

Determinants of Supply of and Demand for Money: A case study of Bangladesh.

সমষ্টি - C
২৯/১২/২০০০

This thesis re-submitted to the University of Dhaka for the award of the degree of

332.4
ALD_382837_Det
erminants of
Supply of and
Demand for
Money A case
study of

Master of Philosophy in Economics
Muhammad Mahboob Ali

Under the joint supervision of
DR. SHAMSUDDIN AHMAD AND DR. SUSHIL RANJAN HOWLADER

GIFT

382837



DEPARTMENT OF ECONOMICS
UNIVERSITY OF DHAKA
DHAKA-1000

ঢাকা
বিশ্ববিদ্যালয়
লেখাগার

July, 2000.

M.Phil.

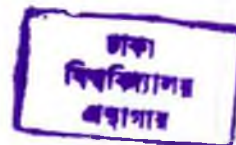
382837

ଜଣକ
ବିଦ୍ୟାଳୟ
ଭବନ

19/11/2020

Contents

A.	Chapter 1:	<i>Introduction, Objectives and Methodology</i>	Pages :1-7
	1.1	<i>Introduction</i>	
	1.2	<i>Objective of study</i>	
	1.3	<i>Methodology</i>	
	1.3.1	<i>Conceptual framework</i>	
	1.3.2	<i>Time period of the study</i>	
	1.3.3	<i>Sources and type of data</i>	
	1.3.4	<i>Data analysis & estimation procedure</i>	
	1.4	<i>Limitations of the study</i>	
	1.5	<i>Plan of the study</i>	
	Notes:		
B.	Chapter 2:	<i>Literature review of Supply of and Demand for Money</i>	Pages :8-25
	2.1	<i>Theory of Supply of Money</i>	
	2.1.1	<i>Monetary base vs money multiplier</i>	
	2.1.2	<i>New view</i>	
	2.1.3	<i>Modified View</i>	
	2.2	<i>Theory of Demand for Money</i>	
	2.2.1	<i>Quantity theory of money</i>	
	2.2.2	<i>Keynes's demand for money</i>	
	2.2.3	<i>Friedman's demand for money</i>	
	2.2.4	<i>Modified View</i>	382837
C.	Chapter 3:	<i>Trends of Real, Monetary and External Variable</i>	Pages :26-39
	3.1	<i>Estimation Procedure</i>	
	3.2	<i>Economic indicators</i>	
	3.3	<i>Estimation of real growth of variables by percentage changes over the year</i>	
D.	Chapter 4:	<i>Supply of Money in Bangladesh</i>	Pages :40-56
	4.1	<i>Note issue principles/rules of Bangladesh Bank</i>	
	4.2	<i>Specification of the supply of money model</i>	
	4.2.1	<i>Estimation procedure</i>	
	4.2.2	<i>Analysis of result</i>	



E.	Chapter 5:	<i>Demand for Money in Bangladesh</i>	Pages :57-68
	5.1	<i>Specification of the demand for money model</i>	
	5.1.1	<i>Estimation procedure</i>	
	5.1.2	<i>Analysis of result</i>	
F.	Chapter 6:	<i>Supply of and Demand for Money in Bangladesh</i>	Pages :69-74
	6.1	<i>Specification of the Money Demand-Supply model</i>	
	6.1.1	<i>Estimation procedure</i>	
	6.1.2	<i>Analysis of result</i>	
G.	Chapter 7:	<i>Summary, Policy Implications and Conclusion</i>	Pages :75-81
	7.1	<i>Summary</i>	
	7.2	<i>Policy implications</i>	
	7.3	<i>Limitation and agenda for further research</i>	
	Bibliography		Pages :82-93
	Appendices:	382837	Pages :94-98
Table:1		<i>Data used for regression analysis in Chapter 4 and 0</i>	
Table:2		<i>Data used for regression analysis in Chapter 5 and 0</i>	
Figure:1		<i>Growth of Narrow Money, Broad Money, and High Powered Money (In Real and Percentage Terms).</i>	
Figure:2		<i>Growth of Real GDP (In Percentage Terms)</i>	

Chapter : 1

Introduction, Objectives and Methodology

1.1 Introduction

Bangladesh is moving towards open economy in a small monetized sector by liberalizing financial & economic policies. A considerable large non-monetized sector is also prevailing in the economy¹. Both the sectors play a substituting role without any direct relationship. Despite economic reforms, the Government through Bangladesh Bank has largely controlled the monetary management. Before financial liberalization programme started in 1990, Bangladesh Bank used to process each year a monetary and credit programme for fixing a target of monetary expansion on the basis of annual growth of gross domestic product, estimated/targeted rate of inflation and changes in the income velocity of money (Sohrabuddin, 1986).

Prior to 1990, tremendous control prevailed in the economy of Bangladesh. This caused her suffering from low level of saving, investment, income, and stagnation of economic growth to low use of inadequate and inappropriate technologies that created financial repression syndrome in the economy². To remove financial repression, financial sector reform programme was started in 1990. This includes gradual withdrawal of barriers in interest rate, new loan classification procedure, introduction of 91 days bill, recapitalisation of banks, convertibility of taka, strengthening of money and capital market etc. Although before 1990, open market operation and bank rate policy were hardly used, at present more emphasis are put on them with the change of the policy. However, till today, each year, through budget speech, the Government declares the target of annual growth rate of GDP estimate of price change, fiscal deficits etc. which are in contradiction to the market determination policy. Total supply of money stock target is being kept fixed and is adjusted through variation in money multiplier and/or monetary base.

Although Bangladesh Bank claims that they have taken steps for creating appropriate monetary management through using flexible and indirect tools, yet they use crawling band system of exchange rate management³. Still sluggishness is prevailing in the economy that creates doubt on the effectiveness of present monetary policy. Bangladesh Bank faces difficulty to take any bold step towards policy formulation for monetary adjustment because the Government still more or less artificially manages equilibrium in both supply of and demand for money. Independence of the Central bank of the country is still not feasible.

There are a few studies on supply of and demand for money in Bangladesh. But these are mostly inadequate. Some of the studies have used data for the time starting from the middle of

the Pakistani period to the post-liberation period of Bangladesh. Estimation of demand for money during the pre and post independence period is not appropriate, as the structures of both the countries are quite different. Moreover, estimation results may become blurred. Virtually, many studies have analysed both the pre and the post liberation periods. During this time period, not only a structural change has occurred due to independence but also the war of 1965 took place. External shocks such as war, famine, etc. have disrupted normal economic situation. The war of 1965 has no economic impact on the independent Bangladesh but the war of 1971 is very important for her. After the independence of Bangladesh, a transition period prevailed for some years. As such in the study, immediately after post liberation period for subsequent three years have not considered in our data series.

Most of the existing studies do not discuss quantitative effects and overlook external sector as one of the instruments or variables. Some of them have also dropped important monetary variables like the rate of interest (Taslim 1984) in their study on demand for money. Some of them have considered 1971, the period of war, and also the transition period (Ahmad, 1976) in their study on money demand function. For discussing supply of money, most of the study of ~~Hossain (1993) or of Ali and Ansari (1984)~~ concentrates to test the applicability of either monetary base approach or money multiplier model. Monetary authorities determine money supply process mainly by assuming quantity theory i.e. $MV=PY$ (where M =Nominal money, V =Velocity of circulation of money, P =Nominal price level, Y =Nominal national income). As such at first we investigate money supply process following the monetarist model.

Furthermore, the present study will consider other endogenous factors in the supply model such as interest rate on deposit and advance, deposit to GDP ratio and bank rate which have been ignored by most of the studies, e.g., Bahar (1988).

The study examines determinants of high-powered money, currency to money supply ratio and reserve deposit ratio to depict causative factors that indirectly determine money supply process in Bangladesh.

Moreover, some of the studies do not simultaneously determine supply of and demand for money in Bangladesh. The need for determining simultaneous equation arises due to multiflow of influence among the variables. As the factors of money supply and demand are interrelated, the reason arises to take into account information provided by other equation systems of supply and demand function of money of which they do not take any cognizance in their study.

While considering both the monetarist and the Keynesian views, and the relevant studies of demand for money, we shall find out the relevant variables related to Bangladesh economy. After choosing the relevant factors, the study on demand for money shall consider alternative functional form. The study has examined structural change considering pre and post financial liberalization period for the supply of and demand for money equations.

The study wants to examine how far the monetarist views are applicable for supply of and demand for money in Bangladesh. The monetarist argues that supply of money is an exogenous

variable and can be controlled by the central bank through variations in the price level. On the other hand, they consider that demand for money is a stable function and interest is inelastic. As such the study intends mainly to investigate effectiveness of monetary policy, and to determine the factors that effects supply of and demand for money function in Bangladesh. Throughout the study the main intention is to find out the real picture of the efficiency of monetary policy considering both supply and demand side. Therefore, we shall also determine simultaneous equation supply of and demand for money.

Need for the present study stems from the willingness to know and analyse how effectively monetary policy can be controlled. To create effective monetary policy for the economy of Bangladesh, a good monetary management by the Central Bank and intermediation of financial institutions is necessary. The better management of monetary policy requires accumulation of wealth, allocation of wealth, liquidity adjustment-interlinkage between these functions will definitely help to accentuate saving-investment channelisation, expedite economic growth, stable balance of payment position and maintenance of price stability. The present study has been undertaken with the view to achieve appropriate adjustment in both supply and demand for money without any artificial barrier to the economy of the country.

1.2 Objective of this study :

The study undertakes the following objectives: -

- i) To determine separately the factors which explain the variations in the supply and demand for money;
- ii) To determine factors which simultaneously explain the variations in the supply and demand for money due to multiflow of influences among the variables;
- iii) To investigate the policy implications of supply of and demand for money function;
- iv) To find out whether any structural change has taken place in the money supply and money demand functions in Bangladesh due to financial liberalization programme.

1.3 Methodology :

The present study intends to review the theoretical and the empirical literatures on supply and demand theories of money. For a country like Bangladesh where both money and capital markets are yet to develop, it is very important to ascertain effective control of the monetary policy. As such we want to estimate determinants of supply of and demand for money in Bangladesh.

In the recent past, the financial sector of Bangladesh has changed from directly controlled monetary policy to indirect policies. For this reason, the study intends to test whether any

structural change has occurred before and after introduction of financial reform programme. The successful implementation of monetary policy shall expedite the economic growth.

The conceptual framework, time period of the study, data analysis, estimation procedure and limitations of the study are given below: -

1.3.1 Conceptual framework :

The study is clearly divided into two parts:

- a) Supply of money function.
- b) Demand for money function.

Both the definitions of money have been considered i.e. Narrow Money M_1 and Broad money M_2 as in Bangladesh, M_2 is still computed following the IMF convention.

1.3.2 Time period of the study:

On 16th December of 1971, Bangladesh became independent. After independence her economy suffered due to the legacy of the war. Three years immediately after independence make the transitional period. The study considers them as abnormal years. The data of 1972-73, 1973-74 and 1974-75 considering the transitional period has dropped, although we want to study from the birth of Bangladesh. We have started our investigation from 1975 (July). However, in case of one year lagged dependent variable we consider the series from the year 1974-75.

Macroeconomic stability programme and structural adjustment process started in the middle of the eighties. As financial repression prevailed in the economy, financial liberalization started in 1990. We have taken the data upto 1996 (June). As such the study period now stands at 1975-76 to 1995-96 totaling twenty-one years.

Time period of the study can be split into two sub- periods as mentioned below:

- a) Sub-period-1: Monetary policy under administrative control i. e. 1975-76 to 1989-90.
- b) Sub-period-2: Monetary policy under liberalization programme i.e. 1990-91 to 1995-96.

To test structural change for the period 1975-76 to 1989-90, we shall consider dummy variable (DM) as '0'. When we consider the period 1990-91 to 1995-96, dummy variable (DM) is assumed as '1'.

1.3.3. Sources and type of data :

The study has used data extensively from the secondary sources i. e. published data in various issues of Economic trends, Bangladesh Bank Bulletin, Bangladesh Arthanaitic Jarip, Bangladesh Arthanaitic Samikha, Statistical Year Book of Bangladesh, Annual Report of Bangladesh Bank, Statistical Pocket Book of Bangladesh, Twenty Years of National Accounting of Bangladesh (1972-73 to 1991-92), and World development Report. We have also consulted published books, journals and unpublished Ph.D. dissertations and research works that are relevant to the study. Exact sources of data are mentioned in the footnotes of the tables.

1.3.4 Data Analysis and Estimation Procedure:

Normally the study has estimated data in real terms except inflation, percentage change in real exchange rate and weighted average rate of nominal interest. The expected rate of inflation is measured by the consumer price index considering base 1973-74 with one-year lag. We have determined Real GDP, as GDP at current prices divided by GDP deflator taking base for 1973-74. For other variables, we use consumer price index, which refers to cost of living index of middle class in Dhaka City. To estimate data in real terms we divide the data series by the consumer price index considering base 1973-74 and multiply the series by 100. Currency to the money supply ratio, reserve-deposit ratio, deposit to GDP ratio etc are computed. We have considered narrow and broad money as a dependent variable. The study has estimated elasticity of real GDP, rate of interest on deposit, rate of interest on advance, exchange rate, foreign aid and loan, foreign remittance, high powered money, currency to the money supply ratio and reserve deposit ratio, bank rate, deposit to GDP ratio, etc. Further we also consider high-powered money, currency to money supply ratio and reserve deposit ratio as dependent variable to find determinants of money supply indirectly.

The study has considered both the supply of and demand for money function in terms of narrow and broad money. To estimate money supply and money demand functions, ordinary least square method which is one of the single equation methods is used. We have used logarithmic or semilogarithmic form for OLS estimation procedure to find out the best-fit equation.

Dummy variable has also been used under the following assumption:

- a) $DM = 0$ for the period 1975-76 to 1989-90 when monetary policy is under direct administrative control.
- (b) $DM = 1$ for the period of 1990-91 to 1995-96 when monetary policy is under liberalization programme.

Usual t-value, F value, Adjusted $\overline{R^2}$, are estimated

Besides the aforesaid statistical test, we have also tested whether serially correlated errors are present or not. For this reason the study has computed D.W. statistics. Whenever serially correlated errors are present, any one of the following has been used :- first order moving average i.e. MA (1) or first order autoregressive i.e. AR (1) to remove autocorrelated error term. Moreover, when explanatory variable is a lagged dependent variable in the function, log likelihood ratio test is used, as the D.W. statistics become inappropriate.

Furthermore, the study has also attempted to determine multiflow effect between variables of supply and demand for money function by computing simultaneous equation system for which two stage least square technique is used.

1.4. Limitations of the study:

The study has considered only organised money market ignoring the unorganised money market. But in Bangladesh, unorganised money market plays an important role. Moreover, organised money market is yet to develop properly.

We have used data from the published sources. But there may be some sort of manipulation for which reliability of the published data is in a question. As there is no alternative but to use this data, we have used the available published data.

Although we analysed time series data for twenty-one years, time period for at least thirty years may give better result. But Bangladesh became independent in 1971. After the liberation period through excluding three years, we use data upto 1996 (June). Moreover, in the financial sector, assessing the effects of financial liberalization programme should need more time.

1.5 Plan of the study:

Entire analysis of the study shall be made in seven chapters. As we are discussing supply of and demand for money in Bangladesh, so we try to narrate present conditions of financial sector, objectives of our study, methodology and limitations of the study in chapter one.

The second chapter of the study will consist of review of literature of standard theories along with various empirical studies specially related to Bangladesh on money supply and money demand function.

The third chapter contains Trends of real, monetary and external variables. In this chapter we have discussed the performance of real, monetary and external variables of the country.

Supply of money process in Bangladesh will be narrated in the fourth chapter. Here illustration of complete supply model and report of findings are given.

The fifth chapter contains money demand function in Bangladesh. In this chapter we have described our complete demand model for money and have also reported our findings.

The sixth chapter describes linkage between variables of supply and demand function, which is determined through simultaneous equation system.

The seventh chapter consists of summary, policy implications and concluding remarks.

In the appendices basic data are provided. Diagrammatic representations are also given. Moreover, all the author's names & the relevant books, journals, periodicals are mentioned in the bibliography which have been used in the entire study.

NOTES:

- (1) Despite the growth of bank branches in rural sector, informal money market is very strong. Black income is estimated at a range from slightly less than twenty percent to a third of GDP (Asaduzzaman, 1995).
- (2) Drake, (1980) describes that Ronald Mckinnon is vigorously advocating for free rate of interest by which he means the removal of any legal or oligopolistic ceilings upon interest rates in general and bank deposit interest rates in particular. He views that Mckinnon considers positive real rate of interest, which will have an important, stimulating influence on the demand for money. This follows that banks should offer positive real rate of interest in order to promote financial development and capital formation.
- (3) According to Williamson, (1996), a crawling band combines a central exchange rate target, or parity, that is changed in frequent small increments, with a wide band around the parity within which the actual exchange rate is allowed to fluctuate, but at the edge of which authorities are committed to intervene to prevent any further movement.

CHAPTER: 2

Literature review of Supply of and Demand for Money

The study has under taken to determine the relevant variables of supply of and demand for money function in Bangladesh. As such in this chapter literature review of standard theories along with various empirical studies have been made. In the sub-sections we first depict theory of supply of money under the following headings: Monetary base Vs Money Multiplier, New view, Modified view. We have discussed theory of demand of money under the followings sub- headings: Quantity theory of money, Keynes's demand of money, Friedman's demand for money, modified view. In this chapter we intend to find out possible determinants of supply of money and demand for money which we shall empirically test in chapter 4 and chapter 5.

2.1 Theory of supply of money

Monetarists view that supply of money can be considered as an exogenous variable as the central bank can control the stock of money supply process. But Gurley and Shaw (1960) have opined that those variables, which are traditionally treated as exogenous, have been influenced by endogenous variables on the supply of money.

2.1.1 Monetary base Vs Money multiplier:

The theoretical frameworks of monetary base and money multiplier model have been discussed below: The theory of monetary base approach describes a stable relationship between the quantity of reserve assets available to the banks and the level of their deposits. The authorities assume that for determining the quantity of reserve assets available to the banks, the level of their deposits shall be equal to the bank multiplier times the volume of reserve assets. For analysing the determinants of the money supply, we have to consider monetary authorities, the bank and the public. Through the willingness of the monetary authorities, quantity of notes and coins are determined.

The proximate determinants of the money supply are determined by three factors, as suggested by Friedman and Schwartz (1963): -

- a) The stock of high powered money,
- b) The ratio of deposits to reserves,
- c) The ratio of deposits to currency.

However, the aforesaid determinants of the stock of money depend on other real and monetary variables and institutional factors. Moreover, both the ratio of deposits to reserves and the ratio of deposits to currency are the behavioral ratios.

According to Vaish, (1981) total money supply (M) can be expressed as notes and currencies held by the public outside the banking system (C_p) and demand and time deposits (D) of the private sector with the banks so that,

$$M = C_p + D \quad \dots\dots\dots (1)$$

Quantity of high powered money (H) can be determined by banks (C_b) and also by the public (C_p) so that,

$$H = C_b + C_p \quad \dots\dots\dots (2)$$

According to Vaish (1981) money multiplier (mm) can be expressed as,

$$mm = \frac{1}{\frac{C_p}{M} + \frac{C_b}{D} (1 - C_p)} \quad \dots\dots\dots (3)$$

where mm = Money multiplier

$\frac{C_p}{M}$ = Currency to Money supply ratio,

$\frac{C_b}{D}$ = Reserve deposit ratio

In equation (3) when we consider narrow money, currency ratio relates to total narrow money supply. On the other hand, in case of broad money, currency ratio relates to total broad money supply.

Money Multiplier depends on the behavioural choice of both the public and the bank. Due to change in the behaviour of commercial banks, the multiplier may vary. As such money stock can be determined by the change in the monetary base as well as the money multiplier. This also depends on several rates of interest, holding of black money, the spread of banking facilities in the country especially in rural areas and such other factors (Gupta, 1976).

Madhur (1976) comments that the framework of proximate determinants is designed to provide highly useful way to observe the simultaneous interaction of the various factors for determining the stock of money.

Theoretically, when high-powered money increases, reserve-deposit ratio or currency-deposit ratio decreases, other things remaining the same, then the money supply can increase. This implies that money supply is directly related to high powered money (H) and inversely related to currency to money supply ratio (C_p/M) and also to reserve-deposit ratio (C_r/D).

The behaviour of the monetary authorities occurs through the variation of the monetary base or high-powered money. According to Van and Thompson (1979), the determinants of the stock of high-powered money can be expressed as follows:

$$H = f(\text{PSD}, \text{OMO}, \text{NMD}, \text{BPF}) \quad \dots(4)$$

Where, PSD = Public sector deficit

OMO = Net open Market sales of Government debt to the public

NMD = Sales of non marketable debt

BPF = Balance of payment flows

Changes in the high powered money is the residual method of financing public sector deficit and the procedure of high powered money can be created by the Government as shown in the following equation:

$$\Delta H = \text{PSD} - \text{OMO} - \text{NMD} - \text{BPF} \quad \dots\dots\dots(5)$$

If the balance of payment is in deficit, then the money supply may decrease or economic growth rate may fall. This also indicates poor performance of the export sector and fall in foreign investment. According to the classical hypothesis, a close relationship between the local money supply and the balance of payment will prevail. When fixed exchanged rate prevails in an open economy, monetarists view that the nations are linked with world economy in which the aggregate money supply of the world will determine world price. But if flexible exchange rate prevails in an open economy, then the rate of domestic inflation will be determined by local money supply and any differences between the local and the rest of the world's inflation rate will call for an adjustment of the exchange rate.

The behaviour of the public is reflected in the currency ratio. Anwaruzzaman (1988) shows the following determinants of the currency to money supply ratio (C_p/M):

$$\frac{C_p}{M} = f(\text{RGDP}, \text{TNBB}, r, p(-1)) \dots\dots\dots(6)$$

M

where, RGDP = Real gross domestic product

TNBB = Total number of bank branches,

r = Interest rate on deposit,

p(-1) = Expected inflation rate.

According to Dornbusch & Fisher (1978), reserve-deposit ratio displays the behaviour of the commercial bank. We can express the determinants of the reserve deposit ratio (C_b/D) in the following function.

$$\frac{C_b}{D} = f(r_1, B_r, \text{RRR}, U) \dots\dots\dots (7)$$

D

Where , r_1 = Interest rate on advance

B_r = Bank rate

RRR = Required reserve ratio

U = Uncertainty may occur in the bank deposits due to inflow and outflow.

Ahmed (1977) examines proximate determinants of money supply in Bangladesh. For estimation purpose, he uses Friedman-Schwartz model considering demand deposit only. The time period of the study is from July 1972 to June 1976. He finds that the stock of high-powered money is the major determinant of stock of money in Bangladesh. The next important determinant is the ratio of deposit to reserve. He observes that the only attempt to regulate the money supply through using monetary policy was applied when bank rate increases in June 1974. The Government influences on the nominal stock of money through fiscal operation and the foreign sector. He concludes that in 1975-76, the monetary authorities through the increase in the net foreign assets neutralize the contractionary effects of demonetizations and the reduction in Government notes and currencies.

Sohrabuddin and Ahmed (1977) in their study discuss control of money supply in Bangladesh with the objective to establish a quantitative relationship between money supply for a given change

in reserve money. Data period ranges from 1972 (11) to 1976 (11). They find that, incorporating dynamism in the narrow money model, the model performs the best for controlling money supply in Bangladesh.

Ali and Ansari (1984) have examined the sources of the monetary base and money multiplier to ascertain which explains money supply better. The time period of the study is June 1974 to June 1983. Kendell's rank correlation coefficient between money stock ratios and multiplier ratios $P(\mu\alpha)$, and also between money stock ratios and monetary base ratios $P(\mu B)$, are computed. For the estimation purpose, the following ratios are compared: -

$$\frac{M_1}{M_0} = \frac{m_1}{m_0} \times \frac{B_1}{B_0}$$

or, $\mu = \alpha B$ (8)

Ali and Ansari observe that among the variables to determine the supply of high powered money, Bangladesh Bank's credit to Government and also to the banks have significant effects. The case for regulating central bank credit is clearly established. They comment that the authorities can control the level of base money but obviously the degree of effectiveness in controlling the base will depend in the extent in which foreign exchange reserves is controlled by the monetary authority of the country.

Anwaruzzaman (1988) has analysed the movements of currency to money supply ratio of Bangladesh as an important concept of the money supply process. The time period of the study is 1959-60 to 1986-87. He finds that the number of bank branches and the inflation rate are the most important determinants of currency to money supply ratio. He concludes that bank expansion strategy has contributed significantly to the phenomenal growth of saving and time deposits, and decline of currency to money supply ratio will make the money supply process more endogenous.

Bahar (1988) examines the factor responsible for changes in money supply in Bangladesh form 1977 to 1988. The hypothesis of the study is that any change in money supply decomposes into changes due to: (1) variations in the base money, (2) variations in the money multiplier, (3) the interactions between the variations in the base money and the multiplier. He comments that the effectiveness of the central bank's policy in controlling money supply depends on its ability to determine the monetary base and on the stability of the money multiplier.

Huda (1988) wants to formulate a framework for analysing the sources of changes in money supply. Sample data is taken for the period of 1974-75 to 1986-87. The findings of the study are as follows: foreign transactions have a larger effect on year to year changes in money supply. Moreover, the hypothesis of classical link between the balance of payment and the local money supply is rejected. The combined effect of Government borrowing and net foreign asset on high-powered money is more or less neutral on most of the occasions. Moreover, from 1981-82 the bank borrowing from central bank has done expansionary effect on high powered money while government borrowing bears either negative or insignificant effect on it.

Howlader, Khan and Ahmed (1989) develop a money multiplier model for Bangladesh economy to identify the main determinants of the money multiplier process. The sample period of the study is 1972-73 to 1984-85. They find that the rate of interest and the variable reserve ratios are the powerful determinants of money multiplier in Bangladesh. It is evident that a small change in the monetary base will result in a change in money supply, which is more than double of the change in the base. They conclude that money multiplier can be increased either by increasing bank rate and/or by reducing reserve ratio.

Hossain (1993) develops a simple money multiplier model for Bangladesh economy for the period of 1972-1973. He finds that the deposit-currency ratio equation is stable. Evidence from the model reveals that time deposit ratio, excess reserve deposit ratios, and narrow and broad money multiplier equations are unstable. He also obtains that deposit-currency ratio is inversely related with real income, and income elasticity of the demand deposit is not statistically different from zero.

Ali and Sarker (1994) try to analyse the movement of reserve money and money multiplier and to assess their impact on the variation of money supply in the Bangladesh. Time period of the study is September 1973 to June 1994. Findings of the study are as follows: the multiplier model is unstable in Bangladesh and as such cannot be precisely predicted. Both GDP and interest rate have significant negative effect on currency-deposit ratio while cash reserve ratio has a positive impact on reserve-deposit ratio. Moreover, if borrowing by the Government can be predicted precisely, reserve money may be useful tool for monetary management in Bangladesh subject to the stability of money multiplier.

Bahar and Murtoza (1994) examine the money supply growth over the time period of July 1986 to June 1994. On the supply side, reserve money is the main element. They comment that in the recent years the accumulation of net foreign assets influences greatly the behaviour of reserve money.

2.1.2 New View:

Tobin, (1965) disagrees with monetarists approach to determine the money supply function. He argues that to express the stock of money in terms of high-powered money, the reserve-deposit ratio and the currency-deposit ratio are showing an arithmetic tautology. The Keynesians express their view that the currency-deposit ratio and the reserve-deposit ratio may be

constant only if *ceteris paribus* prevails. Variations in real national income may lead to vary these two ratios violating the assumption of *ceteris paribus*. If real income increases, the public demand for both currency and bank deposits will increase. The higher the interest rate on deposit, the greater will be the incentive for the public to hold bank deposits. Through the change of interest on loan and securities, bank's reserve deposit ratio can be varied as reserve requirement and interest rate plays an important role subject to the behaviour of the banks. Now we can express the money supply function in the light of the new view as follows:

$$M = f(H, r, r_1, Y, U) \dots\dots\dots(9)$$

Where, H = Reserve money

 r = interest rate on deposit

r_1 = Interest rate on loans and advances

 Y = Real Income

 U = Uncertainty

The Neo-Keyneians say that the monetary theory is portfolio management by economic units. They consider that, as an endogenous variable, money supply reflects the behaviour of banks and other economic units. They view that the banks and the other financial intermediaries can lend up to the extent the public is ready to make deposits with them.

Kaldor (1970) criticises the Monetarists view that the quantity of money is determined by the demand of the public and that the Central bank will not be successful if it wants to change the quantity of money. The proponents of the Keynesians argue that if the Central bank tries to increase aggregate demand by an open market purchase, then it won't be possible because the public would not accept real cash balance more than their needs and portfolios requirements. However, Tobin (1970) disagrees with the extreme Keynesians and accept some major points of the monetarists. He accepts the view of Friedman and Schwartz (1963) that the absolute decline in the money supply can be controlled if during the period appropriate monetary policy is taken. Tobin also accepts monetarist idea that excessive expansion will create inflation though he believes that there are other causes of inflation. Teigen (1970) points out that the supply of money depends on the market forces which are interest rate and the policy instruments of the central bank. Cramp (1970) argues that the quantity of money is largely endogenously determined in response to the economic demand rather than exogenously determined by Central bank.

Rational expectation hypothesis expedites the debate of effectiveness of monetary policy. In decision-making process, adaptive expectation hypothesis, which leads to develop the aforesaid hypothesis, is not working satisfactorily. Adaptive expectation hypothesis puts emphasis on the individual who will use information on the basis of past forecasting errors to revise current expectation. But rational expectation hypothesis asserts that the individual will use all sorts of

current available information and the information which can be acquired but will ignore the past trend basis information. According to the rational expectation theory, when monetary authorities want to expand economic activities through reducing interest rates and cost of money capital through the increase of money supply, then they may not be able to succeed.

The Keynesian model argues that the wealth holder through spending their excess money balances on bonds will reduce interest rate. But according to the monetarist view, the wealth holder will spend their excess money balances on all types of assets, including physical goods. Though interest rate will decrease, it will directly raise the price of goods and output.

Bhattacharya (1974) considers money supply as money proper plus time deposits MT, for the sample period from 1949-50 to 1967-68 for Indian economy. He finds that money supply is not an exogenous variable in the monetary system. The study shows that the money supply among other variables depends on the interest rate differential between the Central bank discount rate and the short-term interest rate of the organized money market. Since the latter is inversely related to the demand, the stock of money become an endogenous variable.

Ramkission (1990) investigates the effects of certain policy variables on the monetary aggregate and interest rate in the economy of Trinidad and Tobago. The currency and the excess liquidity ratio are considered endogenous in the model while the required liquidity ratio is the key policy variable and consequently exogenous. The money multiplier is an identity. He finds that the required liquidity ratio and the treasury bill rate are the two important policy variables and changes in both these variables have the expected impact on the relevant endogenous variables.

2.1.3 Modified view:

Hasin (1992) estimates money supply function for Bangladesh from September 1976 to December 1990. She finds that broad money is more applicable than narrow money and its explanatory variables are high powered money, currency-deposit ratio, required reserve to total deposit ratio, excess-reserve ratio to total deposit ratio and seasonal influences. She concludes that neither the monetarist nor the Keynesian view can be fully supported.

Momen (1992) examines whether the money supply changes are the primary causes of inflation for the period, 1958 to 1985. In the study, the data has been analysed for ten developed and developing countries including Bangladesh. The auto regression technique is used. He finds that in case of Bangladesh real GDP is an exogenous variable while money supply and price inflation are endogenous variables. He comments that IMF policy prescription will be effective in LDCs if their financial structure and level of industrialization can be improved.

Howlader and Ahmed (1994) study the impact of monetary expansion in Bangladesh on the basis of POLAK model, which analyses the effects of imports, exports and money supply within the circular flow model. The period of the study is 1972-1988. The findings of the study are as follows: the actual discretionary policy followed by monetary authority in Bangladesh results in high inflationary rate, and the balance of payment position has worsen but with a good

growth performance. If the monetary authority allows the domestic credit component of the money stock to grow by constant percentage per annum, then the balance of payment position will improve and the rate of inflation will fall but the economic growth rate will decrease.

From the above discussion, in brief following points may be mentioned:

Our discussion reveals that money supply can not be fully controlled by the Bangladesh bank. Though high-powered money is the main determinant of money supply, the other two possible determinants of the money supply are currency ratio to money supply and reserve deposit ratio. Besides the high powered money, the supply of money also depends on bank rate, interest rate on deposit and advance, deposit to GDP ratio which implies that the endogenous factors have some impacts on the money supply process.

2.2 Theory of Demand for money:

Monetarists view that the demand for money has the most stable economic relationship. Wealth effect, the size of the interest elasticity of money demand and the presence of lagged responses, all have influenced on the time path of output and inflation (Cuthberston, 1985). As per monetarist opinion, demand for money is determined by its purchasing power. But Keynesians deny this and argue that the demand for money is an unstable function. They view that a wide range of both monetary and non-monetary factors influence employment, growth rate and price level. Neo Keynesians believe that interest rate and income determine demand for money. Expectation of change in price is an important variable, which distinguishes between the proponents of Monetarists and those of Keynesians.

2.2.1 Quantity theory of money:

Fisher's (1911) quantity theory of money is based on the velocity of circulation, so described Johnson (1972). The theory can be expressed as,

$$MV = PT \text{ -----(10)}$$

Where, M= Nominal quantity of money

V=Velocity of circulation of money,

P=Nominal price level,

T= Number of transactions.

Marshall and Pigou (1917) as discussed by Johnson (1972) is developed Cambridge cash balance approach. According to them, rate of interest, wealth owned by the individual 's convenience in making purchase expectation of future interest rates and prices etc are the determinants. An individual's demand for nominal money balance is proportionate to his nominal income. The aggregate demand for money balances can be expressed as.

$$M_d = KY \text{ (11)}$$

Y = nominal national income

K = factor of proportionality

Since real aggregate income is defined as.

$$y = Y/P \dots\dots\dots (12)$$

Substituting equation (12) into (11) we obtain,

$$M_d = kpy \dots\dots\dots (13)$$

Wicksell shows, following Ackeley (1978), how the quantity of money affected prices, through affecting the demand for goods. Wicksell in his model introduces banking system instead of gold and silver economy. The banking system determines the quantity of money through its willingness to create credit at a given rate of interest level. The price may not necessarily rise proportionately to the increase of money supply. Wicksell in the income expenditure model assumes that the economy tends to attain full employment. If M rises, then P will rise but not proportionately and

$$\frac{dP}{dM} > 0.$$

2.2.2 Keynes's demand for money

Keynes (1936) rejects the quantity approach on the ground that it ignores the possibility that the people may choose holding money as an asset instead of holding financial assets, particularly Government bonds when prices are expected to fall. Keynes opines that the demand for money arises owing to three types of motives. These are (a) Transaction demand for money, (b) Precautionary demand for money, (C) Speculative demand for money. Transaction and precautionary demand for money is held mainly for the purpose of medium of exchange while speculative demand for money is held as a store of value.

In case of transaction demand for money, Keynes was a little bit conventional and defined it in terms of Cambridge cash balance approach. Transaction demand is explained by income and business motive. About eighty percent of the demand for money is based on transaction purposes. For the economy as a whole, total demand for money for transaction (Mt) purposes will depend on national income directly. This can be expressed as follows:

$$M_t = kY \dots\dots\dots (14)$$

where, M_t = transaction demand

k = fixed proportion

Y = national income

Precautionary demand for money arises to meet certain emergency claims, contingency claims or chance to buy advantageously, to face illness, etc. Here precautionary demand for money (M_p) is related to the level of income.

Keynes describes that the money held for transactions and precautionary motive is active balance and directly related to national income. Active balance (M_{ac}) can be expressed as follows:-

$$M_{ac} = M_t + M_p = k (Y + M_p) \dots\dots\dots(15)$$

Keynes describes that the speculative motive for holding money is related to the organized security market where assets are changing continuously as people's expectation about the future value changes. Keynes emphasizes that the interest rate will affect the expectation concerning the future value of the variable, which is a determinant of demand for money.

In terms of Keynesian view, the aggregate speculative demand for real cash balances (M_{sp}) can be expressed as :-

$$M_{sp} = h (r) \dots\dots\dots(16)$$

where, r is the rate of interest.

The individual's speculative demand for holding money involves certain expectations about the future use to increase wealth. An aggregate speculative demand for money is inversely related to the rate of interest.

When interest rate falls, people will hold money due to the anticipated decline against the bond price. Liquidity trap may prevail at a low rate of interest, where demand of wealth holders for money or the wealth holders supply of securities is perfectly elastic. Monetary expansion below the liquidity trap is completely incapable of reducing interest rate. The speculative demand for money can be expressed as follows: -

$$M_{sp} = \frac{h}{r} \quad \text{for } r_2 > r > r_1 \dots\dots\dots(17)$$

$$M_{sp} = 0 \quad \text{for } r > r_2 \dots\dots\dots(18)$$

$$M_{sp} = a \quad \text{for } r \leq r_1 \dots\dots\dots(19)$$

Where, h is a constant and r, r_1, r_2 are rate of interest at different levels.

Total aggregate demand for money can be expressed as: -

$$M_d = M_{ac} + M_{sp} = M_p + kY + h (r) = f (r, Y) \dots\dots\dots(20)$$

Income velocity of money (V) is :

$$V = \frac{Y}{M_d} \dots\dots\dots(21)$$

Keynes rejects that V can be constant in the short run and for a given amount of Y and V , total money demand can fluctuate.

Baumol (1952) provides the theory of transaction demand for money from the point of view of business inventory control. The square root formula can be expressed as:

$$m_t = \sqrt{\frac{2BY}{r}} \dots\dots\dots(22)$$

where, m_t = real transaction demand for money,
 B = real non-interest cost,
 Y = real income,
 r = rate of interest

Equation (22) states that real money balances demand for transaction purpose is directly proportional to the square root of real income while inversely proportional to the square root of interest. For a given level of income, as the rate of interest rises, the demand of real transaction balances will decline.

Tobin (1956) in the liquidity preference theory discusses that the rational behaviour will demonstrate a portfolio comprising both bond and money. This theory assumes that an individual's preference system depends on the expected yield and risk. Individual can hold cashes. Portfolio depends on uncertainty arising out of the possibility of changes in the rate of interest in future. Individual wealth holder's attitude towards risk may create problem for choosing asset. If the wealth holder has alternatives to choose for more than two, then he may consider holding his wealth portfolio.

Bhattachrya (1974) studies demand for money function as follows:

$$M = f(MY^d, r, NW_{-1}) \dots\dots\dots(23)$$

Where MY^d is monetised disposable income, r is short term interest rate of the organized money market, and NW_{-1} is lagged net worth of the private sector. The sample period of the study is from 1949-50 to 1967-68. On the demand side, the study finds that only demand for 'money is inversely related to interest rate. In the 2SLS estimate inclusion of time deposit in the definition on money revealed inverse relationship between money demand and interest rate. Though Keynesian liquidity preference hypothesis has been found in the organized money market but not applicable in the unorganized money market. Furthermore, money demand depends on monetized component of national income rather than the total income.

Ahmed (1977) investigates the parameters of money demand function in Bangladesh for the period of 1959-60 to 1975-76 (excluding 1970-71 & 1971-72). The study states that real money balances depend on rate of interest and real income. His argument is based on the idea of Keynesian school. In the study, both linear and log-linear forms of money demand function are used for estimation purpose. Ahmed finds that the rate of interest is statistically significant and

negatively related to the demand for money and elasticity is less than one. He also observes that the income elasticity of demand for money is positive and greater than one.

Murty and Murty (1978) have analysed the money demand function for Bangladesh. Sample period of the study is 1959-60 to 1975-76 with a gap of two years 1970-71 & 1971-72. They observe that the linear form is appropriate for the equilibrium version of the money demand function and none of the restricted model is appropriate. The behavioural properties of the alternative model have been examined by considering movement of income and interest rate elasticities.

Hossain (1983) examines the parameters of the money demand function in case of Bangladesh. The time period of the study is 1959-60 to 1975-76 excluding 1970-71 & 1971-72. The study examines the relationship between demand for money and real income and also demand for money and the rate of interest separately. In the study, the following observations have been obtained: a) Interest rate is negatively related to the demand for money and the interest rate elasticity is less than unity, b) Real income is positively related to the demand for money. The income elasticity is positive and greater than unity; c) Real income can explain the demand for money in a better way than the rate of interest.

2.2.3 Friedman's demand for Money:

Friedman (1956) restated the quantity theory of money. Friedman in the money demand model use total wealth (W) as human wealth plus non-human wealth. As wealth rises, permanent income will rise which will affect demand for money to rise. If the percentage ratio of non-human wealth to total wealth (C) decreases, then the demand for money will increase to compensate for the human wealth.

The cost of holding money depends on the difference between the rates of return on monetary and non-monetary assets. When price of share will rise, then implicit rate of return on money will be negative and the cost of holding money will rise. As such for the individual wealth holder, the rate of return for holding money is: $[-\frac{\Delta p}{p}]$. When price are falling, then the rate of return is positive and when price is rising, then the rate of return is negative. The rate of return on money related to bond is: $\{-\frac{\Delta p}{p}, -r\}$. If the relative rate increases, then the relative cost of holding cash balances will decrease. Friedman considers expected rate of inflation or price change as a potential variable. In the model wealth can be held along with all kinds of financial assets, consumer durable, property and human wealth. Friedman points out that the demand for real cash balances M_d is dependent on total wealth (W), percentage of total wealth on non-human wealth (C), the rate or return on money of bonds, $\{-r, -\frac{\Delta p}{p}\}$ and other variables which determines the utility of money (U_m).

Friedman's demand for money function can be expressed as,

$$M_d = f(W, C, -r, -\frac{\Delta p}{p}, U_m) \dots\dots\dots(24)$$

As it is difficult to compute real wealth, Friedman suggests,

$$W = \frac{Y_p}{r} \dots\dots\dots(25)$$

Substituting equation (25) for equation (24) we obtain,

$$M_d = f(Y_p, C, -r, -\frac{\Delta p}{p}, U_m) \dots\dots\dots(26)$$

The aggregate demand for wealth holders is the summation of individual demand. Equation (26) can also be used to represent the aggregate demand function since it is identical to that function. Friedman describes that for the firm's aggregate money demand function, the variable C will be excluded. Thus the total aggregate demand for money can be expressed as:

$$M_d = f(Y_p, -r, -\frac{\Delta p}{p}, U_m) \dots\dots\dots(27)$$

Since the rate of return on bonds and equities represents the opportunity cost of holding money, an inverse relationship prevails between the real cash balances and the rate of return.

Patinkin (1965) argues that Friedman's demand for money theory has little difference with modern Keynesian portfolio approach. In equation (27), we find that the expected rate of inflation is an important variable of the demand for money. But Keynesian money demand theory assumes actual or expected price level as stable. Friedman predicts an inverse relationship between the demand for real cash balances and the expected rate of inflation. Moreover, in the Keynesian analysis, the demand for money is interest elastic and if the rate of interest earned from holding bond changes, then wealth holders will only change their money balances. But in Friedman's analysis the demand for money is believed to exhibit low interest elasticity.

Adekulne (1968) the in demand for money function studies different specifications of expectations. The most general forms of these relationships are,

$$M_t = a + b_1 Y_t^e + b_2 \Pi_t + b_3 \left(\frac{dp}{dt} \right) + u_t \dots\dots\dots(28)$$

where, M_t is the private demand for real balances, Y_t^e is expected income, $\frac{dp}{dt}$ is expected rate of change in price, Π is the rate of interest and u_t is the disturbance term.

Adekunle has made the following observations: The lag effect in expectations is shorter in less developed countries. But in the industrial countries the longer lag in income expectations suggests that the expected income or wealth is the appropriate variable in the money demand function. In the LDCs there are substitution effect between real assets and money balances. Desired balances in LDCs are related to current rather than expected income. In the industrial countries desired real cash balances are related to interest rate and expected income. But in less developed countries real cash balances are related to interest rates, expected rate of change in prices and current income.

Ahmed (1976) has studied the demand for money in Bangladesh to assess the influence of the exogenous variables. Data is taken from 1958-59 to 1973-74. The study has mainly followed Adekunle (1968) only changing the yield on long term Government bonds in consideration of the average lending rate of the banking system. Ahmed finds the most vital determinant of the demand for money is income although price plays a substantial role. He concludes that in the absence of a developed money and capital market, interest rate plays only an insignificant role.

Rahim and Shorab Uddin (1978) estimate a demand function for money in Bangladesh. In the study they consider real income, nominal rate of return in money and the rate of inflation as component of the demand function. Data series is taken from 1969-70 to 1976-77. They find that the real demand for narrow money is more responsive, and stable relationship prevails between money demand and its explanatory variables.

Bahar (1987) intends to trace out the factors, which are responsible for changes in real money balances. For determining the demand for money, he considers the following variables are responsible: level of income, utility of holding money balances, rate of interest, rate of change in the price level. He assumes that the utility of holding money balances is stable. In the model the following equations are used for estimation: -

$$\text{Log } (M_1/p)^d = a_0 + a_1 \ln y + a_2 \ln i + a_3 p(-1) \text{-----(29)}$$

$$\text{Log } (M_2/p)^d = b_0 + b_1 \ln y + b_2 \ln i + b_3 p(-1) \text{-----(30)}$$

Bahar finds that the demand for broad money in Bangladesh is more stable than that of narrow money and that income is a significant factor. He obtains that income elasticity of demand for money is more than unity. Furthermore, he observes that the rate of interest on bank deposit is not statistically significant.

Talukder and Zaman (1994) have provided an analysis of the stability assumption of the money demand function, along with the idea in which monetary policy should be framed. Time

period of data is 1974 (June) to 1994 (June). Both narrow and broad money are used. Results of the study are given below: Cost of living index is not a good measure for price level. Real M_1 could only be integrated with real GDP. In case of real M_2 this can be co-integrated with GDP and real deposit rate is stable between 1974 and 1989 but for the period of 1974-1994 demand equilibrium does not exist. By averaging the M_2 series, substituting the cost of living index and percentage change in GDP deflator with one year lag, a stable long run relationship among real M_2 , real GDP and real deposit rate for the period of 1980-94 is obtained of income elasticity is very high but interest elasticity is very small. M_2 is more appropriate monetary aggregate for examining demand for money.

2.2.4 Modified view:

Some of the studies also consider additional variables such as foreign aid and loan, exchange rate. Bangladesh depends heavily on external sector such as foreign aid and loan, foreign remittance, exchange rate, etc. According to Ghatak, (1981), different methods of estimation of money demand function in LDCs have yielded useful additional evidence on the role of expected prices in the demand for money which have influenced and effected varying monetary frameworks through various degrees of monetisation in different countries. Monetisation implies that the demand for real money grows faster than the real output, which requires that authority should take initiatives to supply money to grow at a rate appropriately faster than the real output. Excessive monetary growth has an adverse effect on inflation, real output and income for which price stability in LDCs is important (Drake, 1980).

Huda (1984) has tested Mckinnon's complementarity hypothesis in the Bangladesh economy. The study covers the period 1959-60- 1982-83. Major findings of the study are as follows: The evidence for complementarity between money and physical asset is not convincing. The only evidence of the complementarity is the consistent but insignificant positive relationship between real balances and the investment income ratio. The variable representing the real rate of return, though statistically significant, has an implausibly small coefficient.

Taslim (1984) examines the variables, which are important in determining the demand for money in Bangladesh. The study includes foreign sector. Time period of the study is from 1958-59 to 1981-82. Taslim uses the following money demand model:

$$m^t = f(y_t, p^e_t, f_t) \dots\dots\dots(31)$$

Where y is real income, p^e is the expected inflation rate, f is foreign aid and loan and t is time subscript. He observes that the public's desire for cash holdings functionally relates to the level of income, foreign aid and the price level . He concludes that an increase in real income and inflow of foreign aid and loan tends to increase the demand for money while an increase in the price level tends to lower it.

Jahan (1985) undertakes a study to specify and estimate a money demand function for Bangladesh economy for the period from 1972-73 to 1982-83 .In the study narrow money is

considered. Jahan finds that real income and rate of expected inflation are the dominating factor of the money demand function. He concludes that the exchange rate has a very little to do with the domestic money demand of Bangladesh.

Kamath (1985) has investigated demand for and supply of money in India from 1951-1976. He obtains following findings for demand for money function: (a) Degree of credit restraint as a proxy for unobservable free market interest rates enter as an important argument; (b) The rate of inflation is also a significant argument in the money demand function; (c) The results highlight the importance of demand adjustment lags and adaptive expectation processes in the demand for money function; (d) There does not exist degree of simultaneous equation bias in estimating single money demand functions; (e) Money demand function is stable over the estimation period except a few proxies in case of M_1 .

Islam, et. al. (1987), on the basis of preliminary survey in the areas of Sylhet and Chittagong districts during November 1983 and May 1984, find that foreign remittances are used for both productive and non-productive purposes by the beneficiaries. Beneficiaries of foreign remittance use their major portion of their fund for consumption purposes by the beneficiaries. Beneficiaries of foreign remittance use their major portion of their fund for consumption purposes and from the residue hold a portion of remittance to earn interest and investment purposes. Large portion of foreign remittance is spent on transaction purposes and demand for real cash balances is positively related to their earnings.

Hossain (1988) investigates a short run demand for money model for Bangladesh. The time period of the study is 1974 to 1985. Three alternative models are tested: a) Chow model, b) Goldfield model, c) Laidler model. A comparative test has been done among these models. The major findings are as follows: Laidler short run real money model that is more appropriate. The real permanent income and the expected rate of inflation are important determinants of money demand function. The long run income elasticity of the demand for money exceeds unity and the income elasticity of the demand for broad money exceeds the income elasticity of the demand for narrow money. The estimated coefficient of one period lagged inflation rate is statistically significant. The dynamic simulation results for several sample periods suggest a good fit of the equation and also indicate that the estimated demand function is stable. The empirical results do not indicate the amount of superiority between narrow and broad money.

Hassan (1992) undertakes a study to determine the role of credit constraint, foreign interest rates, currency depreciation and domestic inflation rate in domestic demand for money. He uses an alternative definition of money stock. It is M_0 , M_1 , M_2 . The estimated money demand function fits well, is structurally stable and fulfils the classical hypothesis. Foreign interest rate and currency depreciation do not play a major role in explaining the demand for money. As market determination of interest rate is absent, domestic credit constraint is used as a proxy for interest rate in money demand equation. Determinants of conventional money demand functions are real income, lagged money stock and expected inflation.

Hassan, Samad and Islam (1993) examine Mckinnon-Shaw model of financial development on money demand function for five South Asian less developed countries including Bangladesh. The study period covers 1970-89. It is evident from the study that a positive relationship between money demand and domestic saving prevails. Mckinnon's complementary demand for money is supported by the positive and significant coefficient associated with domestic saving ratio in the low-income group's aggregate demand for money function.

Ali (1996 and 1997) examines Mckinnon's demand for money model in Bangladesh for the period of 1974-75 to 1993-94. He observes that for narrow money, although investment to GDP ratio is positive, its coefficient value is insignificant, and for broad money and investment to GDP ratio, its coefficient value is negative & insignificant. The finding of the study does not support Mckinnon's complementarity hypothesis.

In a nutshell we can say following points:

The aforesaid analysis shows that the demand for money depends on real gross domestic product, interest rate, savings, expected rate of inflation, foreign aid and loan, exchange rate and foreign remittance.

Furthermore, our aforesaid analysis reveals that money supply-demand models are working like a two-way traffic, as some common determinants of both the functions are affecting one another.

Chapter: 3

Trends of Real, Monetary and External variables

Economy of Bangladesh suffers from the problems of both supply and demand sides. Real variables are affected by the monetary and external variables. Monetary and fiscal policy can affect GDP, Govt. spending, investment, consumption and balance of trade. That's why, macro management of the country requires that monetary & fiscal policy should be properly co-ordinated. It further requires that interactions between real economy, domestic & internal environment and exchange rate policy be also properly handled. Changes in aggregate demand will change prices of goods and output. Price may also rise through on arise in high unemployment and unutilised capacity in the economy. Inflation increases with a rising general price level and this may be associated with lower level of output and unemployment. The change in exchange rate has affected relative price and net export. Impact of demand sector reflects in the external sector account. When industrial goods are imported it may lead to higher investment while consumer goods are only used for consumption purpose.

3.1. Estimation Procedure:

We have determined various ratios, to provide indicators for change in real, monetary and external variables. Trends of these variables have also been analysed for twenty-one years. Percentage changes of various variables over the years have also been computed to reflect the real growth of the variables. This in turn is a reflection of the inter-relationship among the variables with one another. Simple and partial correlation matrices for the relative variables have been computed to see the strength of the relationship among the variables.

3.2. Major indicators of economic performance:

Bangladesh suffers from both demand and supply side problems which lowers its economic growth, savings, investment and also earnings from export. An increase in national savings rate can be achieved by fiscal and monetary policy mix.

After independence of the country, the priority was to stimulate rate of economic growth through increasing the saving and investment. But still growth rate was far below from the desired level. Economic growth rate was only 5% in 1995-96. (Source: - Statistical pocket book of Bangladesh, 1996). The trends of change in real variables have been shown in table: 1 from the year 1975-76 to 1995-96.

Table: 1
Trends of Real Variables

(Base: 1973-74)

(Million Taka)

Year	Real GDP	Real Consumption	Real Saving	Real Revenue Receipt	Real Investment	Real Govt. Expenditure
1975-76	76787	79064	716	7158	7632	10065
1976-77	78843	74111	7487	6657	87118	12019
1977-78	84424	82960	5765	7544	9984	12778
1978-79	88478	87030	7408	8038	10027	13068
1979-80	89198	87195	8719	8315	13638	13068
1980-81	92230	89122	9812	9337	14956	15187
1981-82	93365	92910	7439	9205	14448	15069
1982-83	97932	97348	10647	9023	13132	15430
1983-84	103248	101893	10239	8816	12659	14468
1984-85	106362	103881	9859	9088	13766	15003
1985-86	110969	107402	10741	9694	13911	16937
1986-87	115604	111538	12450	10113	14899	18008
1987-88	118956	115422	12745	10251	14803	17622
1988-89	121958	118737	11797	10765	15752	19881
1989-90	130035	126492	11923	11950	16648	21788
1990-91	134464	128912	14605	12605	15464	20141
1991-92	140191	132005	18242	14718	16986	21366
1992-93	146424	136246	21145	17084	20887	23264
1993-94	152600	140699	22693	18278	23449	26754
1994-95	156361	144243	25102	18987	26008	27528
1995-96	164733	152008	23427	19554	27997	27630

Source : Computed from data published in (a) Bangladesh Bureau of Statistics, Twenty Years of National accounting of Bangladesh (1972-73 to 1991-92) July 1993, (b) Ministry of Finance-Bangladesh Arthanaitic Samikhaya, 1997, (c) Bangladesh Bureau of Statistics, Statistical pocketbook of Bangladesh, 1996, (d) Bangladesh Bank, Economic Trends, May 1997.

Table 1 reveals that real gross domestic product is Tk. 76787 million in 1975-76 which increased to Tk. 164733 million in 1995-96. Real consumption is Tk. 79064 million in 1974-75 which increased to Tk. 152008 million in 1995-96. Revenue receipt goes upto Tk. 19554 million in 1995-96 while it is Tk. 7158 million in 1975-76. Real savings and real investment rises from Tk. 716 million and Tk. 7632 million in 1975-76 to Tk. 23427 million and Tk. 27997 million respectively in 1995-96. Government expenditure increases from Tk. 10065 million in 1975-76 to Tk. 27630 million in 1995-96.

Government expenditure can be expressed as,

Government expenditure equals to Government investment expenditure plus Government consumption expenditure plus Government foreign expenditure.

Government has its own expenditure cost for defence, development purpose, and maintenance of law and order situation and righteousness. Though public authority should utilise the expenditure to increase economic provision for the present and future production but non-productive service sector should not get preferences. Public investment in the later part of Eighties declined in the country because of financial constraint, which causes high Government consumption and stagnation of revenues. The ratio of real Govt. expenditure to real GDP is 16.77% in the year 1995-96, which is 13.10% in 1975-76. This indicates that a rise in the Government expenditure which should be lowered so that can be utilised for productive purposes.

In table :2 we shall depict real investment to real GDP ratio, real tax to real GDP ratio, real saving to real GDP ratio and real consumption to real GDP ratio from 1975-76 to 1995-96.

Table :2
Ratio of investment, tax, saving, consumption to GDP
(In percentage)

Year	<u>RI</u> RGDP	<u>RT</u> RGDP	<u>RS</u> RGDP	<u>RC</u> RGDP
1975-76	9.9400	7.2930	0.933	103.00
1976-77	11.0600	6.4660	9.496	94.00
1977-78	11.8200	7.1330	6.829	98.00
1978-79	11.3300	7.1040	8.373	98.00
1979-80	15.2900	7.1780	9.775	98.00
1980-81	16.2600	7.6830	10.638	97.00
1981-82	15.4700	7.5980	7.968	100.00
1982-83	13.4100	7.3410	10.872	99.00
1983-84	12.2600	6.7850	9.917	99.00
1984-85	12.9400	6.9960	9.269	98.00
1985-86	12.5300	6.9240	9.679	97.00
1986-87	12.8900	7.1460	10.769	96.00
1987-88	12.4400	7.3130	10.714	97.00
1988-89	12.9100	7.4220	9.673	97.00
1989-90	12.8000	7.8380	9.169	97.00
1990-91	11.5000	7.6500	10.862	96.00
1991-92	12.1200	8.5390	13.012	94.00
1992-93	14.2600	9.5360	14.441	93.00
1993-94	15.3700	9.5530	14.87	92.00
1994-95	16.6300	9.4900	16.054	92.00
1995-96	16.9900	9.3980	14.221	92.00

Source : Ibid. Data's are estimated.

From table :2 we find that to real investment to real GDP ratio rises to 16.99 in percentage 1995-96 which is 9.94 percentage in 1975-76. This implies that during the twenty-one years the rate of rise of investment is very low. We also observe from the table :2 that real saving in relation to

real GDP ratio is .93% in 1975-76 which is 14.22% in 1995-96. As real saving in relation to real GDP is very low so it is not very much helpful for capital formation. The rate of saving and investment are low, which causes the economic growth rate become low. However, real consumption to real GDP ratio is 100.03% in 1975-76, which declines to 92% in 1995-96. This implies that spending on consumption is not high. Real tax to real GDP ratio is 7.29% in 1975-76, which increases to 9.39% in 1995-96. Tax/GDP ratio is low due to inelasticity of the tax structure. Generally, direct tax is favourable for poor segment of the people. However, fiscal reform measures have strengthened in 1991 with some change in the tax structure for collection of direct tax. Collection of direct tax is still low. Moreover there is a normal tendency for tax evasion. During the period of 1975-76 income tax at constant price is Tk. 85.55 crore while this rises to Tk. 1524.78 crore in 1995-96 and during this twenty-one years total rise of income tax is only Tk. 1439.23 crore (Source : Economic Trends, December, 1996). The collection of income tax rises at a slow rate as Government officials are exempted from income tax. Sales tax is replaced by value added tax (VAT) from July 1991. Still VAT is collected from limited domestic sector and its network should be increased. According to Economic Trends (December 1996), total amount of collection of VAT is Tk. 3852.11 crore in 1995-96, which is 34.09% of total tax revenue receipts.

During the decade of eighties public expenditure in the country has exceeded the public income tax and other forms. During that period, Government heavily depends on foreign assistance and loan.

Immediately after liberation then the Government nationalise banks by the Bangladesh Banks nationalisation order of 1972. Although bank branches are expanded except the expansion of bank branches in rural areas, the commercial banking system demonstrated a failure in achieving the most of the objectives of banks nationalisation during the time period of 1972-82. Further, denationalisation and introduction of private banks also can not bring any fruitful result. Total numbers of scheduled bank branches are 1238 in 1972-73 that rises to 5853 in 1995-96 (Source: Economic Trends, January, 1997).

Now we shall see trends of monetary indicators for twenty-one years starting from 1975-76 to 1995-96 in table: 3.

Table :3
Trends of Monetary indicators

(Base: 1973-74)

Year	Real Narrow money million Taka	Real broad money million Taka	Ratio of narrow to broad money	Money Multiplier		Real High powered money	Real credit to the Govt. by the banking system million taka
				Narrow money	Broad money		
1975-76	6140.46	9722.98	.632	1.91	3.02	3218.66	5039.69
1976-77	6612.52	11825.60	.559	1.78	3.18	3714.48	4325.63
1977-78	7117.69	12449.12	.572	1.80	3.15	3995.35	4457.24
1978-79	7751.51	14030.18	.552	1.78	3.26	4352.82	3733.60
1979-80	7879.34	14763.64	.534	1.65	3.10	4751.02	4341.37
1980-81	7915.75	16482.68	.480	1.48	3.16	5328.67	5902.16
1981-82	7252.90	16396.44	.442	1.57	3.59	4615.72	5699.71
1982-83	8769.31	19634.82	.447	1.62	3.82	5407.79	4729.69
1983-84	10304.64	24376.62	.442	1.59	3.81	6499.71	3929.07
1984-85	11060.93	27533.91	.402	1.58	4.03	6994.77	3724.44
1985-86	11729.19	29366.64	.399	1.51	4.15	7787.43	4259.70
1986-87	11283.39	30772.91	.367	1.41	4.21	8022.73	4210.12
1987-88	10055.58	32688.55	.307	1.00	3.49	10070.73	4473.40
1988-89	10096.70	35274.94	.286	1.00	3.73	10112.43	1823.22
1989-90	11228.12	39311.01	.286	1.01	3.76	11138.40	2958.92
1990-91	11608.95	40295.55	.288	1.10	3.82	10476.55	2703.79
1991-92	12769.79	44115.40	.289	1.21	4.28	10550.73	1851.07
1992-93	13999.32	48714.16	.287	1.01	3.57	13818.63	2236.68
1993-94	16476.48	53710.75	.307	0.99	3.32	16684.02	1489.74
1994-95	17609.39	56401.11	.312	1.24	3.97	14203.06	1753.36
1995-96	18301.18	57830.22	.316	1.31	4.15	13926.44	3843.66

Source : Ibid

From table :3 we find that real narrow money is Tk. 6140.46 million in 1975-76 that raise to Tk. 18301.18 million in 1995-96. Real broad money rises from Tk. 9722.98 million to Tk. 57830.22 million in 1995-96. Ratio of narrow to broad money is 0.632 in 1975-76 which declines to 0.316 in 1995-96. During the period of 1988-89 to 1992-93 this ratio is very low but started to rises form the year 1993-94.

Money multiplier in the context of narrow and broad money is also shown in table 3. We find that money multiplier of narrow money and broad money is 1.31 and 4.15 respectively in 1995-96. High-powered money is an important factor for upward increase of money stock that rises from Tk. 3218.66 million to Tk. 13926.44 million in real terms over the period. High-powered money along with money multiplier determines real stock of money. Through the variation of high-powered money or money multiplier or both the components, money stock of the country is determined.

Table 3, reveals that real government borrowing from the banking system is Tk. 5039.69 million in 1975-76 which decreases to Tk. 3843.66 million in 1995-96. Due to the budgetary shortage government borrows from the banking system which affects high-powered money and money supply process. Total credit to the Government by the banking system includes overdraft, outstanding ways and means, advances, Govt. securities and treasury bills, saving certificates, sanchaypatra, prize bonds and other debit balances.

Bangladesh still heavily depends on external assistance or aid. But the country can not heavily depend on loan or aid. Export earnings are very limited. We have shown trends of variables of external sector in table 4.

Table :4
Trends of variables of external sector

(Base : 1973-74)

Year	Real Foreign aid and loan one year value (million Taka)	Real foreign remittance (Million Taka)	Real Balance of trade (Million Taka)	Percentage change in exchange rate (%)
1975-76	10071.69	171	-9946	-97.40
1976-77	8400.05	495	-4044	-6.37
1977-78	4703.45	885	-8193	-13.08
1978-79	6452.65	960	-8164	-6.72
1979-80	7280.13	1754	-10897	-14.37
1980-81	7924.92	2470	-11685	-6.55
1981-82	8297.89	3027	-13575	-6.38
1982-83	9824.23	4927	-12157	-7.67
1983-84	8532.89	4334	-11098	-4.31
1984-85	8603.72	2997	-10349	-6.40
1985-86	9027.94	3654	-10638	4.84
1986-87	8576.39	4576	-11204	-7.11
1987-88	9926.29	4590	-12257	-8.47
1988-89	9745.76	4581	-13180	-4.76
1989-90	9680.72	4401	-10307	-6.31
1990-91	10407.39	4392	-9171	-0.42
1991-92	10218.52	4013	-11020	-1.75
1992-93	9740.17	5711	-10278	-1.19
1993-94	9885.50	6425	-14434	-0.42
1994-95	8373.79	6731	-16286	-4.49
1995-96	8993.39	6300	-18039	-2.33

Source : Ibid

From the table 4, we find that real foreign aid and loan one-year lag value is Tk.10071.69 million in 1975-76, which decreases to Tk. 8993.39 million in 1995-96. Foreign aid and loan has played an important role in the economic activities of this country as it mitigates a huge amount of the gap of fiscal deficit. Generally, inflow of foreign aid and loan has positive effect on real sector variable, which affects monetary variable. As foreign aid and loan is utilised for expenditure purposes, which effect both investment and consumption ultimately have an impact on monetary stock. Larger inflow of foreign aid and loan can lead to raise both money supply and demand. Foreign aid and loan creates problem as most of them are tied aid or loan. Moreover, this aid increases debt burden of the economy, which fails to create necessary productive capacity for servicing charges. Foreign aid & loan is still higher which has negative impact on internal resource mobilisation . Bangladesh has to bear debt services for repayment of principal amount, and also of interest for cost of borrowing from the external sector.

We observe in table 4 that real foreign remittance is Tk. 171 Million in 1975-76, which rises to Tk. 6300 million in 1995-96. Foreign remittance is one of the major sources of foreign exchange earnings, which is remitted by the Bangladeshi expatriates from abroad to the country. This foreign remittance is used mainly for unproductive sector by the beneficiaries. Beneficiaries of foreign remittance use major portion of their fund for consumption purposes. The inflow of foreign remittance affects the domestic monetary base and aggravates inflationary situation due to lack of proper utilisation and wasteful expenditure.

Real trade deficit is Tk. 9946 million in 1975-76. This rose to Tk. 18039 million in 1995-96. Even after twenty-seven years of emergence of Bangladesh, she suffers from trade deficit. Attempts that were take to diversify exportable commodities and increase export earnings could not bring fruitful result. Measures that have so far been taken to meet the huge gap of trade deficit are not sufficient. Devaluation affects on relative prices level and although done with the hope that this will increase net exports, decrease import and increase output but can not fulfil the target. In the table 5, we depict the percentage change in real exchange rate over the year. Although devaluation is done on the ground that exporters will be benefited and trade can be used as a growth of engine but real trade deficit has increased which indicates that terms of trade for Bangladesh is declining. Convertibility of taka on current account is done to improve the balance of trade position through linking the economy and so that frequent devaluation can be avoided. But these two objectives can not fulfill. Since the trade sector of the country is linked up between both internal as well as external economies, any deterioration in the trade sector will exerts an adverse affect on the internal economy of the country. The deficiency of trade is undesirable as the economy has to face globalisation challenge and this has negative impact on domestic economy, output. Although readymade garments are one of the major source of foreign exchange earnings but owing to lack of backward linkage, the garments industry not only depend on foreign capital, assistance and technology but also it has to rely on import of inputs from abroad. As such substantial portions of earnings have been remitted to the foreign country through opening back to back L/C. Moreover; establishment of World Trade Organisation will affect the economy of the country. To mobilise domestic resources export earnings needs to be boosted up. Categories of major importable commodities (besides garments accessories) in Bangladesh are mostly luxury goods and are imported both for internal consumption purposes and also for summgling purposes. A huge amount of foreign exchange is spending for wasteful and unnecessary importable items each year. Price elasticity of import demand should be greater than

one to discourage large volume of import. Improvement of Balance of trade position and reduction of dependence on foreign aids and loans are needed to accelerate economic growth of the country.

3.2 Estimation of percentage changes of various variable over the year

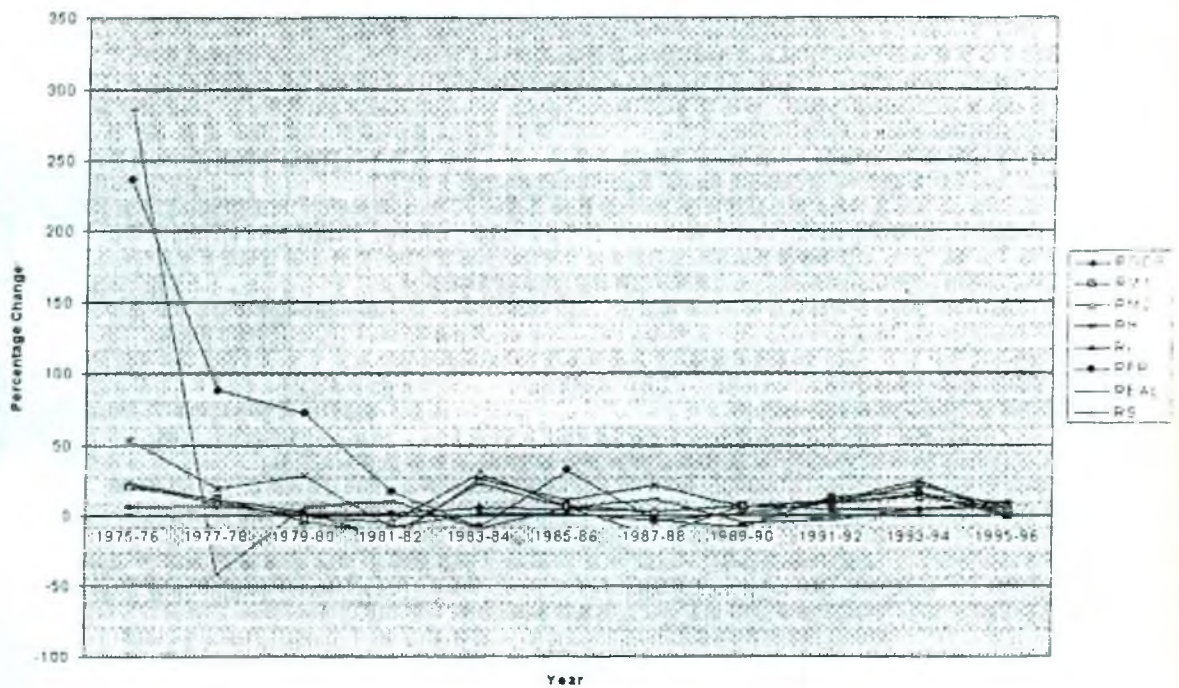
In the table: 5 the study has shown percentage changes over the year.

Table:5
Percentage changes over the year

Year	Real GDP	Real Narrow money	Real broad money	Real High powered money	Real Investment	Real Foreign Remittance	Real Saving	Real Foreign aid & loan one year lag value
1975-76	6	20	21	23	53	236	-78	286
1976-77	3	7	21	15	14	189	943	-17
1977-78	7	12	9	11	19	88	-20	-42
1978-79	5	15	19	16	6	13	36	45
1979-80	1	-4	-1	3	28	72	11	6
1980-81	3	2	13	14	11	43	14	11
1981-82	1	-13	-5	-17	-8	17	-28	10
1982-83	5	19	18	15	-11	60	41	16
1983-84	5	23	30	26	1	-8	1	-9
1984-85	3	7	13	6	9	-31	-4	1
1985-86	4	6	7	11	1	32	9	5
1986-87	4	-3	5	4	8	17	17	-4
1987-88	3	-14	3	21	-4	-3	-1	12
1988-89	3	0	8	0	6	0	-11	-2
1989-90	7	7	7	6	1	-8	0	-5
1990-91	3	4	3	-5	-7	0	23	8
1991-92	4	9	9	10	9	13	24	-3
1992-93	4	8	9	29	21	12	14	-6
1993-94	4	21	13	24	15	16	10	4
1994-95	2	12	10	-11	16	5	16	-11
1995-96	5	5	4	-1	9	-1	-5	9

From the table: 5 we observe that growth rate of real GDP is 6% in the year 1975-76 which is 5% in the year 1995-96. Growth rate of real narrow money supply is 20% in the year 1975-76 while it is 5% in the year 1995-96. During the year 1995-76 growth rate of broad money supply is 21% while this is 4% in the year 1995-96. High-powered money rises at the rate of 23% in 1975-76 while it has declined at the rate of 1% in 1995-96. Growth rate of real investment is 53% and 9% in the year 1975-76 and 1995-96 respectively. Real foreign remittance rises at the rate of 236% in the year 1975-76 but in the year 1995-96 this has declined at the rate of 1%. Real saving decreases to the rate of 78 percent in the year 1975-76 while it is declined at the rate of 5% in the year 1995-96. Rate of growth of foreign aid and loan (one year lag value) is 286% in the year 1975-76 while in the year 1995-96 is at the rate of 9%. We have shown below in the diagrammatic representation relationship among the variables in figure: 1.

Figure 1: Trends of Percentage Change of Variables in Real Terms



- Notes:
- | | | |
|-----------------|---|---|
| RGDP | = | Real Gross Domestic Product |
| RM ₁ | = | Real Narrow Money |
| RM ₂ | = | Real Broad Money |
| RH | = | Real High Powered Money |
| RI | = | Real Income |
| RFR | = | Real Foreign remittance |
| RS | = | Real Saving |
| RFAL | = | Real Foreign Aid and Loan
(one year Lag Value) |

Change the scales. The fig will be clear.

The study has also done simple and partial correlation matrices of the percentage changes of various variables to see the strength of the relationship among the variables. Table 7 depicts below simple correlation coefficients among the variables:

Table: 7

Simple Correlation coefficients

Real Foreign Aid and Loan (RFAL)	Real Gross domestic product (RGDP)	Real savings (RS)
	.2531 (.268)	-.1916 (.405)
Real High powered money (RH)	.4527 (.039)	.1040 (.654)
Real Investment (RI)	.1486 (.520)	.0069 (.976)
Real Narrow Money (RM ₁)	.5854 (.005)	.009 (.968)
Real Broad Money (RM ₂)	.4412 (.045)	.2962 (.192)
Real Foreign Remittance (RFR)	.1741 (.451)	.4684 (.032)
Real Gross Domestic Product (RGDP)	1.000	-.1463 (.527)
Real Savings (RS)	-.1463 (.527)	-.2899 (.202)

Note: (Probability is shown in the Parentheses)

From the simple correlation we observe the following relationship:

- (i) Higher the money supply in real terms, higher is the growth of real GDP.
- (ii) Higher the foreign remittance, higher is the saving. But as a whole remittance is declining over the year.
- (iii) Money demand and saving is positively related but not significant.
- (iv) Higher the remittance, higher is the investment.
- (v) Investment and saving is positively related but not significant.
- (vi) Investment and GDP has positive relationship but insignificant.
- (vii) Higher the foreign aid and loan, higher is the investment.
- (viii) High-powered money is positively related to narrow and broad money supply.
- (ix) High powered money is positively related to GDP as $r = .45$ ($p = .04$) (where 'r' indicates coefficient of correlation and 'p' is probability)

We have given in table: 8 below which depict partial correlation coefficients among the variables.

Table: 8
Partial Correlation coefficients

	Controlled Variable			
	RFR, RFAL	RFR, Year	RFAL, RGDP, RFR	RM ₂
RGDP & RH	.4102 (.081)			
RI & RS		-.4734 (.041)		
RM ₂ & RS			.4984 (.035)	
I & RGDP				.0607 (.799)

(Note: Probability is shown in the parentheses)

From the partial correlation we observe following relationship:

- (i) When the series is detrended and the effect of remittance is separated, there is significant negative relationship between saving and investment as it is reflected in partial correlation coefficient, $r_{RI,RS, RFR, year} = .47$ ($p = .04$)
- (ii) $r_{RGDP, RI, RFR, RFAL} = .41$ ($p = .08$) implies that even after the control of remittance and foreign aid and loan, high-powered money and GDP are positively related.
- (iii) $r_{RM_2, RS, RFAL, RGDP, RFR} = .50$ ($p = .035$) indicate that broad money supply and saving becomes positively significant even when the variables of foreign aid and loan, foreign remittance and real GDP have been controlled & their effects have been separated.
- (iv) When the effect of money supply has been withdrawn, relationship between investment and GDP becomes negligible since partial correlation coefficient is $r_{RI, RGDP, RM_2} = .00$ ($p = .810$).

In a nutshell we may summarise the following:

Fiscal policy has not designed well enough to stimulate growth through taxation, public expenditure, revenue adjustment, accumulation of capital and domestic resource mobilisation and institutional framework. Despite reform measures, real variables indicates that Government has failed to raise taxes, proper mobilisation of domestic resource and creation of effective allocation as per requirement of the economy. Monetary stability in the economy can be achieved through attaining price stability, inflation and real rate of return to increase economic growth rate. For the development of Bangladesh fiscal policy will have to be coordinated with monetary policy along with appropriate measures so that reduction of dependence on the external sector can be achieved to

accelerate economic growth, ensuring social justice and to bring stability in the financial sector. As real, monetary and external variables have multi-flow effects with one another, therefore, vertical and horizontal coordination between these sectors are needed, so that both demand and supply side problem can be eradicated.

Chapter 4

Supply of Money in Bangladesh.

Money supply process in Bangladesh is important for proper monetary management by Bangladesh Bank. Money supply process is linked with both internal and external sectors. In this chapter we intend to evaluate money supply process of the country. We have already reviewed the literature on money supply in Chapter 2. Besides describing note issue principles/rules of Bangladesh Bank, this chapter also contains estimation procedure, analysis of results. The study also intends to find out whether any structural change has occurred in money supply functions. In Bangladesh organized money market is relatively smaller than that of unorganized money market. But the study deals with organized money market since structure and measurement policy of these two markets are quite different and data of unorganized money market are scarce.

4.1. Note issue principles/ rules of Bangladesh Bank:

We shall describe below in brief the relationship between the net foreign assets and the domestic money supply stating the note issue principle/rules of Bangladesh Bank.

Net foreign assets and domestic money supply are interrelated. Creation of the money is determined by the joint activities of Bangladesh Bank and Commercial banks. What amount of money will be created depends on the volume of reserve and the monetary policy of Bangladesh Bank. According to Shorab Uddin (1985), net foreign assets includes gold and foreign exchange reserves less liabilities to foreign official holders and domestic credit net to government and gross domestic credit to the public sector other than the Government. In line with his discussion we can express total currency (TC) as follows,

$$NFA - DC^{cb} + OA^{cb} = TC \quad \dots\dots\dots(1)$$

Where NFA = Net Foreign Asset

DC^{cb} = Domestic Credit (net)

OA^{cb} = Other Asset (net)

Net Foreign asset is not only related with note issue but also related with international payment for transaction purposes.

Now we shall discuss the procedure of money supply:

- (a) NFA includes gold, foreign currencies such as SDRs, ACU Dollars etc. When asset rises, then liability decreases through issuance of the currency upto the same extent of asset increase.
- (b) Issuance dept. of Bangladesh Bank may issue currency everyday.

- (c) Owing to the fiscal operation of the Government to meet the extent of budget deficit, new money will be created in the following way:
- (i) If the Government borrows from Bangladesh Bank directly, then the currency would increase to the same extent.
 - (ii) If the Government borrows from commercial bank, then there will be no change in currency in circulation.
 - (iii) If the Government issues bond and the bond are bought by Bangladesh Bank, then there will be increase in money supply and thus currency will be circulated (for the part, which Bangladesh Bank buys).
 - (iv) For issuance of Treasury bill, procedure is similar to the issuance of bond.
 - (v) For 30 days Bangladesh Bank bill, and 91 days bill, the following will be the outcome:

In case of maturity, currency circulation will be increased and when bills are issued currency circulation will be decreased.

Money supply can be estimated by monetary base and the money multiplier. Monetary base or reserve money is the base through which Bangladesh Bank can influence the liquidity of the scheduled banks and hence their capacity for creation of deposit money. Reserve money can be defined as follows:

Reserve money equals Currency in circulation including Bangladesh bank notes and Government notes and coins plus statutory reserves balances with Bangladesh Bank plus excess reserves balance with Bangladesh Bank.(2)

Reserve money or cash base of the economy is treated on the liability side of the Bangladesh Bank. It influences the process of money supply to affect the rate of inflation. Important components of the reserve money have originated from the Government's fiscal deficit and also from the foreign exchange reserves of the banking system. Due to fiscal deficit, the Government borrows from the banking system, which affects the monetary stock of the country. Increase of Government borrowing from the Bangladesh bank will raise money supply of the country.

An increase in the net foreign asset will increase domestic money supply. Before 1990, when fixed exchange rate system was prevailing, changes in money supply were directly related to changes in foreign exchange reserves. However, gradual shifts in the policy towards flexible exchange rate system have lowered its effectiveness.

In the context of Bangladesh, high-powered money depends on the following components:

$$H = f(\text{BBCG}, \text{BBCSB}, \text{BBCGFI}, \text{NFA}, \text{NOA}) \dots\dots\dots(3)$$

- Where,
- BBCG = Bangladesh Bank credit to the Government (real terms)
 - BBCSB = Bangladesh Bank credit to the Scheduled Banks (real terms)
 - BBCGFI = Bangladesh Bank Credit to other Government and Financial Institutions (real terms)
 - NFA = Net foreign Assets (real terms)
 - NOA = Net Other Assets (real terms)

Money multiplier can be determined by the ratio of money supply to high-powered money over time. It has two important components: currency to money supply ratio of public, and bank and reserve deposit ratio of the scheduled banks.

If Bangladesh Bank is to regulate money supply effectively, and then it must have control over the creation of money. For this relationship, besides other factors, there must be a relationship between reserve-deposit ratio and money supply. Four major factors of reserve deposit ratio are bank rate, rate of interest on advance, required reserve ratio, uncertainties of the bank's deposit inflow and outflow. The higher the opportunity cost of holding funds, the more the banks will try to minimize reserve holding and there will be negative effect on reserve deposit ratio. Bank rate is positively related to reserve deposit ratio. The reserve deposit ratio is negatively related to money supply. Determinants of the reserve-deposit ratio is as follows :

$$\frac{RR}{D} = f(r_1, Br, RRR, ERD, U) \dots\dots\dots (4)$$

- Where, r_1 = Rate of interest on advance,
 Br = Bank rate,
 RRR = Required reserve ratio
 ERD = Excess reserve deposit,
 U = Uncertainty

The behaviour of the bank is reflected by the changes in the ratio of bank reserves to demand deposit, and the behaviour of the public is reflected by the changes in the ratio of currency to money supply. This ratio will vary each year with the monetary policy and economic situation. Currency to money supply ratio is a seasonal pattern. An increase in cash ratio reduces the size of the multiplier as it is negatively related. When currency to money supply ratio rises, then money supply will decline.

Determinants of the currency to money supply ratio ($\frac{CC}{M_3}$) is as follows:

$$\frac{CC}{M_s} = f(RGDP, TNBB, r, P(-1)) \dots\dots\dots (5)$$

Where, RGDP = Real gross domestic product
 TNBB = Total number of bank branches
 r = Rate of interest on deposit
 P(-1) = Expected inflation

An increase in real GDP will improve cash management efficiency of the people and will lead to increase in deposit. If real GDP rises then demand for money along with the currency and deposit will increase. Bank deposits are preferred, as they are interest bearing and safe. This will lead to the opportunity that the demand for deposit will rise faster than the currency which ultimately cause the fall of the currency ratio with the upswing of the real GDP. Currency to money supply ratio is an important factor since currency preference of the public influences the money stock in some definite manner and makes the money stock partially endogenous. Expansion of bank branches reduces currency to money supply ratio since it reduces transaction costs and provides opportunity to hold interest-bearing deposit.

Virtually, reserve deposit ratio and currency to money supply ratio are two important determinants of money multiplier, which affects money supply.

We can now summarise the proximate determinants of the money supply function as,

$$M_s = f(H, \frac{CC}{M_s}, \frac{RR}{D}) \dots\dots\dots(6)$$

Hence, it follows that money stock of a country in a given time period can be proximately obtained as,

- (a) The stock of high powered money,
- (b) Currency to money supply ratio,
- (c) Reserve deposit ratio.

Each of the factors is affected or dependent on several other factors, which have been discussed earlier.

As per New View, money supply can be determined jointly by exogenous and endogenous variables. This can be expressed as,

$$M_s = f(H, B_r, r, D/GDP, U) \dots\dots\dots(7)$$

Where H = High powered money
 B_r = Bank rate
 r = Interest rate on deposit

D/GDP = deposit/GDP ratio (real terms)
 U = Uncertainty

Moreover, money supply can be determined by high powered money (H) and interest rate on advance (r_1) which can be shown as,

$$M_s = f(H, r_1) \dots\dots\dots(8)$$

Money supply cannot be fully controlled by the Central Bank. Behaviour of the public, commercial banks and uncertainty have impact on the money supply process. Fund management system of commercial bank depends on their international commitment, foreign exchange transaction as well local transaction. As such behaviour of the commercial banks in the money supply process has also some uncertainty.

4.3 Specification of the model:

To estimate money supply function we shall first follow monetarist model. Components of money supply are given in equation (6). As per new view money supply is shown in equation (7). Further, we shall consider high-powered money and interest rate on advances as a determinant of the money supply in equation (8). The study will consider currency to money supply ratio in terms of total money supply.

The study will consider both the definitions of money in Bangladesh i.e. narrow money (M_1) and broad money (M_2).

$$M_1 = \text{Currency outside banks plus demand deposit} \dots\dots\dots(9)$$

$$M_2 = \text{Currency outside banks plus demand deposit plus time deposit} \dots\dots\dots(10)$$

The study will use the following alternative money supply functions considering M_1 and M_2 as dependent variables: -

$$M_s = f\left(H, \frac{CC}{M_s}, \frac{RR}{D}\right) \dots\dots\dots(11)$$

$$M_s = f(H, B_r, r, D/GDP) \dots\dots\dots(12)$$

$$M_s = f(H, r_1) \dots\dots\dots(13)$$

Where,
 M_s = Real money supply
 H = Real high powered money
 CC/M_s = Real currency to money supply ratio

RR/D = Real reserve to deposit ratio
 Br = Bank rate,
 r = Rate of interest on deposit,
 r₁ = Rate of interest on advance,
 D/GDP = Deposit to GDP ratio (real terms)

Moreover, we shall consider the determinants of high-powered money, currency to money supply ratio, reserve-deposit ratio, as follows:

For High powered money,

$$H = f(\overset{+}{\text{BBCG}}, \overset{+}{\text{BBCSB}}, \overset{+}{\text{BBCGFI}}, \overset{+}{\text{NFA}}, \overset{?}{\text{NOA}}) \dots\dots\dots(14)$$

$$\frac{CC}{M_s} = f(\overset{-}{\text{RGDP}}, \overset{-}{\text{TNBB}}, \overset{-}{r}, \overset{?}{P(-1)}) \dots\dots\dots(15)$$

For Reserve-deposit ratio

$$\frac{RR}{D} = f(\overset{-}{r_1}, \overset{+}{Br}, \overset{+}{RRR}, \overset{+}{ERD}) \dots\dots\dots(16)$$

Now we shall describe priori relationship between money supply and its determinants and also relationship between high-powered money, currency to money supply ratio and reserve deposit ratio to their determinants respectively.

The money supply process mainly depends on high-powered money. The volume of high-powered money is determined by the behaviour of Bangladesh Bank although it can be controlled subject to the behaviour of the public and commercial banks. When high-powered money rises, and other things remain the same, then the money supply rises. In the ratio of currency to money supply, the circulation of the currency is subject to the behaviour of the public. Now if other things remain the same, ratio of currency to money supply will vary inversely i.e. when currency to money supply rises, then the money supply declines and vice versa. Ratio of reserve to deposit depends on the behaviour of the commercial banks though it includes reserve requirements, interest rate on advance, bank rate, excess reserves, uncertainty, etc. When ratio of reserve to deposit increases, other things remaining the same, then the money supply declines and vice versa.

The higher the rate of interest, the greater will be the incentive for the public to hold bank deposits. One of the major components of money supply is demand deposit that enters into the circulation when commercial banks extend credits or buys securities sold by Bangladesh Bank. As such, when interest rate on deposit increases, then money supply also rises. Interest rate on

advance is also positively related with money supply. Bank rate is negatively related with the money supply. When Bangladesh Bank raises bank rate, the volume of commercial bank's borrowing from Bangladesh Bank declines and vice versa. If GDP increases then public demand for both the currency and the bank deposit will increase. Deposit to GDP ratio reflects the degree of monetisation and efficiency in cash management will occur. Now the relationship between deposit to GDP ratio and money supply can be determined as follows:

If the rate of increase of GDP is greater than the rate of increase of deposit, then the ratio of deposit to GDP will be positively related. On the other hand, if rate of increases of GDP is lower than the rate of increase of deposit then the ratio of deposit to GDP will be negatively related.

Changes in Bangladesh Bank credit to the Government refer to the borrowing of the Government to meet fiscal deficit. The more the Government borrows from Bangladesh Bank, the more will be the increase of high-powered money, which implies positive relationship.

Similarly when the scheduled banks borrow from Bangladesh Bank, then the high-powered money rises and vice versa. Bangladesh Bank credit to other Government and financial institutions is positively related to the high powered money.

Net foreign assets indicate the reason of change in import and export and international capital movement i.e. balance of payment position of the country. As such when net foreign asset rises, high powered money also rises and vice versa. Net other asset includes among other things, non-monetary liability. If non-monetary liability is greater than that of non-monetary asset, then the high-powered money will reduce. But when non-monetary asset is higher than liability, then high-powered money will rise. As such expected sign of net other asset in relation to high-powered money is uncertain.

With the rise of GDP, both currency and money supply will rise. But the rate of rise of money supply is higher than the rate of rise of currency. As such rise of GDP will affect currency to money supply positively. When the number of bank branches rises, people are encouraged to manage their cash efficiently and transaction cost rises and opportunity to hold interest-bearing fund is encouraged. This implies that as the number of bank branches rises, currency to money supply declines and vice versa. If interest rate on deposit rises, then currency to money supplies. reduces. Because rise of interest rate leads to the decline of the opportunity cost of holding money, and forces interest rate on the deposit to be negatively related with money supply. Currency can not be affected by inflation. When inflation is anticipated accurately, during the adjustment procedure, with the increase of currency to money supply, inflation will rise and vice versa. But if the unexpected inflation is higher than the actual inflation, then currency to money supply has a negative effect in the economy.

Reserve-deposit ratio is negatively related to the interest rate on advance. Bank will try to invest its reserve holdings out if lending rate rises, than lending from the bank will decline. This

will lead to the decline in reserve-deposit ratio, as bank has to hold cash at a higher cost. Bank rate is positively related to the reserve deposit ratio, as with the rise of bank rate, bank loan and advances by the public will fall which leads to rise of reserve to deposit ratio. Excess reserve ratio varies with reserve deposit ratio positively because with the fall of interest rate or the rise of bank rate, excess reserve will rise which will lead to rise in reserve deposit ratio. Required reserve ratio is positively related to reserve deposit ratio since to fulfill the margin set by Bangladesh Bank, the scheduled banks have to keep the amount fixed.

4.3.1. Estimation procedure:

For estimating equation 17 and 18, we are using logarithmic form and we are using semi logarithmic form for equation 19 to 27. The study has used log linear or semi log linear form rather than linear form to obtain best-fit equations. Now we estimate equation from 17 to equation 27 to determine supply of money equations.

4.3.2 Analysis of Result: -

For equation (17) we find that constant term is significant at 1% level. High - powered money, and reserve to demand deposit ratio are significant at 1% level. But currency to money supply ratio and dummy variable are not significant at 10% level. F value is significant at 1% level. To remove autocorrelation problem we use MA (1). This equation gives a very good fit explanation about 97.4% of the observed variation in the real narrow money balances. Here we observe that if real high-powered money rises by 1%, then the supply of narrow money will rises by 0.82%. Reserve deposit ratio represents expected sign but the coefficient value is low. However, currency to money supply ratio does not represent expected sign.

We observe from equation (18) that high-powered money and currency to money supply are significant at 1% level and reserve to total deposit ratio is significant at 10% level. Dummy variable is insignificant at 10% level. F value is significant at 1% level. Adjusted \bar{R}^2 is high which implies that real broad money explains about 98.5% of the variation with real high-powered money, currency to money supply and reserve to deposit ratio. Here we find that when real high-powered money rises by 1% then the supply of broad money rises by 0.94%. D.W. stat. shows that autocorrelation is in the inconclusive region at 1% level of significance. As such we use AR(1) and also MA(1) in the equation to rectify autocorrelation but gives a blurred result for which we reported the equation which one is estimated without the correctiveness of autocorrelation.

For equation(19) we find that constant term is significant at 1% level. High-powered money is significant at 1% level and rate of interest on advance is significant at 5% level. Dummy variable is significant at 1% level. F value is significant at 1% level. This equation gives a very good fit explanation about 93% of the observed variation in the real narrow money balances. Here we observe that if real high-powered money rises by 1%, then the supply of narrow money will rises by 0.915%. D.W. stat. indicates that autocorrelation is in the inconclusive region is at 1% level.

Estimated Money Supply Functions :

Equation	Estimated Regressions	Adjusted R ²	F Stat	D.W. Stat	Remarks
17.	LM ₁ = 1.74* + 0.82* LH + 0.21LCC/M ₁ - 0.22* LRR/DD - 0.08DM (3.67) (18.36) (0.95) (-5.45) (1.31)	0.974	153.67	1.67	MA(1) used
18.	LM ₂ = 0.27 + 0.94* LH - 0.64* LCC/M ₂ - 0.18*** LRR/TD - 0.63DM (.465) (8.97) (-3.70) (-1.96) (0.53)	0.985	359.50	1.30	Autocorrelation rectification gives blurred result
19.	LM ₁ = 1.68* + 0.915* LH - 0.04** t ₁ - 0.28* DM (2.75) (11.65) (2.48) (4.19)	0.930	89.90	1.18	-do-
20.	LM ₂ = -0.35 + 1.14* LH + 0.03** t ₁ - 0.08 DM (-0.59) (15.02) (2.26) (-1.27)	0.979	318.87	1.62	---
21.	LM ₁ = 7.61* + 0.46* LH - 0.05** BR + 0.04*** t + 0.77* LDD/GDP (5.99) (4.64) (-2.32) (1.84) (4.75) + 0.015 DM (1.88)	0.978	148.27	1.60	MA(1) used
22.	LM ₂ = 7.88* + 0.23* LH - 0.02BR + 0.013t + 0.62* LTD/GDP (.51) (3.16) (-0.82) (.482) (4.44) - 0.09** DM (1.90)	0.933	495.24	1.90	AR(1) used
23.	LH = 11.22* + 0.07LBBCG - 0.35** LBBCSB + 0.17*** LBBCGHT (7.20) (.81) (-2.35) (1.89) - .00002NFA + 0.0001NOA + 0.23** DM (-0.76) (0.20) (2.03)	0.969	54.818	1.60	AR(1) used
24.	LCC/M ₁ = -1.46 + 0.04 LR GDP + 0.12 LTNBB - 0.007t (-1.19) (0.208) (0.079) (-0.97) + .006*** P _(t-1) + .17* DM (1.82) (4.55)	0.842	21.32	1.56	---

			Adjusted R ²	F Stat	D.W. Stat	Remarks
25.	LCC/M ₂ = 2.49 - 0.15 IIRGDP - 0.26 LTNBB - 0.05* (1.47) (-0.57) (-1.19) (-5.69)		0.906	37.78	1.97	---
	+0.01*P ⁽¹⁾ (-0.96) (2.97)	-0.05 DM				
26.	LRR/DD = -6.21* - 0.086* η_1 + 1.30* IBr + 0.38* IRRR (-14.63) (-3.39) (9.46) (5.24)		0.989	212.845	1.81	MA(1) used
	-0.002 IERD (-0.147) (9.57)	+0.89* DM				
27.	LRR/LTD = -3.13* - 0.17* η_1 + 1.38* IBr - 0.03 IRRR (-5.71) (4.56) (6.61) (0.30)		0.861	14.51	2.38	MA(1) used
	+0.01 IERD (0.52) (4.02)	+0.56* DM				

Where, "****", "***", "**", indicates that 't' value is significant at 10%, 5%, 1% level respectively. Figures in the parentheses are t ratios. Adjusted R square is the coefficients of determination with adjusted degrees of freedom. Durbin-watson Statistics measures first order autocorrelation among the residuals. From the table value of D.W. stat, when $d_L < \text{computed value } d^*$ then positive autocorrelation prevails; if computed value d^* is within the boundary of d_U and d_L then inconclusive region and if computed value $d^* > d_U$ then no autocorrelation. We use moving average (1) i.e. MA (1) or autoregressive (1) i.e. AR (1) for correcting autocorrelation problem. For determining expected inflation, we consider the data series from the year 1974-75.

For equation(20) we find that high-powered money is significant at 1% level and rate of interest on advance is significant at 5% level. Dummy variable is insignificant at 10% level. F value is significant at 1% level. Auto correlation is not present. Adjusted R^2 is high which implies that real broad money explains about 97.9% of the variation. Here we find that when real high-powered money rises by 1% then the supply of broad money rises by 1.14%. D.W. stat. indicates that autocorrelation is not present at 10% level of significance.

From the equation (21) we obtain that constant term, high-powered money, bank rate, demand deposit to GDP ratio are significant at 1% level. Bank rate is significant at 5% level. Rate of interest on deposit is significant at 10% level. To remove autocorrelation problem we use MA(1). This equation provides a very good fit at 97.8% of the observed variation in narrow money. High-powered money, bank rate and interest rate on deposit are of expected sign but the value of latter two coefficients are small. The demand deposit to GDP ratio is positive and coefficient value is quite satisfactory. To remove autocorrelation problem MA (1) is used. F stat. is significant at 1% level.

The equation (22) shows that high-powered money and total deposit to GDP ratio are significant at 1% level. while dummy variable is significant at 5% level. To remove autocorrelation problem we use AR(1). This equation provides a very good fit as adjusted $R^2 = 0.993$. Here we find that when total deposit to GDP ratio rises by 1% then the supply of broad money rises by 0.62%. Although both bank rate and rate of interest rate shows expected sign, yet they are insignificant at 10% level. F stat. is significant at 1% level.

In equation (23) the constant term and Bangladesh Bank credit to the scheduled bank is significant at 5% level while credit to other Govt. and Financial institutions and dummy variable are significant at 10% level. This equation provides a good fit at 96.9% of the observed variation in real high powered money. But the value of net foreign asset is insignificant at 10% level and very small. Bangladesh bank credit to Government is also insignificant at 10% level and value is small. Here we see that rise of Bangladesh Bank credit to scheduled banks by 1% leads to rise of real high powered money by 0.35%. F value is significant at 1% level. To remove autocorrelation problem we use AR(1) .

We observe that in equation (24) the expected inflation is significant at 10% level and dummy variable is significant at 1% level. But other variables are insignificant at 10% level. This equation provides a good fit at 84.2% of the observed variation in the currency to money supply ratio in case of narrow money. F value is significant at 1% level. No autocorrelation prevails at 5% level.

In equation (25) we obtain that the rate of interest on deposit is significant at 1% level and is of expected sign. Although total number of bank branches are not significant at 10% level, yet it is of expected sign. Expected inflation is significant at 1% level. This equation provides a good fit at 90.6% of the observed variation in currency to money supply ratio in terms

of broad money. Dummy variable is insignificant at 10% level. F value is significant at 1% level. D.W. stat. shows that no autocorrelation prevails.

From the equation (26), we find that the constant term, rate of interest on advance, required reserve ratio and bank rate are significant at 1% level. Rate of interest, bank rate and required reserve ratio are of expected sign. This equation provides a good fit at 98.9% of the observed variation in reserve to deposit ratio in terms of narrow money. But the excess amount of reserve in percentage is insignificant at 10% level. Here we observe that when bank rate rises by 1% then reserve deposit ratio rises by 0.086%. Dummy variable is significant at 10% level. F value is significant at 1% level. To remove autocorrelation problem we use MA(1).

Equation (27) depicts that constant term, bank rate, interest rate on advance are significant at 1% level, they also indicate expected sign. But required reserve ratio is not significant at 1% level. Excess amount of deposit in percentage is insignificant at 10% level but shows expected sign. The equation provides a good fit as adjusted R^2 is 0.861. Dummy variable is significant at 1% level. F statistics is significant at 1% level. To remove autocorrelation problem we use MA(1).

Our analysis reveals that in case of narrow money supply, high-powered money is the main component while reserve ratio has got some importance. But currency to money supply ratio has no impact. In case of broad money supply we find that high powered money is the main determinant while currency to money supply ratio is the second and reserve to deposit ratio is ranked the third position. According to Ahmed (1977), from the point of view of monetary policy high-powered money is the most important variable because Bangladesh Bank exercises direct influence over its movement. Moreover, Bahar and Murtoza (1994) find that reserve money during the period of 1986-94 is the major element in influencing the money supply in Bangladesh. In the money supply process, beside high-powered money, bank rate, rate of interest on deposit and deposit to GDP ratio have some importance. This reflects that behaviour of the public and commercial banks have an impact on the money supply process of the country.

We find that high-powered money depends on Bangladesh bank credit to scheduled banks and other Govt. & financial institutions. Bahar (1994) comments that the accumulation of net foreign assets influences greatly the behaviour of reserve money. Ali & Ansari (1984) concludes that the supply of high powered money, Bangladesh Bank's credit to the Govt. & the bank's assume preponderant significance and the degree of effectiveness in controlling the base depends upon the extent to which foreign exchange reserves is controllable by the monetary authority in the country. Our findings that high-powered money does not depend on net foreign asset and credit to the Government was supported by Huda (1988).

We observe that among the determinants of currency to money supply ratio in case of narrow money, only expected inflation carries a significance. When we consider broad money then expected inflation and weighted rate of interest on deposit are significant and have an expected sign. Ali & Sarker (1994) find that gross domestic product and interest rate significantly affects

the currency ratio. Anwaruzzaman (1988) finds that through considering all the determinants at a time by using double log formulation in case of narrow money, number of bank branches and consumer price index are significant but GDP does not provide expected sign, though significant. In case of broad money, consumer price index is significant but has negative sign, though other determinants are not significant.

The study observed that among the determinants of reserve demand deposit ratio, rate of interest on advance, bank rate, required reserve ratio are significant and are of expected sign. But excess amount of reserve is neither significant nor of expected sign. According to Ali and Sarker, (1994) cash reserve requirement has some impact on the reserve to deposit ratio. Both rate of interest on advance and bank rate have impact on reserve to total deposit ratio. However, in the latter case, excess amount of reserve is insignificant but shows the expected sign.

We observe that money supply is controlled through exogenous and endogenous factors. High-powered money is the main determinant and Bangladesh Bank can largely control money supply through high-powered money but can not fully control money supply. In our observation high-powered money depends on scheduled banks credit and other credit to Govt. and financial institutions. Other determinants of money supply are currency to money supply ratio and reserve to deposit ratio. The study obtains that currency to money supply ratio and reserve to deposit ratio depends on the bank and the non-bank public. Our findings indicate the aptness of Hasin's (1992) observation as her findings support fully the view of neither the monetarist school nor the non-monetarist school.

During the study period we observe that in certain cases financial liberalization have impact on the money supply process. Structural change had mixed result during our study period. In the narrow money supply function, when we consider high-powered money and rate of interest on advance, only then structural changes have occurred. In case of broad money supply function only once we have found that structural change has occurred. High-powered money, currency to narrow money supply, reserve-demand deposit ratio and reserve total deposit ratio function all indicate that structural change has occurred. But currency to broad money supply function does not indicate that structural change has occurred. Although financial reform measures have some impact on the economy, yet the radical change in the economy such as high economic growth rate, increase of investment and saving at a higher rate do not achieve. Structural changes are happening very slowly.

The study indicates that the supply of money is not a fully exogenous variable. Currency to broad money supply ratio is positively related with inflation but the rate of interest is negatively related with the ratio. This implies that currency to money supply ratio depends on the behavior of the public. On the other hand, currency to money supply ratio is observed as one of the major determinants of money supply. As such partial endogeneity prevails in the money supply process.

Now we shall analyse real narrow, broad and high powered money over the year. As such economic condition of Bangladesh is described from the year 1975-76 to 1995-96 with the

interval of some years. In table: 1, we have described real money supply (both narrow and broad money) and real high-powered money.

Table : 1

Real Narrow, Broad and High powered Money
(Base : 1973-74) (In Million Taka)

Year	RM ₁	RM ₂	RH
1975-76	6140.46	9722.98	3218.66
1980-81	7915.75	16482.68	5328.67
1985-86	11729.19	29366.64	7787.43
1990-91	11608.95	40295.55	10476.55
1995-96	18301.18	57830.22	13926.44

(Source: Computed from table: 1 in appendices)

From table : 1, we find that real narrow money is Taka : 6140.46 million in 1975-76 which rises to Tk. 7915.75 million in 1980-81. Further in 1985-86 real narrow money is Tk. 11729.19 million which declines to Tk. 11608.95 million. In the year 1995-96 real narrow money is 118301.18 million. In case of real broad money in the year 1975-76 is Tk. 9722.98 million while in the year 1980-81 is Tk. 16482.68 Real broad money is Tk. 29366.64 million, Tk. 40295.55 million, Tk. 57830.22 million in 1985-86, 1990-91 and 1995-96 respectively. Real high-powered money is an important factor for upward increase of money stock which is Tk. 3218.66 million in 1975-76 to Tk. 13926.44 million in 1995-96. Real high-powered money along with money multiplier determines real stock of money. After the emergence of Bangladesh, monetary policy was under strict control of bureaucratic machinery in the name and frame of Government and mostly orders are carried out through the directives of Bangladesh Bank. Before, 1990, Bangladesh Bank hardly uses open market operations, discount rate etc. From 1990-91 Bangladesh bank changes their attitude due to government policy and prefers indirect monetary policy. But independence of Bangladesh Bank from the Finance ministry till now is not feasible for which they cannot determine monetary management independently and without interference from the Government.

Now we shall see expansion of bank branches (TNBB), real demand deposit (RDD) and real time deposit (RTD) in table: 2 to consider their impact on the financial system during the time period 1975-76 to 1995-96 (with interval of some years).

Table: 2

Bank Branches, Real demand and Total deposit.

Year	TNBB (cumulative Figure)	RDD (M.T.)	RTD (M.T.)
1975-76	1696	658.81	1272.78
1980-81	4073	868.68	2611.47
1985-86	5094	2655.00	9268.61
1990-91	5633	3851.31	22937.62
1995-96	5853*	18019.29	94730.68

*estimated

Source: Detail is given in Appendices. Column 3&4 is computed.

One of the main objectives of nationalisation of banking sector in the year 1972 is to expand total number of bank branches through which deposit will mobilise and for investment purposes accumulation of fund will occur. For portfolio management in the banking sector, proper trade off between risk and return should be developed. Financial intermediations have some impact on the economy. Although bank branches have increased from 1975-76 to 1995-96, yet, its growth rate started lower in the eighties and now rate of increase of bank branches is at a very slow rate. During the early eighties privatization and denationalisation started in the banking sector. But private banks with the motivation to maximise their profit opened branches mainly in the urban areas and in case of rural areas, from those villages where people migrates to foreign countries. We observe that in the year 1975-76 total number of bank branches were 1696, which rose to 4073 in the year 1980-81. But in the year 1990-91 it increased to 5633 while during the year 1995-96 the number of branches were 5833. This implies that during the 1990-91 to 1995-96 bank branches rise at the rate of 0.65% per annum.

From table : 2, we also find that the real demand deposit is Tk. 658.81 million in the year 1975-76 while the real total deposit is Tk. 1272.78 million. By deducting from the total deposit to demand deposit we obtain Tk. 613.97 million which is time deposit. During the said period the real time deposit is less than demand deposit which indicates that during the period people don't like to save their fund in the form of term deposit. But in the sub-sequent years the time deposit grows at a faster rate. By deducting, the real demand deposit from the real total deposit in the year 1985-86 we obtain Tk. 6613.61 million (Tk. 9268.61-Tk. 2655.00) as time deposit which is much higher than the demand deposit. During the year 1995-96 we also obtain real time deposit for Tk. 76711.39 million (Tk. 94730.68-18019.29) which is also higher than the demand deposit.

Due to the absence of alternative assets people want to hold money in the form of deposit. Financial intermediaries specially depository intermediaries have occurred during the period from

1975-76 to 1995-96, which have positive effect of growth of real deposit, though the rate of growth is low.

Expansion of bank branches is one of the determinants of currency to money supply ratio. Behaviour of the public is reflected in currency to money supply ratio and reserve deposit ratio and variation of these two factors make the money supply process, partially, endogenous. Spread of banking business reduces transaction cost, helps to handle cash efficiently and create opportunity for maintaining interest-bearing deposit.

Now we shall see ratio of narrow to broad money, ratio of broad money to real GDP and also real excess reserve deposit in table : 3 over the time period (with interval of some years).

Table : 3
Ratio of Narrow to Broad money, broad money to GDP and real excess reserve deposit.

Year	$\frac{RM_1}{RM_2}$	$\frac{RM_2}{RGDP}$	RERD(M.T.)
1975-76	0.63	0.10	43.42
1980-81	0.48	0.15	72.72
1985-86	0.40	0.26	95.32
1990-91	0.28	0.30	417.09
1995-96	0.31	0.36	811.54

Source: Computed from table: 1 in appendices

From table: 3, we observe that ratio of narrow to broad money is 0.63 in the year 1975-76. The ratio declines in 1990-91, as it is 0.28 in the said year. But in 1995-96 it increases to 0.31. In 1995-96, the ratio is and higher in relation to the year 1990-91. But as indicated by table: 2 that savings and fixed deposits are rising and people are gradually getting habituated with financial institutions. The ratio of narrow to broad money indicates that financial deepening has been happening. The ratio of broad money to real gross domestic product is rising. In 1975-76, the ratio is 0.10, which raises to 0.36 in 1995-96. As the ratio of broad money to real gross domestic product is rising this also indicates the financial deepening has taken place referring to the financial intermediaries.

Excess amount of reserves can be termed as equal to balance of the scheduled bank's deposits held with Bangladesh Bank after deducting cash reserve requirement. We observe from table : 3 that in 1975-76, real excess reserve is Tk. 43.42 million. During the year 1995-96, real excess reserve is Tk. 811.54 million. As the financial market is not properly developed, high cost and risk associated rather than return from the earning asset, uncertainty of the demand for the credit, lack of investment opportunity, the credit contractionary, policy of the Government, etc. lead to rise in the excess reserve in the banking system.

In the appendices, Figure : 1 shows the growth of money supply (both narrow and broad money) and high-powered money in real and percentage terms. This reflects that the money supply process has a variation and the stock of money supply has not smoothly increased over the time period.

Following points can be summarised below:

We observe that the main determinant of money supply is high-powered money. High powered money cannot be fully controlled by Bangladesh Bank as determinants of high powered money such as credit to the scheduled banks, credit to the Government or Net foreign asset etc. depend not only on the behaviour of the local banks but also international banks, donar agencies etc. To mitigate balance of payment or budget deficit, new money is normally created. Further, money supply also depends on the interest rate, deposit to GDP ratio, bank rate etc. which indicate that external and internal factors have an impact on the supply process. Currency to money supply ratio depends on rate of interest, expected inflation etc. We observe that reserve to deposit ratio depends on required cash reserve ratio, interest rate, bank rate. But it reveals that the excess reserve is created due to uncertainty though we do not find any impact. Other determinants of reserve to deposit ratio reveals that it can not also be fully controlled. The study also finds that besides high-powered money, money supply depends on interest rate, (both deposit and advance rate), and deposit to GDP ratio. The above discussion reveals that in the money supply process strict exogeneity or endogeneity is not feasible. Both exogenous and endogenous variables plays important role. As such our findings do not provide full support either to the monetarist school or to the non-monetarist school. The study has obtained mixed results about structural change. Though financial liberalization programmes are going on yet structural change does not too much occur so that it can offset the appropriate change in the socio-economic structure of the country.

From this chapter it reveals that money supply process has multifold effect which accentuates the process. Principal determinants of the money supply are also causative factors of demand for money. As such simultaneous effect of supply of and demand for money creates equilibrium position in the monetary management in Bangladesh.

Chapter : 5

Demand for money in Bangladesh

This chapter is designed to examine the demand function for money in Bangladesh. We have done literature review in chapter 2. On the basis of the literature review, in this chapter we have specified the money demand function. This chapter also includes estimation procedure and analysis of results. Our main objective is to identify the determinants of demand for money. The study also examines whether any structural change has occurred due to financial liberalization.

5.1 Specification of demand for money model:

While reviewing the literature in the chapter 2 we find that the money demand is a function of real gross domestic product, weighted average of nominal interest rate on advance, real foreign remittance, one year lagged dependent variable, expected rate of inflation, percentage change in exchange rate, real exchange rate, real foreign aid and loan with one year lag, etc. We form alternative demand functions for money as follows:

$$\begin{aligned}
 M_d &= f(\text{RGDP}) \dots\dots\dots(1) \\
 M_d &= f(\text{RGDP}, r_1, P_{t-1}) \dots\dots\dots(2) \\
 M_d &= f(\text{RGDP}, \text{DEXR}) \dots\dots\dots(3) \\
 M_d &= f(\text{RGDP}, \text{RFAL}, \text{RFR}, \text{DEXR}) \dots\dots\dots(4) \\
 M_d &= f(\text{RGDP}, r, \text{RFR}) \dots\dots\dots(5) \\
 M_d &= f(\text{RGDP}, \text{RFAL}, \text{RFR}, \text{RS}) \dots\dots\dots(6) \\
 M_d &= f(\text{RGDP}, \text{RFR}, \text{REXR}, r_1, M_{d,t-1}) \dots\dots\dots(7)
 \end{aligned}$$

Where,
 M_d = Demand for money,
 RGDP = Real Gross domestic product,
 r_1 = Weighted average nominal interest rate on advance,
 RFR = Real foreign remittance,
 REXR = Real exchange rate.

$P_{(t)}$ = Expected rate of inflation,

r = Weighted average nominal interest rate on deposit,

$M_{d(t)}$ = One year lag of real money demand,

DEXR = Percentage Change in real exchange rate,

RFAL = Real foreign aid and loan with one year lag,

RS = Real saving.

The demand for money is related to the opportunity cost of holding which includes holding money or holding other assets. The demand for money occurs mainly due to transaction purposes for real cash balances. The higher the per capita income, the more an individual will spend on various goods to meet daily transactions. For the economy as a whole, the total demand for money for transaction purpose is directly related to the real gross domestic product. Virtually, the real gross domestic product is one of the major factors for explaining the demand for money function. When real gross domestic product rises, the demand for money rises. Speculation occurs when uncertainty arises. People's expectation will depend on real rate of return and the determinants of liquidity preference of speculative nature. When interest rate rises, people decrease their holding of money as it leads to a lot of expenses for holding cash ultimately decreasing the demand for money balances.

Expected inflation is important for opportunity cost of holding money. If the rate of inflation rises, then the nominal rate of return on physical assets owing to the rise of the opportunity cost of holding money will fall as inflation and demand for money are negatively related. When inflation is expected to rise, purchasing power of money will be lowered resulting in decrease of demand for money as the cost of holding money rises. Expected rate of inflation has impact on real balances. When inflation rate is anticipated to decline, return on real balances yield will be higher which will lead to rise of real balances and vice versa.

Foreign remittance by Bangladeshi nationals from abroad is one of the major sources of foreign exchange earnings. Large portion of foreign remittance is spent on transaction purposes and demand for real cash balances is positively related to their earnings.

Foreign aid and loan also plays an important role in the economic activities. Inflow of foreign aid and loan has positive effects on real sector variables, which affect the monetary variables. Foreign aid and loan increases the volume of transactions in the economy and increases demand for real balances. We assume real foreign aid and loan with one-year lag as disbursement of aid and loan has a time lag.

Saving is current postponement of expenditure. The amount of saving depends mainly on the level of income. The rise of demand for money for transaction purposes will lead to lower

proportion of postponement of current expenditure. This results the amount of saving will be lowered. Virtually, demand for money is mostly used for transaction purposes. As a result, opportunity cost of saving becomes negative.

When exchange rate is expected to depreciate or refixation tends towards downward movement, then the individual or commercial bank will tend to hold foreign currency. This means that demand for local currency will decrease. Such effect of exchange rate will have negative relationship with demand for local money in relation to holding foreign currency. In terms of TK/USD exchange rate, we may express it as follows: As the taka depreciates, demand for money of Taka will decline, and the holders of Taka won't be ready to hold Taka.

The relationship between demand for money and one year lagged dependent variable is positive since the effect of previous year's demand has an effect in the economy in the same direction.

5.1.1 Estimation procedure:

To obtain the best-fit equation we choose either log linear model or semi log linear model, instead of linear form. Except equations: 1 and 6, which are estimated by using log linear form, all other equations are estimated by using semilog linear form.

Dummy variable is included in the model to test structural change.

The equations are estimated by using alternative definition of money demand i.e. M_1 and M_2 .

5.1.2 Analysis of Result :

From equation(7) we observe that both constant term and real GDP are significant at 1% level of significance. This equation provides a good fit at 95% of the observed variation in the real narrow money with real GDP. If the real GDP rises by 1%, then the real narrow money will rise by 1.71%. AR(1) is used to rectify autocorrelation. Dummy variable is significant at 1% level, which implies that structural change has occurred. Moreover, F value is significant at 1% level.

Equation (8) depicts that both constant term and real GDP are significant at 1% level of significance's adjusted R^2 is 0.99 this implies that real broad money explains 99.0% of the total variation in the real broad money with real GDP. Here rise of real GDP for 1% will lead to rise of real broad money for 2.13%. AR (1) is used to rectify autocorrelation problem. Dummy variable is insignificant at 10% level, which implies that no structural change has occurred. F value is significant at 1% level.

				Adjusted R ²	F Stat	D.W. Stat	Log Likelihood	Remarks
17.	LM ₁	= -1.538 + 0.613*** LR GDP - 0.084 LR FAL + 0.078 LR FR	(-0.41) (1.10)	0.87	24.58	1.49	MA(1) used	
		+ 0.069 IRS	(0.80) (37)					
		+ 0.041 DM	(-1.89) (3.96)					
18.	LM ₂	= -6.34*** + 1.20* LR GDP + 0.085 LR FAL + 0.185 LR FR	(-1.89) (3.96)	0.97	107.08	1.60	MA(1) used	
		+ 0.012 IRS + 1.75*** DM	(0.17) (1.83)					
19.	LM ₁	= -10.528* + 1.51* LR GDP + 0.051 LR FR + 3.00 LR EXR	(-4.64) (5.51)	0.96	90.21		34.20	--
		- 0.016 I	(-1.69)					
		+ 0.314** LM _{t-1} - 0.226* DM	(2.39) (-2.98)					
20.	LM ₂	= -9.91* + 1.36* LR GDP + 0.037 LR FR + 0.378 LR EXR	(-2.92) (3.15)	0.98	310.98		34.89	--
		+ 0.01 I	(1.34)					
		+ 0.02* LM _{t-1} - 0.03 DM	(2.93) (-0.48)					

Where, ***, **, * indicates that 't' value is significant at 10%, 5%, 1% level respectively. Figures in the parentheses are 't' ratios. Adjusted R square is the coefficients of determination with adjusted degrees of freedom. Durbin-watson Statistics measures first order autocorrelation among the residuals. From the table value of D.W. stat, when d_L < computed value d* then positive autocorrelation prevails. If computed value d* is within the boundary of d_L and d_U then inconclusive region, and if computed value d* > d_U then no autocorrelation. We use moving average (1) i.e. MA (1) or autoregressive (1) i.e. AR (1) for correcting autocorrelation problem. When lagged dependent variable is used in the model we compute log likelihood ratio as Durbin Watson Statistics is not appropriate. For determining expected inflation, percentage change in real exchange rate, foreign aid and loan we have considered data series from 1974-75 to estimate the value.

Estimated Money Demand Function:

Equation	Estimated Regressions	Adjusted R ²	F Stat	D.W. Stat	Log Likelihood	Remarks
7.	LM ₁ = -10.61 + 1.71*LRGDP - 0.25*DM (-4.67) (8.70) (-3.24)	0.95	129.77	1.47		AR(1) used
8.	LM ₂ = -14.67 + 2.13*LRGDP - 0.03 DM (-4.75) (8.10) (0.56)	0.99	550.08	2.08		AR(1) used
9.	LM ₁ = -12.626*+1.89*LRGDP+0.004P _(t-2) -0.02**+r _t -0.267*DM (-4.53) (7.93) (0.90) (-1.77) (-3.46)	0.94	57.41	1.60		AR(1) used
10.	LM ₂ = -16.854*+2.311*LRGDP-0.0008P _(t-2) +0.022r _t -0.071DM (-6.51) (10.39) (-0.15) (1.3) (-0.98)	0.98	202.80	1.52		AR(1) used
11.	LM ₁ = -14.129*+2.016*LRGDP-0.007**DEXR-0.368*DM (-7.60) (12.49) (2.21) (-5.63)	0.95	90.57	2.10		AR(1) used
12.	LM ₂ = -15.327*+2.192*LRGDP-0.001DEXR-0.041DM (-4.54) (7.62) (-1.32) (-0.61)	0.98	336.14	1.92		AR(1) used
13.	LM ₁ = -16.155*+2.21*LRDGP+0.034 LRFAL -0.067 LRFER (-4.68) (8.61) (0.19) (-0.89) -0.006**DEXR -0.406*DM (-1.88) (-5.16)	0.94	56.15	2.09		AR(1) used
14.	LM ₂ = -17.408*+2.32*LRGDP+0.149 RFAI -0.082 LRFER (-4.508) (7.157) (1.58) (-0.98) -0.002**DEXR -0.076 DM (-2.12) (-1.17)	0.99	247.42	1.81		AR(1) used
15.	LM ₁ = -14.03*+2.06*LRGDP-0.03*r _t -0.018 LRFER (-7.22) (11.27) (-2.91) (-0.59) -0.035*DM	0.96	121.95	1.59		AR(1) used
16.	LM ₂ = -16.63*+2.24*LRGDP+0.02**+r _t -0.04 LRFER -0.09 DM (-7.60) (10.92) (1.75) (1.15) (-1.37) (5.86)	0.98	310.42	1.22		AR(1) used

We find from the equation (9) that constant term and real GDP are significant at 1% level. But the rate of interest on advance is significant at 10% level. Expected rate of inflation is insignificant at 10% level. This equation provides a good fit at 94.0 % of the observed variation in real narrow money. We observe that if the real GDP rises by 1%, then the real money will rise by 1.89%. Dummy variable is significant at 1% level. We use AR(1) to remove autocorrelation problem. F statistics is significant at 1% level.

From the equation (10) we obtain that both constant term and real GDP are significant at 1% level. But both the rate of interest and the expected rate of inflation are insignificant at 10% level. This equation provides a very good fit explaining 98% of the observed variation in real broad money. Here the real GDP rise by 1% will cause real broad money to rise by 2.31%. We use AR(1) to remove autocorrelation. F statistics is significant at 1% level. Dummy variable is insignificant at 10% level.

From equation (11) we find that both constant term, and real GDP, are significant at 1% level. But percentage change in real exchange rate is significant at 5% level and its coefficient value is very small. This equation gives a very good fit at 95.0% of the observed variation in real narrow money. We also observe that when real GDP rises by 1% then real narrow money rises by 2.01%. AR(1) is used to rectify autocorrelation. Dummy variable is significant at 1% level. F statistics is significant at 1% level.

From equation (12) we observe that both constant term and real GDP are significant at 1% level. But percentage change in real exchange rate is insignificant at 10% level. This equation provides a good fit at 98% of the observed variation in real broad money. We find that if the real GDP rises by 1%, then the real broad money rises by 2.19%. AR(1) is used to remove autocorrelation problem. Dummy variable is insignificant at 10% level.

From equation (13) we see that both constant term and real GDP are significant at 1% level. Percentage change in real exchange rate is significant at 10% level of significance though the coefficient value is small. Real foreign aid and loan and real foreign remittances are insignificant at 10% level. We observed that the equation gives a good fit at 94.0% of the observe variation in real narrow money. If the real GDP rises at 1%, then the narrow money rises by 2.21%. AR(1) is used to rectify autocorrelation. Dummy variable is significant at 1% level which indicates that structural change has occurred. F value is significant at 1% level.

We observe from equation (14) that both constant term and real GDP are significant at 1% level. Percentage change in real exchange rate is significant at 5% level. But real foreign aid and loan and real foreign remittances are insignificant at 10% level. As adjusted $\bar{R}^2 = 0.99$, the equation gives a good fit at 99% of the observed variation in real broad money. When RGDP rises by 1%, then demand for M_2 rises by 2.32%. AR(1) is used to remove autocorrelation. Dummy variable is insignificant at 10% level. F value is significant at 1% level.

From equation (15) we see that both constant term and real GDP are significant at 1% level. Interest rate on deposit is significant at 1% level. Interest rate on deposit is significant at 1% level of significance though the coefficient value is small. But real foreign remittance is insignificant at 10% level. We observe that the equation gives a good fit at 96.0% of the observed variation in real narrow money. If real GDP rises at 1% then narrow money will rise by 2.06%. Dummy variable is significant at 1% level which indicates that structural change has occurred. F value is significant at 1% level.

We observe from equation (16) that both constant term and real GDP are significant at 1% level. However, interest rate on deposit is significant at 10% level, though it does not give expected sign. Real foreign aid and loan is insignificant at 10% levels. As adjusted $\bar{R}^2 = 0.98$, the equation gives a good fit at 98% of the observed variation in real broad money. When RGDP rises by 1%, then demand for M_2 rises by 2.24%. AR(1) is used to remove autocorrelation. Dummy variable is insignificant at 10% level. F value is significant at 1% level.

We see in equation (17) that real GDP is significant at 10% level of significance. But constant term, real foreign aid and loan, real foreign remittance and real savings are insignificant at 10% level. Moreover, the coefficient value of RGDP is small. However, the equation gives a good fit at 87% of the observed variation in real narrow money. MA(1) is used to remove autocorrelation. Dummy variable is insignificant at 10% level. F value is significant at 1% level.

From equation (18) we find that constant term, real GDP and real foreign remittances are significant at 10%, 1% and 1% level of significance respectively. But real foreign aid and loan, and real savings are insignificant at 10% level. The equation gives a good fit at 97% of the observed variation in real broad money. MA(1) is used to remove autocorrelation. Dummy variable is significant at 10% level which implies that, to some extent, structural change has occurred. F value is significant at 1% level.

From equation (19) we find that both constant term and real GDP are significant at 1% level but lagged dependent variable is significant at 5% level. Real foreign remittance, real exchange rate and interest rate on advance are insignificant at 10% level. Adjusted \bar{R}^2 is 0.96 which implies that the equation fits well with observed variation in real narrow money. The coefficient value of one year lagged value of narrow money is low. Log likelihood value of 34.20 is significant at 1% level. Dummy variable is significant at 1% level. F value is significant at 1% level.

We obtain that in equation (20) constant term, real GDP, and lagged dependent variable are significant at 1% level. Real foreign remittance, real exchange rate and interest rate on advance are insignificant at 10% level. The equation fits very well at 98% of the observed variation in real broad money. Log likelihood ratio is 34.89 which is significant at 1% level. Dummy variable is insignificant at 10% level. F value is significant at 1% level.

From our analysis we find that real Gross domestic product is the main determinant of the demand for money. With both the narrow and the broad money, RGDP is positively and significantly related. Our findings are supported by Ahmed (1976), Rahim and Uddin (1978), Hossain (1983), Taslim (1984), Jahan (1985), Hassan (1992), Talukder and Zaman (1994), etc.

In case of narrow money, rate of interest (both advance and deposit rate) is negatively related to demand for money but coefficient value is very small. For broad money, interest rate on advance is insignificant at 10% level. However, for broad money, interest rate on deposit is significant at 10% level but it does not provide expected sign. Despite Ahmed (1976), Rahim & Uddin (1978), Hossain (1983) find the rate of interest is significant in Bangladesh. But Taslim (1984) comments that the rate of interest has no impact on the economy of Bangladesh.

We observe that foreign remittance is significant at 1% level and positively related to broad money. Islam et. al. (1986) observe that large portion of foreign remittance is spent on transaction purposes and demand for real cash balances is positively related to their earnings.

Structural change occurs when real narrow money is dependent variable and significant at 1% level and negatively related. But in case of broad money it is insignificant at 10% level and negatively related (except in one case which is also positively related). This implies that for narrow money structural change occurs as gradual shift of administrative structure to flexible system goes on.

Capital market is not well developed in Bangladesh. As such people in Bangladesh is mainly to be invested of their sources of income and expenditure streams in official channel either through bank or by the post office in the form of term deposits which yield interest or purchasing real asset like agricultural land, building or shop in Urban areas or unproductive sources. People spend large portion of their income on transaction purposes rather than avoiding or lowering towards risk. However, in Bangladesh post offices and banks are suffering from excess liquidity which indicates that proper utilisation of fund is not being made.

Speculation of the future price of asset depends on anticipation against future rate of interest. If people anticipate that inflation will occur, demand for money won't rise and vice versa.

Since the inception of Bangladesh, interest on agricultural loan has been waived several times. Besides this, the rural people borrow from the money lenders. But borrowing from unorganised money market involves risk which also affects the gain in money market. Absentee landlords, money lenders, tout etc. indulge in malpractice. They charge high rate of interest in the unorganised money market. As a result disorder prevails there. But expansion of BKB, Grameen bank and other NGOs help the rural people to get loan on the basis of the bank interest rate or almost at par the bank interest rate. When interest rate rises, people decrease their holding of money as expenses for holding cash is not cost effective which ultimately decreases the demand for money balances. However, Shahbuddin (1991) opines that the existing agricultural institutions play the role in diffusing the risk in the peasant economy. He argues that the institutions of share cropping tenancy and rural credit market contribute significantly towards reducing the cost of risk bearing in such economies by spreading risk over different economic agents. We observe that rate of interest is

negatively related with narrow money while positively related with broad money. These findings indicate that Keynesian view is not fully applicable in case of Bangladesh.

Demand for money can vary with the yield from alternative assets which are limited. People will hold money depending on the total volume of money in the economy based on transaction and precautionary motives. The demand for money is related to an opportunity cost of holding which includes money holdings or other assets. In Bangladesh, demand for money mainly occurs due to transaction purposes for real cash balance. The higher the per capita income, the more an individual will pay for various goods to meet daily transactions. For the economy as a whole, total demand for money for transaction purposes directly relates to real gross domestic product. Virtually, real gross domestic product is one of the major factors to explain the demand for money. When real gross domestic product rises, demand for money also rises.

Agriculture sector dominates in Bangladesh but suffers from uncertainty often caused by nature. Due to natural calamity or disaster, production may be hampered. This may result in decreasing per capita income leading to decline of RGDP. Decrease of real gross domestic product will lead to decrease in demand for holding cash balances and, if further rise is expected, inflation will lead to decrease in real rate of return. As uncertainty is prevailing in agriculture sector, speculative motive has got some importance in money demand.

Expectation of inflation is important for opportunity cost of holding money. If the rate of inflation rises, then the nominal rate of return on physical assets will also fall owing to the rise of the opportunity cost of holding money. Inflation and demand for money is negatively related. When inflation is expected to rise, purchasing power of money will be lowered resulting in a decrease of demand for money and a rise in the cost of holding money. Expected rate of inflation has an impact on real balances. When inflation rate is expected to decline, return on real balances yield will be higher leading to rise of real balances and vice versa. However, in our present study, we do not find any affect of expected inflation on demand for money. The rate of expected inflation is a variable which influences the demand for real balances and is negatively related. During the periods of increasing prices, even if it can be fully anticipated, individual will reduce their money holding because it continually loses purchasing power.

We find that one year lagged value of money stock is significant. Our finding is supported by Hassan (1992).

Foreign aid and loan also plays an important role in the economic activities of Bangladesh as it reduces the gap of fiscal deficit each year owing to the shortage of foreign exchange. To meet current and development expenditure, one has to depend on previous year's inflow of foreign aid and loan since to generate fund from the external sector needs time. Inflow of foreign aid and loan has a positive effect on real sector variables which affect the monetary variables. Foreign aid and loan increases the volume of transactions in the economy and increase demand for real balances. We observe that foreign aid and loan is positively related with money as shown in equations (13, 14 & 18) but insignificant at 10% level.

We observe that percentage change in exchange rate is negatively related to demand for money and significant at 1% level. Our findings support the finding of Hassan (1992). Further, real exchange rate is positively related It is insignificant at 10% level.

Thus the observation is that real saving is positively related to demand for money and insignificant at 10% level. This implies that saving has no impact on the transaction demand for money in Bangladesh. People save irrespective of market determining forces, just to avoid any unforeseen happenings like hijacking, misfortune, ill-health, robbery, etc.

Now some indicators of the economy during the period 1975-76 to 1995-96 (with an interval of some years) are given below:

Table : 1

Percentage change in growth of some economic indicator.

Year	RGDP	RM ₁	RM ₂	RFR	RS	RFAL
1975-76	6	20	21	236	-78	286
1980-81	3	2	13	43	14	11
1985-86	4	6	7	32	9	5
1990-91	3	4	3	0	23	8
1995-96	5	5	4	-1	-5	9

Source : Computed from Table 2 in appendices.

During the period 1975-76, the growth rate of real GDP is 6% while this decreases to 3% in the year 1980-81. RGDP rises at 4% during the year 1985-86 and in 1990-91 at 3%. Moreover, in the year 1995-96, RGDP increases at 5%. Due to low growth rate of RGDP, economic development of the country has hampered. In the appendices we have also shown the growth of real GDP over the time period in Figure: 2. This indicates that the rate of growth of GDP over the year does not rise though it fluctuates over the time period.

From the table 1, we also observe that the real narrow money rises 20% during the year 1975-76 but it decreases to 2% in 1980-81. But in 1980-81 the real broad money increases at 13%. We further observe that the rate of increase of broad money is relatively higher than the narrow money upto the pre-financial liberalization period i.e. 1985-86. But in 1990-91 and subsequently in 1995-96 growth rate of narrow money increases at a higher rate than broad money.

During the period 1975-76, the growth of remittance increases at 236%. This is due to the fact that after independence of Bangladesh, people started to go to the Middle East countries and

also other foreign countries to earn. We observe from our original data in Appendices (Table 1) that during the year 1975-76 remittance in current market price is Tk. 246 million which rose to Tk. 1001.1 million in 1985-86. But the growth rate is nil in 1990-91 while in 1995-96 is negative as shown in the aforesaid Table. This is due to the fact that the people are not currently getting more scope to migrate and are preferring to send remittance by hundi instead of official channel.

Percentage decrease in growth of real saving is 78% in 1975-76. Although it increases at the rate of 14%, 9%, 23% during 1980-81, 1985-86, 1990-91 respectively but declines at the rate of 5% in 1995-96. This indicates that despite economic reform measures, growth of saving is not rising upto the desired level. For improving economic conditions growth of savings should grow higher.

Immediately after liberation, percentage growth of inflow of foreign aid and loan was very high as it was 286% in 1975-76. During the year 1995-96, growth of inflow of foreign aid and loan is 9% though it is 5% in 1985-86. This indicates that still we are heavily dependent on foreign aid and loan. The country cannot improve its economic condition as long as heavy dependence on foreign aid and loan can not be drastically curtailed and substituted by local resource mobilisation, reduction of import and increase of export earnings to mitigate deficiency of foreign exchange reserve.

Now in table 2 expected inflation rate and weighted average interest rate on deposit from 1975-76 to 1995-96 (with interval of some years) are shown :

Table : 2
Expected inflation & interest rate on deposit.

Year	$P_{(t)}$	Interest rate on deposit	Real rate of return
1975-76	-8.38	4.23	12.61
1980-81	12.33	6.98	-5.35
1985-86	9.82	8.54	-1.28
1990-91	8.84	9.11	0.27
1995-96	4.07	6.11	2.04

Source : Detail given in appendices. Column(4) is estimated.

From the table-2, it is observed that expected inflation is negative in 1975-76 while rate of interest on deposit is 4.23% and real rate of return is positive. During the year 1980-81 expected inflation is 12.33% but interest rate on deposit is 6.98% indicating real rate is negative. In the year 1985-86 expected rate of inflation and interest rate on deposit are 9.82% and 8.54% respectively indicating negative real rate of return. Although in the year 1990-91 inflationary rate is still high i.e. 8.84%, yet interest rate on deposit is 9.11% indicating positive real rate of return. During the

year 1995-96 expected inflation is substantially decreased to 4.07%, while interest rate is 6.11% indicating positive real rate of return. Positive real rate of return is a good sign of financial intermediaries despite we have earlier observed that growth of change in saving is declining.

In a nutshell we can summarise the findings below :

Demand for money largely depends on real gross domestic product. This implies that it is related to real sector of the economy. Other factors such as rate of interest, expected inflation, foreign remittances, etc affect either narrow or broad money. However, percentage change in real exchange rate and one year lagged dependent variable are positively related to broad money as well as narrow money. As exchange rate and foreign remittance are related to demand for money, we can say that demand for money is affected by external variables. As one year lagged dependent variable is positively related to both narrow and broad money, demand for money is related to the stock of previous years. We observe that structural change of demand for money occurs in relation to narrow money but in case of broad money no sign of structural change takes place. This indicates that financial liberalization programme has some impact on the economy. The study also reveals that some of the determinants of demand for money have multiflow affect on supply of money.

Chapter : 6

Supply of and Demand for Money in Bangladesh

Supply of and Demand for money are very important for the monetary management of Bangladesh. Though monetary management primarily depends on the desire and capability of Bangladesh Bank, it is largely dependent on the behaviour of the public, commercial banks, international financial institutions, and balance of payment position of the country. Interaction between demand and supply schedules of money provides equilibrium in the monetary model of the economy. From chapter 4, we find the determinants of the supply of money function. In chapter 5 we have determined the causative factors of the demand for money function. From our discussion in the aforesaid two chapters, it is easily understandable that some of the determinants of supply - demand model are interrelated and have multiflow effect. As such we determine the factors explaining variations in the demand for and supply of money simultaneously in this chapter.

Here we have specified the money supply demand model. This chapter also includes estimation procedure, analysis of results. We also examine whether any structural change has occurred owing to the financial liberalization. Interactive approach among some of the determinants of supply of and demand for money plays important role to achieve equilibrium condition of the monetary model.

6.1 Specification of the Money Supply-Demand model:

One can build a simultaneous equation model to show the multiflow effects of the determinants of the money supply-demand model. Instead of undertaking such modelling exercise, we have estimated the following reduced form equations of a supply- demand type model, on the basis of our previous analysis of chapter 4 and 5, as an example of showing the multiflow effect, considering alternative definition of money i.e. M_1 and M_2 :

Model :A

$$M_d = f(\text{RGDP}, r_1) \quad \dots\dots\dots(1)$$

where Instrument list : Constant, RGDP, R H, r, RFR

$$M_s = f(\text{RH}, r_1) \quad \dots\dots\dots(2)$$

where Instrument list : Constant, RH, RFAL, RFR, RGDP, r, Dm

Model :B

$$M_d = f(\text{RGDP}, r) \quad \dots\dots\dots(3)$$

where Instrument list : Constant, RH, RFR, Br

$$M_s = f(\text{RGDP}, r) \quad \dots\dots\dots(4)$$

where Instrument list : Constant RFR, RH, Br

Notations are same as indicated in chapters 4 and 5. Usual priori relationship between dependent and independent variable as described in chapters 4 and 5 are also applicable here.

6.1.1 Estimation procedure :

For estimating equations in model :A and B, we use two stage least square method with the help of instrument variables by considering alternative definition of money i.e. broad money and narrow money.

6.1.2 Analysis of result :

In model (A), from equation (5) we see that while considering narrow demand for money, constant term and coefficient of real GDP are significant at 1% level. Rate of interest on advance is significant at 5% level and depicts expected sign. Dummy variable is significant at 10% level. Adjusted \bar{R}^2 is 0.946 which indicates good fit of the equation. F statistics is significant at 1% level. D.W. stat. indicates autocorrelation in the inconclusive region is at 1% level of significance.

By considering equation (6) we find that constant term, real high powered money and rate of interest on advance are significant at 1%, 1% and 5% level respectively. But the rate of interest on advance does not show our expected sign. Adjusted \bar{R}^2 shows that the equation fits well at 93.0% of the observed variation. F stat. is significant at 1% level. D.W. stat. indicates no autocorrelation at 1% level.

In equation (7) of Model (A), we find that constant term, real GDP and rate of interest on advance are significant at 1% level. But the rate of interest on advance does not show expected sign. Adjusted \bar{R}^2 shows that good fit of the equation at 98.3% of the observed variation. F stat. is significant at 1% level. D.W. stat. shows that auto correlation in the inconclusive region is at 1% level. Dummy variable is insignificant at 10% level which indicates that no structural change has occurred.

In equation (8) of model (A), we consider broad money supply as dependent variable. High powered money and rate of interest on advance are significant at 1% and 5% level respectively. Rate of interest on advance shows expected sign. Adjusted \bar{R}^2 shows that the equation fits well at 98.0% of the observed variation. F stat. is significant 1% level. D.W. stat. shows no sign of autocorrelation at 1% level of significance. Dummy variable is insignificant at 10% level which indicates that no structural change has occurred while we consider broad money. High powered money is determined as considering an exogenous variable.

In the model (B), while considering narrow money demand as given in equation (9), we find that constant term, real gross domestic product, and rate of interest on deposit are significant at 1% level. Adjusted \bar{R}^2 indicates good fit of the equation at 0.869 of the observed variation . F statistics is significant at 1% level. D.W. stat. indicates that autocorrelation prevails at 1% level.

From the equation (10) at model (B), it is indicated that when we consider narrow money supply, real high powered money is significant at 1% level. Rate of interest on deposit is significant at 10% level but does not have the expected sign. Adjusted \bar{R}^2 shows good fit of the equation at 86.9% of the observed variation in real narrow money supply. D.W. stat. indicates that autocorrelation prevails at 1% level.

Estimated Reduced Form Equations for Money Demand- Supply Model

Model Equation No.	Estimated Regressions	Adjusted R ²	F Stat	D.W. Stat	Remarks
A 5	LM ₁ = 10.24* + 1.71* LR GDP - 0.03** π - 0.20***DM (-3.97) (7.47) (-2.51) (-1.76)	0.946	111.28	0.92	When AR(1) or MA(1) used result become blurred
A 6	LM ₁ = 1.70* + 0.91* LRH - 0.03** π - 0.28*DM (2.97) (11.52) (-2.27) (-4.18)	0.930	89.4	1.46	-
A 7	LM ₂ = -17.59* + 2.35* LR GDP + 0.04* π - 0.09DM (-6.90) (10.33) (2.97) (-0.87)	0.983	396.43	1.28	Autocorrelation rectification gives blurred result
A 8	LM ₂ = -0.33 + 1.13* LRH + 0.03** π - 0.08 DM (-0.55) (14.84) (2.26) (-1.25)	0.980	318.25	1.60	---
B 9	LM ₁ = -5.58* + 1.27* LR GDP - 0.02* π (-4.26) (11.05) (-2.98)	0.869	67.63	0.61	When AR(1) or MA(1) used result become blurred
B 10	LM ₁ = 3.74* + 0.63* LH - 0.03*** π (7.97) (11.14) (-1.72)	0.869	67.44	0.74	-Do-
B 11	LM ₂ = -16.00* + 2.23* LR GDP + 0.04* π (-18.58) (29.29) (3.65)	0.982	548.24	1.03	-Do-
B 12	LM ₂ = 0.33 + 1.09* LH + 0.02*** π (0.95) (25.95) (1.70)	0.977	433.24	1.50	---

Where, ****, ***, **, * indicates that 't' value is significant at 10%, 5%, 1% level respectively. Figures in the parentheses are t ratios. Adjusted R² is the coefficient of determination with adjusted degrees of freedom. Durbin-watson Statistics measures first order autocorrelation among the residuals. From the table value of D.W. Stat, when d_u < computed value d* then positive autocorrelation prevails; if computed value d* is within the boundary of d_u and d_l then inconclusive region, and if computed value d* > d_u then no autocorrelation prevails.

When we consider broad money in equation (11) we find that constant term and real Gross domestic product are significant at 1% level. Rate of interest on deposit is significant at 10% level though it does not provide expected sign. Adjusted \bar{R}^2 is 0.982 which shows that the equation fits well. F stat. is significant at 1% level. D.W. stat. shows that auto correlation in the inconclusive region is at 1% level.

From equation (12) considering broad money supply function we observe that real high powered money is significant at 1% level. Rate of interest deposit is significant at 10% level and shows expected sign. Adjusted \bar{R}^2 shows good fit at 97.7% of the observed variation. F stat. is significant at 1% level. D.W. Stat. shows no autocorrelation at 1% level.

In equations : 5,7,9,10,11 when we consider AR (1) or MA(1) to remove autocorrelation problem, then it gives blurred result for which we report the estimation result of these equations without any corrective measures for autocorrelation.

RGDP is significantly related to real high powered money. Though the real high powered money, RGDP affects money supply process. On the other hand, in the money demand function, RGDP is the main determinant. Hence, the most important variable in the monetary management is RGDP.

Now below we shall depict the relationship between Real High powdered Money and Real GDP :

$$LH = -14.57 * +2.01 * LRGDP$$

$$\quad \quad \quad (-13.99) \quad \quad (22.51)$$

$$\text{Adjusted } \bar{R}^2 = 0.96, F^* = 506.71$$

From the above equation we find that RGDP is significant at 1% level of significance. Here we find that when RGDP rises by 1% then the high powered money rises by 2.01%.

Virtually RGDP plays the important role in both the supply of and the demand for money process in Bangladesh. High powered money is largely exogenous variable. Now we shall show percentage of components of high powered money below from the year 1975-76 to 1995-96 with regular interval of some years.

Table : 1

Percentage of components of High powered Money

Year	% BBCG	% BBCSB	% BCGFI	% NFA	% NOA
1975-76	156.57	22.05	6.62	-19.23	-66.01
1980-81	110.68	68.32	18.17	-46.60	-50.57
1985-86	54.70	74.70	26.61	-12.87	-43.14
1990-91	25.81	60.59	14.35	17.49	-18.24
1995-96	27.60	31.02	11.01	48.74	-18.37

Source : Computed from the table : 1 given in the appendices.

From the table :1 we observe that Bangladesh Bank credit to the Government rose at the rate of 156.57% and 110.68% in 1975-76 and 1980-81 respectively. This clearly indicates that till the early eighties huge amount of Government borrowing from Bangladesh Bank was done. Subsequently during the year 1985-86 borrowing of credit decreases to 54.70% which reduces to 25.81% in 1990-91. This again increases to 27.60% in 1995-96. The Government normally borrows from Bangladesh Bank to meet their budget deficit.

From the table :1, we also observe that Bangladesh bank credit to schedule Bank is 22.05% in 1975-76. During the year 1985-86 structural adjustment started to take place which may have some positive impact on the rise of borrowing of scheduled banks. Scheduled banks' borrowing from Bangladesh Bank decreases to 31.02% in 1995-96 from 60.59% in 1990-91.

Bangladesh Bank credit to other Government and financial institutions is 6.62% in 1975-76 while it is 11.01% in 1995-96. Net foreign asset is in deficit upto the middle of the eighties. This implies that our net foreign reserve is in deficit during the aforesaid period. To meet foreign exchange gap, the Government has to depend on foreign aid and loan. However, in the year 1990-91, net foreign asset was 17.49% and 48.74% in the year 1995-96. As net foreign asset is increasing, it indicates that financial position and especially reserve position of foreign exchange of the country is rising. Net other asset (liability) is in deficit over the entire time period. However, deficit position is comparatively in a worse condition during the year 1975-76 as it was 66.01%. However, deficit position is mitigating relatively slowly as the figure is almost the same i.e. 18.24% and 18.37% in 1990-91 and 1995-96 respectively.

From the analysis, we observe that high powered money can not be treated as fully endogenous nor fully exogenous. This is due to the fact that net foreign asset depends on export-import of the country, foreign aid and loan, foreign remittance i.e. balance of payment position of

the country. International commitment, commercial transaction, transfer payment of the country affects the reserve position, and it can not be fully predetermined. Moreover, Bangladesh Bank credit to scheduled banks depends on the behaviour of the bank and the public. As such high-powered money is largely exogenous though neither fully endogenous nor fully exogenous variable.

We also observe that rate of interest on advance and deposit rate have impact on supply and demand process of money. Interest rate on advance affects narrow money demand and broad money supply. Furthermore, deposit rate affects narrow money demand and broad money supply. As such interest rate plays important role for joint determination of money supply and demand process.

In case of narrow money demand, structural change has occurred but in case of broad money demand structural change has not occurred. This is due to the fact that people are not interested in long term deposit, rather they are interested in short term deposit. But for money supply function it is not easy to draw conclusion about structural change as we obtain mixed results.

In a nutshell we can summarise the findings below:

From our study, it is understandable that the supply of and demand for money are interrelated and the multiflow effects are taking place in the supply-demand of monetary model of the economy. GDP is influencing demand for money directly and supply of money through high powered money. Further, both lending and deposit rates of interest can affect supply of and demand for money simultaneously. Both external and internal factors have impacts on the supply of and demand for money. For this reason, monetary management of the economy should be designed with proper assessment, planning and implementation, market condition, the people's desire or intention, timely and promptly decision, anticipation of inflation, positive real rate of return, adjustment of price change for accentuating the economic growth, etc.

Chapter:7

Summary, Policy Implications, and Conclusion

The present study seeks to explain the money supply of and demand for money process in the Bangladesh economy as successful implementation of monetary programme is necessary for economic and financial development of the country. Supply of and demand for money are inter related and simultaneously affect each-other in the economy. To expedite economic growth, financial acceleration of investment, creation of employment, channelisation of saving investment, mobilisation of resources and reduction of dependence on foreign aid and loan, productive utilisation of foreign remittance and a successful implementation of monetary policy are necessary. This chapter contains summary of our findings which have been discussed in previous chapters, policy implications, limitations and agenda for further research.

7.1 Summary of findings:

One of the objectives of the study is to determine the effectiveness of monetary policy in Bangladesh during 1975-90. Monetarists argue that money supply has a dominant influence on change in price level, spending, productions, and employment. On the other hand, Neo-Keynesians believe that a wide range of factors, both monetary and non-monetary, have influenced employment, growth and prices.

A stable demand function has been assumed by the proponents of neoclassical and rational expectation models. But Keynesians argue that the demand for money is a potentially unstable economic relationship.

We have undertaken this study with a view to explaining monetary process in organised money market and indicating the factors which are responsible for successful implementation of the monetary programme in the country.

We have found the determinants of supply of and demand for money in Bangladesh separately. Further, the study has made an attempt to find out the multifold effects of determinants of the supply of and demand for money simultaneously.

Another objective of the study is to find out whether any structural change has occurred after 1989-90. This is due to the fact that financial liberalization, which has been undertaken with a view to expediting the economic growth, is still continuing. Financial liberalization is a part of structural adjustment and macro economic stabilisation policy began during the middle of the eighties. To examine whether structural change has occurred, we have introduced dummy variable in each equation.

We have investigated in the study whether it is possible to control effectively supply of money by the monetary authority. For this reason, we have tested monetarist model with data from

Bangladesh from 1975-76 to 1995-96. Beside this, we also test the new view of money supply process. Moreover, we have also examined components of high powered money, currency to money supply ratio and reserve deposit ratio.

In chapter 4 and chapter 5, separate estimation of supply of and demand for money model has been done. In chapter 3, we observe that real, monetary and external variables have inter linked to one-another consequently in chapter 6 the study has also examined simultaneous determination of supply of and demand for money.

The study has tested monetarist model for supply of money function. Further new view on the money supply function has been estimated. We have also tested high powered money, currency to money supply ratio and reserve to deposit ratio equations. Monetarist model in our study fits well in the money supply function. New view is also applicable to supply of money. High powered money is partially dependent on the behaviour of Bangladesh Bank and the currency to money supply and reserve deposit ratios largely depends on the behaviour of the public and the scheduled banks. As such strict exogeneity described by the monetarist money supply theory does not fully hold true. We have tested Friedman and Schwartz's (1963) views on proximate determinants of money supply in case of Bangladesh and found that their views partially hold true. Teigen (1970) views that the supply of money depends on the market forces i.e. interest rate & the policy instrument of the central bank. This is also supported by our findings. Kaldor (1970) views that money supply is largely determined endogenously due to economic activities. But Kaldor's view is not fully supported by our findings. As such our findings neither lend support to the monetarist view nor the Keynesian view fully.

From our observations, it is evident that money supply process is neither fully endogenously nor exogenously determined. This is due to the fact that money supply is mainly controlled by Bangladesh Bank, but not fully controlled by them. Determinants of money supply such as high powered money, currency to money supply ratio and reserve deposit ratio depend on the desire of the monetary authority, behaviour of the public, scheduled banks and uncertainty. Furthermore, money supply also depends on rate of interest on deposit and advance, deposit to GDP ratio, bank rate, etc. This indicates that money supply is partially endogenous and partially predetermined.

We have found that when we consider high powered money, currency to money supply ratio and reserve deposit ratio as determinant of broad and narrow money supply alternatively, then both the equations fit well. Though monetary policy has been undergoing change since 1990, we have found that dummy variable provides us mixed results as its significance varies with the independent variables of the function. This implies that structural change has not fully occurred.

In our analysis, we have found that variation in high powered money in the money supply process, has got quite importance. We also find that currency to money supply ratio and reserve deposit ratio have got second and third importance respectively for determining supply of money. Moreover, interest rate on deposit and advance, deposit to GDP ratio and bank rate are also important determinants of money supply.

We have observed that one of the sources of high powered money is the credit to scheduled banks which can not be fully controlled by Bangladesh Bank. But net foreign asset and credit to the Government have no significance which is supported by the finding of Huda (1988).

In case of currency to money supply ratio, we have found that it depends on the rate of interest and expected inflation. It implies that the behaviour of the public has an importance in determination of currency to money supply ratio. Reserve deposit ratio mainly depends on bank rate, interest rate, and required cash reserve ratio. But excess amount of reserve is insignificant. This suggests that the excess amount of reserve is mainly created by uncertainty. The behaviour of the public and the scheduled banks dominates reserve deposit ratio. As such we can say that neither monetarist nor non monetarist can be fully supported for money supply.

We have examined demand for money model in case of Bangladesh. We have examined monetarist model, Keynesian model and other monetary and external variables. We have found that both narrow and broad money mainly depends on real gross domestic product. This implies that in case of demand for money monetarist model is largely prevailing in Bangladesh. Both advance and deposit rate of interest have effects on real narrow money. In case of broad money demand deposit rate has an effect but the sign is not expected. Real foreign remittances have effect on broad money. Real foreign aid and loan has no effect on demand for money. Percentage changes in real exchange rate has negative effects on demand for money. But expected inflation rate has no effect on demand for money. We also find that dummy variable is significant for narrow money demand but not for broad money demand. This is due to the fact that some structural changes have occurred in the narrow money demand function due to reform measures.

For real demand for money function, we have found that real gross domestic product is the most crucial determinant. This supports the monetarist view. Rate of interest on advance and deposit have affected significantly the narrow money. Although rate of interest is statistically significant, it doesn't possess the right sign in case of broad money. This finding indicates that Keynesian view is not fully applicable in case of Bangladesh. Expected inflation is negatively related to broad money but it has no impact on the demand for money as its coefficient is statistically insignificant. Moreover, its coefficient value is small and it is positively related to narrow money. This does not empirically support the views of the monetarists. Real foreign remittance is positively related to broad money and is significant. The lagged dependent variable shows the positive effect with demand for money. This indicates that money demand is affected by the previous year's money demand. Moreover, percentage change in real exchange rate is negatively related to demand for money (both broad and narrow money). This implies that when devaluation occurs, demand for money of local currency declines. This supports the finding of Taslim (1984).

The study has been extended to determine whether any multifold affect creates problem to achieve equilibrium between supply of and demand for money. We observe that some of the determinants of supply of and demand for money are interrelated such as GDP, high powered money, deposit to GDP ratio and interest rates on advance and deposit. The result indicates that money supply is affected by high powered money. GDP affects directly demand for money while this

is due to the fact that high powered money is largely influenced by GDP. Furthermore, interest rate i.e. both advance & deposit have effects on money supply and demand process.

From our finding we shall depict below determinants of supply of and demand for money in table:1

Table : 1
Determinants of supply of and demand for money.

Sl. No.	Method of Estimation	Narrow Money		Board Money	
		Money supply function	Money demand function	Money supply function	Money demand
(1)	Single equation method	H, RR/DD, Br, r, r ₁ #, D/GDP	RGDP, r ₁ , r, DEXR, M ₍₋₁₎ , DM	H, CC/M ₂ , RR/TD, TD/GDP, r, r ₁ , DM	RGDP, RFR, r#, M ₍₋₁₎ , DEXR
(2)	Simultaneous equation method	H, r#, r ₁ #, DM	RGDP, r ₁ , r, DM	H, r ₁ , r	RGDP, r#, r ₁ #

Note: “#” indicates that though statistically significant but does not possess right sign.

7.2 Policy implications

We have observed that money supply is largely controlled by the relationship between total stock of money and high powered money. As money market is relatively small and administrative directives are replaced by gradual introduction of indirect tools, Bangladesh bank mostly predetermines money supply process through the variations in high powered money. However, high powered money can not be fully controlled. GDP is one of the important determining factors of high powered money. Money supply also depends on deposit/GDP ratio, interest rate, bank rate, etc. Currency to money supply ratio is also a crucial factor for determining money supply process. But currency to money supply is not under full control of Bangladesh bank as it depends on other endogenous factor such as expected inflation. Another important factor of money supply is reserve deposit ratio.

Demand for money is largely dependent on real gross domestic product. Deposit rate of interest has an effect on narrow & broad money although narrow money is negatively related while broad money is positively related to it. This may be due to the fact that structural change has occurred in case of narrow money but in case of broad money no such effect has occurred. As a result financial repressed condition prevails in Bangladesh which makes the sign of rate of interest of broad money demand as positive. Foreign remittance, has affected broad money. However, percentage change in exchange rate is positively related to broad money as well as narrow money. But in most of the cases coefficient value of other explanatory variables is small. As percentage change in

exchange rate and foreign remittance are related to demand for money, we can say that demand for money is affected by external variables. The most important factor for determining demand for money is real GDP which implies that it is related to real sector of the economy. Moreover, one year lag dependent variable is positively related to both narrow and broad money which implies that demand for money is related to money stock of previous year. Change of structure holds true for narrow money which implies that some effects of financial liberalization has occurred.

Moreover, from the simultaneous equation system we observe that RGDP, high powered money and both advance and deposit interest rates exert effects, in the monetary process. Simultaneous equation system of our study has shown that high powered money is largely exogenous. As such high powered money can not be controlled by Bangladesh Bank which contradicts the view of the monetarists.

For the successful implementation of monetary policy, supply of and demand for money should get importance. Since monetary policy is very slowly changing from administrative mechanism towards market mechanism, the effects of the change increase importance of supply of and demand for money for successful implementation of monetary policy. Furthermore, structural change have occurred in case of narrow money demand. But broad money demand is indifferent to structural change. In case of supply of money we observe that mixed result prevails regarding structural change of the country. This implies that to some extent financial liberalization has striking impact on the economy. The affect of financial liberalization has little impact on the economy since channelising saving-investment, allocation of resources, accumulation of wealth, capital formation, etc do not occur.

As real rate of return is positive from 1990-91 to 1995-96 (except 1994-95) it implies that this encourages saving. When interest rate is higher than the inflation rate, it provides an incentive to rise saving through current postponement of expenditure. The amount of saving also depends on income. It is observed that real savings to GDP has been increased over the years due to factors either positive real rate of return or increase of GDP or both.

Real percentage change in exchange rate indicates that currency is being devalued over the time period. When devaluation is done it is assumed that competitiveness of exportable commodities will rise and earnings from export will increase. But real trade deficit is rising indicating ineffectiveness of devaluation. When devaluation is done impact of import and exportable commodities must be taken into consideration. Moreover, regular devaluation has adverse effect not only on debt services in terms of Taka but also on discouragement of foreign direct investment. Increase of real trade deficit is indicating economic growth rate does not increase at a desired level. Despite the measures taken to increase export, it has been found that export earnings are not increasing to close the gap between import and export.

Dependence on foreign aid and loan lowers the mobilisation of internal resources. But we are still heavily dependent on foreign aid, and grant. The country can not improve its economic conditions as heavy dependence on foreign aid & loan can not be drastically curtailed. A lion's share

of different development projects of the country depend on external sector and in most of the cases tied aid has negative impact on the economy. Inflow of foreign aids and loans have positive effect on real sector variables which affects the monetary variable. This real sector variables affects the monetary variable. This increases the volume of demand for money, which increases transaction in the consumption and also utilise mostly in the unproductive services. We also observe that in the year 1995-96 real foreign remittance has decreased for which proper planning is required so that one of the major sources of foreign exchange earnings can not decline. However, relationship between foreign remittance and demand for real cash balances is positive implying that foreign remittance earnings have mostly been spent on conspicuous consumption.

With the rise of GDP, money supply will rise. When the number of bank branches increase, people are encouraged to manage their cash efficiently. But most of the accounts specially in rural areas are operated under large number of small holdings and transaction cost is higher and opportunity to hold interest-bearing fund is not properly encouraged. As a result most of the rural bank branches are not cost effective. Customer services of a bank mainly depends on performance of services, productivity of bank personnel, time and accuracy. As such proper corporate planning and strategic management with long term vision for bank management is required.

Real and monetary sectors both are inter-related to each other. Both the sectors depend on external sector. Virtually in the economy variables have multiflow effects. For example, foreign aid and loan can be utilised to meet fiscal deficit. Money supply is related to the rate of inflation since fiscal deficits are caused by a fall of revenue due to fall in income.

Money supply is related to domestic credit, which is related to the Govt's fiscal deficit. A larger Govt. deficit will slow the growth of the output and consumption and reduce the economy's capital stock. Real credit to the Govt. by the banking system is highly correlated to the money supply, which also affects the domestic resource mobilisation.

Bangladesh Bank is still under the direct supervision of the Government and supplies credits to meet fiscal deficit through monetary measures. Autonomy of Bangladesh Bank has not been achieved. Bangladesh Bank has to control inflationary situation so that internal price stability of the country can be maintained. Many commodities in the country generally suffer from short term supply inelasticities. Unless monetary policies are manipulated with due caution, there is every possibility that the economy may suffer from inflation. Moreover, Bangladesh Bank has to maintain external stability through maintaining stability in the exchange rate of the domestic currency with the foreign currencies in the international market. Stability in the balance of payment position is also required. Bangladesh Bank should be independent from the Government and they have to take decisions independently free from any political biasness. One of the major reasons of the liberalisation programme is to control the broad money supply through reducing the government borrowing from the banking/postal system to decrease fiscal profligacy and to control the rate of inflation to improve balance of trade position.

7.3 Limitation and agenda for further research :

The limitations of the study are given below :

In our analysis we have considered only the organised money market of Bangladesh. But the unorganised money market still plays an important role. A joint estimation of the formal and the informal markets is difficult due to lack of institutional constraints and scarcity of the data in the informal market. Through primary survey, the data of the informal market may be collected but this may not represent the entire country. Monetary management is largely controlled by the formal sector. Furthermore, adjustment and restructuring process is going on the organised money market. As such there is every possibility of negative repercussion in the economy during the transitional period as cost may be high during the said period.

Data in the whole study are based on the secondary sources. As such one may question their reliability. But that is the source such a study has to depend on. There is every chance of manipulation of data by the concerned authorities for which real picture could not be ascertained. Moreover, as compared to developed countries, Bangladesh is still lagging behind for data base information system. It is not properly developed by the firm to facilitate the research work with the advancement of the information technology. In developed nations different sort of database firm supplies information after proper market research and scrutinization has been done. As it is difficult to compute/estimate data from the primary source, we have used published data.

Although we have used data for twenty one years, normally thirty years' data for time series analysis could give better result. Bangladesh became independent on 16th December, 1971. We have also dropped data of post-liberation period for three years, because the transition period is quite complicated and structural change are present. As financial liberalization programme is still going on it is difficult to ascertain the result of financial liberalization programme.

Despite shortcomings, our present study seeks to throw some light on the supply of and demand for money to see effectiveness of the monetary policy of the country.

For further research, unorganised money market may be taken into account along with organised money market to analyse the supply of & demand for money more rigorously than this study does. In doing quality research data reliability is an indeed requisite.

To overcome the problem of unreliability of data in Bangladesh, research organisations should come forward to create data bank in order to disseminate data base information.

BIBLIOGRAPHY

1. Articles, Books and Monographs :

Ackley, G. (1961) : *Macroeconomic Theory*, Macmillan Company, N. Y., USA.

Ackley, G. (1978) : *Macroeconomics : Theory and policy*, Macmillan publishing Co., Inc., N. Y., USA.

Adekunle, J.O.(1968) : "The demand for money : Evidence from developed and less developed economies," *IMF Staff papers*, Vol. XV, No.2.

Ahmad, A.K. Monaw - War Uddin (1987) : *Factor intensity, Trade Policies and Export of Manufactures : A case study of Bangladesh*, Ph.d. dissertation, University of Sydney, Australia (mimeo).

Ahmad, S.(1992) : *Foreign Capital inflow and Economic growth in Bangladesh*, University of Dhaka.

Ahmed, A. (1980) : "The Government role in the monetary expansion : The case of Bangladesh", *The Bangladesh Journal of Political Economy*, Vol. 9, No. 1.

Ahmed, F. (1976) : "The demand for money in Bangladesh : An Empirical analysis", *Journal of the Institute of Bankers Bangladesh*, Vo.3.

Ahmed, S.(1977a) : "A note on proximate determinants of Money Supply in Bangladesh", *The Bangladesh development studies*, Vol. V, No. 1.

Ahmed, S. (1977b) : "Demand for money in Bangladesh : Some preliminary evidences", *The Bangladesh development studies*, Vol. V, No.2

- Ahmed. Z. (1987) : "Management aspects of central Banking", *Journal of the Institute of Bankers Bangladesh*, Volume : 25.
- Ali, A. (1991-92) : "Indicators of Monetary policy with special reference to Bangladesh", *Journal of the institute of Bankers Bangladesh*, Volume : 31 -33.
- Ali, A. and Ansari, M.H.(1984) : "Controlling money supply in Bangladesh : The Monetary base approach", *Journal of the Institute of Bankers of Bangladesh*, Vol. 19.
- Ali, M.M. (1985) : "Determination of the lagged effect of the changes in money supply of price in Bangladesh : An empirical study", *Bangladesh Bank Bulletin*, February.
- Ali, M.M. and Sarker, M.A.S. (1994a) : "Reserve money and money multiplier", a paper presented in the seminar on Monetary policy in Bangladesh from 15-16 October held in Bangladesh Bank.
- Ali, M.M. and Zaman, J.U. (1994b): "*Lagged effect of money supply on inflation in Bangladesh : An empirical study*", a paper presented in the seminar on Monetary policy in Bangladesh from 15-16 October held in Bangladesh Bank.
- Ali, M.M. (1996 & 1997): "Mckinnon's demand for money function : The case of Bangladesh", *Journal of the Institute of Bankers Bangladesh*, Vol. 44 & 45.
- Anwaruzzaman, C.(1988):"Determinants of Currency ratio-Some preliminary evidence", *The Bangladesh Development studies*, Vol. XVI, No. 3.
- Artis, M.J.(1986): *Macroeconomics*, English Language Book Society, UK.

- Asaduzzaman, M.(1995): "*The unrecorded economy of Bangladesh : Some preliminary estimates*", a paper presented at 11 Biennial conference of Bangladesh Economic Association from 29 to 31 July.
- Bahar, H. (1985) : "Behaviour of Currency-deposit ratio in Bangladesh : An empirical study", *Journal of the institute of Bankers Bangladesh*, Vol. 22.
- Bahar, H. (1987) : "Demand function for money in Bangladesh : An empirical analysis", *Bank Parikrama*, Vol. XII, No.2.
- Bahar, H. (1988) : "An analysis of monetary aggregates in Bangladesh :1977-1987", *Bank Parikrama*, Vol. XIII, No.1 and 2.
- Bahar, H. and Murtoza, M.G. (1994) : "*Review of the money supply in Bangladesh over the period 1986-87 to 1993-94*" a paper presented in the seminar on Monetary policy in Bangladesh from 15-16 October held in Bangladesh Bank.
- Battacharya, B.B. (1974) : "Demand and supply of Money in a developing economy : A structural analysis for India", *The Review of Economics and Statistics*, Vol. LVI.
- Baumol, W.J. (1952) : "The Transaction demand for cash : An inventory theoretic approach", *Quarterly Journal of Economics*, Volume : 66.
- Bayes, A.(1987) : "Bangladesh Banking Growth, Structure and Performance", *Bank Parikrama*, Vol. xII, No.2.
- Branson, W.H. (1979) : *Macroeconomic Theory and Policy*, 2nd edition, Harper & Row Publishers, USA.
- Cagrill T.F.(1979) : *Money, The Financial system and Monetary Policy*, Prentice Hall, Inc., N.J., USA.

Choudhury, T.A. (1990) : *An evaluation of the performance of commercial Banks of Bangladesh*. Ph.d. dissertation, Himachal Pradesh University, India (mimeo).

Coates, W.L. & Khatkhate, D.R. (1980) : *Money and Monetary policy in less developed Countries. A survey of issues and evidence*. Pragman Press Ltd., Oxford, U.K.

Cookson, F. and Talukdar, S.I. (1994) : "Review of alternative definitions of money supply and sources of money", a paper presented in the seminar on Monetary policy in Bangladesh from 15-16 October held in Bangladesh Bank.

Corbo, V. & Hernandezl, L. (1996) : "Macroeconomic Adjustment to capital inflows : Lesson from recent Latin American & East Asian experience", *The World Bank Research observer*, Vol. 11, No.1

Cramp, A.B. (1970) : "Does money Matter?", *Lloyds Bank Review*.

Cuthbertson, K. (1985) : *The Supply and Demand for money*. Basil Blackwell Inc., UK.

Dernburg, T.F. & McDougal, D.M. (1980): *Macroeconomics- The Measurement, Analysis and Control of aggregate economic activity*. 6th edition, McGraw Hill Book Company, USA.

Dornbush, R. and Fisher, S. (1978) : *Macroeconomics*. McGraw Hill Book Company, USA.

Drake, P.J. (1980) : *Money, Finance and Development*. Martin Robertson, Oxford, UK.

Dutta, M. (1975) : *Econometric Methods*. South Western Publishing Co., USA.

- Fisher, I. (1911) : *The purchasing power of Money*, The Macmillan Company, N. Y., USA.
- Friedman, M. (1956) : "The Quantity Theory of Money -A Restatement". *Studies in the Quantity Theory of Money*, Friedman, M.(editor), University Press, Chicago, USA.
- Friedman, M. (1958) : "The demand for money-some theoretical and empirical results"*Journal of Political Economy*, Volume:67.
- Friedman, M. and Schwartz, A.J.(1963) : "A Monetary History of the United States, 1867-1960". *National Bureau of economic Research Studies in Business Cycles*, No. 12, University Press, Princeton, USA.
- Friedman, M. (1970) : "A Theoretical framework for Monetary Analysis". *Journal of Political Economy*, Volume :78
- Ghatak, S.(1981) : *Monetary Economics in Developing countries*, Macmillan press ltd., UK.
- Gochore, H.S.(1993) : "Are money, interest rates, output and exchange rate cointegrated : Implications for monetary targeting". *The Philippine review of Economics and Business*, Vol. XXX, No.1
- Gomes, L. and Ryan, D.(1978) : "Money demand functions : Some specification issues analyzed by international comparisons", *The Bangladesh Development Studies*, Vol. VI, No.1.
- Gupta, S.B.(1976) : "Money supply analysis: A reply", *Economics & Political Weekly*, India.
- Gurely, J and Shaw, E. (1960) : *Money in a theory of Finance*, The Bookings Institution, Washington, USA.
- Hasin, F. (1992) : "An econometric estimation of money supply

- function : The case of Bangladesh", *Economic research unit*, Dept. of Economics, Dhaka University, Working paper no. 92-01.
- Hassan, M.K.(1992) : "An econometric analysis of credit constraint, foreign interest rates and currency depreciation in the demand for money in Bangladesh", *The Bangladesh Development Studies*, Vol.XX, No.4.
- Hassan, M.K., Samad, A. and Islam,F.(1993) : "A re-examination of Mckinnon-Shaw hypothesis : evidence from five South-Asian countries", *The Bangladesh Development studies*, Vol.XX1, No.4.
- Hossain, M.(1983) : "On the determinants of demand for money", *Arthanity Journal*, Chittagong University, Vol.2.
- Hossain, Md.A.(1988) : "A Quarterly short run money demand model for Bangladesh 1974 -1985 : 4", *The Bangladesh Development Studies*, Vol. XVI, No.3.
- Hossain, A. (1993) : "The money supply multiplier in Bangladesh", *The Bangladesh Development Studies*, Vol. XXI, No.4.
- Hossain, A.(1994) : "Time series properties of variables in the money demand function in Pakistan", *The Indian Economic Review*, Vol. XXIX, No. 2.
- Hoque, A.(1986) : "Monetary policy and inflation with illustrations from Bangladesh Economy", *Journal of Management, Business and Economics*, Vol. 12, No. 2.
- Huda, M.N. (1984) : "The demand for money in Bangladesh : Evidence on complementarity hypothesis", *Bank Parikrama*, Vol. IX, No.1 and 2.
- Huda, M.N.(1988) : "Approach to money supply analysis", *Journal of the Institute of Bankers Bangladesh*, Vol.27.

Howlader, S.R., Khan, H.A.R. and Ahmed, F.U.(1989): "A money multiplier model for Bangladesh", *Bangladesh Journal of Political Economy*, Vol. 9, No.1.

Howlader, S.R. and Ahmed, F.U. (1994): "Impact of monetary expansion on the Balance of payments in Bangladesh : Implications of Polak model", *Social Science Review*, Vol. XI, No. 2.

Huqe, Md. S. and Majumder, B.A.(1986): "Stability of the demand for money function : Evidence from a developing country". *Pakistan Economic and Social review*, Vol.XXIV, No.1

Islam, M. et, al. (1987): *Overseas migration from rural Bangladesh : A micro study*, Rural economics programme, Dept. of Economics, Chittagong University.

Jahan, S.(1985) : "Demand for money in Bangladesh : An econometric analysis", *Journal of the institute of Bankers Bangladesh*, Vol. 21.

Johnson, H. G. (1972): *Macro Economics and Monetary Theory*, Aldine Publishing House, Chicago, USA.

Johnston, B.F. and Clark, W.C.(1984): "A Three-pronged strategy for rural development", *Leading Issues in Economic Development*, Meier, G.M. (editor), 4th edition, Oxford University Press, N.Y., USA.

Johnston, J. (1984) : *Econometric Methods*, 3rd edition, McGraw Hill Book Company, Singapore.

Jones, J. and Sattar, Z.(1988): "Money, inflation, output and causality : The Bangladesh Case, 1974-1985", *The Bangladesh Development Studies*, Vol. XVI, No.1.

Kaldor, N.(1970): The New Monetarism, *Lloyds Bank Review*, No. 97.

Kamath, S.J.(1985) : "An investigation of the demand for and supply of money in India-1951-1976", *Weltwirtschaftliches Archiv Band* 121. Heft 3.

Kayemuddin, M.D. (1992) : *Evaluation of factors affecting productivity in Small Industries*, Ph.d. dissertation, Dhaka University, (Mimeo).

Keynes, J.M.(1936): *The General Theory of Employment, Interest & Money*, Macmillan, London.

Koutsoyiannis, A. (1977): *Theory of Econometrics*, 2nd Edition, Macmillan Education Ltd., London.

Khan, S.A. (1995) : "De-Regulation in Banking: An analysis in the context of Bangladesh", *Journal of the Institute of Bankers Bangladesh*, Vol. 42, December.

Laidler, D.E.(1977): *The Demand for Money : Theories and Evidence*, Allied Publishers private Limited, New Delhi, India.

Lockett, D.G.(1980) : *Money & Banking*, 2nd Edition, Mcgraw Hill Inc., USA.

Madhur, S.(1976) : "Money Supply analysis", *Economics & Political Weekly*, India.

Mckinnon, R.I.(1973): *Money and Capital in Economic Development*, Brookings Institution, Washington.

Momen, A. (1992) : "Money, Structuralism and the International Monetary fund: An auto regression assessment of the controversy", *The Bangladesh Development studies*, Vol. XX, No.4

Murty, G. and Murty, S. (1978): "The functional form of demand for money", *The Bangladesh Development Studies*, Vol, VI, No.4.

Osmani, S.R. et. al. (1986) : *The Impact of Fiscal policy on the Monetary sector of Bangladesh*, Bangladesh Institute of Development Studies, Research Report no.50.

Oyejide, T.A. (1974): "Controlling money supply in less developed countries: The case of Nigeria", *The Bangladesh Development Studies*, Vol. II, No. 3.

Parikh, A. and Starmer, C. (1988): "The relationship between the money supply and prices in Bangladesh", *The Bangladesh Development Studies*, Vol. XVI, No. 3

Patinkin, D. (1965): *Money, Interest & Prices*, 2nd edition, Harper & Row, N.Y. USA.

Patnaik, S.C. (1981): *Supply and Demand for Money: An equilibrium Analysis*, Sterling Publishers Private Limited, New Delhi, India.

Patrick, H. T. (1966): "Financial development and economic growth in underdeveloped countries", *Economic Development and Cultural Change*, Vol. 14, No. 2.

Perera, N. (1993): "The demand for money in Papua New Guinea : Evidence from co-integration tests", *Savings and Development*, Vol. XVII, No. 3

Pigou, A.C. (1917): "The value of Money", *Quarterly Journal of Economics*, Vol. : 32

Pilbeam, K. (1992) : *International Finance*, The Macmillan Press Ltd., London, UK.

Pindyck, R.S. & Rubinfeld, D.L. (1984): *Econometric Models & Economic Forecasts*, 2nd edition, McGraw Hill Book Co., Singapore.

- Rahim, A.M.A. and Sohrabuddin M. (1978): "Demand for Money in Bangladesh Preliminary Analysis" in Rahim, A.M.A. (edited), *Current Issues of Bangladesh Economy*, Bangladesh Books International limited, Dhaka.
- Rahman, M.A.(1993): *Export and Economic Development of Bangladesh*. Bangladesh Young Economists Association (BYEA), Dhaka.
- Ramkission, R. (1990): "Money, credit and interest rates in the Trinidad and Tobago economy", *Savings and Development*, Vol. XIV. No. 4.
- Rana, P.B. (1986): *Improving Domestic Resource Mobilisation through Financial Development*, Asian Development Bank, Philippines.
- Rodriguez, R.M. and Carter, E.E. (1976): *International Financial Management*. Prentice Hall, Inc. Englewood cliffs, N.J., USA.
- Romer, David (1996) : *Advanced Macroeconomics*, McGraw Hill Companies Inc., Singapore.
- Shabuddin, Q.(1991) : *Peasant behaviour, Under Uncertainty, Decision making among low income farmers in Bangladesh*. Binimary printers, Dhaka.
- Siddique, A.K.M. (1975): "Money and Inflation in Bangladesh" *The Bangladesh Development studies*, Vol. III, No. 1.
- Sohrabuddin, M. and Ahmed, J.(1977): "Controlling money supply in Bangladesh : The money multiplier approach", *Journal of the Institute of Bankers Bangladesh*, Vol. 5.
- Sohrabuddin, M. (1985) : "Monetary policy in the Third Five year plan", paper presented in 7th Biennial conference of the Bangladesh Economic association held in Jahangirnagar University on December, 17-19.

Sohrabuddin, M. (1986): "A structural analysis of monetary policy in Bangladesh : 1973-81", *The Journal of Management, Business and Economics*, Vol. 12, No.1

Subrahmanyam, G.(1994): "Optimal cash reserve ratio in India's liberalised Monetary system", *Saving and Development*, Vol. XIX, No.1.

Taheruddin, M.(1977): "The demand for and supply of bank credit in Bangladesh : An empirical analysis", *The Bangladesh Development Studies*, Vol.VI, No. 4.

Talukder, S.I. and Zaman, J.U.(1994): "Demand for money in Bangladesh: A cointegration approach", a paper presented in the seminar on Monetary policy in Bangladesh from 15-16 October held in Bangladesh Bank.

Taslim, M.A.(1984): "On rate interest and demand for money in LDCs : The case of Bangladesh", *The Bangladesh Development Studies*, Vol. XII, No.3

Teigen, R.L. (1970) : "The Demand for and Supply of Money", *Money, National Income & Stabilisation policy*, Smith, W.L. & Teigen, R.L. (Editor) 2nd edition, Richard D.I. Rwin Inc., Homewood Illinois, USA.

Tobin, J. (1956): "The interest elasticity of transactions demand for cash", *Review of Economics & Statistics*, Vol. 38.

Tobin, J. (1965): "The monetary interpretation of History" *American Economic Review*, Vol. 55.

Tobin, J. (1970): "Money & Income : Post Hoc Ergo Propter Hoc?", *Quarterly journal of Economics*, Vol.: 84.

Vaish, M.G. (1981): *Macroeconomic Theory*, 6th edition, Vikas Publishing House Pvt. Ltd., New Delhi, India.

Vane, H.R. and Thompson, J.L.(1979) : *Monetarism : Theory, Evidence & Policy*, Martin Robertson and Company Ltd., UK.

Williamson, J. (1997): "*Exchange rate Management: Country Experience with crawling band*", paper presented in the seminar organised by Bangladesh Economic Association held in Planning Academy, Dhaka on February, 24.

Wonnacott, R.J. and Wonnacott, T.H.(1979): *Econometrics*, 2nd Edition, John Wiley and Sons, Inc., USA.

2. Official Publications : National and International

Annual report 1995-96 (1997): Bangladesh Bank, Dhaka.

Asian Development Outlook, (1994): Asian Development Bank, Oxford University Press, Hong Kong.

Bangladesh Arthanaitic Jarip (1993-94): Ministry of Finance, The Government of the People's Republic of Bangladesh, Dhaka, June.

Bangladesh Arthanaitic Samikha (1997): Ministry of Finance, The Government of the People's Republic of Bangladesh, Dhaka, June.

Bangladesh Bank Bulletin (1995) : Bangladesh Bank, Vol.XXIII, No. 2, April - June.

Economic Trends (1997): Vol. XXII, No.1, Bangladesh Bank, January.

Economic Trends (1997): Vol.XXII, No. 5, Bangladesh Bank, May.

Statistical Pocket Book of Bangladesh- 1996 (1997): Bangladesh Bureau of statistics, The Government of People's Republic of Bangladesh, Dhaka, January.

Statistical year book of Bangladesh-1995 (1996): Bangladesh Bureau of Statistics, The Government of the People's Republic of Bangladesh, Dhaka.

Twenty years of National Accounting of Bangladesh (1972-73 to 1991-92), (1993) : Bangladesh Bureau of Statistics, The Government of the People's Republic of Bangladesh, Dhaka.

World Development Report (1994): World Bank, Oxford University press, June.



Table:1
Data used for regression analysis in chapter: 4 and 0

Year	M ₁ current price H.Tk.	M ₂ current price H.Tk.	OC current price H.Tk.	DO current price H.Tk.	TD current price H.Tk.	R current price H.Tk.	BKCG current price H.Tk.	BKCSB current price H.Tk.	BKGEI current price H.Tk.	HEFA current price H.Tk.	NOA current price H.Tk.	BE 8.00	F1 11.62
1975-76	8822	13969	3299	5523	10670	4622	7237	1019	306	-889	-3051	8.00	11.62
1976-77	9729	17399	3563	6166	13036	5464	6363	1213	305	624	-3041	8.00	11.03
1977-78	12241	21410	5043	7198	16367	6868	7662	2313	356	347	-3116	8.00	10.66
1978-79	15248	27600	6133	8115	21467	8562	7344	3736	909	902	-4329	8.00	11.12
1979-80	17318	32449	6934	10384	25515	10438	9538	7094	1816	-2011	-5999	8.00	11.04
1980-81	19863	41360	9148	10715	32212	13353	14779	9123	2427	-6222	-6754	10.50	13.07
1981-82	20121	45487	8775	11346	36712	12804	15811	1356	3097	-13596	-5864	10.50	13.53
1982-83	26343	58983	11386	14957	47597	16245	14208	12510	3658	-7527	-6604	10.50	13.35
1983-84	35499	83858	15563	19936	68295	22359	13516	13773	5295	-2147	-8078	10.50	13.75
1984-85	42318	105942	17228	25089	88113	26755	14246	21675	6774	-3526	-12414	11.00	14.50
1985-86	49279	123381	19531	29748	103850	32715	17895	24438	8706	-4209	-14115	11.25	14.66
1986-87	52628	143531	20749	31879	122782	37418	19636	21343	8546	-764	-11343	10.75	14.70
1987-88	50477	164080	24150	26327	139930	50575	22452	25528	8744	5347	-11496	10.75	14.66
1988-89	54607	190781	26156	28451	164625	54688	9860	31364	9338	4562	-436	10.75	14.68
1989-90	63687	222976	31883	31804	191093	63173	16783	39210	9281	-2649	548	9.75	14.83
1990-91	72037	250044	36118	35919	213926	65007	16777	39390	9327	11372	-11858	9.75	14.99
1991-92	82572	285259	40726	41846	244533	68221	11969	33730	9026	33866	-20370	8.50	15.12
1992-93	90626	315356	44801	45825	270555	69448	14478	28972	8826	56676	-19508	6.50	14.39
1993-94	111671	364030	54160	57511	309870	113079	10096	25767	16359	82508	-21651	5.50	12.78
1994-95	131794	422123	65651	66143	356472	106300	12540	27338	10725	88641	-32944	5.50	12.22
1995-96	144594	456905	71233	73361	385672	110030	30368	34137	12112	53627	-20214	6.50	13.41

(Continued to page: 95)

Data used for regression analysis in chapter: 4 and 0

(Continued from page: 94)

RR current price (M/Tk.)	ER current price (M/Tk.)	I	CPI	GDPD deflator	GDP current price (M.T.)	TNBB (Cumulative figure)	P ⁽⁻¹⁾
618	364	4.23	153	1.4367	110320	1696	-8.38
772	288	4.32	157	1.4713	116003	1923	2.61
912	174	4.22	177	1.7198	145194	2572	12.75
1170	367	4.27	191	1.9671	164047	3192	7.91
1425	1068	4.31	227	2.1979	196050	3735	18.85
1746	897	6.98	255	2.5093	231433	4073	12.33
1967	569	7.29	296	2.7742	259015	4385	16.07
2573	6	7.36	326	3.0040	294189	4572	10.13
3720	340	8.11	357	3.4401	355185	4768	9.51
4781	1352	8.13	397	3.8259	406933	4972	11.20
5690	1068	8.54	436	4.2014	466227	5094	9.82
6738	2944	8.59	481	4.6642	539201	5217	10.32
16036	2779	8.69	536	5.0198	597136	5323	11.43
18751	1918	8.88	579	5.4084	659598	5453	8.02
21155	1140	9.06	633	5.6721	737571	5582	9.33
19133	3890	9.11	689	6.2053	834392	5633	8.85
13662	6193	8.11	724	6.4662	906502	5683	5.08
15312	22901	6.51	734	6.4736	948065	5734	1.38
17548	30952	5.34	747	6.7776	1030365	5759	1.77
20286	9877	4.86	786	7.4843	1170261	5805	5.22
21739	3304	6.11	818	7.9008	1301526	5853	4.07

Source : a) Bangladesh Bank (1997): Economic Trends, May, Volume : XXII, No.5
b) Bangladesh Bank (1997): Annual Report (1995-96).
c) Ministry of Finance, Government of Bangladesh (1995): Economic Review, June, 1995.
d) Ministry of Finance, Government of Bangladesh (1997): Bangladesh Arthrahitic Samikhya.
e) Bangladesh Bureau of Statistics (1997): Statistical Pocket Book of Bangladesh.

Table 2
Data used for regression analysis in chapter 5 and 6

Year	GDP current price (M.Tk.)	GDP deflator (base year 1973-74)	CPI (base year 1973-74)	F	M ₁ current price (M.Tk.)	M ₂ current price (M.Tk.)	FR current price (M.Tk.)	EXR \$=Tk.	DEXR (%)	FAL One year lag value (M.Tk.)	S current price (M.Tk.)	F(-1) One year lag va	I ₁
1975-76	110320	1.4367	153	4.23	8822	13969	246	16.06	97.40	14470	1029	-8.38	11.62
1976-77	116003	1.4713	157	4.32	9729	17399	729	15.43	-6.37	12359	11015	2.61	11.03
1977-78	145194	1.7198	177	4.22	12241	21410	1542	15.12	-13.08	8089	9915	12.74	10.66
1978-79	174047	1.9671	191	4.27	15248	27600	1888	15.22	-6.72	12693	14573	7.91	11.12
1979-80	196050	2.1979	227	4.31	17318	32449	3855	15.49	-14.37	16001	19164	18.85	11.04
1980-81	231433	2.5093	255	6.98	19863	41360	6197	16.26	-6.55	19886	24623	12.33	13.07
1981-82	259015	2.7742	269	7.29	20121	45487	8397	20.07	6.33	23020	20638	16.07	13.53
1982-83	294189	3.0040	326	7.36	26343	58983	14802	23.80	7.67	29512	31985	10.13	13.35
1983-84	355185	3.4401	357	8.11	35499	83858	14910	24.94	-4.31	29354	35224	9.51	13.75
1984-85	406933	3.8259	397	8.13	42318	105342	11465	25.96	-6.40	32917	37722	11.20	14.50
1985-86	466227	4.2014	486	8.54	49279	123381	16611	29.89	4.84	37930	45128	9.82	14.66
1986-87	539201	4.6642	491	8.59	52628	143531	21363	30.63	-7.11	40002	58073	10.32	14.70
1987-88	597136	5.0198	536	8.69	50477	164080	23039	31.24	-8.47	49828	63981	11.43	14.66
1988-89	659598	5.4084	579	8.88	54507	190781	24774	32.14	-4.76	52709	61801	8.62	14.68
1989-90	737571	5.6721	633	9.06	63687	222976	24961	32.92	-6.31	54910	67629	9.33	14.83
1990-91	834392	6.2053	689	9.11	62037	150044	27256	35.68	-0.42	64581	90632	8.85	14.99
1991-92	906502	6.4662	724	8.11	82572	285259	32415	38.15	1.75	66075	117960	5.08	15.12
1992-93	948065	6.4736	734	6.51	90626	315356	36969	39.14	1.19	63054	136882	1.38	14.39
1993-94	1030365	6.7776	747	5.34	111671	364030	43548	40.00	0.42	67000	153807	1.77	12.78
1994-95	1170261	7.4843	786	4.86	131794	422123	48145	40.20	-4.49	62672	187868	5.22	12.22
1995-96	1301526	7.9008	818	6.11	144594	456905	49780	40.86	-2.33	71055	185096	4.07	13.41

a) Bangladesh Bank (1997): Economic Trends, Volume : XXII, No.5

b) Bangladesh Bank (1997): Annual Report (1995-96).

Source :- c) Bangladesh Bureau of statistics(1997): Twenty years of National Accounting of Bangladesh (1972-73) to (1991-92)

d) Ministry of Finance, Govt. of Bangladesh (1997): Bangladesh arthanaitic Samikhya

e) Bangladesh Bureau of statistics (1997): Statistical Pocket Book of Bangladesh.

Figure: 1

Growth of M1, M2 and HP (In Real and Percentage Terms)

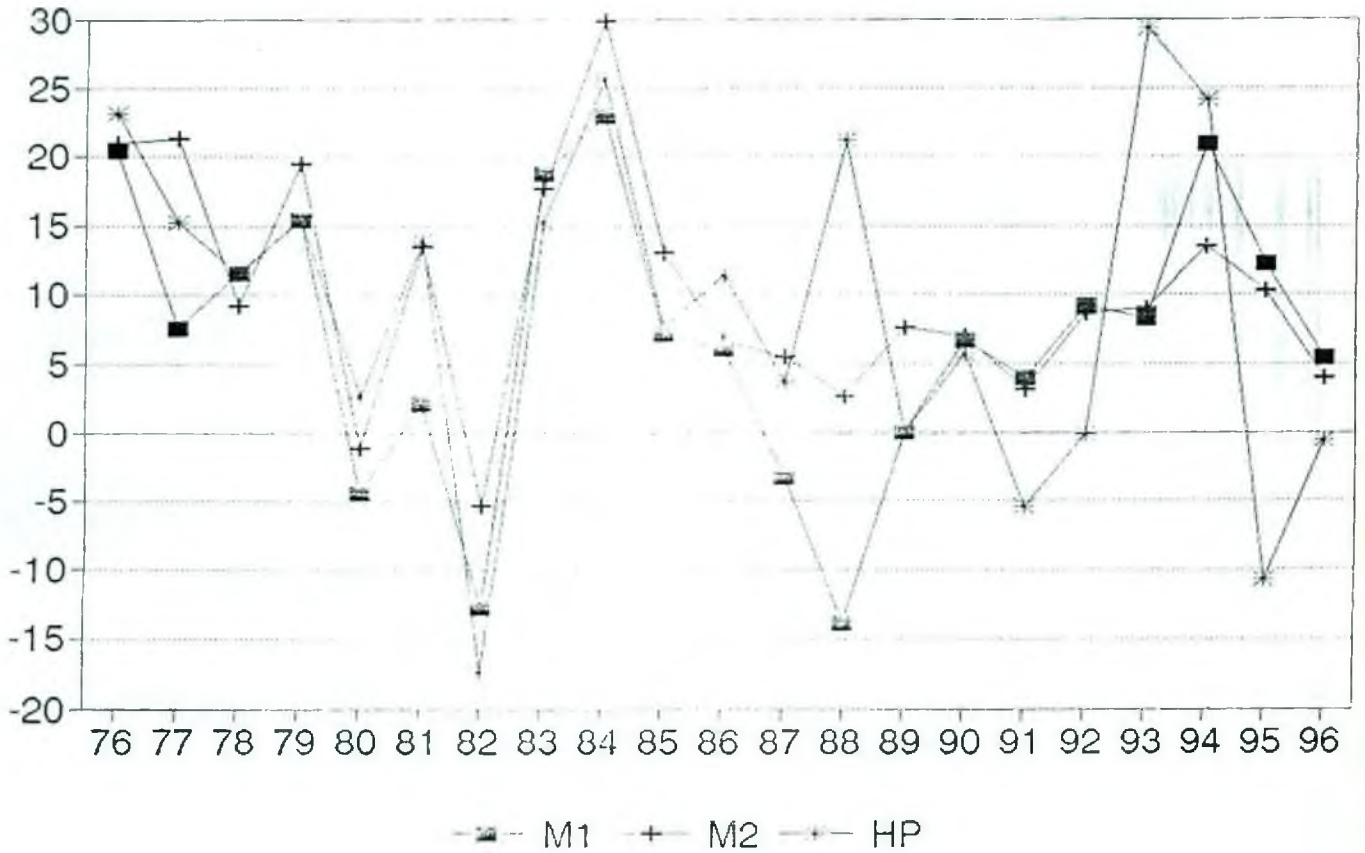


Figure: 2

Growth of Real GDP (In Percentage Terms)

