of interest rates restricted the institutions (with less resources) in mobilizing more savings by offering higher rates. The wide margin between deposit and lending rates, the introduction of commercial banks with foreign banks' collaboration for commercial banking activities were some of the main reasons motivating the regulatory authority towards financial deregulation. A move towards deregulation by granting commercial banks and financial institutions the authority to fix interest rates was initiated on May 26, 1986.

The overall impact of controlled interest rates and other regulations was that the asset and liability structure of the commercial banks was tightly controlled. The direct

control of deposit and lending rates became redundant. During the years after deregulation, the banking activities developed rapidly as is evident by the growth of assets, the expansion of bank branches in rural areas and gradual decline of currency-deposit ratio over the years.

4.2.4.2 NRB and Liberalized Interest Rates

Effective August 31, 1989, the interest rates of banks and financial institution were completely liberalized. Accordingly, commercial banks and financial institutions were granted autonomy in fixing their own deposit and lending rates. The rationale for ending the administered interest rate regime was to let market forces to determine interest rate structure, bring about flexibility in the mobilization of financial savings and make efficient allocation of available resources.

Interest rate liberalization, however, could not fully meet the objectives behind this step. The oligopolistic nature of the commercial banking system produced cartelling in interest rate determination. As a result, the lending rate increased faster than the deposit rate resulting in wider spread between lending and deposit rates. Interest rate structure could not be transparent and depositors and borrowers were not treated uniformly in terms of interest rates. Thus, instead of fair competition in the market, discrepancies were observed in the interest rate structure. To correct this, effective August 22, 1992 the NRB issued the following directives to banks and the other financial institutions (40 Years of The Nepal Rastra Bank 1956-1996, NRB, April 1996):

- I) Interest rate on deposits of at least up to one year to be clearly spelt out.
- II) Range of interest rates on the credit of same type or purpose not to be more than one percent.
- III) Fixation of interest rate on flat basis to be stopped.

In addition to this, the NRB also suggested commercial banks and other financial institutions to limit the spread of interest rates at 6% within mid-December 1993. This was necessary because the widening interest rate spread had not only a deleterious impact on the global competitiveness of the domestic financial system but also had created exploitative type of financial intermediation. The compliance of the financial institutions to this suggestion however remained less than satisfactory. In considering the situation of sluggish economic growth, slowdown in the growth of private sector credit, higher interest rate spread of commercial banks, rising demand of the entrepreneurs and businessman for the reduction of interest rate and as per the commitment of the government in the budget speech of the fiscal year 1998/99 to limit the interest spread within 5%, the NRB issued the following directives on interest rate on July 30, 1998 (Nepal Rastra Bank, Economic Report, 1998/99):

- a) The commercial banks are required to maintain the weighted interest spread of their deposits and lending rates below 5%. In order to maintain this level, commercial banks had to make necessary adjustment in their interest rate structure.

As regard the calculation of weighted interest rate spread the NRB issued the following methodology on November 17, 1998.

b) Counting Procedures for Weighted Interest Spread

The interest spread would be calculated as the weighted difference between interest income of commercial banks derived from total domestic and foreign loans and advances, money at call and balances held abroad and interest expenditure payable on the total deposits held by the commercial banks.

For the simplicity and understanding the accounting procedure, the following simple mathematical formula could be used.

i) Derivation of weighted average lending (interest) rate

$$= \frac{\text{Total interest income from loans and advances, money at call and balance held abroad}}{\text{Average loans and advances, average money at call, average balance held abroad}} \times 100$$

ii) Derivation of weighted average deposit (interest) rate

$$= \frac{\text{Total interest expenses on total deposits}}{\text{Average deposit}} \times 100$$

iii) Derivation of weighted interest spread

$$= \text{Weighted average lending rate} - \text{Weighted average deposit rate}$$

c) The interest spread would be monitored on the basis of half- yearly statistics (of August to January and February to July) that are filled in a prescribed format and dispatched to Banking Operation Department and Inspection and Supervision Department of the NRB.

d) If the interest spread of any commercial bank exceed the stipulated spread limit of 5%, the exceeding percent multiplied by total interest income of that period would have to be deposited in a separate special fund created for it. The distribution of dividend out of this fund account is to be restricted. However, such special fund would be taken as a part of supplementary capital for the calculating purpose of capital adequacy ratio.

In case of newly established commercial banks, the provision of interest spread would be applied only after a year from the date of their operation.

4. 3 A Brief Glimpse on Monetary and Fiscal Policies in Nepal

The two important sub-divisions of economic policy are monetary policy and the fiscal policy. These two policies are used as mutually complementary policies to serve as instruments of government's economic policy and to achieve certain social goals. In Nepal, both monetary and fiscal policies are implemented according to their relative effectiveness. Let us discuss them one by one.

4.3.1 Monetary Policy in Nepal

Monetary policy is defined as a policy, which employs monetary authority's control over the supply cost and use of money as an instrument for achieving the certain given objectives of economic policy. Monetary policy aims at influencing the economic activity in the economy mainly through two major variables i.e. (a) money supply and (b) the rate of interest.

In Nepal, the monetary policy mainly focuses in economic stability. Mr. Gunanidhi Sharma gives this type of view. " Policy instruments for controlling money in Nepal have been used for realizing long term and short-term goals. While the former is related to growth, the latter is concerned with the stability of Nepalese economy "(Sharma, 1987, P 195).

Mr. Yubraj Khatiwada also gives similar type of view. "Since monetary policy is mainly a tool of demand management, its role in the Nepalese economy should also be primary sought in economic stabilization rather than in economic growth" (Khatiwada, 1994, P 5).

Mr. Sharma further emphasizes the interest rate and says, "As the rate of interest has a high positive correlation with the mobilization of financial savings, it is imperative to consider it as an instrument foe realizing long term purpose and keep the (rate) structure reasonably stable, without frequent changes. Portfolio scheme and the interest free loans too are relevant for achieving long term goals" (Sharma, 1987, P 195).

Nepal Rastra bank, the central bank of the country was established in 1956 but it started its functioning only after mid-1960s. NRB was given the status of a regulation authority in the year 1966. Until 1966, the efforts were focused on evolving NRB as the monetary authority and bringing monetary system under its control. Then after for 1966-1980, it initiated most of the monetary policy tools such as: credit control regulations, interest rate, margin rate, refinance rate, cash reserve regulations, liquidity requirement, credit policy, open market operations, treasury bill auction, operations on secondary markets, NRB bonds etc.

The evolution of monetary policy instruments and policy direction of NRB made a great contribution for the regulation of monetary system in Nepal. Around the period 1980-1989, NRB was oriented towards the aggressive banking service expansion and drive towards developing financing. Hence, the focus of the monetary authority was concentrated more in widening institutional set up for formulating directed credit programs to ensure institutional financial facilities to targeted sectors and group of the society. In the decade 1990-1999, NRB remained more challenging. With the economic liberalization and structural adjustment programs, its role was to help for the stabilization of the economy with proper demand management through the adoption of indirect monetary policy instruments.

The regulatory and supervisory role of the NRB was also necessarily widened due to gradual liberalization of the financial sector along with marketed external sector liberalizations. Liberalization of interest rates, foreign exchange and exchange rate

systems along with entry of a number of new financial institutions into the system has widened the scope of NRB activities from attaining price and balance of payments stability to exchange rate stability and ensuring healthy growth of financial system. In the mean time, the monetary authority has the responsibility of widening access to institutional credit facility for priority sector and weaker sector of the society with the framework of the liberalized economy.

4.3.2 Fiscal Policy in Nepal

Fiscal policy in Nepal is defined as an economic policy, which deals with the receipts and expenditures of the government and refers to the budgetary policy of the government. Fiscal policy operates through changes in government expenditures, taxation and public borrowings. The manipulation of government expenditure and revenue to achieve national objectives, such as high employment, price stability, economic growth and balance of payment equilibrium is called compensatory fiscal policy.

The two systems used for adopting fiscal policy in an economy are government's budget speech and periodic plans. The budget is the short-term economic scheme of the government that governs the period of one fiscal year but the periodic plan is the long-term vision. The budget is prepared within the objectives of the periodic plans. In Nepal, the first budget was announced in 1952 and the first fifth year periodic plan was started on 1956.

The priority was given to build infrastructures such as transportation, education, health and communication during the early years of planned development process. The concept of balanced growth was introduced in the third plan and the country was divided into four regions. The budget expenditure rose from 0.33 billion in the first plan to 3.54 billion in the fourth plan. Agriculture was given the top priority from fifth plan to even in the current ninth plan and the concept of minimum basic needs was introduced in the sixth and seventh plans. After the restoration of democracy, the years 1991 and 1992 remained the unplanned years. The economic liberation was commenced from the beginning of the seventh plan but it reached at more depth in 19th plan. The objects of eighth plan were sustainable development, poverty alleviation and balanced regional development but it became almost unsuccessful. The current plan is the ninth plan with a new concept of long-term development and with only one broad objective of poverty eradication. The agricultural perspective plan (APP) is one of the main features of this plan. The targeted expenditure is also significantly increased to R 372.711 billions during this plan.

The main fiscal instruments used by the government to achieve definite objectives of the economy in Nepal are: government revenue, government expenditure.

Later we empirically test the relative effectiveness of monetary and fiscal policies in Nepal.

THE ANALYSIS AND FINDINGS

Regarding the objectives of this study, the related hypotheses are tested and the empirical results are presented in the tabular form. Using the time series data, we perform quantitative as well as qualitative analysis. For the analysis purpose, we divide this chapter into three parts. The first part covers the data analysis of money supply in Nepal, the second part covers the data analysis of interest rate structure in Nepal and the third part covers the data analysis of the impact of money supply on interest rate and also the analysis of the effectiveness of monetary and fiscal policies in Nepal. In the first and second parts, the data are analyzed with the help of their actual figures, percentage change, percentage share, growth rate, difference, ratios, and graphs but in the third part, the analysis is done on the basis of estimated regression equations.

5.1 The Money Supply in Nepal

In this part, the two definitions of money supply, their determining factors and their trend is studied using the time series data for the period 1980-1999.

5.1.1 The Reserve Money and its Components

The reserve money is a significant factor for both types of money supply. In Nepal, its components are identified as currency held by private sector, currency held by commercial banks, deposits (reserves) of private sector with NRB and deposits (reserves) of commercial banks with NRB. Table 5.1 represents the composition of reserve money in Nepal during the study period.

According to table 5.1, out of the total reserve money, about 66 to 76% is the currency held by private sector, 4 to 7% is the currency held by commercial banks, 3 to 11% is the deposits of private sector and 10 to 23% is the deposits of commercial banks. The components of RM do not have constant share in it for different years. The currency held by the private sector is observed maximum (76.3%) in 1981 and minimum (66.6%) in 1997. The currency held by the commercial banks has the maximum share of 6.9% in 1996 and minimum share of 4.4% in 1980. The deposit of private sector contributes maximum of 10.3% in 1980 and minimum of 3.3% in 1996. Similarly, the deposits of commercial banks attend maximum of 22.9% in 1998 and minimum of 10.4% in 1981.

In reserve money, the currency of private sector takes the highest share than other components because the deposits (reserves) with NRB are already fixed by the monetary authority of the country in certain percentage, it means that the commercial banks should maintain a fixed percentage of required cash reserve in Nepal Rastra Bank and fixed percentage of reserve in their vaults but the public is free to take the decision

either cash or deposit and they want to take the money in its most liquid form (i.e. currency) for its potential use.

Table 5.1
Composition of RM in Nepal

Year	% of C held by Pvt.Set in RM	% of C held by CBs in RM	% of D of Pvt.Set. with NRB in RM	% of D of CBs with NRB in RM	(i) Total % of RM
1980	72.9	4.4	10.3	12.4	100.0
1981	76.3	5.5	7.8	10.4	100.0
1982	72.2	5.4	6.6	15.8	100.0
1983	68.6	5.2	8.6	17.6	100.0
1984	70.8	6.1	7.0	16.1	100.0
1985	72.2	5.8	5.9	16.1	100.0
1986	73.5	5.9	6.1	14.5	100.0
1987	75.6	5.8	4.8	13.8	100.0
1988	70.9	6.5	7.4	15.2	100.0
1989	70.1	6.7	5.3	17.9	100.0
1990	69.8	5.8	6.3	18.1	100.0
1991	69.4	5.7	3.9	21.0	100.0
1992	72.3	6.1	5.0	16.6	100.0
1993	66.7	5.6	5.3	22.4	100.0
1994	69.2	6.5	4.7	19.6	100.0
1995	68.8	6.2	3.5	21.5	100.0
1996	70.8	6.9	3.3	19.0	100.0
1997	66.6	6.9	3.9	22.6	100.0
1998	67.2	6.3	3.6	22.9	100.0
1999	67.0	6.3	4.2	22.5	100.0

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

5.1.2 The Components of Narrow and Broad Money Supply

In practice, Nepal uses the two definitions of money supply. The first is narrow definition of money supply, which consists currency with public and demand deposits with commercial banks but the second is broad definition of money supply, which consists narrow money supply plus time deposits with commercial banks. Table 5.2 shows the composition of narrow and broad money supply during the study period in percentage.

Table 5.2
Composition of M₁ and M₂ in Nepal

2. Year	% of C In M ₁	% of DD In M ₁	% of TD in M ₂	% of M ₁ in M ₂
1980	63.6	36.4	46.4	53.6
1981	64.4	35.6	49.1	50.9
1982	67.5	32.5	51.6	48.4
1983	63.3	36.7	52.8	47.2
1984	66.4	33.6	52.8	47.2
1985	68.2	31.8	55.4	44.6
1986	68.9	31.1	53.6	46.4
1987	70.8	29.2	53.6	46.4
1988	66.4	33.6	55.2	44.8
1989	67.5	32.5	55.7	44.3
1990	68.3	31.7	54.9	45.1
1991	71.6	28.4	56.8	43.2
1992	70.1	29.9	57.4	42.6
1993	68.4	31.6	59.1	40.9
1994	69.0	31.0	59.1	40.9
1995	68.2	31.8	59.3	40.7
1996	68.6	31.4	60.6	39.4
1997	71.1	28.9	62.9	37.1
1998	68.4	31.6	64.3	35.7
1999	68.4	31.6	66.5	33.5

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

According to table 5.2, in M₁, C ranges from 63 to 72% while DD ranges from 28 to 37%. C has maximum (71.1%) share in M₁ for the year 1997 and minimum (63.3%) share in 1983. Reversibly, DD has maximum (36.7%) share in M₁ for 1983 and minimum (28.9%) share for 1997. In M₂, TD has 46 to 67% share while M₁ has 33 to 54% share. TD attends maximum (66.5%) share in 1999 and minimum (46.4%) share in 1980. Reversibly, M₁ attends maximum (53.6%) share in 1980 and minimum (33.5%) share in 1999.

The percentage of currency held by public is more in narrow money supply than that of demand deposits held at commercial banks because demand deposit is not interest bearing deposit and they put money in the most liquid form. If the people put the money in the form of demand deposits, they withdraw it in the short period. Similarly, the percentage of time deposits with commercial banks is more than the percentage of narrow money in broad money supply. TD shows increasing trend but M₁

shows decreasing trend in M_2 . This is due to the people's desire to keep the money as time deposits to get interest rather than investing it. It also shows that the people do not want to take risk investing their cash but want to be safe putting it in the form of time deposit even at a very low interest rate also. Besides this, it also indicates that the people's desire to keep liquid money is decreasing with respect to time. This is a positive sign of magnetization for economic development.

5.1.3 The Tendency of Monetary Aggregates

In Nepal, the currency, demand deposits, time deposits and reserve money are in growing tendency, which push the narrow and broad money supply to grow day by day. The table 5.3 shows the growth rates of monetary aggregates during the period 1980-1999.

Table 5.3
Growth Rates of Monetary Aggregates in Nepal
(in Percent)

Year	C	DD	TD	RM	M_1	M_2
1980	11.4	15.9	22.4	16.6	13.0	17.2
1981	14.8	10.8	26.3	9.6	13.3	19.3
1982	18.0	2.9	24.1	24.7	12.6	18.2
1983	12.9	35.9	26.7	18.9	20.4	23.7
1984	18.9	3.8	13.3	15.2	13.4	13.3
1985	14.2	5.1	23.4	12.0	11.1	17.6
1986	29.6	25.5	19.3	27.2	28.3	23.3
1987	18.7	8.6	15.4	15.4	15.5	15.4
1988	10.9	35.7	26.1	18.4	18.2	22.4
1989	24.7	18.8	25.4	26.0	22.7	24.2
1990	22.3	17.7	16.9	22.8	20.8	18.6
1991	19.9	2.8	23.7	20.6	14.5	19.5
1992	17.0	25.7	22.3	12.4	19.5	21.1
1993	19.6	29.2	31.6	29.6	22.5	27.7
1994	20.5	17.7	19.7	16.2	19.6	19.6
1995	14.4	18.5	16.3	15.1	15.7	16.1
1996	11.4	9.2	17.0	8.3	10.7	14.4
1997	9.1	-2.8	16.2	15.9	5.4	11.9
1998	13.0	28.3	24.6	12.1	17.4	21.9
1999	13.2	13.3	25.1	13.5	13.3	20.9

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

The graph 5.1 shows the growing trend of monetary aggregates in Nepal for the period 1980-1999.

In table 5.3, the growth rates (in percentage) of monetary aggregates such as C, DD, TD, RM, M_1 and M_2 are shown in Nepal for the study period 1980-1999. There is rapid expansion in C, TD, RM, M_1 , M_2 but a small contraction in DD in the year 1997. The degree of expansion is not symmetrical for the whole period. C and M_1 has maximum growth rate (29.6% and 28.3%) in 1986 while minimum (9.1% and 5.4%) in 1997. The maximum growth rate of 35.9% was observed for DD in 1983 and a negative growth rate of -2.8% in 1997. TD has the maximum growth rate of 31.6% in 1993 and minimum of 13.3% in 1984. The maximum growth rate (27.7%) for M_2 was observed in 1993 and minimum (11.9%) in 1997. Similarly, RM has maximum growth rate of 29.6% in 1993 and minimum of 8.3% in 1996.

From the above figures, it is clear that money supply is increasing at a faster rate in Nepal. All the monetary aggregates have significantly increased after economic liberalization as compared to before economic liberalization. The rapid expansion in money supply is due to the expansion in their determinants and the expansionary monetary policy of the authority. Due to the mobilization of resources, the saving capacity of the people has increased. Eventhough the people save more money but they do not want to invest it thinking of high risk. Hence, most of the people are risk averters in Nepal. Because of this reason, people keep their money either in cash or deposits in the bank whose ultimate effect is an increase in money supply. The excessive increase in money supply in relation to an increase in investment has not been able to increase real income of the people and its effect is a rise in the prices (i.e. inflation).

The graph 5.1 shows the growth trend of monetary aggregates in Nepal for the study period 1980-1999. It predicts that all the monetary aggregates are in increasing tendency. The reserve money and the narrow money supply are almost growing at the same rate and in the same direction. The broad money supply is growing in greater speed due to the large increase in time deposits.

a)

5.1.4 The Role of Reserve Money in Money Supply

The reserve money plays crucial role in both types of money supply. It is the major determinant of money supply. The table 5.4 shows the share of RM in narrow and broad money supply.

According to table 5.4, during the study period, the average share of RM in M_1 is 96.5%. The lowest share of RM in M_1 is 84.4% for 1981 and that the highest is 106.7% for 1997. The contribution of RM in M_1 is not symmetrical and its trend shows ups and downs. Similarly, the average share of RM in M_2 is 41.9%. The lowest share of RM in M_2 is 34.2% for 1999 and that the highest is 46.7% for 1980. The contribution of RM in M_2 is declining with respect to time.

From table 5.4 it is obvious that RM has been the dominant determinant of narrow money supply. For the years, 1991,1993,1997,1998 and 1999 RM appeared larger than M_1 leaving no positive role for narrow money multiplier. The more than 100% share of RM in M_1 implies that in these years, the currency and reserve ratios of commercial banks were higher. From table 5.6, it is found that the average currency and

reserve ratios in the study period were 2.1230 and 0.7130 respectively but average currency and reserve ratios for the years 1991,1993,1997,1998 and 1999 were 2.2936 and 0.9085 respectively.

Table 5.4
Share of RM in M₁ and M₂ in Nepal

Year	% of RM in M ₁	% of RM in M ₂	Year	% of RM in M ₁	% of RM in M ₂
1980	87.2	46.7	1990	97.9	44.1
1981	84.4	42.9	1991	103.1	44.5
1982	93.5	45.3	1992	96.9	41.3
1983	92.3	43.5	1993	102.6	41.9
1984	93.8	44.2	1994	96.6	40.7
1985	94.5	42.1	1995	99.1	40.4
1986	93.7	43.5	1996	97.0	38.2
1987	93.6	43.4	1997	106.7	39.6
1988	93.7	42.0	1998	101.8	36.4
1989	96.3	42.6	1999	102.1	34.2

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

The higher than average currency and reserve ratios of commercial banks for the years 1991,1993,1997,1998 and 1999 refer that there was the excessive amount of currency and reserves of commercial banks in these years. This is a reason for reducing the value of narrow money multiplier. The declining trend of share of RM in M₂ shows the strong growth in time deposits during the study period. However, it is obvious that RM is also a major determinant of broad money supply M₂.

5.1.5 The Determinants of Reserve Money

There are altogether six factors, which determine the size of the reserve money. Among them the five such as: Net Foreign Assets (NFA), Net Credit to Government (NCG), Credit to Government Enterprises (CGE), Credit to Commercial Banks (CCB) and Credit to Private Sector (CPS) are positive summation of reserve money while Net Non-Monetary Liabilities (NNML) is negative summation of reserve money. The table 5.5 shows the share of determining factors of reserve money.

A) Net Foreign Assets (NFA)

From the table 5.5, we can observe that average percentage share of NFA in RM for the study period (1980-1999) is 70.2%. The share for the different years is not symmetrical. There are many ups and downs in the contribution of NFA to the RM. The lowest share of NFA in RM is 19.8% in 1985 and the greatest share is 113.0% in 1994. In 1980, the share of NFA in RM is 70.8% and it decreased to 19.8% in 1985 and again

increased to 113% in 1994 and further decreased to 84% in 1997 and again increased to 100.7% in 1999.

Table 5.5
Share of Determining Factors of RM in Nepal
(In Percent)

Year	RM	NFA	NCG	CGE	CCB	CPS	NNML
1980	100	70.8	36.0	15.1	10.7	2.0	-34.5
1981	100	64.2	37.3	14.7	17.3	2.2	-35.7
1982	100	70.8	42.1	13.3	4.1	1.8	-32.1
1983	100	74.4	73.0	12.2	1.8	1.6	-36.0
1984	100	36.5	76.7	12.5	3.3	2.1	-30.9
1985	100	19.8	86.4	13.7	7.5	3.1	-30.5
1986	100	22.5	86.2	12.1	8.1	1.9	-30.8
1987	100	25.0	84.0	11.1	6.8	2.1	-29.2
1988	100	48.8	70.1	9.8	4.0	4.1	-36.8
1989	100	46.6	75.6	7.1	1.4	2.4	-33.2
1990	100	51.9	74.4	5.6	0.4	1.9	-34.1
1991	100	80.8	56.5	4.4	0.2	3.3	-45.1
1992	100	97.2	52.0	4.0	0.2	2.7	-56.0
1993	100	107.9	55.0	2.3	0.2	2.1	-67.5
1994	100	113.0	51.4	1.7	0.1	1.9	-68.1
1995	100	98.9	5.2	2.2	0.0	1.9	-8.4
1996	100	88.9	56.5	3.2	1.0	2.7	-52.3
1997	100	84.0	52.4	3.6	0.0	3.6	-43.7
1998	100	100.8	46.7	3.5	0.0	2.6	-53.6
1999	100	100.7	42.6	3.2	0.0	2.6	-49.1

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

The increase and decrease in net foreign asset is due to the conditions of foreign trade and balance of payment situations of Nepal. When the exports of goods and services are more than the imports, the condition of foreign trade becomes favorable and the NFA increases. Inversely when the imports of goods and services are more than the exports, the condition of foreign trade becomes unfavorable and the NFA decreases. The low share of NFA in RM for 1984-1987 is due to the poor condition of foreign trade of Nepal to the rest of the world and the high share of NFA in RM for 1991-1999 is due to the favorable condition of foreign trade of Nepal. The irregular trend of NFA in RM reflects the movement in the balance of payment of the country. As NRB is only the controller of foreign exchange reserves the deficit/surplus in the balance of payments has a direct impact on NFA and on the Reserve Money. From the figures in table 5.5, it is found that NFA is the main determinant of reserve money in Nepal.

B) Net Credit to Government (NCG)

From the table 5.5, the average percentage share of NCG in RM for the study period is 58.2%. The highest share of NCG in RM is 86.4% in 1985 and the lowest is 5.2% in 1995. The NCG also shows increasing and decreasing trend. The increase in NCG has positive impact on RM. The increase and decrease in NCG is due to the fiscal policy of the government. When the government borrows more amounts as overdraft from NRB and banking sector to finance the budget deficit, the NCG increases and if the government borrows less amounts, the NCG decreases. The high share of NCG in RM for 1983-1990 is due to the governments' borrowing more amounts as overdraft from NRB and the low share of NCG in RM for 1991-1999 is due to the governments' borrowing less amounts as overdraft from NRB. From the figures in table 5.5, NCG is observed as the second important determinant of reserve money in Nepal.

C) Credit to Government Enterprises (CGE)

From the table 5.5, the average percentage share of CGE in RM for the study period is 7.8%. The highest share of CGE in RM is 15.1% in 1980 and the lowest is 1.7% in 1994. The share of CGE in RM for the whole study period is not proportional. It increases sometime and decreases sometime. The increase in CGE is for the reason that the government enterprises such as: NIDC, ADB/N etc. borrow more amounts from NRB and the decrease in CGE is because they borrow fewer amounts from NRB. The increase in CGE has positive impact on RM.

D) Credit to Commercial Banks (CCB)

From the table 5.5, the average percentage share of CCB in RM for the study period is 3.4%. In the years 1995, 1997, 1998 and 1999, the share of CCB in RM is zero. In the year 1980, it has the highest share of 10.7% in RM. When the commercial banks take more direct loans and advances from NRB, the CCB increases and when they do not take the direct loans and advances from NRB CCB becomes zero. The increase in CCB has positive impact on RM.

E) Credit to Private Sector (CPS)

From the table 5.5, the average percentage share of CPS in RM for the study period is 2.4%. The highest share of CPS in RM is observed as 3.6% in 1997 and the lowest is 1.6% in 1983. The share of CPS in RM for the whole study period is not proportional. It has increasing as well as decreasing trend. If the private organizations take more amount of loans and advances from NRB the CPS increases and if they take fewer amount of loans and advances the CPS decreases. The increase in CPS has positive impact on RM.

F) Net Non-Monetary Liabilities (NNML)

From the table 5.5, the average percentage share of NNML in RM for the study period is -40.4%. The highest share of NNML in RM is -68.1% in 1994 and the lowest

is –8.4% in 1995. When the liabilities of NRB such as: capital, development fund, NRB staffs' provident fund, medical facility fund, welfare fund, buildings, furniture etc. increase, then the NNML increases and if they decrease, NNML decreases. The large negative figure of NNML has played a crucial role in the expansion of RM.

The expansion in Net Foreign Assets (NFA), Net Credit to Government (NCG), Credit to Government Enterprises (CGE), Credit to Commercial Banks (CCB) and Credit to Private Sector (CPS) push the reserve money in upward direction and increase the money supply while expansion in Net Non-Monetary Liabilities (NNML) push the reserve money in downward direction causing decrease in money supply in the economy.

5.1.6 The Determinants of Money Multiplier

The determinants of money multiplier are: currency ratio (c), reserve ratio (r), other deposit ratio (d) and time deposit ratio (t). In the table 5.6; c, r, d and t are given.

Table 5.6
The Currency, Reserve, Other Deposit and Time Deposit Ratios

Year	c	r	d	t
1980	1.7450	0.4035	0.2457	2.3809
1981	1.8087	0.3762	0.1846	2.7142
1982	2.0741	0.6077	0.1915	3.2742
1983	1.7233	0.5741	0.2153	3.6519
1984	1.9742	0.6185	0.1961	3.3313
1985	1.9238	0.5827	0.1585	3.5088
1986	2.2150	0.6173	0.1805	3.7183
1987	2.4203	0.6264	0.1545	3.9501
1988	1.9785	0.6058	0.2078	3.6704
1989	2.0755	0.7298	0.1557	3.8732
1990	2.1573	0.7393	0.1945	3.8469
1991	2.5177	0.6684	0.1402	4.6292
1992	2.3444	0.7367	0.1611	4.5055
1993	2.1693	0.9081	0.1731	4.5864
1994	2.2213	0.8389	0.1493	4.6625
1995	2.1440	0.8630	0.1085	4.5751
1996	2.1872	0.7986	0.1046	4.9036
1997	2.4405	1.0812	0.1414	5.8268
1998	2.1648	0.9413	0.1170	5.6969
1999	2.1759	0.9434	0.1289	6.3277

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

A) Currency Ratio(c)

According to table 5.6, the highest currency ratio was observed 2.5177 in 1991 and lowest was 1.7233 in 1983. For the whole study period the currency ratio is not constant and the ups and downs are seen. The currency ratio increases when the non-bank public's preference for currency relative to demand deposit increases. If the people keep their money in the most liquid form, i.e. currency rather than demand deposit, the currency ratio is high and if the people keep their money as demand deposit rather than currency, the currency ratio is low. The factors which affect the currency ratio are: interest rate on interest bearing deposits, the availability of bank services, the public faith in banking system etc. The decline in the currency ratio increases the money supply through its effect on money multiplier.

B) Reserve Ratio(r)

From the table 5.6, we can see that for the year 1997, the reserve ratio was 1.0812, which was the highest and for the year 1981, it was 0.3762, which was the lowest. The highest reserve ratio in 1997 is for the reason that the reserves are more and the demand deposits are less in this year. The lowest reserve ratio in 1981 is because the reserves are less and the demand deposits are more in this year. The reserve ratio is an important determinant of the stock of money in an economy. It is an instrument of monetary policy. A smaller cash reserve ratio enables greater expansion in money supply.

C) Other Deposits Ratio (d)

According to table 5.6, the other deposit ratio is highest for 1980 that is 0.2457 and lowest for 1996 that is 0.1046. The highest other deposit ratio in 1980 is for the reason that the other deposits are more and the demand deposits are less in this year. The lowest other deposit ratio in 1996 is because the other deposits are less and the demand deposits are more in this year. There is no definite trend of other deposit ratio. The other deposit ratio is negatively related with money supply. When it reduces, the money supplies increase and vice versa.

D) Time Deposits Ratio (t)

According to table 5.6, it is clear that the time deposit ratio has gone up. The figures show that time deposit ratio bears a significantly increasing trend. It was 2.3809 in 1980, which went up to 6.3277 in 1999. The increase in the time deposit ratio year by year is due to the reason that the time deposits are increasing at a faster rate than the demand deposits. As there is positive relationship between time deposit ratio and broad money multiplier, the increase in the time deposit ratio pushes the broad money multiplier, which lifts up the broad money supply in the economy. The time deposit ratio is also affected by interest rate, expansion of bank branches, innovation of new financial instruments, expected rate of inflation etc.

5.1.7 The Required Reserve Ratio and Reserves of Commercial Banks

The commercial banks are forced legally to maintain a certain percentage of their total deposit liabilities in the form of reserves in Nepal Rastra bank and in their vaults, which is known as required reserve ratio. The monetary authority of the country fixes the required reserve ratio. So how the required reserve ratio has played a role in the commercial banks' reserves determination during the study period is observed with the help of the table 5.7.

Table 5.7

The Required Reserve Ratio and Reserves of Commercial Banks

Year	Required Reserve Ratio (In Percentage)			Reserves of Commercial Banks (In Million Rs)		
	Cash Reserve with NRB	Cash Reserve in CBs Vaults	Total	*Required Reserves	Excess Reserves	Total
1980	7	-	7	233.08	182.92	416.00
1981	5	4	9	372.89	56.81	429.70
1982	5	4	9	441.63	272.27	713.90
1983	5	4	9	565.79	351.01	916.80
1984	5	4	9	636.03	389.57	1025.60
1985	5	4	9	768.25	363.75	1132.00
1986	5	4	9	924.81	424.89	1349.70
1987	5	4	9	1063.12	423.98	1487.10
1988	5	4	9	1345.67	606.13	1951.80
1989	5	4	9	1705.91	1088.29	2794.20
1990	8	4	12	2626.20	704.00	3330.20
1991	8	4	12	3202.50	1280.10	4482.60
1992	8	4	12	3999.42	286.88	4286.30
1993	8	4	12	5225.17	1604.03	6829.20
1994	8	4	12	6260.22	1164.58	7424.80
1995	8	4	12	7325.46	1728.64	9054.10
1996	8	4	12	8544.91	600.29	9145.20
1997	8	4	12	9785.09	2324.81	12109.90
1998	7	3	10	10240.16	3192.64	13432.80
1999	7	3	10	12677.36	2490.74	15168.10

Sources: I) *40 Years of The Nepal Rastra Bank (1956-1996)*, April 1996.

II) Nepal Rastra Bank, *Economic Report*, 1997/98.

III) Nepal Rastra Bank, *Quarterly Economic Bulletin (various issues)*.

* Required reserves are tentatively calculated by the researcher.

The table 5.7 shows the provision of required reserve and the condition of commercial bank reserves in the period 1980-1999. The total reserves of commercial banks contain required reserves and excess reserves. In 1980, the commercial banks were required to maintain 7% of their total deposit liabilities in the form of cash reserve ratio with NRB while they had Rs 233.08 million as required reserves and Rs 182.92 million as excess reserve out of Rs 416 million as total reserves.

The Nepal Rastra Bank directed commercial banks on March 16, 1981 to maintain a minimum of 9% of the total deposit as required reserve which include 5% cash reserve with NRB and 4% cash reserve in their vaults. In this year, they had Rs 429.70 million as total reserve which include Rs 372.89 million as required reserve and Rs 56.8 million as excess reserves. For the period 1981-1989, the provision of required reserve remained same but the total reserves of commercial banks slightly increased resulting 2794.20 million Rs in 1989. In 1989, the commercial banks had Rs 1705.91 million as required reserves and Rs 1088.29 as excess reserves.

Effective April 15, 1990, the NRB issued directives to commercial banks and financial institutions conducting banking business to maintain a minimum 8% cash reserve of total deposit liabilities with Nepal Rastra Bank and 4% cash reserve in their vaults out of total 12% required reserve ratio. In 1990, they had Rs 3330.20 million as total reserves out of which required reserves were Rs 2626.20 million and excess reserves were Rs 704 million. For the period 1990-1997, the provision of required reserve ratio remained constant but the total reserves of commercial banks slightly increased resulting Rs 12109.90 million in 1997. In this year required reserves were Rs 9785.09 million and excess reserves were Rs 2324.81 million.

In place of all previous directions on compulsory cash reserve ratio to be maintained by the commercial banks, new regulations were brought into effect from April 13, 1998. According to this new provision, the commercial banks were required to hold cash balance with NRB equivalent to 8% of the total domestic current and saving deposit liabilities and 6% of their total domestic fixed deposit liability. Besides this, commercial banks were required to maintain 3% cash in vault out of their total domestic deposit liabilities. On an average, the cash reserve ratio was lowered to 10% from 12% out of which 7% cash balance with NRB and rest 3% in their vaults. In 1998, the total reserve of commercial bank was Rs 13432.80 million containing Rs 10240.16 million as required reserves and Rs 3192.64 million as excess reserves. In 1999 and onwards, this provision of reserve remained same but the total reserve of commercial banks increased to Rs 15168.10 million. In 1999, required reserves were Rs 12677.36 million and excess reserves were Rs 2490.74 million.

According to table 5.7, the commercial banks always have the reserves more than the required reserves. Due to the lack of investment opportunities, the commercial banks possess the excess amount of reserves which is idle and can not earn interest. The people in Nepal are risk averters and they do not want to take risk in using the commercial banks' loan for investment. Therefore, the demand for loan is less than the

supply of loan in Nepal. Due to this reason, the commercial banks are suffered from excess liquidity problem.

The required reserve is policy determined variable, however, if the required reserve ratio is given, the levels of required reserves can also rise with a rise in constituent deposits or the total deposits as the required reserve ratio is imposed. The reserves maintained in excess of required reserves are behavioral of commercial banks and they affect the money supply negatively. The factors such as market rate of interest, the discount rate and deposit variability are the crucial determinants of excess reserves.

5.1.8 The Narrow and Broad Money Multipliers

The table 5.8 shows the narrow and broad money multipliers calculated by using two different methods.

Table 5.8
The Narrow and Broad Money Multipliers

Year	$m_1=M_1/RM$	$m_1=1+c/c+r+d$	$m_2=M_2/RM$	$m_2=1+c+t/c+r+d$
1980	1.1466	1.1466	2.1410	2.1410
1981	1.1854	1.1854	2.3308	2.3308
1982	1.0699	1.0699	2.2094	2.2094
1983	1.0838	1.0838	2.2984	2.2984
1984	1.0665	1.0665	2.2610	2.2610
1985	1.0585	1.0585	2.3751	2.3751
1986	1.0671	1.0671	2.3012	2.3012
1987	1.0684	1.0684	2.3024	2.3024
1988	1.0668	1.0668	2.3814	2.3814
1989	1.0387	1.0387	2.3468	2.3468
1990	1.0214	1.0214	2.2659	2.2659
1991	0.9701	0.9701	2.2467	2.2467
1992	1.0315	1.0315	2.4212	2.4212
1993	0.9750	0.9750	2.3860	2.3860
1994	1.0037	1.0037	2.4564	2.4564
1995	1.0092	1.0092	2.4776	2.4776
1996	1.0313	1.0313	2.6180	2.6180
1997	0.9374	0.9374	2.5281	2.5281
1998	0.9819	0.9819	2.7495	2.7495
1999	0.9796	0.9796	2.9276	2.9276

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

According to table 5.8, it is clear that narrow and broad money multipliers calculated by using two different methods are the same. When observing the study period 1980-1999, it seems that the narrow money multiplier is greater than unity

except in the years 1991,1993,1997,1998 and 1999. In these years, the currency and reserve ratios of commercial banks were higher. From table 5.6, it is found that the average currency and reserve ratios in the study period were 2.1230 and 0.7130 respectively but average currency and reserve ratios for the years 1991,1993,1997,1998 and 1999 were 2.2936 and 0.9085 respectively. The higher than average currency and reserve ratios of commercial banks for the years 1991,1993,1997,1998 and 1999 refer that there was the excessive amount of currency and reserves of commercial banks in these years. This is a reason for reducing the value of narrow money multiplier. The highest narrow money multiplier is seen as 1.1854 in 1981 and lowest is seen as 0.9374 in the year 1997. The narrow money multiplier is a dominant determinant of narrow money supply. The less than unit value shows that there is negative role of money multiplier for the narrow money supply.

According to table 5.8, the broad money multiplier on the average is increasing. It was 2.1410 in 1980 but became 2.9276 in 1999 showing increasing trend though there are irregular trend throughout the period. The highest broad money multiplier is observed in 1999 as 2.9276 and the lowest in 1980 as 2.1410. One of the important components of broad money, i. e. time deposits are increasing at a faster rate than demand deposits. As there is positive relationship between time deposit ratio and broad money multiplier, the increase in the time deposit ratio pushes the broad money multiplier, which lifts up the broad money supply in the economy. Therefore, the increasing trend of broad money multiplier tells that people prefer to keep their money in the form of time deposits rather than demand deposits during the study period.

From the above analysis, it is obvious that:

1. The money supply in Nepal is not merely a policy-determined phenomenon but it is jointly determined by the central bank, the commercial bank and the public.
2. The change in the high-powered money is largely exogenously controlled by the monetary authority but change in the money multiplier is endogenous and depend upon the behavioral choices of the public and banks.
3. The historical behaviour of money supply in Nepal shows that money supply is increasing year by year.
4. Among the various determinant of Reserve money net foreign assets and net credit to government are the important ones.
5. The currency ratio (c) and other deposit ratio (d) are affected by real economic activity and seasonal factors.
6. The reserve ratio (r) is determined by the interest rate, real economic activity and the government regulation.
7. The time deposit ratio (t) is influenced by the decision of the public as to how much time deposit to be held in relations to demand deposits, the economic activities and the rate of interest.
8. Currency (C) is the main component of narrow money supply and time deposit is the main component of broad money supply in Nepal.

5.2 The Interest Rate Structure in Nepal

In this part, the interest rate prevailing in the organized sector, the interest spread and the impact of lending and deposit interest rates of commercial banks on time deposits and loans is studied using the time series data for the period 1980-1999.

5.2.1 The Interest Rate Structure in the Organized Sector of Nepal

Before 1990, the interest rates of banks and financial institutions were fully controlled and administered by the monetary authority of the country (i.e. by NRB). Effective August 31, 1989, the interest rates were completely liberalized. Accordingly, commercial banks and financial institutions were granted autonomy in fixing their own deposit and lending rates. The rationale for ending the administered interest regime was to let market forces to determine the interest rates structure, bring about flexibility in the mobilization of financial savings and make efficient allocation of available resources.

The table 5.9 shows the interest rate structure, which prevailed in the organized sector of Nepal during the study period.

In table 5.9, the interest rate structure of Nepal in the 5 years gap from 1980 to 1999 is shown. Observing the interest rate structure, we can find mainly 4 kinds of interest rates. They are: interest on government securities, interest of Nepal Rastra Bank, interest of commercial banks and interest of the financial institutions such as Agricultural Development Bank of Nepal (ADB/N) and NIDC.

A) Interest on Government Securities

There are three types of government securities, viz, treasury bills, national saving certificates and development bonds.

I) Treasury Bills

Issue of treasury bills is one of the means by which the government borrows money for short periods, 12 months. The treasury bills are normally used for a period of 91 days. The government gives certain interest on treasury bills. The treasury bills interest rate was 5% for the years 1980 and 1985. It increased to 7.20% in 1990 and further increased to 8.50% in 1995 but decreased to 3.30% in 1999.

II) National Saving Certificates

Under the small saving scheme, the government of Nepal, issued 15 years national saving certificates in 1984. The government gives certain interest on national saving certificates. The interest given on national saving certificate was 13% in 1985. It increased to 13-15.5% in 1990, 9-15.5% in 1995 and 8.5-13.25% in 1999.

III) Development Bonds

Development bonds are also means of government borrowing from the public. The government fixes the development bond interest rate. The development bond

interest rate was 10.5% in 1980 and 1985. It was 3-10.5% in 1990 and 1995. It became 3.12% in 1999.

Table 5.9
Structure of Interest Rates in Nepal
 (As of mid -July)

<i>(Percent per annum)</i>					
Types	1980	1985	1990	1995	1999
Treasury Bills	5.00	5.00	7.20	8.50	3.30
National Sa.Certificates	-	13.00	13.0-15.5	9.0-15.5	8.5-13.25
Development Bond	10.50	10.50	3.0-10.5	3.0-10.5	3.0-12.0
B. Nepal Rastra Bank					
Refinance Rate	12.00	15.00	11.00	11.00	9.00
NRB Bond Rate	-	-	-	8.20	-
C. Commercial Banks					
1.Deposits Rates					
Saving Deposit	8.50	8.50	8.5-9.5	7.0-8.0	5.75-8.0
Time Deposit					

3 Month	4.00	4.50	8.50	5.0-7.5	4.0-7.5
6 Month	9.50	8.75	9.0-10.0	6.0-8.0	6.0-8.0
1 Year	12.50	12.50	11.5-12	8.0-9.25	7.25-9.25
2 Year & above	13.50	13.5-14.0	12.5-12.75	7.25-10.25	7.25-10.25
2. Lending Rates					
Industry	11.0-17.0	15.0-18.0	16.0-18.0	14.0-18.0	11.0-17.0
Agriculture	10.0-15.0	15.0-20.0	15.0-16.0	13.0-15.5	14.0-15.5
Export Bills	13.0-14.0	15.0-16.0	15.0-16.0	12.0-16.0	7.5-15.0
Commercial Loans	14.00	17.0-21.0	18.0-21.0	12.0-19.0	11.0-17.0
Over Draft	17.0-21.0	17.0-21.0	18.0-21.0	12.0-19.0	10.0-19.0
D. Financial Institutions					
ADB/N					
To Cooperative	-	13.0-18.0	13.0-18.0	12.0-15.0	12.0-15.0
To Others	-	15.0-20.0	15.0-20.0	14.0-17.0	14.0-17.0
(2) NIDC	-	14.5-18.0	16.0-18.0	15.0-16.0	15.5-18.0

Source: Nepal Rastra Bank, *Quarterly Economic Bulletin* (various issues).

(-) Indicates non-availability of data

B) Interests of Nepal Rastra Bank

There are two types of interests of Nepal Rastra Bank. They are refinance rate and NRB bonds rate.

I) Refinance Rate

Refinance rate means the rate at which Nepal Rastra Bank gives credit facilities to commercial banks encouraging them to provide export and industrial credit. Nepal Rastra Bank committed to make available credit to commercial banks at the rate of 12% per annum in 1980. The refinance rate increased to 15% in 1985 and decreased to 11% in 1990 and 1995. It further decreased to 9% in 1999.

II) NRB Bonds Rate

NRB bonds are issued by Nepal Rastra Bank. In 1995, NRB bonds were issued and the interest given was 8.20% per annum.

C) Interests of Commercial Banks

There are two types of Interest operated by commercial banks. They are interest on deposits and interest charged on loans.

I) Deposit Rates

There are two types of interest bearing deposits. They are saving deposit and time deposit. The commercial banks give certain percent of interest on the deposits based on the time of the amount deposited.

The interest given by commercial banks on saving deposit during the study period was 5.75% to 9.5% per annum. The interest rate on time deposit depends upon the period of time, viz, 3-month, 6- month, 1-year, 2-years and above. In the study period, the interest on 3-month deposit was 4% to 8.5% and on 6-month deposit was 6% to 10%. It remained as 7.25% to 12.5% for 1-year deposit and 7.25% to 13.5% for 2-years deposit.

II) Lending Rates

The lending interest rates are those interest rates, which are charged by the commercial banks while giving the loans to the relative sector of the economy. There are five types of lending interest rates. They are lending rate to industry, agriculture, exports bills, commercial loans and overdraft.

The interest rate of commercial banks charged to industrial sector was 11% to 18% during the study period. It ranged from 13% to 20% for agricultural sector, 12% to 20% for export bills, 12% to 21% on commercial loans and 10% to 21% was charged for overdraft.

D) Interest of Financial Institutions

The Agricultural Development Bank of Nepal (ADB/N) and the Nepal Industrial Development Corporation (NIDC) give loans to the various sectors of the economy with the aim of promoting their investment. They provide loans and charge certain interest to cooperative and other institutions.

During the study period, the interest rate charged by ADB/N to cooperative was 12% to 18% and to other financial institutions was 14% to 20%. The interest rate charged by NIDC was 14.5% to 18% in the same period.

5.2.2 The Impact of Commercial Banks Lending Interest Rates on The Total Amount of Loans

The lending interest rates of commercial banks are related to the amount of loans. At the low lending rates, the commercial banks can flow more and more amount of loan. There are five types of lending interest rates of the commercial banks, they are: lending interest rates to industry, to agriculture, to export bills, to commercial loans and to over draft. The table 5.10 shows the structure of lending interest rates of commercial banks and the total amount of loans in Nepal during the study period.

According to table 5.10, for the year 1980, the lending rate to industry was 17%, to agriculture was 15%, to export bills was 14%, to commercial loans was 14%, to over draft was 21% and the amount of loan was Rs. 2773.50 million. In 1981 and 1982, the

lending rates remained the same but there was slightly rise for loans, which was Rs 3140.50 million.

In 1983, the lending rates increased to 18%, 20%, 16%, 17% and 21% correspondingly and remained the same for 1986 except the commercial loan rate, which increased to 21% in 1986 but the amount of loans increased from Rs 3383.60 million in 1983 to Rs 5974.20 million in 1986. After 1986, the lending rate to industry seems to be in irregular order but other remained unchanged up to 1991. In 1992 and 1993, the lending rates to industry, to agriculture and to exports bills increased but the lending rates to commercial loans and to over draft remained the same and the amount of loans reached to Rs 21477.10 million in 1993. All of them decreased in 1994 and increased in 1995 and showing zigzag trend remained as 17%, 15.50%, 15%, 17% and 19% respectively in 1999 but the amount of loan increased from Rs 29339.10 million in 1994 to Rs 84082.50 million in 1999.

The loans of commercial banks are in a small extent affected by the lending interest rates but whatever be the lending interest rates the amount of loan seems to be in increasing trend. This is for the reason that the loans of commercial banks are affected not only by lending interest rates but by various other factors such as: the extension of bank branches, the establishment of new financial institutions, the banking habit of the people, the increase in the level of prices and the commercial banks may have suffered from the condition of bad debts also.

Table 5.10
**Structure of Commercial Banks Lending Interest Rates
and The Total Amount of Loans in Nepal**

Year	*Commercial Banks Lending Interest Rates (% per annum)					Total Amount of Loans (In Million Rs)
	To Industry	To Agriculture	To Exports Bills	To Commercial Loans	To Over Draft	
1980	17.00	15.00	14.00	14.00	21.00	2773.50
1981	17.00	15.00	14.00	14.00	21.00	3578.70
1982	17.00	15.00	14.00	14.00	21.00	3140.50
1983	18.00	20.00	16.00	17.00	21.00	3383.60
1984	18.00	20.00	16.00	17.00	21.00	3526.00
1985	18.00	20.00	16.00	17.00	21.00	4532.10
1986	18.00	20.00	16.00	21.00	21.00	5974.20
1987	16.00	20.00	16.00	21.00	21.00	6941.50
1988	16.00	20.00	16.00	21.00	21.00	8164.30
1989	18.00	16.00	16.00	21.00	21.00	10356.70
1990	18.00	16.00	16.00	21.00	21.00	11798.70
1991	18.00	16.00	16.00	21.00	21.00	14009.00
1992	21.00	20.00	20.00	21.00	21.00	18797.60
1993	21.00	19.00	20.00	21.00	21.00	21477.10
1994	17.00	15.00	14.00	18.00	18.00	29339.10
1995	18.00	15.50	16.00	19.00	19.00	40590.30
1996	17.50	16.00	16.00	20.00	20.00	52619.80
1997	17.50	16.00	16.50	18.00	20.00	60973.70
1998	17.00	15.50	16.00	18.00	20.00	69493.60
1999	17.00	15.50	15.00	17.00	19.00	84082.50

Sources: I) Nepal Rastra Bank, *Quarterly Economic Bulletin*, (various issues)

II) Nepal Rastra Bank, *Economic Report*, (various issues)

* In case of both lower and upper limits of interest rates are given, the upper limits are taken.

5.2.3 The Impact of Commercial Banks Saving Deposit Interest Rate on The Amount of Saving Deposits

The saving deposit interest rate of commercial bank is related to the amount of saving deposits. The saving deposit is a precautionary deposit. The table 5.11 shows saving deposit interest rate of commercial banks and the amount of saving deposits in Nepal during the study period.

Table 5.11
**Structure of Commercial Banks Saving Deposit Interest Rate
and The Amount of Saving Deposits in Nepal**

Year	*Commercial Banks Saving Deposit Interest Rates (% per annum)	Amount of Saving Deposit (In Million Rs)	Year	*Commercial Banks Saving Deposit Interest Rates (% per annum)	Amount of Saving Deposit (In Million Rs)
1980	8.50	571.20	1990	9.50	5218.20
1981	8.50	716.70	1991	9.00	6671.50
1982	8.50	877.40	1992	10.00	8634.90
1983	8.50	1068.70	1993	10.00	12923.30
1984	8.50	1333.90	1994	7.50	17460.70
1985	8.50	1776.20	1995	8.00	22765.90
1986	8.50	2255.70	1996	8.00	25889.50
1987	10.00	2672.20	1997	8.00	27783.30
1988	10.00	3338.80	1998	8.50	36885.30
1989	9.50	4321.80	1999	8.00	50140.80

Sources: I) Nepal Rastra Bank, *Quarterly Economic Bulletin*, (various issues)

II) Nepal Rastra Bank, *Economic Report*, (various issues)

* In case of both lower and upper limits of interest rates are given, the upper limits are taken.

According to table 5.11, for 1980, the saving deposit interest rate was 8.50% and the amount of saving deposit was Rs 571.20 million. The saving deposit interest rate remained unchanged up to 1986 but the amount of saving deposit increased to Rs 2255.70 million. In 1987, the saving deposit interest rate increased to 10% and remained unchanged for 1988 but the amount of saving deposit increased from Rs 2255.70 million in 1986 to Rs 2672.20 million in 1987 and to Rs 3338.80 million in 1988. From 1986 to 1987, the proportion of saving deposit interest increased in 1.50% but the proportion of saving deposit increased in 15.52%.

In 1989, the saving deposit interest rate decreased to 9.50% and remained unchanged for 1990 but the amount of saving deposit increased from Rs 4321.80 million in 1989 to Rs 5218.20 million in 1990. The saving deposit interest rate further decreased to 9% in 1991 and increased to 10% in 1992 and 1993. The amount of saving deposit reached to Rs 13923.30 million in 1993. In 1994, the saving deposit interest rate decreased to 7.50% and again increased to 8% in 1995 remaining unchanged for 1996 and 1997 but the amount of saving deposit increased from Rs 17460.70 million in 1994 to Rs 27783.30 million in 1997. In 1998, the saving deposit interest rate slightly increased to 8.50% and again decreased to 8% in 1999 but the saving deposit increased from Rs 36885.30 million in 1998 to Rs 50140.80 million in 1999. From 1998 to 1999, the proportion of saving deposit interest decreased in 0.50% but the proportion of saving deposit increased in 26.44%.

The comparison between the saving deposit interest rate and the amount of saving shows that saving deposit seems interest inelastic because it is increasing with respect to time. This is for the reason that the mobilization of the resources increases the real income of the people and they save in small amount and for precautions, they want to deposit the money in the form of saving deposit in the commercial banks even at a very low interest rate and they want to withdraw it whenever they need. As the result, the amount of saving deposit increases.

5.2.4 The Impact of Commercial Banks Fixed Deposit Interest Rates on The Amount of Fixed Deposits

The Fixed deposit interest rates of commercial banks are related to the amount of fixed deposits. At the high fixed deposit rate, the people want to deposit more money in the form of fixed deposits. The table 5.12 shows the structure of fixed deposit interest rates of commercial banks and the amount of fixed deposits in Nepal during the study period.

According to table 5.12, for the year 1980, the fixed deposit interest rate for 3 month was 4%, for 6 month was 9.50%, for 1 year was 12.50% and for 2 years and above 13.50% and the amount of fixed deposit was Rs 1814.90 million. In 1981, the fixed deposit rates remained the same but there was slightly rise for deposits, which was Rs 2228.30 million.

In 1982, the fixed deposit rate for 3 month increased to 4.50% and other three remained the same but there was rise for deposits, which was Rs 2789.80 million. In 1983, the fixed deposit rate for 6 month increased to 8.75% and other three remained the same but there was rise for deposits, which was Rs 3417.90 million. The fixed deposit rates for 1 year and 2 years and above remained unchanged up to 1989 but the fixed deposit rate for 3 month increased to 8.50% in 1986 and the fixed deposit rate for 6 month increased to 8.80% in 1987. The deposits increased to Rs 6386.20 million in 1987.

Up to 1989, the fixed deposit rates were in increasing trend but beyond 1989, they showed irregular trend i.e. increasing and decreasing trend. The fixed deposit interest rate for 6 month increased to 10% but for 1 year decreased to 12.00% and for 2 years and above decreased to 12.75% in 1990 but the amount of fixed deposit in 1990 further increased to Rs 11761.50 million. In 1995, the fixed deposit interest rate for 3 month was 6.50%, for 6 month was 7.50%, for 1 year was 9% and for 2 years and above 10.25% which was the decreased and the amount of fixed deposit was Rs 23358.70 million. Showing zigzag trend i.e increasing and decreasing the rates reached to 7.50%, 8%, 9.25% and 10.25% respectively in 1999. In the same year, the amount of fixed deposit reached to Rs 56960.20 Million.

The amount of fixed deposit is affected by the fixed deposit interest rates in a small extent but whatever be the fixed deposit interest rates the amount of fixed deposit seems to be in increasing trend. The mobilization of the resources increases the real

income of the people and they save more and more money but do not invest it. For security, they want to put the money in the form of interest bearing deposit in commercial banks for a certain period even at a very low interest rate. As the result, the amount of fixed deposit increases.

Table 5.12
**Structure of Commercial Banks Fixed Deposit Interest Rates
and The Amount of Fixed Deposits in Nepal**

Year	*Commercial Banks Fixed Deposit Interest Rates (% per annum)				Amount of Fixed Deposits (In Million Rs)
	3 Month	6 Month	1 Year	2 Years and Above	
1980	4.00	9.50	12.50	13.50	1814.90
1981	4.00	9.50	12.50	13.50	2228.30
1982	4.50	9.50	12.50	13.50	2789.80
1983	4.50	8.75	12.50	14.00	3417.90
1984	4.50	8.75	12.50	14.00	3912.30
1985	4.50	8.75	12.50	14.00	4693.70
1986	8.50	8.75	12.50	14.00	5632.50
1987	8.50	8.80	12.50	14.00	6386.20
1988	8.50	8.80	12.50	14.00	8036.40
1989	8.50	9.00	12.50	14.00	10044.70
1990	8.50	10.00	12.00	12.75	11761.50
1991	9.00	9.50	12.00	12.75	14382.60
1992	10.00	10.50	12.50	13.50	17326.30
1993	10.00	11.00	12.00	13.00	21414.70
1994	6.50	7.50	9.00	10.25	23358.70
1995	7.50	8.00	9.25	10.25	24811.80
1996	8.00	9.00	11.00	10.25	30157.10
1997	8.00	9.00	11.00	10.25	36976.80
1998	8.00	8.50	10.50	10.25	47303.20
1999	7.50	8.00	9.25	10.25	56960.20

Sources: I) Nepal Rastra Bank, *Quarterly Economic Bulletin*, (various issues).

II) Nepal Rastra Bank, *Economic Report*, (various issues).

* In case of both lower and upper limits of interest rates are given, the upper limits are taken.

The increase in the fixed deposits year by year is for the reason that there is the lack of investment opportunities in the economy; the people are risk averters who expect uncertainty in the economy and the increase in the level of prices etc. The fixed

deposits of commercial banks are also affected by other factors such as: the extension of bank branches, the establishment of new financial institutions, the banking habit of the people, the social and political situation of the country etc.

5.2.3 The Interest Spread in Nepal

The interest spread is defined as the difference between the loaning out interest rate and deposit interest rate. The table 5.13 shows the interest spread between commercial loans interest rate and one-year time deposit interest rate in Nepal during the study period.

Table 5.13
**The Interest Spread Between Commercial Loaning Out Interest
Rate and One-Year Time Deposit Interest Rate in Nepal**

Year	Commercial Loaning Out Interest Rate (% per annum)		One Year Time Deposit Interest Rate (% per annum)		Interest Spread in %	
	Lower Limit	Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper Limit
1980	14.00	14.00	12.50	12.50	1.50	1.50
1981	14.00	14.00	12.50	12.50	1.50	1.50
1982	14.00	14.00	12.50	12.50	1.50	1.50
1983	17.00	17.00	12.50	12.50	4.50	4.50
1984	17.00	17.00	12.50	12.50	4.50	4.50
1985	17.00	21.00	12.50	12.50	4.50	8.50
1986	17.00	21.00	12.50	12.50	4.50	8.50
1987	17.00	21.00	12.50	12.50	4.50	8.50
1988	17.00	21.00	12.50	12.50	4.50	8.50
1989	17.00	21.00	12.50	12.50	4.50	8.50
1990	18.00	21.00	11.50	12.00	6.50	9.00
1991	18.00	21.00	11.50	12.00	6.50	9.00
1992	17.00	21.00	11.50	12.50	5.50	8.50
1993	15.00	21.00	11.50	12.00	3.50	9.00
1994	13.50	18.00	8.50	9.00	5.00	9.00
1995	12.00	19.00	8.00	9.00	4.00	10.00
1996	14.50	20.00	9.50	9.25	5.00	10.75
1997	14.50	18.00	9.50	11.00	5.00	7.00
1998	13.50	18.00	9.00	10.50	4.50	7.50
1999	11.00	17.00	7.25	9.25	3.75	7.75

Sources: I) Nepal Rastra Bank, *Quarterly Economic Bulletin*, (various issues).
II) Nepal Rastra Bank, *Economic Report*, (various issues).

The table 5.13 gives the interest spread in two ways. The first is taking the lower limits of both types of lending and deposits rates and the second is taking their upper limits. During the study period, taking the lower limits, the highest interest spread seems to be 6.50 % in 1990 and 1991 while the lowest seems to be 1.50% in 1980, 1981 and 1982. Taking the upper limits, the highest interest spread seems to be 10.75 % in 1996 while the lowest seems to be 1.50% in 1980, 1981 and 1982.

The average interest spread while taking the lower limits is found to be 4.26% and that while taking their upper limits is found to be 7.18 %. The average of both types of upper and lower limits for the whole study period is found to be 5.72%. Similarly, the average of both types of upper and lower limits for the controlled economy (i.e. 1980-1989) is found to be 4.60% and that for liberalized economy (i.e. 1990-1999) is found to be 6.83%.

The average interest spread seems to be higher in liberalized economy rather than in controlled economy. This is for the reason that the oligopolistic nature of the commercial banking system produced cartelling in interest rate determination. As a result, the lending rates increased faster than the deposit rates or the deposit rates declined faster than the lending rates resulting in wider spread between lending and deposit rates. Interest rate structure could not be transparent and depositors and borrowers were not treated uniformly in terms of interest rate. Thus, instead of fair competition in the market, discrepancies were observed in interest rate structure.

The high interest spread prevailing in the organized sector of the economy is due to the following reasons.

- 1) The high compulsory cash reserve ratio (r) of the commercial banks and financial institutions with NRB. (For compulsory cash reserve ratio, look table 5.7)
- 2) The interest free nature of the cash reserve ratio that deposited in NRB.
- 3) The weak financial management system of the banks and financial institutions and the government intervention.
- 4) The expansion of organization and high operating costs of the banks and financial institutions.
- 5) The excess burden of the unskilled and untrained staffs.
- 6) The lack of modern technology in these institutions such as computerization, networking system etc.
- 7) The growing proportion of the bad debts in the banking system.
- 8) The government borrows the major portion of the resources of banking system as overdraft to finance the budget deficit.

Due to the above-mentioned reasons, the interest spread prevailing in the organized sector of the economy in Nepal seems to be very high in comparison to the international level and it needs to be improved. To overcome the above problems and to take the interest rate in desirable limit the NRB and the government should take the steps in the proper directions.

5.3 The Regression Estimations

Regarding the objectives of this study, the related hypotheses are tested with the help of regression estimation and the empirical results are presented in the tabular form. For the relationship between money supply and interest rate the second sub-sample period (i.e.1990-1999) is taken because in the first sub-sample period (i.e. 1980-1989) the interest rates are administered by the monetary authority. To know the effectiveness on monetary and fiscal policies the results are analyzed and compared for two sub sample periods (1980-1989 and 1990-1999).

5.3.1 The Impact of Narrow Money Supply on The Commercial Loaning Out Interest Rate

Expecting the impact of narrow money supply on the commercial loaning out interest rate, the following model has been set.

$$\ln r^{CL} = \ln a_0 + a_1 \ln M_{1t} + U \quad (5.1)$$

Where, r^{CL} = Interest rate on commercial loans

M_{1t} = Narrow money supply at time t

a_0 = Constant

a_1 = Magnitude of M_{1t}

U = Error term

The regression results are presented in table 5.14

Table 5.14
The Regression Results in Impact of M_1 on The Commercial Loaning Out Interest Rate

Dependent Variable: $\ln r^{CL}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{1t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	1		5.37	-0.25					
		SE	(0.40)	(0.04)	-0.91	0.83	0.81	1.70	39.95
		t	(13.34)*	(-6.32)*					

•* Significant at 1% level

The regression estimations in table 5.14 show that narrow money supply has significant inverse impact on commercial loaning out interest rate. It means, 1 % increase in the narrow money supply leads to 0.25 % decrease in commercial loaning

out interest rate and vice versa. There is strong negative correlation between the interest rate on commercial loans and narrow money supply. The $\bar{R}^2$ suggests that about 81% variation in r^{CL} is explained by M_1 . The t-statistics are significant at 1% level and the F-statistic indicates the overall significance of the model. The DW-statistics shows that there is no autocorrelation between the error terms. This means that the commercial loaning out interest rate is fully explained by narrow money supply. It is because the estimated regression equation is efficient. Hence, the result may be used for policy purpose. However, while using the results some other factors may have to be considered.

5.3.2 The Impact of Broad Money Supply on The Commercial Loaning Out Interest Rate

To know the impact of broad money supply on the commercial loaning out interest rate, the following model has been fitted.

$$\ln r^{CL} = \ln b_0 + b_1 \ln M_{2t} + U \quad (5.2)$$

Where, r^{CL} = Interest rate on commercial loans
 M_{2t} = Broad money supply at time t
 b_0 = Constant
 b_1 = Magnitude of M_{2t}
 U = Error term

The regression results are presented in table 5.15

Table 5.15
The Regression Results in Impact of M_2 on The Commercial Loaning Out Interest Rate

Dependent Variable: $\ln r^{CL}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{2t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	2		4.28	-0.13					
		SE	(0.60)	(0.05)	-0.65	0.42	0.35	1.44	5.78
		t	(7.13)*	(-2.42)**					

- * Significant at 1% level
- ** Significant at 5% level

The regression results in table 5.15 show that broad money supply has significant inverse impact on commercial loaning out interest rate. It means, 1 % change in the broad money supply is associated with 0.13 % change in commercial loaning out

interest rate and vice versa. There is negative correlation between the interest rate on commercial loans and broad money supply. The adjusted R^2 suggests that about 35% variation in r^{CL} is explained by M_2 . The t-statistics are significant at 1% and 5% level and the F-statistic indicates the overall significance of the model. The DW-statistics shows that no decision can be made either autocorrelation exist or not between the error terms. This model is not that efficient, it is because there may be autocorrelation problem.

5.3.3 The Impact of Narrow Money Supply on The Industrial Loans Interest Rate

The following model is fitted expecting the impact of narrow money supply on the industrial loaning out interest rate.

$$\ln r^{IL} = \ln a_0 + a_1 \ln M_{1t} + U \quad (5.3)$$

Where, r^{IL} = Interest rate on Industrial loans
 M_{1t} = Narrow money supply at time t
 a_0 = Constant
 a_1 = Magnitude of M_{1t}
 U = Error term

The regression results are presented in table 5.16

Table 5.16
**The Regression Results in Impact of M_1 on
The Industrial Loaning Out Interest Rate**

Dependent Variable: $\ln r^{IL}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{1t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	3		4.26	-0.14					
		SE	(0.53)	(0.05)	-0.70	0.49	0.42	1.78	7.77
		t	(8.10)*	(-2.79)**					

- * Significant at 1% level
- ** Significant at 5% level

The estimated regression equation in table 5.16 shows that the narrow money supply has significant inverse impact on industrial loaning out interest rate. It means, 1 % increase in the narrow money supply leads to 0.14 % decrease in industrial loaning out interest rate and vice versa. There is strong negative correlation between the interest rate on industrial loans and narrow money supply. The $\bar{R}^2$ suggests that about 42%

variations in r^{IL} are explained by M_1 . The t-statistics are significant at 1% and 5% level and the F-statistic indicates the overall significance of the model. The DW-statistics shows that there is no autocorrelation between the error terms. This means that the industrial loaning out interest rate is fully explained by narrow money supply. The estimated regression equation is efficient. Hence, the model may be used for policy purpose with some caution. That is, some other factors may have to be considered.

5.3.4 The Impact of Broad Money Supply on The Industrial Loans Interest Rate

To know the impact of broad money supply on the industrial loaning out interest rate, the following model has been set.

$$\ln r^{IL} = \ln b_0 + b_1 \ln M_{2t} + U \quad (5.4)$$

Where, r^{IL} = Interest rate on industrial loans
 M_{2t} = Broad money supply at time t
 b_0 = Constant
 b_1 = Magnitude of M_{2t}
 U = Error term

The regression results are presented in table 5.17

5.17

The Regression Results in Impact of M_2 on The Industrial Loaning Out Interest Rate

Dependent Variable: $\ln r^{IL}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{2t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	4		3.72	-0.08					
		SE	(0.49)	(0.04)	-0.56	0.31	0.22	1.55	3.59
		t	(7.58)*	(-1.90)**					

●* Significant at 1% level

●** Significant at 5% level

The regression estimations in table 5.17 show that broad money supply has significant inverse impact on industrial loaning out interest rate. It means, 1 % increase in the broad money supply leads to 0.08 % decrease in industrial loaning out interest rate and vice versa. There is negative correlation between the interest rate on industrial loans and broad money supply. The adjusted R^2 suggests that about 22% variations in r^{IL} are explained by M_2 . The t-statistics are significant at 1% and 5% level. The DW-

statistics shows that there is no autocorrelation between the error terms. This means that the industrial loans interest rate is fully explained by broad money supply. However, the insignificant value of F-statistic in 5% and below level, suggests that the model is not good fit as the previous ones. Hence, the model is not efficient enough to be used for policy purpose.

5.3.5 The Impact of Narrow Money Supply on One-Year Time Deposit Interest Rate

The following model is fitted to know the impact of narrow money supply on one-year time deposits interest rate on.

$$\ln r^{1Y} = \ln a_0 + a_1 \ln M_{1t} + U \quad (5.5)$$

Where, r^{1Y} = Interest rate on one-year time deposit

M_{1t} = Narrow money supply at time t

a_0 = Constant

a_1 = Magnitude of M_{1t}

U = Error term

The regression results are presented in table 5.18

Table 5.18
**The Regression Results in Impact of M_1 on
One-Year Time Deposit Interest rate**

Dependent Variable: $\ln r^{1Y}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{1t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	5		4.93	-0.24					
		SE	(0.76)	(0.75)	-0.77	0.59	0.54	1.68	11.6
		t	(6.44)*	(-3.41)*					

●* Significant at 1% level

The regression estimations in table 5.18 show that narrow money supply has significant inverse impact on one-year time deposit interest rate. It means, 1 % increase in narrow money supply leads to 0.24 % decrease in one-year time deposit interest rate and vice versa. There is strong negative correlation between the one-year time deposit interest rate and narrow money supply. The R^2 suggests that about 54% variations in r^{1Y} are explained by M_1 . The t-statistics are significant at 1% level and the F-statistic indicates the overall significance of the model. The DW-statistics shows that there is no

autocorrelation between the error terms. This means that the one-year time deposit interest rate is fully explained by narrow money supply. This model is efficient and may be used for policy purpose with some caution.

5.3.6 The Impact of Broad Money Supply on The Interest Rates on One-Year Time Deposit

Expecting the impact of broad money supply on the interest rate on one-year time deposit the following model has been set.

$$\ln r^{1Y} = \ln b_0 + b_1 \ln M_{2t} + U \quad (5.6)$$

Where, r^{1Y} = Interest rate on One-Year Time Deposit

M_{2t} = Broad money supply at time t

b_0 = Constant

b_1 = Magnitude of M_{2t}

U = Error term

The regression results are presented in table 5.19

Table 5.19
**The Regression Results in Impact of M_2 on
One-Year Time Deposit Interest Rate**

Dependent Variable: $\ln r^{1Y}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{2t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	6		3.46	-0.10					
		SE	(0.87)	(0.08)	-0.42	0.18	0.07	1.31	1.69
		t	(3.97)*	(-1.40)***					

●* Significant at 1% level

●*** Significant at 10% level

The regression estimations in table 5.19 show that broad money supply has significant inverse impact on one-year time deposit interest rate. It means, 1 % increase in broad money supply leads to 0.10 % decrease in one-year time deposit interest rate and vice versa. There is negative correlation between the one-year time deposit interest rate and narrow money supply. The $\bar{R}^2$ suggests that about 7% variations in r^{1Y} are explained by M_2 . The t-statistics are significant at 1% and 10% level. The DW-statistics shows that no decision can be made either autocorrelation exist or not between the error

terms. However, the insignificant value of F-statistic in 5% and below level, suggests that the model is not good fit. The model is not that efficient.

5.3.7 The Impact of Narrow Money Supply on Two-Years and Above Time Deposit Interest Rate

Expecting the impact of narrow money supply on two-years and above time deposit interest rate the following model has been set.

$$\ln r^{2YA} = \ln a_0 + a_1 \ln M_{1t} + U \quad (5.7)$$

Where, r^{2YA} = Interest rate on two-years and above time deposit

M_{1t} = Narrow money supply at time t

a_0 = Constant

a_1 = Magnitude of M_{1t}

U = Error term

The regression results are presented in table 5.20

Table 5.20
**The Regression Results in Impact of M_1 on
Two-Years and Above Time Deposit Interest Rate**

Dependent Variable: $\ln r^{2YA}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{1t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	7		6.61	-0.42					
		SE	(0.77)	(0.76)	-0.89	0.79	0.77	1.55	30.84
		t	(8.53)*	(-5.55)*					

●* Significant at 1% level

The regression estimations in table 5.20 show that narrow money supply has significant inverse impact on two-years and above time deposit interest rate. It means, 1 % increase in narrow money supply leads to 0.42 % decrease in two-years and above time deposit interest rate and vice versa. There is strong negative correlation between the two-years and above time deposit interest rate and narrow money supply. The $\bar{R}^2$ suggests that about 77% variations on r^{2YA} are explained by M_1 . The t-statistics are significant at 1% level and the F-statistic indicates the overall significance of the model. The DW-statistics shows that there is no autocorrelation between the error terms. This means that the two-years and above time deposit interest rate is fully explained by narrow money supply. The estimated regression equation is efficient. Hence, the result

may be used for policy purpose. However, while using the results some other factors may have to be considered.

5.3.8 The Impact of Broad Money Supply on Two-Years and Above Time Deposit Interest Rate

The following model is fitted to know the impact of broad money supply on two-years and above time deposit interest rate.

$$\ln r^{2YA} = \ln b_0 + b_1 \ln M_{2t} + U \quad (5.8)$$

Where, r^{2YA} = Interest rate on two-years and above time deposit

M_{2t} = Broad money supply at time t

b_0 = Constant

b_1 = Magnitude of M_{2t}

U = Error term

The regression results are presented in table 5.21

Table 5.21
**The Regression Results in Impact of M_2 on
Two-Years and Above Time Deposit Interest Rate**

Dependent Variable: $\ln r^{2YA}$

Study Period	Eq ⁿ No.		Constant	$\ln M_{2t}$	r	R^2	$\bar{R}^2$	D-W	F
1990 - 1999	8		4.74	-0.22					
		SE	(1.06)	(0.96)	-0.63	0.40	0.32	0.97	5.82
		t	(4.45)*	(-2.38)**					

●* Significant at 1% level

●** Significant at 5% level

The above regression estimations in table 5.21 show that broad money supply has significant inverse impact on two-years and above time deposit interest rate. It means, 1 % increase in broad money supply leads to 0.22 % decrease in two-years and above time deposit interest rate and vice versa. There is negative correlation between the two-years and above time deposit interest rate and broad money supply. The $\bar{R}^2$ suggests that about 32% variations on r^{2YA} are explained by M_2 . The t-statistics are significant at 1% and 5% level and the F-statistic indicates the overall significance of the model. The DW-statistics shows that no decision can be made either autocorrelation exist or not between the error terms. Hence, the estimated equation is not that efficient.

From the above estimated regression equations, it is clear that the equations with M_1 definition of money supply are efficient and they explain the change in interest rates

better than M_2 definition of money supply. The impact of narrow money supply in interest rates is stronger than the impact of broad money supply in interest rates. This is for the reason that the M_1 has relatively more exogenous characteristics than M_2 . The currency, a major part of M_1 , is exogenously determined by the monetary authority but the time deposit, the major part of broad money supply depends upon the endogenous variables like income level, level of prices etc. and time deposits are increasing irrespective of interest rates.

5.3.9 The Relative Effectiveness of Monetary and Fiscal Policies

The relative effectiveness of monetary and fiscal policies in influencing the nominal income is tested here. Although our major part of the study is to know the impact of money supply on interest rate, we have also attempt to know the effectiveness of monetary and fiscal actions for income stabilization during our study period. For this purpose, nominal national income (Y) is represented by GDP at current prices, as dependent variable and narrow money supply and government expenditure as explanatory variables. The narrow money supply is taken as monetary action whereas government expenditure is taken as fiscal action. The following model expresses their relationship.

$$\ln Y_t = a_0 + a_1 \ln M_{1t} + a_2 \ln(GE)_t + U \quad (5.9)$$

Where, Y_t = Real GDP at time t

M_{1t} = Narrow money supply at time t

$(GE)_t$ = Government expenditure at time t

a_0 = Constant

a_1 and a_2 = Coefficients of M_{1t} and $(GE)_t$

U = Error term

The various empirical results between the nominal income and the two explanatory variables are presented in table 5.22

The empirical results as shown in the table 5.22 suggest that 1% change in M_1 is associated with 0.32% direct change in Y and 1% change in GE is associated with 0.02% inverse change in Y. For the whole study period, the monetary action is found more effective than the fiscal action. The coefficient of M_1 is significant but that of GE is insignificant as prescribed by t-test. The negative and highly insignificant elasticity of GE explains that the increase in government expenditure reduces the real GDP. This is for the reason that the increase in government expenditure increases the market prices but decreases the real purchasing power of the people which ultimately reduces the real GDP. The goodness of fit of the regression equation is satisfactory. The F-value shows the overall significance of the model. The DW-statistics suggest that there is no autocorrelation between the error terms. The estimated regression equation is efficient, someone may use the result for policy purpose. However, some other factors may have to be considered in using the results.

The elasticity coefficients of the explanatory variables remain unchanged for both sub-sample periods as prescribed by F (Chow)-test statistics, which tells us that the

monetary policy is still more effective than fiscal policy for both sub-sample periods. The coefficient of M_1 and the coefficient of GE both have been increased during liberalized economy. The coefficients of M_1 are significant for both sub-sample periods but the coefficients of GE are insignificant for controlled economy and significant for liberalized economy. For the both periods, the regression equation is found to be overall significance as prescribed by F-statistics. For the both periods, there is no autocorrelation between the residuals.

Table 5.22
**The Regression Results in Relative Effectiveness
of Monetary and Fiscal Policies in Nepal**

Dependent Variable: $\ln Y$									
Study Period	Eq ⁿ No.		Constant	$\ln M_{1t}$	$\ln (GE)_t$	R^2	$\bar{R}^2$	D-W	F
1980 - 1999	9	SE t	7.52 (0.79) (95.31)*	0.32 (0.67) (4.76)*	-0.02 (0.70) (-0.32)	0.99	0.99	1.94	1312.38
1980 - 1989	10	SE t	7.58 (0.18) (41.96)*	0.34 (0.14) (2.38)*	-0.05 (0.13) (-0.40)	0.96	0.95	2.35	97.40
1990 - 1999	11	SE t	6.91 (0.16) (43.64)*	0.54 (0.08) (3.15)*	0.26 (0.09) (2.95)*	0.99	0.99	3.01	538.58

The computed F (Chow) $_{3,14} = 2.43$

- * Significant at 1% level,

From the above-mentioned results, we can say that monetary variable has significant effect on income stabilization for the whole study period as well as the two sub-sample periods but the fiscal variable has insignificant effect on income stabilization for the whole study period and for the first sub-sample period, however it is significant for the second sub-sample period. It means in Nepal, monetary policy is more effective than fiscal policy for income stabilization in economy. However, the fiscal policy also exhibits some positive effect in the economic liberalization.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

The first chapter of this dissertation contains introduction of the Nepalese economy, its characteristics, the present situations of development and the role of monetary and fiscal measures in Nepal. The statement of the problems, the objectives, the hypothesis, the significance, the limitations and the chapter scheme of the study are mentioned in brief.

In the second chapter, the previous research works done in the related field are reviewed. The classical, neo-classical, Keynesian and monetarists view about money supply and interest rates are presented and the empirical studies are reviewed briefly. The books, articles and dissertations about money supply and interest rates in Nepalese context as well as non-Nepalese context are studied. All the reviewed literatures showed that no one has studied in the concerned title for the period 1980-1999 and no one has observed the impact of money supply on interest rates in liberalized economic system in Nepalese context.

In the third chapter, the research methodology of the study is mentioned. The qualitative and quantitative methods are given. The variables are identified as dependent and explanatory, the models are specified and the relationship between the two and more economic variables is described with the help of correlation coefficient and regression equations. The t-statistics, F-statistics, the coefficient of determination (R^2) and adjusted coefficient of determination ($\bar{R}^2$), Durbin-Watson (D-W) test, the F (Chow)- test statistics, the range of the study period, the sources of data, methods of data processing and the device for data calculation are mentioned.

In the fourth chapter, theoretical discussion in Nepalese context is given. In the first part of this chapter, the money supply is discussed. The narrow and broad types of money supply, their components, their growth rates, their trend of growth etc. are observed. The money multiplier theory of money supply focuses about its main determinants as reserve money (the monetary base or high-powered money) and the money multiplier.

In the second part of fourth chapter, the interest rate structure in the organized sector of the country is discussed. The four types of interest rates are identified in Nepal as: the interest on government securities, the interest rate of Nepal Rastra Bank, the

interest rate of commercial banks and the interest rate of financial institutions. The interest spread is discussed. The NRB and controlled interest rates before 1989, the NRB and liberalized interest rates after 1989, the directives of NRB to commercial banks about interest rates, the formulation for spread rate calculation etc. are discussed.

In the third part of the fourth chapter, a brief glimpse about monetary and fiscal policies in Nepal showed that NRB is responsible for the monetary change in the country but the fiscal policy depends upon the decisions made by the government.

The analysis and findings of the research are tabulated and explained in the fifth chapter. The six sources of reserve money are identified as net foreign assets, net credit to government, credit to government enterprises, credit to commercial banks, credit to private sector and net non-monetary liabilities. The former five play positive role but the last one plays negative role for the growth of reserve money. Empirically it is found that net foreign assets and net credit to government are the strong sources of high-powered money. The high-powered money is the major determinant of both types of money supply and it has direct positive impact on both types of money supply.

The determinants of money multiplier are identified as currency ratio, reserve ratio, other deposit ratio and time deposit ratio. The required reserve ratio of commercial banks and their required and excess reserves are found. The narrow money multiplier is observed around unity while the broad money multiplier is observed greater than two for the study period.

The interest rate structure that exists in the organized sector of Nepal is observed. The lending interest rates of commercial banks and financial institutions are found to be higher in comparison with the deposits rates. Therefore, the interest spread is found to be high in Nepal and generally more than 5%.

The impact of both types of money supply on loans and deposit interest rates of commercial banks is found to be significant. The both types of money supply have shown inverse effect towards the commercial loaning out interest rate, industrial loaning out interest rate, one-year time deposit interest rate and two-years and above time deposit interest rate but the impact of narrow money supply on the interest rates is found stronger than the impact of broad money supply. Generally, the models with M_1 definition show their goodness of fit and the overall significance. In this case, the effect of interest rate liberalization is also found to be positive.

The relative effectiveness of monetary and fiscal policies is observed and it is found that for the growth of real GDP, monetary policy is more effective than fiscal policy. However the model is found to be stable in the two sub sample periods, the economic liberalization policy is found more effective.

6.2 Conclusions

The following conclusions can be drawn from the empirical analysis of money supply and interest rate structure in Nepal for the study period 1980-1999.

- 1) The historical behaviour of money supply in Nepal shows that the monetary aggregates such as currency, demand deposits, time deposits, reserve money, narrow money supply and broad money supply are increasing year by year. The significant growth rate of monetary aggregates suggests that during the study period there is rapid expansion in them. The structure of narrow and broad money supply shows that currency is major component of narrow money supply and time deposits is major component of broad money supply. The money supply in Nepal is not merely a policy-determined phenomenon but the central bank, the commercial banks and the public jointly determine it.
- 2) The main determinant of both types of money supply is the reserve money. If the value of money multiplier is more or less stable, the monetary authority exogenously controls the change in the reserve money. Since reserve money is a policy determined variable the monetary authority could regulate the total volume of money stock by means of its proper management. The increasing trend of net foreign assets arise some difficulties to control reserve money in desired direction because it acts as endogenous source of change in reserve money.
- 3) Among the various sources of reserve money the net foreign asset and the net credit to government are the important ones. The movement in the balance of payment (BOP) situations and the government's fiscal policy largely affects the sources of reserve money, which indicates that the monetary authority does not have full control over the reserve money. Therefore, the money supply should be controlled with the help of money multiplier. The determinants of money multiplier are currency ratio, reserve ratio, other deposit ratio and time deposit ratio. The currency ratio and the reserve ratio are affected by real economic activities, seasonal factors, interest rates, extension of bank branches, banking habits of the people etc. and these factors have significant impact on money multiplier. So, these factors should be regulated to take the money supply in proper direction.
- 4) The increasing trend of broad money multiplier suggests that the people prefer to keep their money in the form of time deposits rather than demand deposits due to the interest they gain in time deposits. The change in the money multiplier has a minor impact on the change in money supply compared to the change in reserve money. So to control the total volume of money supply in the economy, proper management of reserve money is more important than manipulating on various components of money multiplier.

- 5) Due to the lack of investment opportunities, the commercial banks possess the excess amount of reserves which is idle and can not earn interest. The people in Nepal are risk averters and they do not want to take risk in using the commercial banks' loan for investment. Therefore, the demand for loan is less than the supply of loan in Nepal. Due to this reason, the commercial banks are suffered from excess liquidity problem.
- 6) The interest rate structure prevailing in the organized sector of the economy in Nepal for the study period shows that it is in increasing trend up to 1990 but in irregular trend after 1990. The deposit interest rates of commercial banks are decreasing while the lending rates are almost same. This shows that the interest spread is very high. The directives issued by NRB in 1998 suggests that the interest spread should not be more than 5% but in the study period it is found to be more than 5%. Therefore, the interest spread must be lowered within the desired limit and it is necessary to promote investment rather than saving for the proper use of capital funds.
- 7) The regression results in impact of the narrow money supply on interest rates predict that the narrow money supply explains the significant change in the interest rates efficiently and it may be used for policy purpose considering some other factors also. Regarding the regression results in impact of the broad money supply on interest rates, the broad money supply does not explain the significant change in the interest rates efficiently because there may be autocorrelation problem.
- 8) The M_1 definition of money supply explains the change in interest rates better than M_2 definition of money supply. The impact of narrow money supply in interest rates is stronger than the impact of broad money supply in interest rates. This is for the reason that the M_1 has relatively more exogenous characteristics than M_2 . The currency, a major part of M_1 , is exogenously determined by the monetary authority but the time deposit, the major part of broad money supply depends upon the endogenous variables like income level, level of prices etc. and time deposits are increasing irrespective of interest rates.
- 9) The higher elasticity coefficient in the relationship between the growth of narrow money supply and the real GDP compared to that between growth of government expenditure and real GDP indicates that the monetary policy is more effective than the fiscal policy for real income stabilization. Although the coefficients for the narrow money supply and the government expenditure have not been changed significantly before and after the economic liberalization as prescribed by stability test (i.e. F- Chow test), it indicates that the coefficients of narrow money supply and government expenditure have been increased during the liberalization period suggesting that liberalized economy is more effective than controlled economy.

6.3 Recommendations

The conclusions drawn from the empirical analysis of money supply and interest rate structure in Nepal have suggested the following policy recommendations.

- 1) From the empirical analysis, it is found that the reserve money is a dominant determinant of money supply in Nepal. Therefore, its proper management is immediate necessity for regulating the level of money supply in appropriate direction. The net foreign asset, which is the main source of reserve money, in the recent times, is significantly increasing. As the balance of payment situation in the economy determines the volume of net foreign assets, the monetary authority cannot control it. With the help of financial reforms, the other components of reserve money may be regulated. Therefore, the interim objective of the monetary policy should be towards keeping the exchange rate at a certain level for maintaining healthy balance of payments position rather than controlling money supply.
- 2) The control of money supply through the control of reserve money implies the adoption of indirect monetary policy instruments such as open market operation, the bank rate, price control etc. and they may not be useful in some cases. For example, the bank rate may fail in the condition of excess liquidity with commercial banks. Therefore, the direct monetary policy instruments such as cash reserve ratio may work through its impact on money multiplier. Therefore, the monetary authority should divert its attention towards the change in cash reserve ratio in the desirable direction.
- 3) When the government utilizes the excessive overdraft loan from the NRB to finance budget deficit, the monetary control can not be maintained in the proper way and the internal and external stability of the economic condition of the country is affected. If the government does not have to utilize net borrowings from the banking sector, the government finance situation will not make an expansionary impact on the monetary sector. Therefore, the government should develop the ability to keep budget deficit under control for the effective implementation of monetary policy.
- 4) The statistically significant impact of narrow money supply on interest rates indicates that the narrow money supply rather than broad money supply may be used as a potent tool for appropriate interest rate management. The positive and proper interest rates are needed for the promotion of investment in the desired sector of the economy.
- 5) As the lending interest rates found to be high in comparison to the deposit rates, the whole interest rate structure of Nepal seems to be high in comparison to the

international level and the foreign investors suspect to invest their capital in Nepal. Therefore, the attention should be taken for reducing the prevailing interest rate gradually to the international level. To reduce the interest rates, the rate of inflation has to be reduced and the exchange rate has to be kept stable. The price and exchange rate stability can be attained only through macroeconomic stability. In this regard, the monetary policy should play a supportive role.

- 6) Regarding the high interest spread, the commercial banks should undertake measures such as organizational reforms, maximum utilization of resources, increase in the non-cash reserve transactions and the depositors and the borrowers must be treated uniformly and transparently to reduce the spread between interest rates on loans and deposits. The commercial banks should stop cartelling in interest rate determination and fair competition should be maintained between them.
- 7) The monetary as well as fiscal policies are necessary for the development of the nation. One without another can not be completed. However, as suggested by the regression results while testing their relative effectiveness, the government of Nepal should take monetary policy rather than fiscal policy as an effective policy action for the income stabilization in the economy.
- 8) In the context of liberal economic policy pursued by Nepal, the economic growth rate should be sustainable. In order to make the economic growth rate sustainable, the internal and external stability of economy requires to be maintained. Creating a suitable situation in price and interest rate, the internal stability can be attained whereas the external stability can be achieved by keeping foreign exchange rate at a desired level. The long-term target of the monetary policy will be to attain macro-economic stability and to channelize savings mobilized in the financial sector towards productive sector. Therefore, for the monetary policy to reach this target, it is essential to control the tendency of the government to take unlimited overdraft loan from the central bank, to stop the government intervention and to develop the central bank as an autonomous institution.

BIBLIOGRAPHY

- Ackley, Gardner (1978), *Macroeconomics: Theory And Policy*, Macmillan Publishing Company, New York.
- Ahn, Se-Il and Soo-Nam Oh (1998), "The Use of Interest Rates as an Operating Target for Monetary Policy in Korea", *Economic Papers, The Bank of Korea*, Vol. 1, No.2, September.
- Earl, Peter E. (1990), *Monetary Scenarios-A Modern Approach to Financial Systems*, Edward Elgar Publishing Limited, England.
- Eisner, Robert (1975), "Factors Affecting the Level of Interest Rate", *Monetary Economics-Readings in Current Issues*, edited by William E. Gibson and George C. Kaufman, Tata McGraw-hill Publishing Company Ltd., New Delhi.
- Fisher, I. (1911), *The Purchasing Power of Money: Its Determinants and Relation to Credit, Interest and Crises*, Macmillan, New York.
- Fry, Maxwell J. (1977), *Interest Rate Policy in Nepal*, NRB, Kathmandu.
- Gibson, William E. (1975), "Interest Rates and Monetary Policy", *Monetary Economics-Readings in Current Issues*, edited by William E. Gibson and George C. Kaufman, Tata McGraw-hill Publishing Company Ltd., New Delhi.
- Gujrati, Damodar N. (1988), *Basic Econometrics*, Mc Graw- Hill Company, New York.
- Gupta, Suraj B. (1998), *Monetary Economics: Institution, Theory and Policy*, S. Chand and Company Ltd., Delhi.
- Hendershott, Patric and George Horwich (1975), "Money, Interest and Policy", *Monetary Economics-Readings in Current Issues*, edited by William E. Gibson and George C. Kaufman, Tata McGraw-hill Publishing Company Ltd., New Delhi.

- Higgins, Benjamin (1994), *Economic Development: Problems, Principles and Policies*, Universal Book Stall, Delhi.
- HMG/N, National Planning Commission (1998), *The Ninth Plan (1997-2002)*.
- Holmes, Alan R. (1975), "Operational Constraints on the Stabilization of Money Supply Growth", *Monetary Economics-Readings in Current Issues*, edited by William E. Gibson and George C. Kaufman, Tata McGraw-hill Publishing Company Ltd., New Delhi.
- IMF (2000), *International Financial Statistics Year Book 2000*, International Monetary Fund, Washington D. C.
- Jhingan, M. L. (1995), *Macroeconomic Theory*, Konark Publishers Pvt. Ltd, Delhi.
- Johnson, H. G. (1979), *Selected Essays in Monetary Economics*, George Allen and Unwin, London.
- Keynes, J.M. (1936), *The General Theory of Employment, Interest and Money*, Harcourt.
- Khatiwada, Yub Raj (1994), *Some Aspects of Monetary Policy in Nepal*, South Asian Publishers, New Delhi.
- Koutsoyians, A. (1996), *Theory of Econometrics*, The Macmillan Press Ltd., London.
- Meier, Gerald M. (1995), *Leading Issues in Economic Development*, Oxford University Press, Delhi.
- Ministry of Finance (1999), *Economic Survey 1998/99*, MOF, HMG/N.
- Nepal Rastra Bank (1980-1999), *Quarterly Economic Bulletin*, Various Issues, Nepal Rastra Bank, Kathmandu.
- Nepal Rastra Bank (1996), *40 Years of The Nepal Rastra Bank 1956-1996*, Nepal Rastra Bank, Kathmandu.

- Nepal Rastra Bank Bankers Club (1999), *Mirmire*, various issues, Kathmandu.
- Nepal Rastra Bank (1980-1999), *Economic Report*, Various Issues, Nepal Rastra Bank, Kathmandu.
- Neupane, Guru Prasad (1977), *Money Supply, Interest Rates and Financial Development in Nepal*, unpublished M.A. Thesis.
- Oh, Junggun (1998) "Interest Rate Spreads and Monetary Policy in Korea", *Economic Papers, The Bank of Korea*, Vol. 1, No.1, January.
- Pandey, Rameswori (1979), *An Analytical Study of Money Supply, Level of Prices and Interest Rate Structure-A Case Study of Nepal*, unpublished M.A. Thesis.
- Pant, Raghab D. (1983), *Interest Rate Policy of Nepal*, A study jointly sponsored by Institute for Development Studies and International Development Research Center, Ottawa, Canada.
- Patinkin, Don (1965), *Money, Interest and Prices*, Harper International Edition, Harper and Row Publishers, New York.
- Paul, R. R. (1996), *Monetary Economics*, Kalyani Publishers, Delhi.
- Samuelson, P. A. (1975), "Money Interest Rates and Economic Activity: Their Relationship in a Market Economy", *Monetary Economics-Readings in Current Issues*, edited by William E. Gibson and George C. Kaufman, Tata McGraw-hill Publishing Company Ltd., New Delhi
- Shapiro, Edward (1997), *Macro Economic Analysis (Fifth Edition)*, Galgotia Publications Pvt. Ltd., Delhi.
- Sharma, Gunandhi (1987), *Monetary Structure of the Nepalese Economy: Policy Issues in Theory and Practice*, South Asian Publishers, New Delhi.

- Sharma, Gunanidhi (1993), "Interest Rate and Its Place in Economic Decision Making", *The Economic Journal of Nepal*, Vol. 16, Apr-June, No. 2, A Quarterly Publication of the Central Department of Economics, Tribhuvan University, Kirtipur, Kathmandu, Nepal.
- Thapa, Nara Bahadur (1997), "The Money Supply Function in Nepal", *Economic Review (Occasional Paper)*, Number 9, January, Nepal Rastra Bank, Research Department, Katmandu.
- Vaish, M. C. (1995), *Macroeconomic Theory*, Wishwa Prakashan, Delhi.
- World Bank (1999), *World Development Report 1998/99*, Washington D.C, U.S.A.

APPENDIX A

Time Series Data Used in The Study (1980-1999)

Reserve Money and Its Components (In Million Rs)

Year	Currency Held By		Deposits of		Reserve Money
	Private Sector	Commercial Banks	Private Sector	Commercial Banks	
1980	1799.30	109.40	253.30	306.60	2468.60
1981	2065.70	148.20	210.80	281.50	2706.20
1982	2436.70	180.80	225.00	533.10	3375.60
1983	2752.00	211.20	343.80	705.60	4012.60
1984	3273.40	280.90	325.10	744.70	4624.10
1985	3737.30	298.30	308.00	833.70	5177.30
1986	4842.90	391.60	394.70	958.10	6587.30
1987	5746.10	437.70	366.80	1049.40	7600.00
1988	6374.60	587.50	669.50	1364.30	8995.90
1989	7946.60	761.30	596.00	2032.90	11336.80
1990	9718.20	808.20	876.40	2522.00	13924.80
1991	11654.50	953.90	648.90	3528.70	16786.00
1992	13639.70	1147.00	937.10	3139.30	18863.10
1993	16313.00	1360.10	1301.60	5469.10	24443.80
1994	19659.70	1859.40	1321.20	5565.40	28405.70
1995	22493.90	2037.60	1138.30	7016.50	32686.30
1996	25046.40	2446.40	1180.90	6716.30	35390.00
1997	27333.70	2837.30	1583.70	9272.60	41027.30
1998	30893.20	2889.70	1669.50	10543.10	45995.50
1999	34984.30	3310.40	2168.40	11762.20	52225.30

APPENDIX B

Time Series Data Used in The Study (1980-1999)

M₁, M₂ and Their Components

(In Million Rs)

Year	C	DD	TD	M1	M2
1980	1799.30	1031.10	2454.90	2830.40	5285.30
1981	2065.70	1142.10	2454.90	3207.80	5662.70
1982	2436.70	1174.80	2454.90	3611.50	6066.40
1983	2752.00	1596.90	2454.90	4348.90	6803.80
1984	3273.40	1658.10	2454.90	4931.50	7386.40
1985	3737.30	1742.70	2454.90	5480.00	7934.90
1986	4842.90	2186.40	2454.90	7029.30	9484.20
1987	5746.10	2374.10	2454.90	8120.20	10575.10
1988	6374.60	3222.00	2454.90	9596.60	12051.50
1989	7946.60	3828.80	2454.90	11775.40	14230.30
1990	9718.20	4504.80	2454.90	14223.00	16677.90
1991	11654.50	4629.10	2454.90	11656.50	14111.40
1992	13639.70	5818.00	2454.90	19457.70	21912.60
1993	16313.00	7520.00	2454.90	23833.00	26287.90
1994	19659.70	8850.70	2454.90	28510.40	30965.30
1995	22493.90	10491.50	2454.90	32985.40	35440.30
1996	25046.40	11451.60	2454.90	36498.00	38952.90
1997	27333.70	11126.60	2454.90	38460.30	40915.20
1998	30893.20	14270.60	2454.90	45163.80	47618.70
1999	34984.30	16173.60	2454.90	51157.90	53612.80

APPENDIX C

Time Series Data Used in The Study (1980-1999)

Reserve Money and Its Determining Factors (In Million Rs)

Year	NFA	NCG	CGE	CCB	CPS	NNML	RM
1980	1746.7	887.5	372.1	264.4	48.9	-851.0	2468.6
1981	1736.1	1009.5	398.7	468.1	58.8	-965.0	2706.2
1982	2390.9	1419.7	449.8	137.8	61.9	-1084.5	3375.6
1983	1901.4	2928.6	489.1	74.0	64.3	-1444.8	4012.6
1984	1686.1	3545.8	576.4	152.1	94.8	-1431.1	4624.1
1985	1026.3	4473.8	708.0	388.0	159.3	-1578.1	5177.3
1986	1485.1	5677.0	794.3	533.9	123.0	-2026.0	6587.3
1987	1903.6	6385.5	845.4	520.3	161.8	-2216.6	7600.0
1988	4394.4	6303.7	879.1	357.4	367.5	-3306.2	8995.9
1989	5280.5	8573.7	809.5	160.1	277.2	-3764.2	11336.8
1990	7231.6	10357.8	778.9	50.5	260.4	-4754.4	13924.8
1991	13561.5	9478.3	730.6	37.2	555.6	-7577.2	16786.0
1992	18337.5	9803.0	747.8	34.0	510.9	-10570.1	18863.1
1993	26383.7	13448.2	559.9	47.8	514.2	-16510.0	24443.8
1994	32103.9	14587.9	495.3	29.2	539.3	-19349.9	28405.7
1995	32338.4	1699.3	731.7	15.4	633.9	-2732.4	32686.3
1996	31464.6	19983.3	1149.3	364.6	939.9	-18511.7	35390.0
1997	34473.6	21483.3	1495.5	6.5	1489.0	-17920.5	41027.4
1998	46353.1	21472.4	1621.8	5.5	1186.2	-24643.5	45995.5
1999	52607.5	22259.1	1650.9	5.5	1367.4	-25665.1	52225.3

APPENDIX D

Time Series Data Used in The Study (1980-1999)

Interest Rate Structure of Nepal (Percent Per Annum)

Types	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
A. Government Securities											
Treasury Bills	-	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.10	7.20
National Sa.Cer.	-	-	-	-	-	-	13.00	-	13.00	13.00	13.0-15.5
Development Bond	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	3.0-10.5	3.0-11.0	3.0-10.5
B. Nepal Rastra Bank											
Refinance Rate	12.00	12.00	15.00	15.00	15.00	15.00	11.00	11.00	11.00	11.00	11.00
NRB Bond Rate	-	-	-	-	-	-	-	-	-	-	-
C. Commercial Banks											
1. Deposits Rates											
Saving Deposit	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.5-10.0	8.5-10.0	8.5-9.5	8.5-9.5
Time Deposit											
3 Month	4.00	4.00	4.50	4.50	4.50	4.50	8.50	8.50	8.50	8.50	8.50
6 Month	9.50	9.50	9.50	8.75	8.75	8.75	8.75	8.80	8.80	8.75-9.0	9.0-10.0
1 Year	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	11.5-12
2 Year & above	13.50	13.50	13.50	13.75	13.75	13.75	13.5-14.0	13.75	13.5-14.0	13.5-14.0	12.5-12.75
2. Lending Rates											
Industry	14.00	14.00	11.0-17.0	16.50	16.50	16.50	15.0-18.0	15.50	15.0-16.0	15.0-18.0	16.0-18.0
Agriculture	10.0-15.0	10.0-15.0	10.0-15.0	15.0-20.0	15.0-20.0	15.0-20.0	15.0-20.0	15.0-20.0	15.0-20.0	15.0-16.0	15.0-16.0
Export Bills	13.0-14.0	13.0-14.0	13.0-14.0	15.0-16.0	15.0-16.0	15.0-16.0	15.0-16.0	15.0-16.0	15.0-16.0	15.0-16.0	15.0-16.0
commercial Loans	14.00	14.00	14.00	17.00	17.00	17.00	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	18.0-21.0
over Draft	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	17.0-21.0	18.0-21.0
D. Financial Institution											
ADB/N											
To Cooperative	-	-	-	-	-	-	13.0-18.0	-	13.0-18.0	13.0-18.0	13.0-18.0
To Others	-	-	-	-	-	-	15.0-20.0	-	15.0-20.0	15.0-20.0	15.0-20.0
NIDC	14.50-18.0	14.50-18.0	14.50-18.0	14.50-18.0	14.50-18.0	14.50-18.0	14.5-18.0	14.5-18.0	16.0-18.0	16.0-18.0	16.0-18.0

Continued

- (-) Indicates Non- availability of Data

APPENDIX D

Time Series Data Used in The Study (1980-1999)

Interest Rate Structure of Nepal (Percent Per Annum)

Types	1991	1992	1993	1994	1995	1996	1997	1998	1999
A. Government Securities									
Treasury Bills	8.80	9.70	10.40	6.20	8.50	12.80	5.60	2.40	3.30
National Sa.Cer.	12.5-15.5	12.5-15.5	12.5-15.5	12.0-15.5	9.0-15.5	9.0-15.5	9.0-15.5	9.0-13.25	8.5-13.25
Development Bond	3.0-10.5	3.0-10.5	3.0-10.5	3.0-10.5	3.0-10.5	3.0-10.5	3.0-12.0	3.0-12.0	3.0-12.0
B. Nepal Rastra Bank									
Refinance Rate	13.00	13.00	13.00	11.00	11.00	11.00	11.00	9.00	9.00
NRB Bond Rate	-	9.60	11.20	6.20	8.20	12.80	-	-	-
C. Commercial Banks									
1. Deposits Rates									
Saving Deposit	8.5-9.0	9.0-10.0	9.0-10.0	7.0-7.5	7.0-8.0	7.5-8.0	7.0-8.0	6.5-8.5	5.75-8.0
Time Deposit									
3 Month	8.5-9.0	8.5-10.0	9.5-10.0	5.0-6.5	5.0-7.5	6.75-8.0	6.75-8.0	5.0-8.0	4.0-7.5
6 Month	9.50	9.5-10.5	10.0-11.0	6.0-7.5	6.0-8.0	7.25-9.0	7.75-9.0	6.0-8.5	6.0-8.0
1 Year	11.5-12	11.5-12.5	11.5-12.0	8.5-9.0	8.0-9.25	9.5-11.0	9.5-11.0	9-10.5	7.25-9.25
2 Year & above	12.5-12.75	12.5-13.5	12.5-13.0	8.0-11.00	8.0-11.00	7.25-10.25	7.25-10.25	7.25-10.25	7.25-10.25
2. Lending Rates									
Industry	16.0-18.0	16.0-21.0	16.0-21.0	13.0-17.0	14.0-18.0	15.0-17.5	15.5-17.5	13.5-17.0	11.0-17.0
Agriculture	15.0-16.0	16.0-20.0	16.0-19.0	13.0-15.0	13.0-15.5	14.5-16.0	14.5-16.0	14.5-15.5	14.0-15.5
Export Bills	15.0-16.0	16.0-20.0	15.0-20.0	12.0-14.0	12.0-16.0	13.0-16.0	14.5-16.5	12.5-16.0	7.5-15.0
Commercial Loans	18.0-21.0	17.0-21.0	15.0-21.0	13.5-18.0	12.0-19.0	14.5-20.0	14.5-18.0	13.5-18.0	11.0-17.0
Over Draft	18.0-21.0	17.0-21.0	15.0-21.0	13.5-18.0	12.0-19.0	14.5-20.0	14.5-20.0	14.5-20.0	10.0-19.0
D. Financial Institution									
ADB/N									
To Cooperative	13.0-18.0	16.0-18.0	14.0-18.0	14.0-16.0	12.0-15.0	12.0-15.0	12.0-15.0	13.0-16.0	12.0-15.0
To Others	15.0-20.0	18.0-20.0	16.0-20.0	16.0-18.0	14.0-17.0	14.0-17.0	14.0-17.0	15.0-18.0	14.0-17.0
NIDC	16.0-18.0	16.0-18.0	18.0-19.0	15.0-16.0	15.0-16.0	15.0-16.0	15.5-18.0	15.5-18.0	15.5-18.0

- (-) Indicates Non- availability of Data

APPENDIX E

Time Series Data Used in The Study (1980-1999)

(Log - Transformed)

Year	lnRM	lnNFA	lnNCG	lnCGE	lnCCB	lnCPS	lnNNML
1980	7.8114	7.4655	6.7884	5.9192	5.5775	3.8898	-6.7464
1981	7.9033	7.4594	6.9172	5.9882	6.1487	4.0741	-6.8721
1982	8.1243	7.7794	7.2582	6.1088	4.9258	4.1255	-6.9889
1983	8.2972	7.5503	7.9823	6.1926	4.3041	4.1636	-7.2757
1984	8.4390	7.4302	8.1735	6.3568	5.0245	4.5518	-7.2662
1985	8.5520	6.9337	8.4060	6.5624	5.9610	5.0708	-7.3640
1986	8.7929	7.3032	8.6442	6.6775	6.2802	4.8122	-7.6138
1987	8.9359	7.5515	8.7618	6.7398	6.2544	5.0864	-7.7037
1988	9.1045	8.3881	8.7489	6.7789	5.8789	5.9067	-8.1036
1989	9.3358	8.5718	9.0565	6.6964	5.0758	5.6247	-8.2333
1990	9.5414	8.8862	9.2455	6.6579	3.9220	5.5622	-8.4668
1991	9.7283	9.5150	9.1568	6.5939	3.6163	6.3200	-8.9329
1992	9.8450	9.8167	9.1904	6.6171	3.5264	6.2362	-9.2658
1993	10.1041	10.1805	9.5066	6.3278	3.8670	6.2426	-9.7117
1994	10.2543	10.3767	9.5879	6.2052	3.3742	6.2903	-9.8704
1995	10.3947	10.3840	7.4380	6.5954	2.7340	6.4519	-7.9130
1996	10.4742	10.3566	9.9027	7.0469	5.8988	6.8458	-9.8262
1997	10.6220	10.4479	9.9750	7.3102	1.8718	7.3059	-9.7937
1998	10.7363	10.7440	9.9745	7.3913	1.7047	7.0785	-10.1123
1999	10.8633	10.8706	10.0105	7.4091	1.7047	7.2207	-10.1529

APPENDIX F

Time Series Data Used in The Study (1980-1999)

(Log - Transformed)

Year	lnY	lnM ₁	lnM ₂	lnGE	lnr ^{CL}	lnr ^{IL}	lnr ^{1Y}	lnr ^{2YA}
1980	9.8313	7.9482	8.5727	8.1521	2.6391	2.6391	2.5257	2.6027
1981	9.9099	8.0733	8.7495	8.3169	2.6391	2.6391	2.5257	2.6027
1982	9.9484	8.1919	8.9170	8.5870	2.7408	2.6391	2.5257	2.6027
1983	9.9183	8.3777	9.1294	8.8507	2.8332	2.8034	2.5257	2.6210
1984	10.0106	8.5034	9.2549	8.9143	2.8332	2.8034	2.5257	2.6210
1985	10.0703	8.6089	9.4171	9.0354	2.8332	2.8034	2.5257	2.6210
1986	10.1200	8.8578	9.6263	9.1898	2.9444	2.8034	2.5257	2.6210
1987	10.1336	9.0021	9.7699	9.3512	2.7517	2.7408	2.5257	2.6210
1988	10.2015	9.1692	9.9722	9.5543	2.9444	2.7408	2.5257	2.6210
1989	10.2544	9.3738	10.1889	9.7984	2.9444	2.8034	2.5257	2.6210
1990	10.3024	9.5626	10.3594	9.8868	2.9704	2.8332	2.4639	2.5353
1991	10.3648	9.6979	10.5377	10.0669	2.9704	2.8332	2.4639	2.5353
1992	10.4100	9.8760	10.7292	10.1818	2.9704	2.9178	2.4849	2.5649
1993	10.4423	10.0788	10.9737	10.3384	2.8904	2.9175	2.4639	2.5455
1994	10.5184	10.2580	10.9984	10.4222	2.7568	2.7081	2.1691	2.1691
1995	10.5467	10.4038	10.3020	10.5729	2.7408	2.7726	2.1552	2.1691
1996	10.6021	10.5050	11.4366	10.7481	2.8478	2.7881	2.3273	2.1401
1997	10.6487	10.5574	11.5495	10.8341	2.7881	2.8034	2.3273	2.1401
1998	10.6755	10.7181	11.7477	10.9352	2.7246	2.7246	2.2773	2.1401
1999	10.7089	10.8427	11.9375	11.0516	2.6391	2.6391	2.1102	2.1401