LESSON – 25
THE SUPPLY OF MONEY

Learning outcomes

After studying this unit, you should be able to:

- Define Money supply
- Find the determinants of money supply
- Know high powered money and money multiplier
- Identify the measures of money supply in India
- Money supply and liquidity

INTRODUCTION:

DEFINITIONS OF MONEY SUPPLY

The supply of money is a stock at their particular point of time, though it conveys the idea of a flow over time. The term the supply of money is synonymous with such terms as money stock, stock of money, money supply and quantity of money. The supply of money at any moment is the total amount of money in the economy. There are three alternative views regarding the definition or measures of money supply. "The most common view is associated with the traditional and Keynesian thinking which stresses the medium of exchange function of money. According to this view money supply is defined as currency with the public and demand deposits with commercial banks. Demand deposits are savings and current accounts of depositors in a commercial bank. They are the liquid form of money because depositors can draw cheques for any amount lying in their accounts and the bank has to make immediate payment on demand. Demand deposits with commercial banks plus currency with the public are together denoted as M1 the money supply. This is regarded as a narrower, definition of the money supply.

The second definition is broader and is associated with the modern quantity theorists headed by Friedman. Professor Friedman defines the money supply at any moment of time as 'literally the number of dollars people are carrying' around in their pockets, the number of dollars they have to their credit at banks or dollars they have their credit at banks in the form of demand deposits, and also commercial bank time deposits." Time deposits are fixed deposits of customers in a commercial bank. Such deposits earn a fixed rate of interest varying with the time period for which the amount is deposited. Money can be withdrawn before the expiry of that period by paying a penal rate of interest to the bank. So time deposits possess liquidity and are included in the M1 money supply by Friedman. Thus this definition includes M1 plus time deposits of commercial banks in the supply of money. This wider definition is characterized as M2 in America and M3 in Britain and India. It stresses the store of value function of money or what Friedman says, 'a temporary abode of purchasing power.
The third definition is the broadest and is associated with Gurley and Shaw.

They include in the supply of money, M2 plus deposits of savings banks, building societies, loan associations, and deposits of other credit and financial institutions. The choice between these alternative definitions of the money supply depends on two considerations: One "a particular choice of definition may facilitate or blur the analysis of the various motives for holding cash;"2 and two from the point of view of monetary policy an appropriate definition should include the area over which the monetary authorities can have direct influence. If these two criteria are applied, none of the three definitions is wholly satisfactory.

The first definition of money supply may be analytically better because M1 is a sure medium of exchange. But M1 is an inferior store of value because it earns no rate of interest, as is earned by time deposits. Further, the central bank can have control over a narrower area if only demand deposits are included in the money supply.

The second definition that includes time deposits (M2) in the supply of money is less satisfactory analytically because "in a highly developed financial structure, 'it is important to consider separately the motives for holding means of payment and time deposits." Unlike demand deposits, time deposits are not a perfect liquid form of money. This is because the amount lying in them can be withdrawn immediately by cheques. Normally, it cannot be withdrawn before the due date of expiry of the deposit. In case a depositor wants his money earlier, he has to give a notice to the bank which allows the withdrawal after charging a penal interest rate from the depositor. Thus time deposits lack perfect liquidity and cannot be included in the money supply. But this definition is more appropriate from the point of view of monetary policy because the central bank can exercise control over a wider area that includes both demand and time deposits held by commercial banks.

The third definition of money supply that includes M2 plus deposits of non bank financial institutions is unsatisfactory on both the criteria. Firstly, they do not serve the medium of exchange function of money. Secondly, they almost remain outside the area of control of the central bank. The only advantage they possess is that they are highly liquid store of value. Despite this merit, deposits of non-bank financial institutions are not included in the definition of money supply.

DETERMINANTS OF MONEY SUPPLY

There are two theories of the determination of the money supply. According to the first view, the money supply is determined exogenously by the central bank. The second view holds that the money supply is determined endogenously by changes in the economic activity which affect people's desire to hold currency relative to deposits, the rate of interest, etc.

Thus the determinants of money supply are both exogenous and endogenous which can be described broadly as: the minimum cash reserve ratio, the level of bank reserves, and
the desire of the people to hold currency relative to deposits. The last two determinants together are called the monetary base or the high powered money.

1. The Required Reserve Ratio
The required reserve ratio (or the minimum cash reserve ratio or the reserve deposit ratio) is an important determinant of the money supply. An increase in the required reserve ratio reduces the supply of money with commercial banks and a decrease in required reserve ratio increases the money supply. The RRI is the ratio of cash to current and time deposit liabilities which is determined by law. Every commercial bank is required to keep a certain percentage of these liabilities in the form of deposits with the central bank of the country. But notes or cash held by commercial banks in their tills are not included in the minimum required reserve ratio.

But the short-term assets along with the cash are regarded as the liquid assets of a commercial bank. In India the statutory liquidity ratio (SLR) has been fixed by law as an additional measure to determine the money supply. The SLR is called 'Secondary reserve ratio in other countries while the required reserve ratio is referred to as the primary ratio. The raising of the SLR has the effect of reducing the money supply with commercial banks for lending purposes, and the lowering of the SLR tends to increase the money supply with banks for advances.

2. The Level of Bank Reserves
The level of bank reserves is another determinant of the money supply. Commercial bank reserves consist of reserves on deposits with the central bank and currency in their tills or vaults. It is the central bank of the country that influences the reserves of commercial banks in order to determine the supply of money. The central bank requires all commercial banks to hold reserves equal to a fixed percentage of both time and demand deposits. These are legal minimum or required reserves. Required reserves (RR) are determined by the required reserve ratio (RRr) and the level of deposits (D) of a commercial bank: RR= RRr xD. If deposits amount of Rs 80 lakhs and required reserve ratio is 20 per cent, then the required reserves will be 20% x 80=Rs 16 lakhs. If the reserve ratio is reduced to 10 per cent, the required reserves will also be reduced to Rs 8 lakhs. Thus the higher the reserve ratio, the higher the required reserves to be kept by a bank, and vice versa. But it is the excess reserves (ER) which are important for the determination of the money supply. Excess reserves are the difference between total reserves (TR) and required reserves (RR): ER=TR-RR.

If total reserves are Rs 80 lakhs and required reserves’ are Rs 16 lakhs, then the excess reserves are Rs 64 lakhs (Rs 80 - 16 lakhs). When required reserves are reduced to Rs 8 lakhs, the excess reserves increase to Rs 72 lakhs. It is the excess reserves of a commercial bank which influence the size of its deposit liabilities. A commercial bank advances loans equal to its excess reserves Which are an important component of the money supply. To determine the supply of money with a commercial bank, the central bank influences its reserves by adopting open market operations and discount rate policy.
Open market operations refer to the purchase and sale of government securities and other types. of assets like bills, securities, bonds, etc., both government and private in the open market. When the central bank buys or sells securities in the open market, the level of bank reserves expands or contracts. The purchase of securities by the central bank is paid for with cheques to the holders of securities who, in turn, deposit them in commercial banks thereby increasing the level of bank reserves. The opposite is the case when the central bank sell securities to the public and banks who make payments to the central bank through cash and cheques thereby reducing the level of bank reserves.

The discount rate policy affects the money supply by influencing the cost and supply of bank credit to commercial banks. The discount rate, known as the bank rate in India, is the interest rate at which commercial banks borrow from the central bank. A high discount rate means that commercial banks get less amount by selling securities to the central bank. The commercial banks, in turn raise their lending rates to the public thereby making advances dearer for them.

Thus there will be contraction of credit and the level of commercial bank reserves. Opposite is the case when the bank rate is lowered. It tends to expand credit and the consequent bank reserves. It should be noted that commercial bank reserves are affected significantly only when open market operations and discount rate policy supplement each other. Otherwise, their effectiveness as determinants of bank reserves and consequently of money supply is limited.

3. Public's Desire to Hold Currency and Deposits
People's desire to hold currency (or cash) relative to deposits in commercial banks also determines the money supply. If people are in the habit of keeping less in cash and more in deposits with the commercial banks, the money supply will be large. This is because banks can create more money with larger deposits. On the contrary, if people do not have banking habits and prefer to keep their money holdings in cash, credit creation by banks will be less and, the money supply will be at a low level.

High Powered Money and the Money Multiplier

The current practice is to explain the determinants of the money supply in terms of the monetary base or high powered money. High-powered money is the sum of commercial bank reserves and currency (notes and coins) held by the public. High-powered money is the base for the expansion of bank deposits and creation of the money supply. The supply of money varies directly with changes in the monetary base, and inversely with the currency and reserve ratios.

4. Other Factors
The money supply is a function not only of the high-powered money determined by the monetary authorities, but of interest rates; income and other factors. The latter factors change the proportion of money balances that the public holds as cash. Changes in business activity can change the behavior of banks and the public and thus affect the
money supply. Hence the money supply is not only an exogenous controllable item but also an endogenously determined item.

Conclusion
We have discussed above the factors which determine money supply through the creation of bank credit. But money supply and bank credit are indirectly related to each other. When the money supply increases, a part of it is saved in banks depending upon the depositors' propensity to save. These savings become deposits of commercial banks who, in turn, lend after meeting the statutory reserve requirements. Thus with every increase in the money supply, the bank credit goes up. But it may not happen in exactly the same proportion due to the following factors:

(a) The marginal propensity to save does not remain constant. It varies from time to time depending on changes in income levels, prices, and subjective factors.
(b) Banks may also create more or less credit due to the operation of leakages in the credit creation process.
(c) The velocity of circulation of money also affects the money supply. If the velocity of money circulation increases, the bank credit may not fall even after a decrease in the money supply. The central bank has little control over the velocity of money which may adversely affect bank credit.

HIGH-POWERED MONEY AND THE MONEY MULTIPLIER

The current practice is to explain the determinants of the money supply in terms of the monetary base or high-powered money. High-powered money is the sum of commercial bank reserves and currency (notes and coins) held by the public. High-powered money is the base for the expansion of bank deposits and creation of the money supply. The supply of money varies directly with changes in the monetary base, and inversely with the currency and reserve ratios.
The use of high-powered money consists of the demand of commercial banks for the legal limit or required reserves with the central bank and excess reserves and the demand of the public for currency. Thus high-powered money $H=C+RR+ER$, where $C$ represents currency, $RR$ the required reserves and $ER$ the excess reserves.

A commercial bank's required reserves depend upon its deposits. But a bank usually holds reserves in excess of its required reserves. In fact, banks do not advance loans up to the legal limits but precisely less than that. This is to meet unanticipated cash withdrawals or adverse clearing balances. Hence the need arises for maintaining excess reserves by them. The money supply is "thus determined by the required reserve ratio and the excess reserve ratio of commercial banks. The required reserve ratio ($RRr$) is the ratio of required, reserves to deposits ($RR/D$), and the excess reserve ratio ($ERr$) is the ratio or excess reserves to deposits ($ER/D$).

Currency held by the public is another component of high-powered money. The demand for currency by the public is expressed as a proportion of bank deposits. Thus the currency ratio $Cr=CID$, where $C$ is the currency and $D$ deposits. The currency ratio is
influenced by such factors as changes in income levels of the people, the use of credit
instruments by the public, and uncertainties in economic activity.

The formal relation between the money supply and high-powered money can be
stated in the form of equations as under:

The money supply (M) consists of deposits of commercial banks (CD) and
currency (C) held by the public. Thus the supply of money
\[ M = D + C \quad \text{(1)} \]

High-powered money (H) (or monetary base) consists of currency held by the public (C)
plus required reserves (RR) and excess reserves of commercial banks. Thus high-
powered money

\[ H = C + RR + ER \quad \text{(2)} \]

The relation between M and H can be expressed as the ratio of M to H. So
divide equation (1) by (2):

\[ \frac{M}{H} = \frac{1 + \frac{C}{D} + \frac{RR}{D} + \frac{ER}{D}} {1} \quad \text{(4)} \]

By substituting \( Cr \) for \( \frac{C}{D} \), \( RRr \) for \( \frac{RR}{D} \), and \( ERr \) for \( \frac{ER}{D} \), equation (4) becomes

\[ \frac{M}{H} = 1 + \frac{Cr}{Cr} + \frac{RRr}{RR} + \frac{ERR}{ERR} \quad \text{(5)} \]

Thus high-powered money

\[ H = Cr + RRr + ERR / 1 + Cr \times M \quad \text{(6)} \]

\[ M = 1 + Cr / Cr + RRr + ERr \times H \quad \text{(7)} \]

And money supply

Equation (7) defines money supply in terms of high-powered money. It expresses the
money supply in terms of four determinants, H, Cr, RRr, and ERr. The equation states
that the higher the supply of high powered money, the higher the money supply. Further,
the lower the currency ratio (Cr), the reserve ratio (RRr), and the excess reserve ratio
(ERr) the higher the money supply, and vice versa.
The relation between the money supply and high-powered money is illustrated in Figure 24.1. The horizontal curve $H_s$ shows the given supply of high powered money. The curve $H_d$ shows the demand for high-powered money associated with each level of money supply and represents equation (6). The slope of the $H_d$ curve is equal to the term \((Cr+RRr+ERr)/(1+Cr)\). Given $Cr$, $RRr$, $ERr$ and the high-powered money $H_s$, the equilibrium money supply is $OM$. If the money supply is larger than this, say $OM_1$, there will be excess demand for high-powered money. On the contrary, a less than $OM$ money supply will mean less demand for high-powered money.

If there is an increase in anyone of the ratios $Cr$ or $RRr$ or $ERr$, there would be an increase in the demand for high-powered money. This is shows by the $H_d$ curve in Figure 24.1 where the increase in the demand for high-powered money leads to decline in the money supply to $OM$.

The quotient of equation (7) is the money multiplier $m$. Thus

\[
= \frac{1+Cr}{CR + RRr + ERr} \quad \text{(8)}
\]

Now the relation between the money supply and high-powered money of equation (7) becomes

\[
M = mH \quad \text{(9)}
\]

Equation (9) expresses the money supply as a function of $m$ and $H$. In other words, the money supply is determined by high powered money ($H$) and the money multiplier ($m$). The size of the money multiplier is determined by the currency ratio ($Cr$) of the public, the required reserve ratio ($RRr$) at the 'Central bank, and the excess reserve ratio ($ERr$) of commercial banks. The lower these ratios are, the larger the money multiplier is. If $m$ is fairly stable, the central bank can manipulate the money supply ($M$) by manipulating $H$. The central bank can do so by open market operations. But the stability of $m$ depends
upon the stability of the currency ratio and the reserve ratios RRr and ERr. Or, it depends upon off-setting changes in Rli.r and ERr ratios. Since these ratios and currency with the public are liable to change, the money multiplier is quite volatile in the short run.

Given the division of high-powered money between currency held by the public, the required reserves at the central bank, and the excess reserves of commercial banks, the money supply varies inversely with Cr, RRr and ERr. But the supply of money varies directly with changes in the high-powered money. This is shown in Figure 24.2. An increase in the supply of high-powered money by Mf shifts the Hs' curve upward to Hs'. At E, the demand and supply of high-powered money is in equilibrium and money supply is OM. With the increase in the supply of high-powered money to Hs', the supply of money also increases to OM, at the new equilibrium point E'. Further, Figure 14.2 reveals the operation of the money multiplier; With the increase in the high-powered money by M, the money supply increases by 11M. An increase in high-powered money by Re 1 increases by a multiple of Re 1.

Some economists do not take into consideration excess reserves in determining high-powered money and consequently the money supply. But the monetarists give more importance to excess reserves. According to them, due to uncertainties prevailing in banking operations as in business, banks always keep excess reserves. The amount of excess reserves depends upon the interaction of two types of costs: the cost of holding excess reserves, and the cost generated by deficiency in excess reserves. The first cost is in terms of the market rate of interest at which excess reserves are maintained. The second cost is in terms of the bank rate which is a sort of penalty to be paid to the central bank for failure to maintain the legal required reserve ratio by the commercial bank. The excess reserve ratio varies inversely with the market rate of interest and directly with the bank rate. Since the money supply is inversely related to the excess reserve ratio, decline in the excess reserve ratio of banks tends to increase the money supply and vice versa. Thus the money supply is determined by high-powered money, the currency ratio, the required reserve ratio and the market rate of interest and the bank rate.

The monetary base or high-powered money is directly controllable by the central bank. It is the ultimate base of the nation's money supply. Of course, the money multiplier times the high-powered money always equals the money supply, i.e. M=mH. This formulation tells us how much new money will be created by the banking system for a given increase in the high-powered money. The monetary policy of the central bank affects excess reserves and the high-powered money identically. Suppose the central bank makes open market purchases. This raises the high-powered money in the form of excess reserves of banks. An increase in money supply that results from it comes from the banking system which creates new money, on the basis of its newly acquired excess reserves. Thus this concept tells us that the monetary authorities can control the money supply through changing the high-powered money or the money multiplier.

MEASURES OF MONEY SUPPLY IN INDIA
There are four measures of money supply in India which are denoted by $M_1$, $M_2$, $M_3$, and $M_4$. This classification was introduced by the Reserve Bank of India (RBI) in April 1977. Prior to this till March 1968, the RBI published only one measure of the money supply, $M_0$ or $M_1$, defined as currency and demand deposits with the public. This was in keeping with the traditional and Keynesian views of the narrow measure of the money supply. From April 1968, the RBI also started publishing another measure of the money supply which it called Aggregate Monetary Resources (AMR). This included $M_1$ plus time deposits of banks held by the public. This was a broad measure of money supply which was in line with Friedman's view. But since April 1977, the RBI has been publishing data on four measures of the money supply which are discussed as under.

$M_1$. The first measure of money supply, $M_1$ consists of:
(i) Currency with the public which includes notes and coins of all denominations in circulation excluding cash on hand with banks;
(ii) demand deposits with commercial and cooperative banks, excluding inter-bank deposits; and
(iii) 'other deposits' with RBI which include current deposits of foreign central banks, financial institutions and quasi-financial institutions such as IDBI, IFCI, etc, other than of banks, IMF, IBRD, etc. The RBI characterizes $M_1$ as narrow money.

$M_2$. The second measure of money supply is $M_2$ which consists of $M_1$ plus post office savings bank deposits. Since savings bank deposits of commercial and cooperative banks are included in the money supply, it is essential to include post office savings bank deposits. The majority of people in rural, and urban India have preference for post office deposits from the safety viewpoint than bank deposits.

$M_3$. The third measure of money supply in India is $M_3$ which consists of $M_1$ plus time deposits with commercial and cooperative banks, excluding inter-bank time deposits. The RBI calls $M_3$ as broad money. $M_4$. The fourth measure of money supply is $M_4$ which consists of $M_3$ plus total post office deposits comprising time deposits and demand deposits as well. This is (he broadest measure of money supply.

Of the four inter-related measures of money supply for which the RBI publishes data, it is $M_3$ which is of special significance. It is $M_3$ which is taken into account in formulating macroeconomic objectives of the economy every year. Since $M_1$ is narrow money and includes only demand deposits of banks along with currency held by the public, it overlooks the importance of time deposits in policy making. That is why, the RBI prefers $M_3$ which includes total deposits of banks and currency with the public in credit budgeting for its credit policy. It is on the estimates of increase in $M_3$ that the effects of money supply on prices and growth of national income are estimated. In fact, $M_3$ is an empirical measure of money supply in India, as is the practice in developed countries. The Chakravarty Committee also recommended the use of $M_3$ for monetary targeting without any reason.

**MONEY SUPPLY AND LIQUIDITY**
Of the four measures of money supply in India, M, which consists of currency with the public and demand deposits with commercial and cooperative banks, is the most liquid form of money. Currency consists of notes, rupee coins, two rupee coins, five rupee coins and small coins: and cash on hand with banks, are the most liquid assets. Demand deposits are savings bank accounts and current accounts in banks from which depositors can withdraw cheques for any amount lying in their accounts. Thus like currency, demand deposits are the most liquid and possess the medium of exchange function of money.

A liquid asset is one which is easily spendable, and transferable at face value anywhere and at any time. It can be turned into the generally acceptable medium of exchange quickly without any risk of loss. The phrase 'without risk of loss" refers to the currency unit (Rs, $ or £) and not to real purchasing power. Government bonds, time deposits (also known as savings deposits which are different from savings bank deposits, shares, real estate, etc., are 'frozen' assets which can be sold or exchanged for money on short notice only. They are thus less liquid than money.

M consists of M, plus post office savings bank deposits. In India, the majority of people in rural and urban areas prefer to keep their cash in post office savings bank deposits from the safety viewpoint because they think that post offices are government owned and managed. With the nationalisation of 20 commercial banks and opening of their branches in almost all rural areas of the country, the distinction between post office savings banks deposit and commercial savings bank deposits has disappeared. Still the majority of rural people being illiterate, they prefer post offices to banks even by force of habit.

The inclusion of post office savings bank deposits in M, is meant to measure, the increase in total money supply which affects the economy. But post office savings bank deposits are less liquid than currency and demand deposits because they cannot be easily withdrawn. There are no cuphing facilities, except in metropolitan cities and that too in main post offices. The depositors have to undergo a cumbersome process of cash withdrawals in post offices. M includes M plus time deposits (also known as savings deposits in developed countries) with commercial banks and cooperative banks. This is broad money which stresses the store of value function of money along with the medium of exchange function. Time deposits with banks are less liquid than currency and demand deposits because they are held for a fixed time period at a fixed rate of interest. 70 to 90 per cent of the total money deposited in this account can be withdrawn before the expiry of full period by paying a penal interest rate to the bank. So time deposits do possess liquidity but less than demand deposits.

The fourth measure of money supply is M which includes M plus total post office deposits comprising time deposits and savings bank, deposits. They tend to increase the money supply in the country manifold. But these total post office deposits are less liquid than total bank deposits for the reasons already given in the case of M.
If deposits with non-bank financial institutions such as mutual savings banks, building societies, insurance companies, loan associations and other credit and financial institutions are also included along with total post office deposits in M3, the total money supply would be many times more than what is ordinarily defined as money. And if such assets as shares, bonds, government securities, etc. are also included in the supply of money, it would be difficult to measure the money stock in the country.

Taking all such assets vis-à-vis money, they differ in the degree of liquidity. Since currency is easily spendable and transferable, and has more stability in value, it possesses the highest degree of liquidity. Demand deposits of banks are also as liquid as currency because they are chequing accounts and easily serve as medium of exchange. But demand deposits of post offices do not possess the same degree of liquidity as bank deposits. Time deposits of banks, post offices and other non-bank financial institutions are less liquid than demand deposits because they cannot be easily transferred to depositors in the form of cash and spent. They serve more as a store of value. So far as shares of corporations are concerned, they are also less liquid because they take more time to be sold and transferred. They involve cost in the act of transferability in the form of brokerage or commission. They cannot be easily converted into cash and spent. Hence, they possess less liquidity than demand deposits. Bonds of companies also possess less liquidity because they can be converted into cash after the expiry of the bond maturity period. But they are transferable and earn higher interest return. Government securities are issued in the name of initial purchases and, as such, are non-marketable, because they cannot be sold to someone else. So they are not liquid. On the other hand, money market mutual fund shares, post office savings bonds and natural savings certificates possess the advantage of being cashable though they are also non-transferable. They can be returned for repayment of principal plus a fixed amount of interest after a short waiting period before the actual maturity date. They are thus as liquid as fixed deposits of banks and post offices.

It is on account of these reasons that economists prefer M1 as the measure of money supply because among all the assets, currency and demand deposits possess the highest degree of liquidity. However, for practical purposes in policy formulation and for empirical studies, governments and researchers use M3 as the measure of money supply which is less liquid than M1.

But how does a change in money supply affect liquidity? A change in the money supply affects liquidity by bringing changes or readjustments in the portfolio holdings of the assets of the people. This depends on the effect of money supply on aggregate spending. If people decide to spend the increased money supply in purchasing such assets as shares and debentures, there will be less money available in liquid form with the public. If the stock market 'R' is bullish, people may convert assets in their portfolios in buying more shares. On the other hand, if there is uncertainty in the stock market, people may hold the increased money supply in bank deposits or invest it in real estate if they expect property prices to rise. But it is the money authority that influences money supply in the economy by following "easy" or "tight" monetary policy. It does so by controlling aggregate spending and thereby influencing business activity, output and employment. But the
monetary authority is not always successful in controlling spending by increasing' or
decreasing, the money supply and hence liquidity. This is because the central bank has
little control over the velocity of circulation of money, non-bank financial intermediaries,
business expectations, time lags in monetary policy, etc. It is, therefore, very difficult to
predict the effects of changes in money supply on liquidity.

DERIVATION OF MONEY MULTIPLIERS

We have explained above the derivation of the money multiplier and its relation with
high powered money. But the total money supply is usually measured not in terms of M
but as M1, M2, and M3. Therefore, the derivation of money multipliers of these three
measures M1, M2 and M3 of the total money supply and the relation of each with the
high powered money are shown below in the form of equations.

First, take M1. In the M1 measure of money supply are included the demand
deposits of commercial banks (D) and currency with the public (C). Thus the money
supply

\[ M_1 = D + C \]  

In the high powered money (or monetary base) are included the required reserves of
commercial banks (RR) plus currency with the public (C). Thus high powered money

\[ H = RR + C \]  

By dividing equation (1) by equation (2), the ratio of M1 to H can be expressed as

\[ \frac{M_1}{H} = \frac{D + C}{RR + C} \]

Dividing the right hand side of the above equation by D;

\[ \frac{M_1}{H} = \frac{D}{D} + \frac{C}{D} + \frac{RR}{D} + \frac{C}{D} \]

\[ \frac{M_1}{H} = 1 + \frac{C}{D} + \frac{RR}{D} + \frac{C}{D} \]

The higher the value of the multiplier, the lower will be the reserve ratio (RR)
and cash currency ratio (Cr).

\[ M_2 = D + C + TD \]  

In high powered money are included required reserves (RR), the excess reserves
of commercial banks (ER) plus currency held by the public (C). So

\[ H = RR + ER + C \]

In order to find out the ratio of M2 to H, divide equation (3) by equation (4),
\[ \frac{M2}{H} = \frac{D/D + C/D + TD/D + RR/D + ER/D + C/D}{1+Cr+Td/Rr+Er+Cr} \]

By substituting Cr for C/D, Td for TD/D, RRr for RR/D and Er for ER/D:

\[ \frac{M2}{H} = 1+Cr+Td/Rr+Er+Cr \]

\[ M2 = 1+Cr+Td/Rr+Er+Cr \times H \]

The value of m2 multiplier is higher than that of ml multiplier because it leads to greater increase in the monetary base (ll). The higher the value of m2 multiplier, the lower will be rate of Cr, Rr and Er.

M) includes M2 plus deposits of non-bank financial institutions (Dn) and a portion of deposits of these institutions which remains with banks (Rp). Thus the deposits of these institutions are taken as RpDn which are related to the reserve, ratio of commercial banks (Rr). Thus

\[ M3 + D + RpDn + Dn + Cr(D + Dn) \]

And the monetary base will be determined as:

\[ H = Rr(D + RpDn) + Cr(D + Dn) \]

\[ Rr = RR/D \text{ or } R = Rr(D) \]

\[ Cr = C/D \text{ or } C = Cr(D) \]

To find out the ratio of M3 and H, divide equation (5) by equation (6),

\[ M3 = D + RpDn + Dn + Cr(D + Dn) \]

\[ H = Rr(D + RpDn) + Cr(D + Dn) \]

Dividing the right hand side of the above equation by D,

\[ \frac{M3}{H} = D + RpDn + Dn + Cr(D + Dn) / Rr(D + RpDn) + Cr(D + Dn) \text{ OR} \]

\[ \frac{M3}{H} = D + Dn(Rp + 1) + Cr(D + Dn) / Rr(D + RpDn) + Cr(D + Dn) \text{ OR} \]

DIVIDING THE RIGHT HAND SIDE OF THE ABOVE EQUATION BY D,

\[ \frac{M3}{H} = 1 + \frac{Dn/D(Rp + 1) + Cr(1 + Dn/D)}{Rr(1 + Rp Dn/D) + Cr(1 + Dn/D)} \]

\[ = 1 + \frac{Dn/D Rp + Dn/D + Cr + Cr x Dn/D}{Rr + Rp Dn/D + Cr x Dn/D} \]

\[ \frac{M3}{H} = 1 + Cr + (1 + Rp + Cr) / Rr + Cr + (Rr Rp + Cr) \]

\[ M3 = 1 + Cr + (1 + Rp + Cr) / Rr + Cr + (Rr Rp + Cr) \times H \]
Questions for self assessment:

1. Explain the various components of the money supply.

2. Discuss the determinants of the money supply. Should time deposits be included under the supply of money?

3. Discuss the various measures of the money supply adopted by the Reserve Bank of India. How do they differ from those adopted by developed countries?

4. Of the various measures of money supply which possess more liquidity and why?

5. Explain the determinants of high-powered money.

6. Discuss the relation between money supply and high-powered money.

7. Write a note on the money multiplier.
POINTS TO PONDER:

Supply of money

DEFINITIONS OF MONEY SUPPLY:
- The supply of money is a stock at their particular point of time, though it conveys the idea of a flow over time.
- The term the supply of money is synonymous with such terms as money stock, 'stock of money', 'money supply' and 'quantity of money'.

DETERMINANTS OF MONEY SUPPLY
1. The Required Reserve Ratio
2. The Level of Bank Reserves
3. Public's Desire to Hold Currency and Deposits
4. Other Factors which includes interest rates and other things.

HIGH-POWERED MONEY
High-powered money is the sum of commercial bank reserves and currency (notes and coins) held by the public. High-powered money is the base for the expansion of bank deposits and creation of the money supply.
MEASURES OF MONEY SUPPLY IN INDIA

There are four measures of money supply in India which are denoted by M1, M2, M3, and M4. This classification was introduced by the Reserve Bank of India (RBI) in April 1977. Prior to this till March 1969, the RBI published only one measure of the money supply, M or M1.

Money supply and liquidity