Theory 1# Fisher's Transactions Approach to Demand for Money:

In his theory of demand for money Fisher and other classical economists laid stress on the medium of exchange function of money, that is, money as a means of buying goods and services. All transactions involving purchase of goods, services, raw materials, assets require payment of money as value of the transaction made.

If accounting identity, namely value paid must equal value received is to occur, value of goods, services and assets sold must be equal to the value of money paid for them. Thus, in any given period, the value of all goods, services or assets sold must equal to the number of transactions 7 made multiplied by the average price of these transactions. Thus, the total value of transactions made is equal to PT.

On the other hand, because value paid is identically equal to the value of money flow used for buying goods, services and assets, the value of money flow is equal to the nominal quantity of money supply M multiplied by the average number of times the quantity of money in circulation is used or exchanged for transaction purposes. The average number of times a unit of money is used for transactions of goods, services and assets is called transactions velocity of circulation and is denoted by V.

Symbolically, Fisher's equation of exchange is written as under:

$MV = PT$ …(1)

Where, M = the quantity of money in circulation

V = transactions velocity of circulation

P = Average price

T = the total number of transactions.

The above equation (1) is an identity, that is true by definition. However by taking some assumptions about the variables V and T, Fisher transformed the above identity into a theory of demand for money.

According to Fisher, the nominal quantity of money M is fixed by the Central Bank of a country (note that Reserve Bank of India is the Central Bank of India) and is therefore treated as an exogenous variable which is assumed to be a given quantity in a particular period of time.

Further, the number of transactions in a period is a function of national income; the greater the national income, the larger the number of transactions required to be made. Further, since Fisher assumed that full employment of resources prevailed in the economy, the level of national income is determined by the amount of the fully employed resources.

Thus, with the assumption of full employment of resources, the volume of transactions T is fixed in the short run. But most important assumption which makes Fisher's equation of exchange as a theory of demand for money is that velocity of circulation (V) remains constant and is independent of M, P and T.

This is because he thought that velocity of circulation of money (V) is determined by institutional and technological factors involved in the transactions process. Since these institutional and technological factors do not vary much in the short run, the transactions velocity of circulation of money (V) was assumed to be constant.

As we know that for money market to be in equilibrium, nominal quantity of money supply must be equal to the nominal quantity of money demand.

In other words, for money market to be in equilibrium:

$M_s = M_d$

where M_s is fixed by the Central Bank of a country.

With the above assumptions, Fisher's equation of exchange in (1) above can be rewritten as

$M_d = PT/V$

or $M_d = 1/V \cdot PT$ …(2)

Thus, according to Fisher's transactions approach, demand for money depends on the following three factors:

(1) The number of transactions (T)

(2) The average price of transactions (P)

(3) The transaction velocity of circulation of money

It has been pointed out that Fisher's transactions approach represents some kind of a mechanical relation between demand for money (M_d) and the total value of transactions (PT). Thus Prof. Suraj Bhan Gupta says that in Fisher's approach the relation between demand for money M_d and the value of transactions (PT) "betrays some kind of a mechanical relation between it (i.e. PT) and M_d as PT represents the total amount of work to be done by money as a medium of exchange. This makes demand for money (M_d) a technical requirement and not a behavioural function".

In Fisher's transactions approach to demand for money some serious problems are faced when it is used for empirical research. First, in Fisher's transactions approach, not only transactions involving current production of goods and services are included but also those which arise in sales and purchase of capital assets such as securities, shares, land etc. Due to frequent changes in the values of these capital assets, it is not appropriate to assume that T will remain constant even if Y is taken to be constant due to full-employment assumption.

The second problem which is faced in Fisher's approach is that it is difficult to define and determine a general price level that covers not only goods and services currently produced but also capital assets just mentioned above.

The Cambridge Cash Balance Theory of Demand for Money:

Cambridge Cash Balance theory of demand for money was put forward by Cambridge economists, Marshall and Pigou. This Cash Balance theory of demand for money differs from Fisher's transactions approach in that it places emphasis on the function of money as a store of value or wealth instead of Fisher's emphasis on the use of money as a medium of exchange.

It is worth noting that the exchange function of money eliminates the need to barter and solves the problem of double coincidence of wants faced in the barter system. On the other hand, the function of money as a store of value lays stress on holding money as a general purchasing power by individuals over a period of time between the sale of a good or service and subsequent purchase of a good or service at a later date.

Marshall and Pigou focused their analysis on the factors that determine individual demand for holding cash balances. Although they recognized that current interest rate, wealth owned by the individuals, expectations of future prices and future rate of interest determine the demand for money, they however believed that changes in these factors remain constant or they are proportional to changes in individuals' income.

Thus, they put forward a view that individual's demand for cash balances (i.e. nominal money balances) is proportional to the nominal income (i.e. money income).

Thus, according to their approach, aggregate demand for money can be expressed as:

$M_d = kPY$

Where, Y = real national income

P = average price level of currently produced goods and services

PY = nominal income

k = proportion of nominal income (PY) that people want to hold as cash balances

Cambridge Cash balance approach to demand for money is illustrated in Fig. 15.1 where on the X-axis we measure nominal national income (PY) and on the F-axis the demand for money (M_d). It will be seen from Fig. 15.1 that demand for money (M_d) in this Cambridge Cash Balance Approach

is a linear function of nominal income. The slope of the function is equal to k, that is, $k = M_d/P_y$ .Thus important feature of Cash balance approach is that it makes the demand for money as function of money income alone.

A merit of this formulation is that it makes the relation between demand for money and income as behavioural in sharp contrast to Fisher's approach in which demand for money was related to total transactions in a mechanical manner.
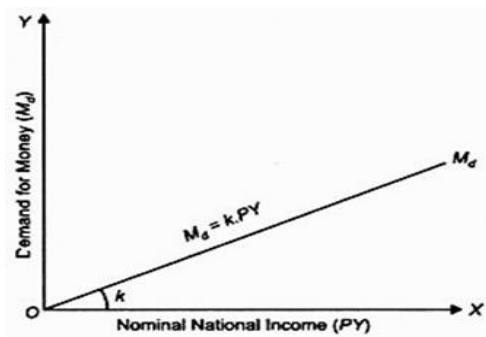
Fig. 15.1. *Demand for Money : Cambridge Cash Balance Approach.*

Although, Cambridge economists recognized the role of other factors such as rate of interest, wealth as the factors which play a part in the determination of demand for money but these factors were not systematically and formally incorporated into their analysis of demand for money.

In their approach, these other factors determine the proportionality factor k, that is, the proportion of money income that people want to hold in the form of money, i.e. cash balances. It was J.M. Keynes who later emphasized the role of these other factors such as rate of interest, expectations regarding future interest rate and prices and formally incorporated them explicitly in his analysis of demand for money.

Thus, Glahe rightly writes, "Cambridge approach is conceptually richer than the transactions approach, the former is incomplete because it does not formally incorporate the influence of economic variables just mentioned on the demand for cash balances… John Maynard Keynes first attempted to eliminate this shortcoming."

Another important feature of Cambridge demand for money function is that the demand for money is proportional function of nominal income ($M_d = kPY$). Thus, it is proportional function of both price level (P) and real income (Y). This implies two things. First, income elasticity of demand for money is unity and, secondly, price elasticity of demand for money is also equal to unity so that any change in the price level causes equal proportionate change in the demand for money.

Criticism:

It has been pointed out by critics that other influences such as rate of interest, wealth, expectations regarding future prices have not been formally introduced into the Cambridge theory of the demand for cash balances. These other influences remain in the background of the theory. "It was left to Keynes, another Cambridge economist, to highlight the influence of the rate of interest on the demand for money and change the course of monetary theory."

Another criticism leveled against this theory is that income elasticity of demand for money may well be different from unity. Cambridge economists did not provide any theoretical reason for its being equal to unity. Nor is there any empirical evidence supporting unitary income elasticity of demand for money.

Besides, price elasticity of demand is also not necessarily equal to unity. In fact, changes in the price level may cause non-proportional changes in the demand for money. However, these criticisms are against the mathematical formulation of cash balance approach, namely, $M_d = kPY$.

They do not deny the important relation between demand for money and the level of income. Empirical studies conducted so far point to a strong evidence that there is a significant and firm relation between demand for money and level of income.

Theory 2# Keynes' Theory of Demand for Money:

In his well-known book, Keynes propounded a theory of demand for money which occupies an important place in his monetary theory. It is also worth noting that for demand for money to hold Keynes used the term what he called liquidity preference. How much of his income or resources will a person hold in the form of ready money (cash or non-interest-paying bank deposits) and how much will he part with or lend depends upon what Keynes calls his "liquidity preference." Liquidity preference means the demand for money to hold or the desire of the public to hold cash.

Demand for Money or Motives for Liquidity Preference: Keynes' Theory:

Liquidity preference of a particular individual depends upon several considerations. The question is: Why should the people hold their resources liquid or in the form of ready money when they can get interest by lending money or buying bonds?

The desire for liquidity arises because of three motives:

(i) The transactions motive,

(ii) The precautionary motive, and

(iii) The speculative motive.

1. The Transactions Demand for Money:

The transactions motive relates to the demand for money or the need for money balances for the current transactions of individuals and business firms. Individuals hold cash in order "to bridge the interval between the receipt of income and its expenditure". In other words, people hold money or cash balances for transaction purposes, because receipt of money and payments do not coincide.

Most of the people receive their incomes weekly or monthly while the expenditure goes on day by day. A certain amount of ready money, therefore, is kept in hand to make current payments. This amount will depend upon the size of the individual's income, the interval at which the income is received and the methods of payments prevailing in the society.

The businessmen and the entrepreneurs also have to keep a proportion of their resources in money form in order to meet daily needs of various kinds. They need money all the time in order to pay for raw materials and transport, to pay wages and salaries and to meet all other current expenses incurred by any business firm.

It is clear that the amount of money held under this business motive will depend to a very large extent on the turnover (i.e., the volume of trade of the firm in question). The larger the turnover, the larger, in general, will be the amount of money needed to cover current expenses. It is worth noting that money demand for transactions motive arises primarily because of the use of money as a medium of exchange (i.e. means of payment).

Since the transactions demand for money arises because individuals have to incur expenditure on goods and services during the receipt of income and its use of payment for goods and services, money held for this motive depends upon the level of income of an individual.

A poor man will hold less money for transactions motive as he spends less because of his small income. On the other hand, a rich man will tend to hold more money for transactions motive as his expenditure will be relatively greater

The demand for money is a demand for real cash balances because people hold money for the purpose of buying goods and services. The higher the price level, the more money balances a person has to hold in order to purchase a given quantity of goods. If the price level doubles, then the individual has to keep twice the amount of money balances in order to be able to buy the same quantity of goods. Thus the demand for money balances is demand for real rather than nominal balances.

According to Keynes, the transactions demand for money depends only on the real income and is not influenced by the rate of interest. However, in recent years, it has been observed empirically and also according to the theories of Tobin and Baumol transactions demand for money also depends on the rate of interest.

This can be explained in terms of opportunity cost of money holdings. Holding one's asset in the form of money balances has an opportunity cost. The cost of holding money balances is the interest that is foregone by holding money balances rather than other assets. The higher the interest rate, the greater the opportunity cost of holding money rather than non-money assets.

Individuals and business firms economies on their holding of money balances by carefully managing their money balances through transfer of money into bonds or short-term income yielding non-money assets. Thus, at higher interest rates, individuals and business firms will keep less money holdings at each level of income.

2. Precautionary Demand for Money:

Precautionary motive for holding money refers to the desire of the people to hold cash balances for unforeseen contingencies. People hold a certain amount of money to provide for the danger of unemployment, sickness, accidents, and the other uncertain perils. The amount of money demanded for this motive will depend on the psychology of the individual and the conditions in which he lives.

3. Speculative Demand for Money:

The speculative motive of the people relates to the desire to hold one's resources in liquid form in order to take advantage of market movements regarding the future changes in the rate of interest (or bond prices). The notion of holding money for speculative motive was a new and revolutionary Keynesian idea. Money held under the speculative motive serves as a store of value as money held under the precautionary motive does. But it is a store of money meant for a different purpose.

The cash held under this motive is used to make speculative gains by dealing in bonds whose prices fluctuate. If bond prices are expected to rise which, in other words, means that the rate of interest is expected to fall, businessmen will buy bonds to sell when their prices actually rise. If, however, bond prices are expected to fall, i.e., the rate of interest is expected to rise, businessmen will sell bonds to avoid capital losses.

Nothing is certain in the dynamic world, where guesses about the future course of events are made on precarious basis, businessmen keep cash to speculate on the probable future changes in bond prices (or the rate of interest) with a view to making profits.

Given the expectations about the changes in the rate of interest in future, less money will be held under the speculative motive at a higher current rate of interest and more money will be held under this motive at a lower current rate of interest.

The reason for this inverse correlation between money held for speculative motive and the prevailing rate of interest is that at a lower rate of interest less is lost by not lending money or investing it, that is, by holding on to money, while at a higher current rate of interest holders of cash balance would lose more by not lending or investing.

Thus the demand for money under speculative motive is a function of the current rate of interest, increasing as the interest rate falls and decreasing as the interest rate rises. Thus, demand for money under this motive is a decreasing function of the rate of interest. This is shown in Fig. 15.2. Along X-axis we represent the speculative demand for money and along the y-axis the current rate of interest.

The liquidity preference curve LP is downward sloping towards the right signifying that the higher the rate of interest, the lower the demand for money for speculative motive, and vice versa. Thus at the high current rate of interest Or, a very small amount OM is held for speculative motive.

This is because at a high current rate of interest more money would have been lent out or used for buying bonds and therefore less money would be kept as inactive balances. If the rate of interest falls to Or', then a greater amount of money OM is held under speculative motive. With the further fall in the rate -of interest to Or', money held under speculative motive increases to OM.
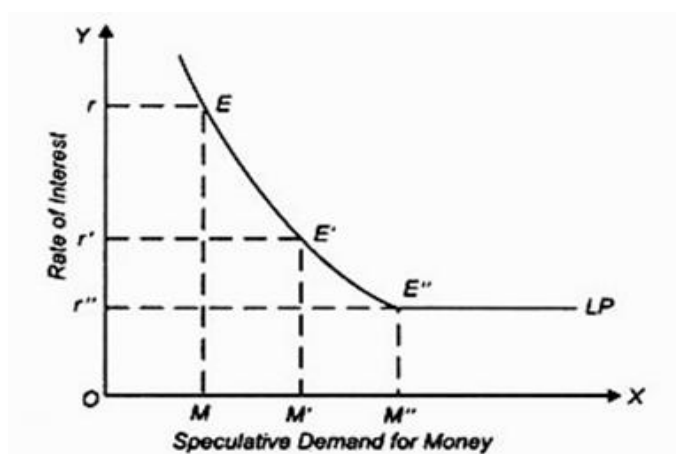

Fig. 15.2. Liquidity Preference Curve and Liquidity Trap.

Liquidity Trap:

It will be seen from Fig. 15.2 that the liquidity preference curve LP becomes quite flat i.e., perfectly elastic at a very low rate of interest; it is horizontal line beyond point E" towards the right. This perfectly elastic portion of liquidity preference curve indicates the position of absolute liquidity preference of the people. That is, at a very low rate of interest people will hold with them as inactive balances any amount of money they come to have.

This portion of liquidity preference curve with absolute liquidity preference is called liquidity trap by the economists because expansion in money supply gets trapped in the sphere of liquidity trap and therefore cannot affect rate of interest and therefore the level of investment. According to Keynes, it is because of the existence of liquidity trap that monetary policy becomes ineffective to tide over economic depression.

But the demand for money to satisfy the speculative motive does not depend so much upon what the current rate of interest is, as on expectations about changes in the rate of interest. If there is a change in the expectations regarding the future rate of interest, the whole curve of demand for money or liquidity preference for speculative motive will change accordingly.

Thus, if the public on balance expect the rate of interest to be higher (i.e., bond prices to be lower) in the future than had been previously supposed, the speculative demand for money will increase and the whole liquidity preference curve for speculative motive will shift upward.

Aggregate Demand for Money: Keynes' View:

If the total demand of money is represented by M_d we may refer to that part of M held for transactions and precautionary motive as M_1 and to that part held for the speculative motive as M_2. Thus $M_d = M_1 + M_2$. According to Keynes, the money held under the transactions and precautionary motives, i.e., M_1, is completely interest-inelastic unless the interest rate is very high.

The amount of money held as M_1, that is, for transactions and precautionary motives, is mainly a function of the size of income and business transactions together with the contingencies growing out of the conduct of personal and business affairs.

We can write this in a functional form as follows:

$M_1 = L_1(Y)$ …(i)

where Y stands for income, L_1 for demand function, and M_1 for money demanded or held under the transactions and precautionary motives. The above function implies that money held under the transactions and precautionary motives is a function of income.

On the other hand, according to Keynes, money demanded for speculative motive, i.e., M_2 as explained above, is primarily a function of the rate of interest.

This can be written as:

$M_2 = L_2(r)$ …(ii)

Where r stands for the rate of interest, L_2 for demand function for speculative motive.

Since total demand of money $M_d = M_1 + M_2$, we get from (i) and (ii) above

$M_d = L_1(Y) + L_2(r)$

Thus, according to Keynes' theory of total demand for money is an additive demand function with two separate components. The one component, $L_1(Y)$ represents the transactions demand for money arising out of transactions and precautionary motives is an increasing function of the level of money income. The second component of the demand for money, that is, $L_2(r)$ represents the speculative demand for money, which depends upon rate of interest, is a decreasing function of the rate of interest.

Critique of Keynes' Theory:

By introducing speculative demand for money, Keynes made a significant departure from the classical theory of money demand which emphasized only the transactions demand for money. However, as seen above, Keynes' theory of speculative demand for money has been challenged.

The main drawback of Keynes' speculative demand for money is that it visualizes that people hold their assets in either all money or all bonds. This seems quite unrealistic as individuals hold their financial wealth in some combination of both money and bonds. This gave rise to portfolio approach to demand for money put forward by Tobin, Baumol and Friedman.

The portfolio of wealth consists of money, interest-bearing bonds, shares, physical assets etc. Further, while according to Keynes' theory, demand for money for transaction purposes is insensitive to interest rate, the modern theories of money demand put forward by Baumol and Tobin show that money held for transaction purposes is interest elastic.

Further, Keynes' additive form of demand for money function, namely, $M_d = L_X(Y) + L_2(r)$ has now been rejected by the modern economists. It has been pointed out that money represents a single asset, and not the several ones. There may be more than one motive to hold money but the same units of money can serve several motives. Therefore, the demand for money cannot be divided into two or more different departments independent of each other.

Further, as has been argued by Tobin and Baumol, the transactions demand for money also depends upon the rate of interest. Others have explained that speculative demand for money is an increasing function of the total assets or wealth. If income is taken as a proxy for total wealth then even speculative demand for money will depend upon the size of income, apart from the rate of interest.

In view of all these arguments, the Keynesian total demand for money function is written in the following modified form:

$M_d = L(Y,r)$

where it is conceived that demand for money function (M_d) is increasing function of the level of income, it is a decreasing function of the rate of interest. The presentation of the demand for money function in the above revised and modified form, $M_d = L (Y, r)$ has been a highly significant development in monetary theory.

Theory 3# Tobin's Portfolio Approach to Demand for Money:

American economist James Tobin, in his important contribution, explained that rational behaviour on the part of the individuals is that they should keep a portfolio of assets which consists of both bonds and money. In his analysis he makes a valid assumption that people prefer more wealth to less. According to him, an investor is faced with a problem of what proportion of his portfolio of financial assets he should keep in the form of money (which earns no interest) and interest-bearing bonds.

The portfolio of individuals may also consist of more risky assets such as shares. According to Tobin, faced with various safe and risky assets, individuals diversify their portfolio by holding a balanced combination of safe and risky assets. He points out that individual's behaviour shows risk aversion. That is, they prefer less risk to more risk at a given rate of return. In Keynes' analysis an individual holds his wealth in either all money or all bonds depending upon his estimate of the future rate of interest. But, according to Tobin, individuals are uncertain about future rate of interest.

If a wealth holder chooses to hold a greater proportion of risky assets such as bonds in his portfolio, he will be earning a high average return but will bear a higher degree of risk. Tobin argues that a risk averter will not opt for such a portfolio with all risky bonds or a greater proportion of them.

On the other hand, a person who, in his portfolio of wealth, holds only safe and riskless assets such as money (in the form of currency and demand deposits in banks) he will be taking almost zero risk but will also be having no return and as a result there will be no growth of his wealth. Therefore, people generally prefer a mixed diversified portfolio of money, bonds and shares, with each person opting for a little different balance between riskiness and return.

It is important to note that a person will be unwilling to hold all risky assets such as bonds unless he obtains a higher average return on them. In view of the desire of individuals to have both safety and reasonable return, they strike a balance between them and hold a mixed and balanced portfolio consisting of money (which is a safe and riskless asset) and risky assets such as bonds and shares though this balance or mix varies between various individuals depending on their attitude towards risk and hence their trade-off between risk and return.

Tobin's Liquidity Preference Function:

Tobin derived his liquidity preference function depicting relationship between rate of interest and demand for money (that is, preference for holding wealth in money form which is a safe and "riskless" asset. He argues that with the increase in the rate of interest {i.e. rate of return on bonds), wealth holders will be generally attracted to hold a greater fraction of their wealth in bonds and thus reduce their holding of money.

That is, at a higher rate of interest, their demand for holding money (i.e., liquidity) will be less and therefore they will hold more bonds in their portfolio. On the other hand, at a lower rate of interest they will hold more money and less bonds in their portfolio. This means, like Keynes' speculative demand for money, in Tobin's portfolio approach demand function for money as an asset (i.e. his liquidity preference function curve) slopes downwards as is shown in Fig. 15.3, where on the horizontal axis asset demand for money is shown.

This downward-sloping liquidity preference function curve shows that the asset demand for money in the portfolio increases as the rate of interest on bonds falls. In this way Tobin derives the aggregate liquidity preference curve by determining the effects of changes in interest rate on the asset demand for money in the portfolio of individuals. Tobin's liquidity preference theory has been found to be true by the empirical studies conducted to measure interest elasticity of the demand for money.

As shown by Tobin through his portfolio approach, these empirical studies reveal that aggregate liquidity preference curve is negatively sloped. This means that most of the people in the economy have liquidity preference function similar to the one shown by curve M_d in Fig. 15.3.
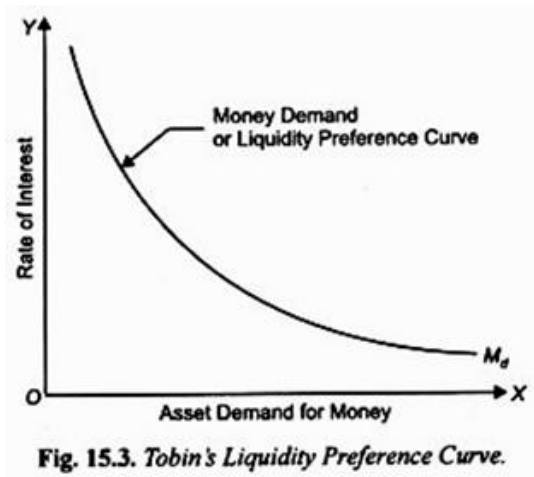
Fig. 15.3. *Tobin's Liquidity Preference Curve.*

Evaluation:

Tobin's approach has done away with the limitation of Keynes' theory of liquidity preference for speculative motive, namely, individuals hold their wealth in either all money or all bonds. Thus, Tobin's approach, according to which individuals simultaneously hold both money and bonds but in different proportion at different rates of interest, yields a continuous liquidity preference curve.

Further, Tobin's analysis of simultaneous holding of money and bonds is not based on the erroneous Keynes' assumption that interest rate will move only in one direction but on a simple fact that individuals do not know with certainty which way the interest rate will change.

It is worth mentioning that Tobin's portfolio approach, according to which liquidity preference (i.e. demand for money) is determined by the individual attitude towards risk, can be extended to the problem of asset choice when there are several alternative assets, not just two, of money and bonds.

Theory 4# Baumol's Inventory Approach to Transactions Demand for Money:

Instead of Keynes' speculative demand for money, Baumol concentrated on transactions demand for money and put forward a new approach to explain it. Baumol explains the transactions demand for money from the viewpoint of the inventory control or inventory management similar to the inventory management of goods and materials by business firms.

As businessmen keep inventories of goods and materials to facilitate transactions or exchange in the context of changes in demand for them, Baumol asserts that individuals also hold inventory of money because this facilitates transactions (i.e. purchases) of goods and services.

In view of the cost incurred on holding inventories of goods there is need for keeping optimal inventory of goods to reduce cost. Similarly, individuals have to keep optimum inventory of money for transactions purposes. Individuals also incur cost when they hold inventories of money for transaction purposes.

They incur cost on these inventories as they have to forgo interest which they could have earned if they had kept their wealth in saving deposits or fixed deposits or invested in bonds. This interest income forgone is the cost of holding money for transaction purposes. In this way Baumol and Tobin emphasised that transaction demand for money is not independent of the rate of interest.

It may be noted that by money we mean currency and demand deposits which are quite safe and riskless but carry no interest. On the other hand, bonds yield interest or return but are risky and may involve capital loss if wealth holders invest in them. However, saving deposits in banks, according to Baumol, are quite free from risk and also yield some interest.

Therefore, Baumol asks the question why an individual holds money (i.e. currency and demand deposits) instead of keeping his wealth in saving deposits which are quite safe and earn some interest as well. According to him, it is for convenience and capability of it being easily used for transactions of goods that people hold money with them in preference to the saving deposits.

Unlike Keynes both Baumol and Tobin argue that transactions demand for money depends on the rate of interest. People hold money for transaction purposes "to bridge the gap between the receipt of income and its spending." As interest rate on saving deposits goes up people will tend to shift a part of their money holdings to the interest-bearing saving deposits.

Individuals compare the costs and benefits of funds in the form of money with the interest- bearing saving deposits. According to Baumol, the cost which people incur when they hold funds in money is the opportunity cost of these funds, that is, interest income forgone by not putting them in saving deposits.

Baumol's Analysis of Transactions Demand:

Baumol analyses the transactions demand for money of an individual who receives income at a specified interval, say every month, and spends it gradually at a steady rate. This is illustrated in Fig. 15.4. It is assumed that individual is paid Rs. 12000 salary cheque on the first day of each month. Suppose he gets it cashed (i.e. converted into money) on the very first day and gradually spends it daily throughout the month (Rs. 400 per day) so that at the end of the month he is left with no money.

It can be easily seen that his average money holding in the month will be Rs. 12000/2 = Rs. 6000 (before 15th of a month he will be having more than Rs. 6,000 and after 15th day he will have less than Rs. 6,000). Average holding of money equal to Rs. 6,000 has been shown by the dotted line.

Now, the question arises whether it is the optimal strategy of managing money or what is called optimal cash management. The simple answer is no. This is because the individual is losing interest which he could have earned if he had deposited some funds in interest-bearing saving deposits instead of withdrawing all his salary in cash on the first day. He can manage his money balances so as to earn some interest income as well.

Suppose, instead of withdrawing his entire salary on the first day of a month, he withdraws only half of it (i.e. Rs. 6,000) in cash and deposits the remaining amount of Rs. 6,000 in saving account which gives him interest of 5 per cent, his expenditure per day remaining constant at Rs. 400. This is illustrated in Fig. 15.5.

It will be seen that his money holdings of Rs. 6,000 will be reduced to zero at the end of the 15th day of each month. Now, he can withdraw Rs. 6,000 on the morning of 16th of each month and then spends it gradually, at a steady rate of 400 per day for the next 15 days of a month. This is a better method of managing funds as he will be earning interest on Rs. 6,000 for 15 days in each month. Average money holdings in this money management scheme is Rs. 6000/2 = 3000.
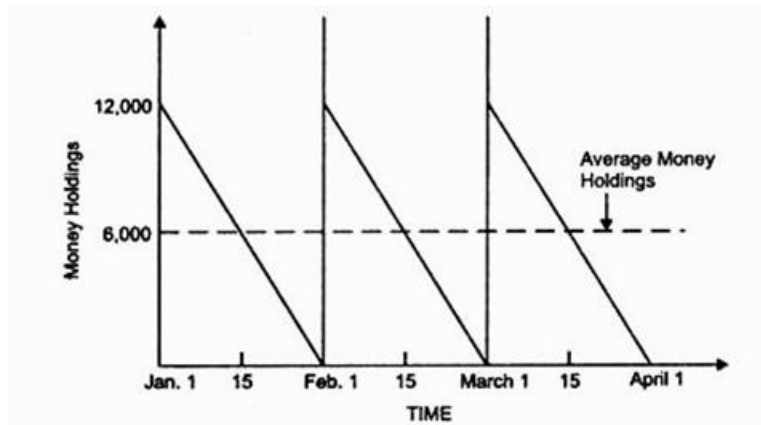

Fig. 15.4. *Stream of Cash Payments and Transactions Demand for Money.*
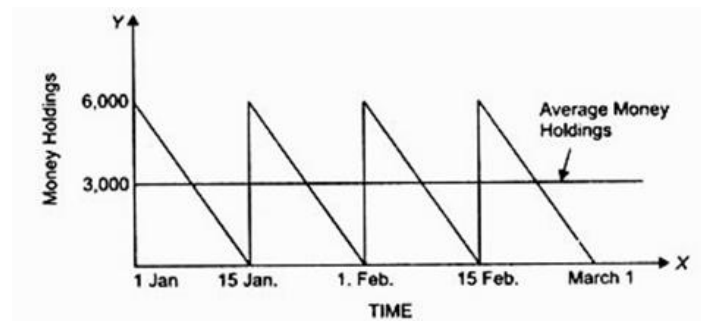

Fig. 15.5. *Transactions Demand for Money and Stream of Cash Payments.*

Likewise, the individual may decide to withdraw Rs. 4,000 (i.e., 1/3rd of his salary) on the first day of each month and deposits Rs. 8,000 in the saving deposits. His Rs. 4,000 will be reduced to zero, as he spends his money on transactions (that is, buying of goods and services), at the end of the 10th day and on the morning of 11th of each month he again withdraws Rs. 4,000 to spend on goods and services till the end of the 20th day and on 21st day of the month he again withdraws Rs. 4,000 to spend steadily till the end of the month.

In this scheme on an average he will be holding Rs. 4000/2 =2000 and will be investing remaining funds in saving deposits and earn interest on them. Thus, in this scheme he will be earning more interest income.

Now, which scheme will he decide to adopt? It may be noted that investing in saving deposits and then withdrawing cash from it to meet the transactions demand involves cost also. Cost on brokerage fee is incurred when one invests in interest-bearing bonds and sells them.

Even in case of saving deposits, the asset which we are taking for illustration, one has to spend on transportation costs for making extra trips to the bank for withdrawing money from the Savings Account. Besides, one has to spend time in the waiting line in the bank to withdraw cash each time from the saving deposits.

Thus, the greater the number of times an individual makes trips to the bank for withdrawing money, the greater the broker's fee he will incur. If he withdraws more cash, he will be avoiding some costs on account of brokerage fee. Thus, individual faces a trade-off problem; the greater the amount of pay cheque he withdraws in cash, less the cost on account of broker's fee but the greater the opportunity cost of forgoing interest income.

The problem is therefore to determine an optimum amount of money to hold. Baumol has shown that optimal amount of money holding is determined by minimizing the cost of interest income forgone and broker s fee. Let us elaborate it further.

Let the size of the pay cheque (i.e. salary) be denoted by Y, the average amount of the cash he withdraws each time the individual goes to the bank by C, the number of times he goes to the bank to withdraw cash by T, broker's fee which he has to bear each time he makes a trip to the bank by b. In the first scheme of money management when he gets his whole pay-cheque cashed on the first day of every month he incurs broker's fee only once since he makes only a single trip to the bank. Thus

T in our first case is equal to one $T = \dfrac{Y}{C} = \dfrac{12000}{12000} = 1$ because in this case $C = Y$. In the second

case $T = \dfrac{12000}{6000} = 2$ and in the third case $T = \dfrac{12000}{4000} = 3$.

Interest income lost by holding money is the average amount of money holding multiplied by the interest rate. As seen above, average money held is one half of cash withdrawn each time $\left(i.e, \dfrac{C}{2} \right)$.

Thus, interest income lost in the first case is $\dfrac{rC}{2} = \dfrac{5}{100} \times \dfrac{1200}{2} = ₹\,300$, in the second case interest

lost $= r.\dfrac{C}{2} = \dfrac{5}{100} \times \dfrac{6000}{2} = 150$ and in the third case it is $\dfrac{5}{100} \times \dfrac{4000}{2} = 100$.

Thus the total cost incurred on broker's fee and interest income forgone is given by

$$\text{Total Cost} = bT + \dfrac{r.C}{2}$$

where b stands for broker's fee.

As seen above $\qquad T = \dfrac{Y}{C}$

Therefore, $\qquad \text{Total Cost} = \dfrac{Y}{C}b + \dfrac{r.C}{2}$

Baumol has shown that average amount of cash withdrawal which minimises cost is given by

$$C = \sqrt{\dfrac{2bY}{r}}$$

This means that average amount of cash withdrawal which minimizes cost is the square root of the two times broker's fee multiplied by the size of individual's income (Y) and divided by the interest rate. This is generally referred to as Square Root Rule. For this rule, it follows that a higher broker's fee will raise the money holdings as it will discourage the individuals to make more trips to the bank.

On the other hand, a higher interest rate will induce them to reduce their money holdings for transaction purposes as they will be induced to keep more funds in saving deposits to earn higher interest income. That is, at a higher rate of interest transactions demand for money holdings will decline.

Keynes thought that transactions demand for money was independent of rate of interest. According to him, transactions demand for money depends on the level of income. However, Baumol and Tobin have shown that transactions demand for money is sensitive to rate of interest. Interest represents the opportunity cost of holding money instead of bonds, saving and fixed deposits.

The higher the rate of interest, the greater the opportunity cost of holding money (i.e. the greater the interest income forgone for holding money for transactions). Therefore, at a higher rate of interest people will try to economies the use of money and will demand less money for transactions.

At a lower interest rate on bonds, saving and fixed deposits, the opportunity cost of holding money will be less which will prompt people to hold more money for transactions. Therefore, according to Baumol and Tobin, transactions demand curve for money slopes downward as shown in Fig. 15.6. At higher interest rates, bonds, savings and fixed deposits are more attractive relative to money holding for transactions. Therefore, at higher interest rates people tend to hold less money for transaction purposes.

On the other hand, when the rates of interest are low, opportunity cost of holding money will be less and, as a consequence, people will hold more money for transactions. Therefore, the curve of transactions demand for money slopes downward.
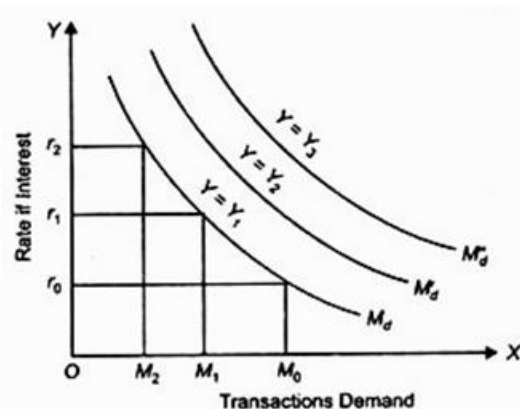

Fig. 15.6. *Transactions Demand for Money : Baumol-Tobin Approach.*

It will be observed from the square root rule given above that transactions demand for money varies directly with the income (Y) of the individuals. Therefore, the higher the level of income, the greater the transactions demand for money at a given rate of interest. In Fig. 15.6. the three transactions demand curves for money M_d, M_d' and M_d'', for three different income levels, Y_1, Y_2, Y_3 are shown.

It will be known from the square root rule that optimum money holding for transactions will increase less than proportionately to the increase in income. Thus, transactions demand for money, according to Baumol and Tobin, is function of both rate of interest and the level of income.

$M_{td} = f(r, y)$

where M_{td} stands for transactions demand for money, r for rate of interest and Y for the level of income.

Theory 5# Friedman's Theory of Demand for Money:

A noted monetarist economist Friedman put forward demand for money function which plays an important role in his restatement of the quantity theory of money and prices. Friedman believes that money demand function is most important stable function of macroeconomics.

He treats money as one type of asset in which wealth holders can keep a part of their wealth. Business firms view money as a capital good or a factor of production which they combine with the services of other productive assets or labour to produce goods and services. Thus, according to Friedman, individuals hold money for the services it provides to them.

It may be noted that the service rendered by money is that it serves as a general purchasing power so that it can be conveniently used for buying goods and services. His approach to demand for money does not consider any motives for holding money, nor does it distinguish between speculative and transactions demand for money. Friedman considers the demand for money merely as an application of a general theory of demand for capital assets.

Like other capital assets, money also yields return and provides services. He analyses the various factors that determine the demand for money and from this analysis derives demand for money function. Note that the value of goods and services which money can buy represents the real yield on money.

Obviously, this real yield of money in terms of goods and services which it can purchase will depend on the price level of goods and services. Besides money, bonds are another type of asset in which people can hold their wealth. Bonds are securities which yield a stream of interest income, fixed in nominal terms. Yield on bond is the coupon rate of interest and also anticipated capital gain or loss due to expected changes in the market rate of interest.

Equities or Shares are another form of asset in which wealth can be held. The yield from equity is determined by the dividend rate, expected capital gain or loss and expected changes in the price level. The fourth form in which people can hold their wealth is the stock of producer and durable consumer commodities.

These commodities also yield a stream of income but in kind rather than in money. Thus, the basic yield from commodities is implicit one. However, Friedman also considers an explicit yield from commodities in the form of expected rate of change in their price per unit of time.

Friedman's nominal demand function (M_d) for money can be written as:

$M_d = f(W, h, r_m, r_b, r_e, P, \Delta P/P, U)$

As demand for real money balances is nominal demand for money divided by the price level, demand for real money balances can be written as:

$M_d/P = f(W, h, r_m, r_b, r_e, P, \Delta P/P, U)$

where M_d stands for nominal demand for money and M_d/P for demand for real money balances, W stands for wealth of the individuals, h for the proportion of human wealth to the total wealth held by the individuals, r_m for rate of return or interest on money, r_b for rate of interest on bonds, r_e for rate of return on equities, P for the price level, $\Delta P/P$ for the change in price level (i.e. rate of inflation), and U for the institutional factors.

1. Wealth (W):

The major factor determining the demand for money is the wealth of the individual (W). In wealth Friedman includes not only non-human wealth such as bonds, shares, money which yield various rates of return but also human wealth or human capital. By human wealth Friedman means the value of an individual's present and future earnings. Whereas non-human wealth can be easily converted into money, that is, can be made liquid.

Such substitution of human wealth is not easily possible. Thus human wealth represents illiquid component of wealth and, therefore, the proportion of human wealth to the non-human wealth has been included in the demand for money function as an independent variable.

Individual's demand for money directly depends on his total wealth. Indeed, the total wealth of an individual represents an upper limit of holding money by an individual and is similar to the budget constraint of the consumer in the theory of demand. The greater the wealth of an individual, the more money he will demand for transactions and other purposes.

As a country becomes richer, its demand for money for transaction and other purposes will increase. Since as compared to non-human wealth, human wealth is much less liquid, Friedman has argued that as the proportion of human wealth in the total wealth increases, there will be a greater demand for money to make up for the illiquidity of human wealth.

2. Rates of Interest or Return (r_m, r_b, r_e):

Friedman considers three rates of interest, namely, r_m, r_b and r_e which determine the demand for money. r_m is the own rate of interest on money. Note that money kept in the form of currency and demand deposits does not earn any interest.

But money held as saving deposits and fixed deposits earns certain rates of interest and it is this rate of interest which is designated by r_m in the money demand function. Given the other rates of interest or return, the higher the own rate of interest, the greater the demand for money.

In deciding how large a part of his wealth to hold in the form of money the individual will compare the rate of interest on money with rates of interest (or return) on bonds and other assets. The opportunity cost of holding money is the interest or return given up by not holding these other forms of assets.

As rates of return on bond (r_b) and equities (r_e) rise, the opportunity cost of holding money will increase which will reduce the demand for money holdings. Thus, the demand for money is negatively related to the rate of interest (or return) on bonds, equities and other such non-money assets.

3. Price Level (P):

Price level also determines the demand for money balances. A higher price level means people will require a larger nominal money balance in order to do the same amount of transactions, that is, to purchase the same amount of goods and services.

If income (Y) is used as proxy for wealth (W) which, as stated above, is the most important determinant of demand for money, then nominal income is given by Y.P which becomes a crucial determinant of demand for money. Here Y stands for real income (i. e. in terms of goods and services) and P for price level.

As the price level goes up, the demand for money will rise and, on the other hand, if price level falls, the demand for money will decline. As a matter of fact, people adjust the nominal money balances (M) to achieve their desired level of real money balance (M/P).

4. The Expected Rate of Inflation ($\Delta P/P$):

If people expect a higher rate of inflation, they will reduce their demand for money holdings. This is because inflation reduces the value of their money balances in terms of its power to purchase goods and services.

If the rate of inflation exceeds the nominal rate of interest, there will be negative rate of return on money. Therefore, when people expect a higher rate of inflation they will tend to convert their money holdings into goods or other assets which are not affected by inflation.

On the other hand, if people expect a fall in the price level, their demand for money holdings will increase.

5. Institutional Factors (U):

Institutional factors such as mode of wage payments and bill payments also affect the demand for money. Several other factors which influence the overall economic environment affect the demand for money. For example, if recession or war is anticipated, the demand for money balances will increase.

Besides, instability in capital markets, which erodes the confidence of the people in making profits from investment in bonds and equity shares, will also raise the demand for money. Even political instability in the country influences the demand for money. To account for these institutional factors Friedman includes the variable U in his demand for money function.

Simplifying Friedman's Demand for Money Function:

A major problem faced in using Friedman's demand for money function has been that due to the non-existence of reliable data about the value of wealth (W), it is difficult to estimate the demand for money. To overcome this difficulty Friedman suggested that since the present value of wealth or $W = Y_p/r$ (where Y_p is the permanent income and r is the rate of interest on money.), permanent income Y_p can be used as a proxy variable for wealth.

Incorporating this in Friedman's demand for money function we have:

$M_d = (Y_p, h, r_m, r_b, r_e, P, \Delta P/P, U)$

If we assume that no price change is anticipated and institutional factors such as h and U remain fixed in the short run and also all the three rates of interest return are clubbed into one, Friedman's demand for money function is simplified to

$M_d = f(Y_p r)$

The Demand for Money: The Classical and the Keynesian Approach

The demand for money arises from two important functions of money. The first is that money acts as a medium of exchange and the second is that it is a store of value. Thus individuals and businesses wish to hold money partly in cash and partly in the form of assets. What explains changes in the demand for money? There are two views on this issue. The first is the "scale" view which is related to the impact of the income or wealth level upon the demand for money. The demand for money is directly related to the income level. The higher the income level, the greater will be the demand for money.

The second is the "substitution" view which is related to relative attractiveness of assets that can be substituted for money. According to this view, when alternative assets like bonds become unattractive due to fall in interest rates, people prefer to keep their assets in cash, and the demand for money increases, and vice versa.

The scale and substitution view combined together have been used to explain the nature of the demand for money which has been split into the transactions demand, the precautionary demand and the speculative demand. There are three approaches to the demand for money: the classical, the Keynesian, and the post-Keynesian. We discuss these approaches below.

The Classical Approach:

The classical economists did not explicitly formulate demand for money theory but their views are inherent in the quantity theory of money. They emphasized the transactions demand for money in terms of the velocity of circulation of money. This is because money acts as a medium of exchange and facilitates the exchange of goods and services. In Fisher's "Equation of Exchange".

$$MV = PT$$

Where M is the total quantity of money, V is its velocity of circulation, P is the price level, and T is the total amount of goods and services exchanged for money.

The right hand side of this equation PT represents the demand for money which, in fact, "depends upon the value of the transactions to be undertaken in the economy, and is equal to a constant fraction of those transactions." MV represents the supply of money which is given and in equilibrium equals the demand for money. Thus the equation becomes

$$Md = PT$$

This transactions demand for money, in turn, is determined by the level of full employment income. This is because the classicists believed in Say's Law whereby supply created its own demand, assuming the full employment level of income. Thus the demand for money in Fisher's approach is a constant proportion of the level of transactions, which in turn, bears a constant relationship to the level of national income. Further, the demand for money is linked to the volume of trade going on in an economy at any time.

Thus its underlying assumption is that people hold money to buy goods.

But people also hold money for other reasons, such as to earn interest and to provide against unforeseen events. It is therefore, not possible to say that V will remain constant when M is changed. The most important thing about money in Fisher's theory is that it is transferable. But it does not explain fully why people hold money. It does not clarify whether to include as money such items as time deposits or savings deposits that are not immediately available to pay debts without first being converted into currency.

It was the Cambridge cash balance approach which raised a further question: Why do people actually want to hold their assets in the form of money? With larger incomes, people want to make larger volumes of transactions and that larger cash balances will, therefore, be demanded.

The Cambridge demand equation for money is

$$Md = kPY$$

where Md is the demand for money which must equal the supply to money (Md=Ms) in equilibrium in the economy, k is the fraction of the real money income (PY) which people wish to hold in cash and demand deposits or the ratio of money stock to income, P is the price level, and Y is the aggregate real income. This equation tells us that "other things being equal, the demand for money in normal terms would be proportional to the nominal level of income for each individual, and hence for the aggregate economy as well."

Its Critical Evaluation:

This approach includes time and saving deposits and other convertible funds in the demand for money. It also stresses the importance of factors that make money more or less useful, such as the costs of holding it, uncertainty about the future and so on. But it says little about the nature of the relationship that one expects to prevail between its variables, and it does not say too much about which ones might be important.

One of its major criticisms arises from the neglect of store of value function of money. The classicists emphasized only the medium of exchange function of money which simply acted as a go-between to facilitate buying and selling. For them, money performed a neutral role in the economy. It was barren and would not multiply, if stored in the form of wealth.

This was an erroneous view because money performed the "asset" function when it is transformed into other forms of assets like bills, equities, debentures, real assets (houses, cars, TVs, and so on), etc. Thus the neglect of the asset function of money was the major weakness of classical approach to the demand for money which Keynes remedied.

The Keynesian Approach: Liquidity Preference:

Keynes in his General Theory used a new term "liquidity preference" for the demand for money. Keynes suggested three motives which led to the demand for money in an economy: (1) the transactions demand, (2) the precautionary demand, and (3) the speculative demand.

The Transactions Demand for Money:

The transactions demand for money arises from the medium of exchange function of money in making regular payments for goods and services. According to Keynes, it relates to "the need of cash for the current transactions of personal and business exchange" It is further divided into income and business motives. The income motive is meant "to bridge the interval between the receipt of income and its disbursement."

Similarly, the business motive is meant "to bridge the interval between the time of incurring business costs and that of the receipt of the sale proceeds." If the time between the incurring of expenditure and receipt of income is small, less cash will be held by the people for current transactions, and vice versa. There will, however, be changes in the transactions demand for money depending upon the expectations of income recipients and businessmen. They depend upon the level of income, the interest rate, the business turnover, the normal period between the receipt and disbursement of income, etc.

Given these factors, the transactions demand for money is a direct proportional and positive function of the level of income, and is expressed as

$L_1 = kY$

Where L_1 is the transactions demand for money, k is the proportion of income which is kept for transactions purposes, and Y is the income.

This equation is illustrated in Figure 70.1 where the line kY represents a linear and proportional relation between transactions demand and the level of income. Assuming k= 1/4 and income Rs 1000 crores, the demand for transactions balances would be Rs 250 crores, at point A. With the increase in income to Rs 1200 crores, the transactions demand would be Rs 300 crores at point B on the curve kY.
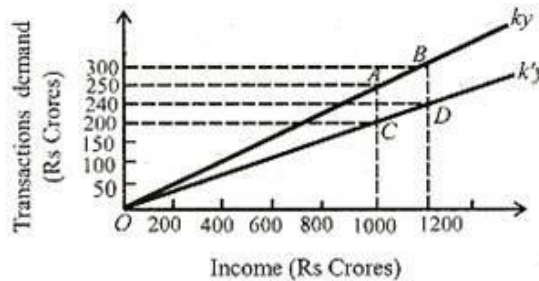

Fig. 70.1

If the transactions demand falls due to a change in the institutional and structural conditions of the economy, the value of κ is reduced to say, 1/5, and the new transactions demand curve is kY. It shows that for income of Rs 1000 and 1200 crores, transactions balances would Rs 200 and 240 crores at points C and D respectively in the figure. "Thus we conclude that the chief determinant of changes in the actual amount of the transactions balances held is changes in income. Changes in the transactions balances are the result of movements along a line like kY rather than changes in the slope of the line. In the equation, changes in transactions balances are the result of changes in Y rather than changes in k."

Interest Rate and Transactions Demand:

Regarding the rate of interest as the determinant of the transactions demand for money Keynes made the L_T function interest inelastic. But the pointed out that the "demand for money in the active circulation is also the some extent a function of the rate of interest, since a higher rate of interest may lead to a more economical use of active balances." "However, he did not stress the role of the rate of interest in this part of his analysis, and many of his popularizes ignored it altogether." In recent years, two post-Keynesian economists William J. Baumol and James Tobin have shown that the rate of interest is an important determinant of transactions demand for money.

They have also pointed out the relationship, between transactions demand for money and income is not linear and proportional. Rather, changes in income lead to proportionately smaller changes in transactions demand.

Transactions balances are held because income received once a month is not spent on the same day. In fact, an individual spreads his expenditure evenly over the month. Thus a portion of money meant for transactions purposes can be spent on short-term interest-

yielding securities. It is possible to "put funds to work for a matter of days, weeks, or months in interest-bearing securities such as U.S. Treasury bills or commercial paper and other short-term money market instruments.

The problem here is that there is a cost involved in buying and selling. One must weigh the financial cost and inconvenience of frequent entry to and exit from the market for securities against the apparent advantage of holding interest-bearing securities in place of idle transactions balances.

Among other things, the cost per purchase and sale, the rate of interest, and the frequency of purchases and sales determine the profitability of switching from ideal transactions balances to earning assets. Nonetheless, with the cost per purchase and sale given, there is clearly some rate of interest at which it becomes profitable to switch what otherwise would be transactions balances into interest-bearing securities, even if the period for which these funds may be spared from transactions needs is measured only in weeks. The higher the interest rate, the larger will be the fraction of any given amount of transactions balances that can be profitably diverted into securities."

The structure of cash and short-term bond holdings is shown in Figure 70.2 (A), (B) and (C). Suppose an individual receives Rs 1200 as income on the first of every month and spends it evenly over the month. The month has four weeks. His saving is zero.

Accordingly, his transactions demand for money in each week is Rs 300. So he has Rs 900 idle money in the first week, Rs 600 in the second week, and Rs 300 in the third week. He will, therefore, convert this idle money into interest bearing bonds, as illustrated in Panel (B) and (C) of Figure 70.2. He keeps and spends Rs 300 during the first week (shown in Panel B), and invests Rs 900 in interest-bearing bonds (shown in Panel C). On the first day of the second week he sells bonds worth Rs. 300 to cover cash transactions of the second week and his bond holdings are reduced to Rs 600.

Similarly, he will sell bonds worth Rs 300 in the beginning of the third and keep the remaining bonds amounting to Rs 300 which he will sell on the first day of the fourth week to meet his expenses for the last week of the month. The amount of cash held for transactions purposes by the individual during each week is shown in saw-tooth pattern in Panel (B), and the bond holdings in each week are shown in blocks in Panel (C) of Figure 70.2.
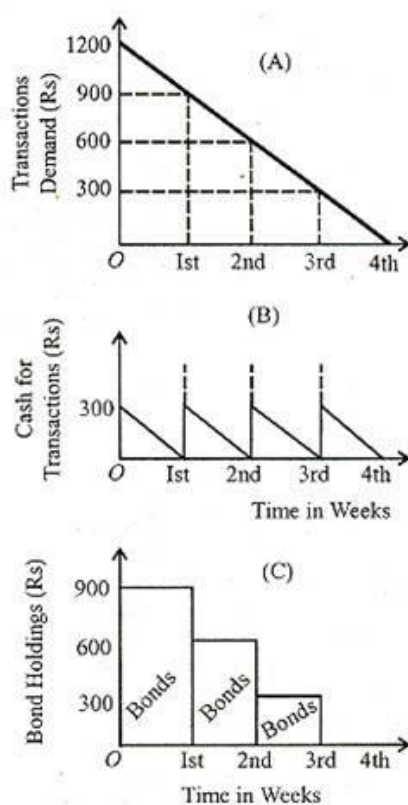

Fig. 70.2

The modern view is that the transactions demand for money is a function of both income and interest rates which can be expressed as $L_1 = f(Y, r)$.

This relationship between income and interest rate and the transactions demand for money for the economy as a whole is illustrated in Figure 3. We saw above that $L_T = kY$. If y=Rs 1200 crores and k= 1/4, then L_T = Rs 300 crores.

This is shown as Y_1 curve in Figure 70.3. If the income level rises to Rs 1600 crores, the transactions demand also increases to Rs 400 crores, given k = 1/4. Consequently, the transactions demand curve shifts to Y_2. The transactions demand curves Y_1, and Y_2 are interest- inelastic so long as the rate of interest does not rise above r_8 per cent.

Transactions Demand
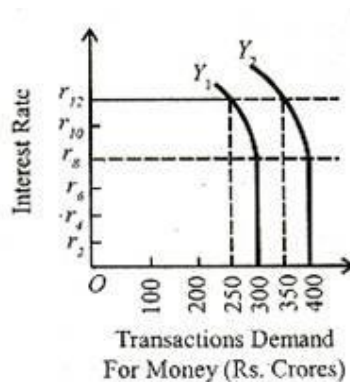For Money (Rs. Crores)
Fig. 70.3

As the rate of interest starts rising above r_8, the transactions demand for money becomes interest elastic. It indicates that "given the cost of switching into and out of securities, an interest rate above 8 per cent is sufficiently high to attract some amount of transaction balances into securities." The backward slope of the K, curve shows that at still higher rates, the transaction demand for money declines.

Thus when the rate of interest rises to r_{12}, the transactions demand declines to Rs 250 crores with an income level of Rs 1200 crores. Similarly, when the national income is Rs 1600 crores the transactions demand would decline to Rs 350 crores at r_{12} interest rate. Thus the transactions demand for money varies directly with the level of income and inversely with the rate of interest.

The Precautionary Demand for Money:

The Precautionary motive relates to "the desire to provide for contingencies requiring sudden expenditures and for unforeseen opportunities of advantageous purchases." Both individuals and businessmen keep cash in reserve to meet unexpected needs. Individuals hold some cash to provide for illness, accidents, unemployment and other unforeseen contingencies.

Similarly, businessmen keep cash in reserve to tide over unfavourable conditions or to gain from unexpected deals. Therefore, "money held under the precautionary motive is rather like water kept in reserve in a water tank." The precautionary demand for money depends upon the level of income, and business activity, opportunities for unexpected profitable deals, availability of cash, the cost of holding liquid assets in bank reserves, etc.

Keynes held that the precautionary demand for money, like transactions demand, was a function of the level of income. But the post-Keynesian economists believe that like transactions demand, it is inversely related to high interest rates. The transactions and precautionary demand for money will be unstable, particularly if the economy is not at full employment level and transactions are, therefore, less than the maximum, and are liable to fluctuate up or down.

Since precautionary demand, like transactions demand is a function of income and interest rates, the demand for money for these two purposes is expressed in the single equation LT=f(Y, r)[9]. Thus the precautionary demand for money can also be explained diagrammatically in terms of Figures 2 and 3.

The Speculative Demand for Money:

The speculative (or asset or liquidity preference) demand for money is for securing profit from knowing better than the market what the future will bring forth". Individuals and businessmen having funds, after keeping enough for transactions and precautionary purposes, like to make a speculative gain by investing in bonds. Money held for speculative purposes is a liquid store of value which can be invested at an opportune moment in interest-bearing bonds or securities.

Bond prices and the rate of interest are inversely related to each other. Low bond prices are indicative of high interest rates, and high bond prices reflect low interest rates. A bond carries a fixed rate of interest. For instance, if a bond of the value of Rs 100 carries 4 per cent interest and the market rate of interest rises to 8 per cent, the value of this bond falls to Rs 50 in the market. If the market rate of interest falls to 2 per cent, the value of the bond will rise to Rs 200 in the market.

This can be worked out with the help of the equation

$V = R/r$

Where V is the current market value of a bond, R is the annual return on the bond, and r is the rate of return currently earned or the market rate of interest. So a bond worth Rs 100 (V) and carrying a 4 per cent rate of interest (r), gets an annual return (R) of Rs 4, that is,

V=Rs 4/0.04=Rs 100. When the market rate of interest rises to 8 per cent, then V=Rs 4/0.08=Rs50; when it fall to 2 per cent, then V=Rs 4/0.02=Rs 200.

Thus individuals and businessmen can gain by buying bonds worth Rs 100 each at the market price of Rs 50 each when the rate of interest is high (8 per cent), and sell them again when they are dearer (Rs 200 each when the rate of interest falls (to 2 per cent).

According to Keynes, it is expectations about changes in bond prices or in the current market rate of interest that determine the speculative demand for money. In explaining the speculative demand for money, Keynes had a normal or critical rate of interest (r_c) in mind. If the current rate of interest (r) is above the "critical" rate of interest, businessmen expect it to fall and bond price to rise. They will, therefore, buy bonds to sell them in future when their prices rise in order to gain thereby. At such times, the speculative demand for money would fall. Conversely, if the current rate of interest happens to be below the critical rate, businessmen expect it to rise and bond prices to fall. They will, therefore, sell bonds in the present if they have any, and the speculative demand for money would increase.

Thus when $r > r_0$, an investor holds all his liquid assets in bonds, and when $r < r_0$ his entire holdings go into money. But when $r = r_0$, he becomes indifferent to hold bonds or money.

Thus relationship between an individual's demand for money and the rate of interest is shown in Figure 70.4 where the horizontal axis shows the individual's demand for money for speculative purposes and the current and critical interest rates on the vertical axis. The figure shows that when r is greater than r_0, the asset holder puts all his cash balances in bonds and his demand for money is zero.
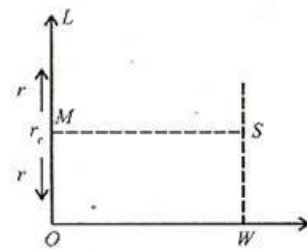
Speculative Demand
for Money

Fig. 70.4

This is illustrated by the LM portion of the vertical axis. When r falls below r_0, the individual expects more capital losses on bonds as against the interest yield. He, therefore, converts his entire holdings into money, as shown by OW in the figure. This relationship between an individual asset holder's demand for money and the current rate of interest gives the discontinuous step demand for money curve LMSW.

For the economy as a whole the individual demand curve can be aggregated on this presumption that individual asset-holders differ in their critical rates r_0. It is smooth curve which slopes downward from left to right, as shown in Figure 70.5.
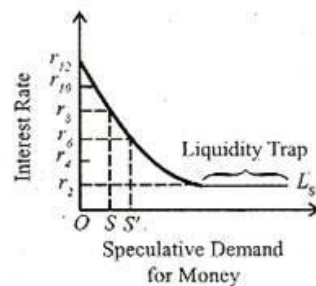

Speculative Demand
for Money

Fig. 70.5

Thus the speculative demand for money is a decreasing function of the rate of interest. The higher the rate of interest, the lower the speculative demand for money and the lower the rate of interest, the higher the speculative demand for money. It can be expressed algebraically as Ls = f (r), where Ls is the speculative demand for money and r is the rate of interest.

Geometrically, it is shows in Figure 70.5. The figure shows that at a very high rate of interest r_{J2}, the speculative demand for money is zero and businessmen invest their cash holdings in bonds because they believe that the interest rate cannot rise further. As the rate of

interest falls to say, r_8 the speculative demand for money is OS. With a further fall in the interest rate to r_6, it rises to OS'. Thus the shape of the Ls curve shows that as the interest rate rises, the speculative demand for money declines; and with the fall in the interest rate, it increases. Thus the Keynesian speculative demand for money function is highly volatile, depending upon the behaviour of interest rates.

Liquidity Trap:

Keynes visualised conditions in which the speculative demand for money would be highly or even totally elastic so that changes in the quantity of money would be fully absorbed into speculative balances. This is the famous Keynesian liquidity trap. In this case, changes in the quantity of money have no effects at all on prices or income. According to Keynes, this is likely to happen when the market interest rate is very low so that yields on bond, equities and other securities will also be low.

At a very low rate of interest, such as r_2, the Ls curve becomes perfectly elastic and the speculative demand for money is infinitely elastic. This portion of the Ls curve is known as the liquidity trap. At such a low rate, people prefer to keep money in cash rather than invest in bonds because purchasing bonds will mean a definite loss. People will not buy bonds so long as the interest rate remain at the low level and they will be waiting for the rate of interest to return to the "normal" level and bond prices to fall.

According to Keynes, as the rate of interest approaches zero, the risk of loss in holding bonds becomes greater. "When the price of bonds has been bid up so high that the rate of interest is, say, only 2 per cent or less, a very small decline in the price of bonds will wipe out the yield entirely and a slightly further decline would result in loss of the part of the principal." Thus the lower the interest rate, the smaller the earnings from bonds. Therefore, the greater the demand for cash holdings. Consequently, the Ls curve will become perfectly elastic.

Further, according to Keynes, "a long-term rate of interest of 2 per cent leaves more to fear than to hope, and offers, at the same time, a running yield which is only sufficient to offset a very small measure of fear." This makes the Ls curve "virtually absolute in the sense that almost everybody prefers cash to holding a debt which yields so low a rate of interest."

Prof. Modigliani believes that an infinitely elastic Ls curve is possible in a period of great uncertainty when price reductions are anticipated and the tendency to invest in bonds decreases, or if there prevails "a real scarcity of investment outlets that are profitable at rates of interest higher than the institutional minimum."

The phenomenon of liquidity trap possesses certain important implications.

First, the monetary authority cannot influence the rate of interest even by following a cheap money policy. An increase in the quantity of money cannot lead to a further decline in the rate of interest in a liquidity-trap situation. Second, the rate of interest cannot fall to zero.

Third, the policy of a general wage cut cannot be efficacious in the face of a perfectly elastic liquidity preference curve, such as Ls in Figure 70.5. No doubt, a policy of general wage cut would lower wages and prices, and thus release money from transactions to speculative purpose, the rate of interest would remain unaffected because people would hold money due to the prevalent uncertainty in the money market. Last, if new money is created, it instantly goes into speculative balances and is put into bank vaults or cash boxes instead of being invested. Thus there is no effect on income. Income can change without any change in the quantity of money. Thus monetary changes have a weak effect on economic activity under conditions of absolute liquidity preference.

The Total Demand for Money:

According to Keynes, money held for transactions and precautionary purposes is primarily a function of the level of income, $L_T = f(F)$, and the speculative demand for money is a function of the rate of interest, $Ls = f(r)$. Thus the total demand for money is a function of both income and the interest rate:

$L_T + L_S = f(Y) + f(r)$

or $L = f(Y) + f(r)$

or $L = f(Y, r)$

Where L represents the total demand for money.

Thus the total demand for money can be derived by the lateral summation of the demand function for transactions and precautionary purposes and the demand function for speculative purposes, as illustrated in Figure 70.6 (A), (B) and (C). Panel (A) of the Figure

shows OT, the transactions and precautionary demand for money at Y level of income and different rates of interest. Panel (B) shows the speculative demand for money at various rates of interest. It is an inverse function of the rate of interest.
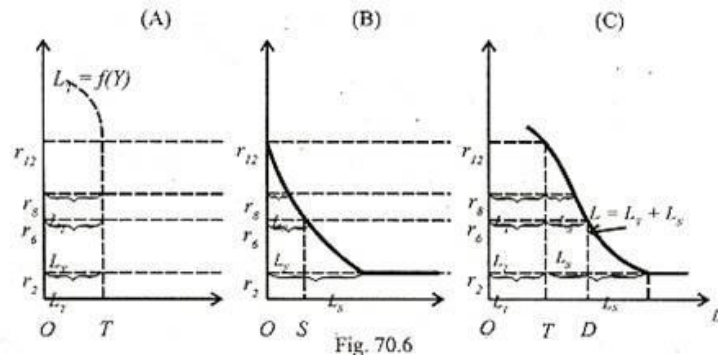

Fig. 70.6

For instance, at r_6 rate of interest it is OS and as the rate of interest falls to r the Ls curve becomes perfectly elastic. Panel (C) shows the total demand curve for money L which is a lateral summation of LT and Ls curves: $L=L_T+L_S$. For example, at r_b rate of interest, the total demand for money is OD which is the sum of transactions and precautionary demand OT plus the speculative demand TD, OD=OT+TD. At r_2 interest rate, the total demand for money curve also becomes perfectly elastic, showing the position of liquidity trap.

Money Supply: Importance, Concepts, Determinants and Everything Else

Let us make in-depth study of the importance, concept, measurement, measures, determinants, factors determining, relation with budget deficit and effect of open economy of money supply.

Importance of Money Supply:

Growth of money supply is an important factor not only for acceleration of the process of economic development but also for the achievement of price stability in the economy.

There must be controlled expansion of money supply if the objective of development with stability is to be achieved. A healthy growth of an economy requires that there should be neither inflation nor deflation. Inflation is the greatest headache of a developing economy.

A mild inflation arising out of the creation of money by deficit financing may stimulate investment by raising profit expectations and extracting forced savings. But a runaway inflation is highly detrimental to economic growth. The developing economies have to face the problem of inadequacy of resources in initial stages of development and it can make up this deficiency by deficit financing. But it has to be kept strictly within safe limits.

Thus, increase in money supply affects vitally the rate of economic growth. In fact, it is now regarded as a legitimate instrument of economic growth. Kept within proper limits it can accelerate economic growth but exceeding of the limits will retard it. Thus, management of money supply is essential in the interest of steady economic growth.

Concept of Money Supply and Its Measurement:

By money supply we mean the total stock of monetary media of exchange available to a society for use in connection with the economic activity of the country.

According to the standard concept of money supply, it is composed of the following two elements:

1. Currency with the public,

2. Demand deposits with the public.

Before explaining these two components of money supply two things must be noted with regard to the money supply in the economy. First, the money supply refers to the total sum of money available to the public in the economy at a point of time. That is, money supply is a stock concept in sharp contrast to the national income which is a flow representing the value of goods and services produced per unit of time, usually taken as a year.

Secondly, money supply always refers to the amount of money held by the public. In the term public are included households, firms and institutions other than banks and the government. The rationale behind considering money supply as held by the public is to separate the producers of money from those who use money to fulfill their various types of demand for money.

Since the Government and the banks produce or create money for the use by the public, the money (cash reserves) held by them are not used for transaction and speculative purposes and are excluded from the standard measures of money supply. This separation of producers of money from the users of money is important from the viewpoint of both monetary theory and policy.

Let us explain the two components of money supply at some length:

Currency with the Public:

In order to arrive at the total currency with the public in India we add the following items:

1. Currency notes in circulation issued by the Reserve Bank of India.

2. The number of rupee notes and coins in circulation.

3. Small coins in circulation.

It is worth noting that cash reserves with the banks has to be deducted from the value of the above three items of currency in order to arrive at the total currency with the public. This is because cash reserves with the banks must remain with them and cannot therefore be used for making payments for goods or by any commercial bank's transactions.

It may further be noted that these days paper currency issued by Reserve Bank of India (RBI) are not fully backed by the reserves of gold and silver, nor it is considered necessary to do so. Full backing of paper currency by reserves of gold prevailed in the past when gold standard or silver standard type of monetary system existed.

According to the modern economic thinking the magnitude of currency issued should be determined by the monetary needs of the economy and not by the available reserves of gold and silver. In other developedcountries, since 1957 Reserve Bank of India follows Minimum Reserve System of issuing currency.

Under this system, minimum reserves of Rs. 200 crores of gold and other approved securities (such as dollars, pound sterling, etc.) have to be kept and against this any amount of currency can be issued depending on the monetary requirements of the economy.

RBI is not bound to convert notes into equal value of gold or silver. In the present times currency is inconvertible. The word written on the note, say 100 rupee notes and signed by the governor of RBI that 'I promise to pay the bearer a sum of 100 rupees' is only a legacy of the past and does not imply its convertibility into gold or silver.

Another important thing to note is that paper currency or coins are fiat money, which means that currency notes and metallic coins serve as money on the bases of the fiat (i.e. order) of the Government. In other words, on the authority of the Government no one can refuse to accept them in payment for the transaction made. That is why they are called legal tender.

Demand Deposits with the Public:

The other important component of money supply are demand deposits of the public with the banks. These demand deposits held by the public are also called bank money or deposit money. Deposits with the banks are broadly divided into two types: demand deposits and time deposits. Demand deposits in the banks are those deposits which can be withdrawn by drawing cheques on them.

Through cheques these deposits can be transferred to others for making payments from whom goods and services have been purchased. Thus, cheques make these demand deposits as a medium of exchange and therefore make them to serve as money. It may be noted that demand deposits are fiduciary money proper.

Fiduciary money is one which functions as money on the basis of trust of the persons who make payment rather than on the basis of the authority of Government. Thus, despite the fact that demand deposits and cheques through which they are operated are not legal tender, they function as money on the basis of the trust commanded by those who draw cheques on them. They are money as they are generally acceptable as medium of payment.

Bank deposits are created when people deposit currency with them. But far more important is that banks themselves create deposits when they give advances to businessmen and others. On the basis of small cash reserves of currency, they are able to create a much larger amount of demand deposits through a system called fractional reserve system which will be explained later in detail.

In the developed countries such as USA and Great Britain deposit money accounted for over 80 per cent of the total money supply, currency being a relatively small part of it. This is because banking system has greatly developed there and also people have developed banking habits.

On the other hand, in the developing countries banking has not developed sufficiently and also people have not acquired banking habits and they prefer to make transactions in currency. However in India after 50 years of independence and economic development the proportion of bank deposits in the money supply has risen to about 50 per cent.

Four Measures of Money Supply:

Several definitions of money supply have been given and therefore various measures of money supply based on them have been estimated. First, different components of money supply have been distinguished on the basis of the different functions that money performs. For example, demand deposits, credit card and currency are used by the people primarily as a medium of exchange for buying goods and services and making other transactions.

Obviously, they are money because they are used as a medium of exchange and are generally referred to as M_1. Another measure of money supply is M_3 which includes both M_1 and time deposits held by the public in the banks. Time deposits are money that people hold as store of value.

The main reason why money supply is classified into various measures on the basis of its functions is that effective predictions can be made about the likely effects on the economy of changes in the different components of money supply. For example, if M_1 is increasing firstly it can be reasonably expected that people are planning to make a large number of transactions.

On the other hand, if time-deposits component of money supply measure M_3 which serves as a store of value is increasing rapidly, it can be validly concluded that people are planning to save more and accordingly consume less.

Therefore, it is believed that for monetary analysis and policy formulation, a single measure of money supply is not only inadequate but may be misleading too. Hence various measures of money supply are prepared to meet the needs of monetary analysis and policy formulation.

Recently in India as well as in some developed countries, four concepts of money supply have been distinguished. The definition of money supply given above represents a narrow measure of money supply and is generally described as M_1.

From April 1977, the Reserve Bank of India has adopted four concepts of money supply in its analysis of the quantum of and variations in money supply. These four concepts of measures of money supply are explained below.

Money Supply M1 or Narrow Money:

This is the narrow measure of money supply and is composed of the following items:

Ml = C + DD + OD

Where, C = Currency with the public

DD = Demand deposits with the public in the commercial and cooperative banks.

OD = Other deposits held by the public with Reserve Bank of India.

The money supply is the most liquid measure of money supply as the money included in it can be easily used as a medium of exchange, that is, as a means of making payments for transactions.

Currency with the public (C) in the above measure of money supply consists of the following:

(i) Notes in circulation.

(ii) Circulation of rupee coins as well as small coins

(iii) Cash reserves on hand with all banks.

Note that in measuring demand deposits with the public in the banks (i.e., DD), inter-bank deposits, that is, deposits held by a bank in other banks, are excluded from this measure.

In the other deposits with Reserve Bank of India (i.e., OD) deposits held by the Central and State Governments and a few others such as RBI Employees Pension and Provident Funds are excluded.

However, these other deposits of Reserve Bank of India include the following items:

(i) Deposits of Institutions such as UTI, IDBI, IFCI, NABARD etc.

(ii) Demand deposits of foreign Central Banks and Foreign Governments.

(iii) Demand deposits of IMF and World Bank.

It may be noted that other deposits of Reserve Bank of India constitute a very small proportion (less than one per cent).

Money Supply M2:

M2 is a broader concept of money supply in India than M1. In addition to the three items of M1, the concept of money supply M_2 includes savings deposits with the post office savings banks. Thus,

M2 = M1 + Savings deposits with the post office savings banks.

The reason why money supply M2 has been distinguished from M1 is that saving deposits with post office savings banks are not as liquid as demand deposits with commercial and cooperative banks as they are not chequable accounts. However, saving deposits with post offices are more liquid than time deposits with the banks.

Money Supply M3 or Broad Money:

M3 is a broad concept of money supply. In addition to the items of money supply included in measure M1, in money supply M3 time deposits with the banks are also included. Thus

M3= M1+ Time Deposits with the banks.

It is generally thought that time deposits serve as store of value and represent savings of the people and are not liquid as they cannot be withdrawn through drawing cheque on them. However, since loans from the banks can be easily obtained against these time deposits, they can be used if found necessary for transaction purposes in this way. Further, they can be withdrawn at any time by forgoing some interest earned on them.

It may be noted that recently M3 has become a popular measure of money supply. The working group on monetary reforms under the chairmanship of late Prof. Sukhamoy Chakravarty recommended its use for monetary planning of the economy and setting target of the growth of money supply in terms of M3.

Therefore, recently RBI in its analysis of growth of money supply and its effects on the economy has shifted to the use of M3 measure of money supply. In the terminology of money supply employed by the Reserve Bank of India till April 1977, this M3 was called Aggregate Monetary Resources (AMR).

Money Supply M4:

The measure M4 of money supply includes not only all the items of M3 described above but also the total deposits with the post office savings organisation. However, this excludes contributions made by the public to the national saving certificates. Thus,

M4 = M3 + Total Deposits with Post Office Savings Organisation.

Let us summaries the four concepts of money supply as used by Reserve Bank of India in the following tabular form:
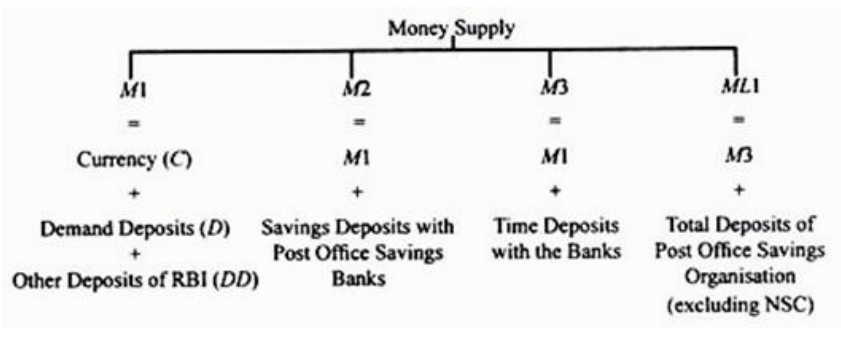
Determinants of Money Supply:

In order to explain the determinants of money supply in an economy we shall use M, concept of money supply which is the most fundamental concept of money supply. We shall denote it simply by M rather than M_1. This concept of money supply is composed of currency held by the public (C_p) and demand deposits with the banks (D). Thus

$M = C_p + D$ …(1)

Where, M = Total money supply with the public

C_p = Currency with the public

D = Demand deposits held by the public

The two important determinants of money supply as described in equation (1) are (a) the amounts of high-powered money which is also called Reserve Money by the Reserve Bank of India and (b) the size of money multiplier.

We explain below the role of these two factors in the determination of money supply in the economy:

1. High-Powered Money (H):

The high-powered money which we denote by H consists of the currency (notes and coins) issued by the Government and the Reserve Bank of India. A part of the currency issued is held by the public, which we designate as C_p and a part is held by the banks as reserves which we designate as R.

A part of these currency reserves of the banks is held by them in their own cash vaults and a part is deposited in the Reserve Bank of India in the Reserve Accounts which banks hold with RBI. Accordingly, the high-powered money can be obtained as sum of currency held by the public and the part held by the banks as reserves. Thus

$H = C_p + R$ …(2)

Where, H = the amount of high-powered money

C_p = Currency held by the public

R = Cash Reserves of currency with the banks.

It is worth noting that Reserve Bank of India and Government are producers of the high-powered money and the commercial banks do not have any role in producing this high-powered money (H). However, commercial banks are producers of demand deposits which are also used as money like currency.

But for producing demand deposits or credit, banks have to keep with themselves cash reserves of currency which have been denoted by R in equation (2) above. Since these cash reserves with the banks serve as a basis for the multiple creation of demand deposits which constitute an important part of total money supply in the economy, it provides high-powered-ness to the currency issued by Reserve Bank and Government.

A glance at equations (1) and (2) above will reveal that the difference in the two equations, one describing the total money supply and the other high-powered money, is that whereas in the former, demand deposits (D) are added to the currency held by the public, in the latter it is cash reserves (R) of the banks that are added to the currency held by the public.

In fact, it is against these cash reserves (R) that banks are able to create a multiple expansion of credit or demand deposits due to which there is large expansion in money supply in the economy. The theory of determination of money supply is based on the supply of and demand for high- powered money.

Some economists therefore call it 'The H Theory of Money Supply'. However, it is more popularly called 'Money-multiplier Theory of Money Supply' because it explains the determination of money supply as a certain multiple of the high- powered money. How the high-powered money (H) is related to the total money supply is graphically depicted in Fig. 16.1.

The base of this figure shows the supply of high-powered money (H), while the top of the figure shows the total stock of money supply. It will be seen that the total stock of money supply (that is, the top) is determined by a multiple of the high-powered money (H). It will be further seen that whereas currency held by the public (C_p) uses the same amount of high-powered money, that is, there is one-to-one relationship between currency held by the public and the money supply.

In sharp contrast to this, bank deposits (D) are a multiple of the cash reserves (R) of the banks which are part of the supply of high-powered money. That is, one rupee of high- powered money kept as bank reserves gives rise to much more amount of demand deposits. Thus, the relationship between money supply and the high-powered money is determined by the money multiplier.

The money multiplier which we denote by m is the ratio of total money supply (M) to the stock of high-powered money, that is, m = M/H . The size of money multiplier depends on the preference of the public to hold currency relative to deposits, (that is, ratio of currency to deposits which we denote by K) and banks' desired cash reserves ratio to deposits which we call r. We explain below the precise multiplier relationship between high-powered money and the total stock of money supply.

Fig. 16.1. *The High-Powered Money and the Stock of Total Money Supply*
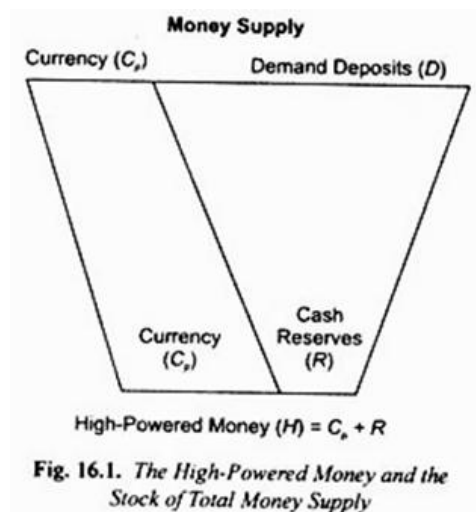
It follows from above that if there is increase in currency held by the public which is a part of the high-powered money with demand deposits remaining unchanged, there will be a direct increase in the money supply in the economy because this constitutes a part of the money supply.

If instead currency reserves held by the banks increase, this will not change the money supply immediately but will set in motion a process of multiple creation of demand deposits of the public in the banks. Although banks use these currency reserves held by the public which constitutes a part of the high- powered money to give more loans to the businessmen and thus create demand deposits, they do not affect either the amount of currency or the composition of high-powered money. The amount of high-powered money is fixed by RBI by its past actions. Thus, changes in high-powered money are the result of decisions of Reserve Bank of India or the Government which owns and controls it.

2. Money Multiplier:

Money multiplier is the degree to which money supply is expanded as a result of the increase in high-powered money. Thus

$m = M/H$

Rearranging we have, $M = H.m$ …(3)

Thus money supply is determined by the size of money multiplier (m) and the amount of high- powered money (H). If we know the value of money multiplier we can predict how much money will change when there is a change in the amount of high-powered money.

Change in the high-powered money is decided and controlled by Reserve Bank of India, the money multiplier determines the extent to which decision by RBI regarding the change in high-powered money will bring about change in the total money supply in the economy.

Size of Money Multiplier:

Now, an important question is what determines the size of money multiplier. It is the cash or currency reserve ratio r of the banks (which determines deposit multiplier) and currency-deposit ratio of the public (which we denote by k) which together determines size of money multiplier. We derive below the expression for the size of multiplier.

From equation (1) above, we know that total money supply (M) consists of currency with the public (C_p) and demand deposits with the banks. Thus

$$M = C_p + D \qquad \qquad \text{...(1)}$$

The public hold the amount of currency in a certain ratio of demand deposits with the banks. Let this currency-deposit ratio be devoted by k,

$$C_p = kD$$

Substituting kD for C_p in equation (1) we have

$$M = kD + D = (k+1)D \qquad \qquad \text{...(2)}$$

Now take equation which defines high-powered money (H) as

$$H = C_p + R \qquad \qquad \text{...(3)}$$

where R represents cash or currency reserves which banks keep as a certain ratio of their deposits and is called cash-reserve ratio and is denoted by r. Thus

$$R = rD$$

Now substituting rD for R and kD for C_p in equation (3) we have

$$H = kD + rD$$

$$H = (k+r)D \qquad \qquad \text{...(4)}$$

Now, money multiplier is ratio of total money supply to the high-powered money, therefore we divide equation (1) by equation (4), to get the value of multiplier, which we denote by m. Thus

$$m = \frac{M}{H} = \frac{(k+1)D}{(k+r)D} = \frac{k+1}{k+r}$$

or, Money multiplier $= \dfrac{M}{H} = \dfrac{1+k}{r+k}$

or, $$M = H = \frac{1+k}{r+k} \qquad \qquad \text{...(5)}$$

where r = Cash-reserve ratio of the banks

k = Currency-deposit ratio of the public.

where H is the high-powered money and $\dfrac{1+k}{r+k}$ is money multiplier

From above it follows that money supply in the economy is determined by the following:

1. H, that is, the amount of high-powered money, which is also called reserve money

2. r, that is, cash reserve ratio of banks (i. e., ratio of currency reserves to deposits of the banks)

This cash reserve ratio of banks determines the magnitude of deposit multiplier.

3. k, that is, currency-deposit ratio of the public.

From the equation (4) expressing the determinants of money supply, it follows that money supply will increase:

1. When the supply of high-powered money (i.e., reserve money) H increases;

2. When the currency-deposit ratio (k)' of the public decreases; and

3. When the cash or currency reserves-deposit ratio of the banks (r) falls.

Cash Reserve Ratio of the Banks and the Deposit Multiplier:

Because of fractional reserve system, with a small increase in cash reserves with the banks, they are able to create a multiple increase in total demand deposits which are an important part of money supply. The ratio of change in total deposits to a change in reserves is called the deposit multiplier which depends on cash reserve ratio.

The value of deposit multiplier is the reciprocal of cash reserve ratio, ($d_m = 1/r$) where d_m stands for deposit multiplier. If cash reserve ratio is 10 per cent of deposits, then $d_m = 1/0.10 = 10$. Thus deposit multiplier of 10 shows that for every Rs. 100 increase in cash reserves with the banks, there will be expansion in demand deposits of the banks by Rs. 1000 assuming that no leakage of cash to the public occurs during the process of deposit expansion by the banks.

Currency-Deposit Ratio of the Public and Money Multiplier:

However, in the real world, with the increase in reserves of the banks, demand deposits and money supply do not increase to the full extent of deposit multiplier. This is for two reasons. First, the public does not hold all its money balances in the form of demand deposits with the banks.

When as a result of increase in cash reserves, banks start increasing demand deposits, the people may also like to have some more currency with them as money balances. This means during the process of creation of demand deposits by banks, some currency is leaked out from the banks to the people.

This drainage of currency to the people in the real world reduces the magnitude of expansion of demand deposit and therefore the size of money multiplier. Suppose the cash reserve ratio is 10 per cent and cash or currency of Rs. 100 is deposited in bank A. The bank A

will lend out Rs. 90 and therefore create demand deposits of Rs. 90 and so the process will continue as the borrowers use these deposits for payment through cheques to others who deposit them in another bank B.

However, if borrower of bank A withdraws Rs. 10 in cash from the bank and issues cheques of the remaining borrowed amount of Rs. 80, then bank B will have only Rs. 80 as new deposits instead of Rs. 90 which it would have if cash of Rs. 10 was not withdrawn by the borrower. With these new deposits of Rs. 80, bank B will create demand deposits of Rs. 72, that is, it will lend out Rs. 72 and keep Rs. 8 as reserves with it (80x 10/100 = 8).

The drainage of currency may occur during all the subsequent stages of deposit expansion in the banking system. The greater the leakage of currency, the lower will be the money multiplier. We thus see that the currency-deposit ratio, which we denote by k, is an important determinant of the actual value of money multiplier.

It is important to note that deposit multiplier works both ways, positively when cash reserves with banks increase, and negatively when the cash reserves with the banks decline. That is, when there is a decrease in currency reserves with the banks, there will be multiple contraction in demand deposits with the banks.

Excess Reserves:

In the explanation of the expansion of demand deposits or deposit multiplier we have assumed that banks do not keep currency reserves in excess of the required cash reserve ratio. The ratio r in the deposit multiplier is the required cash reserve ratio fixed by Reserve Bank of India.

However, banks may like to keep with themselves some excess reserves, the amount of which depends on the extent of liquidity (i.e. availability of cash with them) and profitability of making investment and rate of interest on loans advanced to business firms. Therefore, the desired reserve ratio is greater than the statutory minimum required reserve ratio. Obviously, the holding of excess reserves by the banks also reduces the value of deposit multiplier.

Conclusion:

Theory of determination of money supply explains how a given supply of high-powered money (which is also called monetary base or reserve money) leads to multiple expansion in money supply through the working of money multiplier. We have seen above how a small increase in reserves of currency with the banks leads to a multiple expansion in demand deposits by the banks through the process of deposit multiplier and thus causes growth of money supply in the economy.

Deposit multiplier measures how much increase in demand deposits (or money supply) occurs as a result of a given increase in cash or currency, reserves with the banks depending on the required cash reserve ratio (r) if there are no cash drainage from the banking system. But in the real world drainage of currency does take place which reduces the extent of expansion of money supply following the increase in cash reserves with the banks.

Therefore, the deposit multiplier exaggerates the actual increase in money supply from a given increase in cash reserves with the banks. In contrast, money multiplier takes into account these leakages of currency from the banking system and therefore measures actual increase in money supply when the cash reserves with the banks increase.

The money multiplier can be defined as increase in money supply for every rupee increase in cash reserves (or high-powered money), drainage of currency having been taken into account. Therefore, money multiplier is less than the deposit multiplier.

It is worth noting that rapid growth in money supply in India has been due to the increase in high-powered money H, or what is also called Reserve Money (Lastly Reserve Bank of India, the money multiplier remaining almost constant.

The money supply in a country can be changed by Reserve Bank of India by undertaking open market operations, changing minimum required currency reserve-deposit ratio, and by varying the bank rate. The main source of growth in money supply in India is creation of credit by RBI for Government for financing its budget deficit and thus creating high-powered money.

Further, though the required currency reserve-deposit ratio of banks can be easily varied by RBI, the actual currency reserve-deposit ratio cannot be so easily varied as reserves maintained by banks not only depend on minimum required cash reserve ratio but also on their willingness to hold excess reserves.

Lastly, an important noteworthy point is that though money multiplier does not show much variation in the long run, it can change significantly in the short run causing large variations in money supply. This unpredictable variation in money multiplier in the short

run affecting money supply in the economy prevents the Central Bank of a country from controlling exactly and precisely the money supply in the economy.

Factors Determining Money Supply: RBPS Analysis:

In its analysis of factors determining money supply in India and sources of variation in it, Reserve Bank of India does not follow any explicit theory of money supply such as money multiplier theory explained above. It provides only purely accounting or ex-post analysis of variations in money supply and the factors or sources causing these variations.

Although Reserve Bank provides figures of the high-powered money in its analysis, it virtually clubs high-powered money with the ordinary money to calculate the total money supply in the country and therefore does not give due importance to the high-powered money as an important factor causing variation in money supply in the economy.

Further, Reserve Bank also does not lay emphasis on the two behavioural ratios, namely, desired currency-deposit ratio (k) of the public and desired cash reserve ratio (r) of the banks, as determinants of money supply, though it provides ex-post or realised figures of these ratios. We explain below Reserve Bank's analysis of sources of variation in money supply.

Reserve Bank of India classifies factors determining money supply into the following categories:

(a) Government borrowing from the banking system;

(b) Borrowing of the private or commercial sector from the banking system;

(c) Changes in net foreign assets held by the Reserve Bank of India caused by changes in balance of payments position; and

(d) Government's currency liabilities to the public.

(a) Bank Credit to the Government:

When the Government expenditure exceeds government revenue and there is deficit in government's budget, then it resorts to borrowing from the Reserve Bank of India which creates new currency notes for the purpose. This creation of new currency for financing the deficit of the Central Government Budget is known as monetization of deficit.

It was previously called deficit financing. Monetization of deficit is an important source of change in money supply in the economy. It may be noted here that since 1995, a good part of budget deficit is financed through open market operations by RBI by selling Government securities to the banks.

This is done to neutralize the monetary impact of large accumulation of net foreign exchange assets with RBI caused by capital inflows on a large scale. Therefore, there has been a decline in RBI's credit to the Government in the last about 10 years.

The Government also borrows from the ordinary commercial banks. When banks lend money to the Government, they create credit. For instance, for purchase of food grains by the Food Corporation of India, the banks give a large amount of loan to the Government. The creation of deposits by the banks when they create credit for the Government leads to the increase in money supply in the economy.

(b) Bank Credit to the Commercial or Private Sector:

The private sector also borrows from the banking system when its own resources are less than its total expenditure. This also adds to the money supply with the public because when banks lend, they create credit. This also affects the money supply in the same manner as the Government borrowing from the banking system.

There is, however, an important difference. Whereas Government can borrow more or less compulsorily from Reserve Bank of India, the private sector cannot do so from the commercial banks.

(c) Changes in Net Foreign Exchange Assets:

Changes in the foreign exchange assets held by the Reserve Bank can also bring about a change in the money supply. The change in the net foreign assets may be caused by balance of payment situation. Suppose the balance of payments is adverse or unfavourable and therefore available foreign exchange is less than the country needs to pay for its imports, both visible and invisible.

In order to meet this adverse balance of trade the country will have to dispose of some of its foreign exchange assets. If there is a net adverse balance of payments, rupees would flow into the Reserve Bank which pays out foreign exchange. This would have the effect of reducing the Reserve Money (i.e. the high-powered money) in India and the contraction of the money supply with the public. Opposite result would follow when there is a net surplus in the balance of payments of a country.

It follows from above that a deficit in the balance of payments on current account decreases the supply of rupee currency (that is, high-powered or reserve money) in the economy and thereby causes contraction in money supply with the public. On the contrary, a surplus in the balance of payments will increase the foreign exchange assets and thereby will lead to the expansion in reserve money and money supply in the economy.

It may also be noted that apart from balance of payments on current account foreign exchange reserves or assets may also come through either foreign aid or deposits in Indian banks by NRI or foreign direct investment made by foreign companies in India. For example, in recent years there has been a large-scale inflow of foreign exchange through investment made by foreign companies and NRI deposits in India.

As a result, our foreign exchange reserves have substantially gone up, which have resulted in the issue and expansion of rupee currency in circulation. In August 2004 foreign exchange reserves has risen to US $ 119 billion. But RBI has neutralized its monetary impact by mopping up liquidity of the banks through open market operations by selling them Government securities. This is called sterilization of inflows of foreign exchange.

Further, to deal with the problem of excess liquidity of the Indian banks caused by the rise in foreign exchange reserves, and with a view to check rise in inflation rate Reserve Bank of India has in April 2004 entered into an agreement with the Central Government to sterilize the monetary impact of these reserves.

With this agreement, Market Stabilisation Scheme (MSS) has been started. Under this scheme the Central Government has issued Market Stabilisation Bonds. These bonds were sold by RBI to commercial banks to mop up excess liquidity of Rs. 60,000 crore in 2004-05. But these Rs. 60,000 crore were kept apart in special deposits with RBI and were not meant to be used by the Government.

It should be noted that if the foreign exchange reserves are used to import goods in short supply, it will help in lowering inflation rate for two reasons. First, this will reduce rupee currency in circulation which will cause reduction in money supply in the economy.

Contraction in money supply will help in controlling inflation through reducing aggregate demand. Secondly, the imports of goods will increase aggregate supply of goods in the economy which will tend to lower prices.

(d) Government's Currency Liabilities to the Public:

Changes in money supply in the economy are also brought about by Government's currency liabilities to the public. Coins and one-rupee notes represent Government's currency liabilities to the public. On 31st March 2004-05, there were outstanding balances of Government currency liabilities of Rs. 7291 crores as compared to Rs. 7071 crores on March 31, 2003. If Government's currency liabilities increase, the money supply also increases.

Budget Deficit and Money Supply:

A budget deficit is also an important source of expansion of money supply in the economy. There are two possible links between budget deficit and growth in money supply. First, when following an expansionary fiscal policy the government raises its expenditure without financed by extra taxation and thereby causing a budget deficit, it will tend to raise interest rate. This happens when budget deficit is financed through borrowing from the market.

As a result, demand for money or loanable funds increases which, given the supply of money, causes interest rate to rise. Rise in interest rate tends to reduce or crowd out private investment. If the Central Bank is following the policy of a fixed interest rate target, when the government resorts to borrowing to finance the budget deficit, then to prevent the rise in interest rate the Central Bank will take steps to increase the money supply in the economy.

The second link between budget deficit and expansion in money supply is direct. This occurs when the Central Bank itself purchases government securities when the government resorts to borrowing. The Central Bank is said to monetize budget deficit when it purchases government securities as it prints new notes for the purpose and gives it to the government for meeting public expenditure.

In some countries such as the US, Federal Reserve (which is the Central Bank of the USA) enjoys a good deal of independence from the Treasury (i.e., the Government) and voluntarily decides when and how much to purchase government securities to finance its budget deficit.

Central Bank's Dilemma:

The Central Bank of a country faces a dilemma in deciding whether or not to monetize budget deficit. If the Central Bank does not monetize budget deficit to meet its increased expenditure, the government will borrow from the market and in the absence of any accommodating monetary policy this will tend to raise interest rate and thereby reduce or crowd out private investment.

Referring to the policy of Federal Reserve of the United States, Dornbusch, Fischer and Startz write, "There is accordingly a temptation for the Federal Reserve to prevent crowding out by buying government securities thereby increasing the money supply and hence allows an expansion in income without a rise in interest rates". But the policy of monetization of budget deficit by the Central Bank involves a risk. If the economy is working near-full employment level, that is, at near-full production capacity, monetisation of budget deficit will cause inflation in the economy.

However, if the economy is in the grip of a severe depression, the risk of causing inflation through monetisation of budget deficit and consequent growth in money supply is not much there. It follows from above that in any particular case the Central Bank, if it enjoys freedom from the Government, has to judge whether it should adopt accommodatory monetary policy to achieve its goal of interest-targeting or allow fiscal expansion through monetisation of budget deficit accompanied by the tight monetary policy to check inflation. It is the latter course of action that was adopted by Reserve Bank of India before 1995 when government's fiscal deficit was high and a good part of it was monetised by it.

Money Supply and the Open Economy:

The transactions of an open economy also affect the growth of money supply in it. In the open economy there is free flow of goods and services through trade with foreign countries. Besides, in the open economy there are flows of capital between countries. The impact of transactions of an open economy on the money supply can be better understood from national income identity of an open economy.

National income of the open economy is written as:

$Y = C + I + G + NX$ …(1)

or, $NX = Y – (C + I + G)$ …(2)

where NX stands for net exports or trade balance. In the trade balance if we also include exports and imports of services (i.e., invisibles), then NX can be taken as current account balance.

The current account balance (NX) can be either positive or negative. If in equation (2) above aggregate expenditure $(C + I + G)$ exceeds national output (Y), current account balance or NX will be negative, that is, imports will be greater than exports.

In other words, there will be deficit in current account of the balance of payments. On the other hand, if aggregate expenditure is less than national income $[(C + I + G) < Y]$, there will be surplus in the current account balance of payments. This implies that our exports will be greater than imports.

Now, if in a year there is deficit in current account, that is, NX is negative, it means our demand for foreign exchange, say, the US dollars, for imports of goods and services will exceed the supply of foreign exchange. This situation is depicted in Fig. 16.2 where the curve DD represents demand curve for foreign exchange (US \$) and SS is the supply curve of foreign exchange (US \$) at exchange rate (Rs. per US dollar) and OR and LK represent deficit in current account.
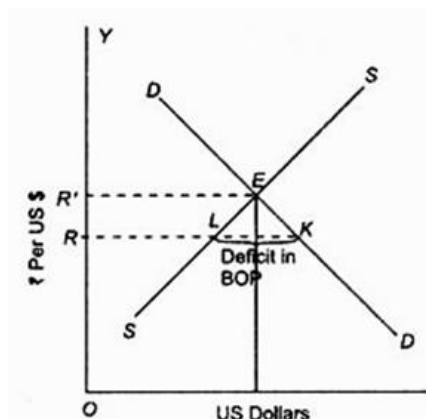

Fig. 16.2. *Deficit in Balance of Payments and Foreign Exchange Market*

If the economy is under flexible exchange rate regime and the Central Bank of the country does not intervene at all, the exchange rate will change to OR' and as a result deficit in current account balance will be eliminated and equilibrium restored at the new exchange rate. If there is such a situation, there is no impact on the money supply.

However, if the Central Bank wants to maintain the exchange rate at OR, then current account deficit equal to LK has to be met. If there are no capital inflows, then to maintain the exchange rate at OR, the Central Bank of the country has to supply foreign exchange equal to LK out of the reserves held by it.

But when the Central Bank (RBI in case of India) pays out foreign exchange from its reserves, it will receive money (i.e., rupees in India) from importers of goods and services in return for foreign exchange paid to them to meet the deficit. Thus some money (say Indian rupees) will flow into the Central Bank and thus withdrawn from circulation.

As a result of Central Bank intervention to meet the current account deficit and to maintain the exchange rate money supply in the economy decreases. It is important to note that the Central Bank of the country cannot go on supplying foreign exchange reserves, year after year, for a long time because foreign exchange assets with the Central Bank are available in limited amount.

The above analysis of contraction in money supply as a result of use of foreign exchange reserves to meet the current account deficit is based on two assumptions. First, it is assumed that there are no capital flows to meet the deficit in current account balance. Second, it is assumed the exchange rate is not allowed to change as a result of in balance between demand and supply of foreign exchange due to current account deficit.

Capital Inflows:

However, if there are sufficient net capital inflows accruing from the capital account of the balance of payments, then deficit in current account (i.e., negative NX) can be met by these capital inflows. In this case there will be no impact of deficit in current account balance of payments on money supply in the economy.

Now take the opposite case of surplus in current account balance (i.e., when NX is positive). This implies that the supply of foreign exchange exceeds demand for it. In the absence of capital out-flows this excess supply of foreign exchange will have to by purchased by the Central Bank if exchange rate is to be maintained.

The Central Bank (RBI) will print new notes to pay for the purchase of foreign exchange. This will lead to the increase in money supply in the economy. However, if exchange rate is allowed to change, as is the case under flexible exchange rate system, the exchange rate will adjust to bring supply and demand for foreign exchange in equilibrium.

Overall Balance of Payments and Capital Inflows:

When in an open economy with flexible exchange rate regime there is deficit in overall balance of payments (i.e., on both current and capital accounts), it means that capital inflows are insufficient to bridge the gap in the balance of payments, then, in case of India, this has to be met with use of foreign exchange reserves by the Reserve Bank of India.

When Reserve Bank of India pays foreign exchange (e.g. US $) to finance the deficit in overall balance of payments, it gets rupees in return. Thus rupee currency flows into the RBI. As a result, money supply (rupee currency) in the economy will decline.

However, under flexible rate system, if RBI does not intervene, the deficit in overall balance of payments will cause rupee to depreciate.

Now suppose there is surplus in overall balance of payment as capital inflows exceed the deficit in current account. The large capital inflows can occur due to heavy foreign direct investment (FDI) and portfolio investment by foreign institutional investors (FII) as it happened in some years in India, especially in 2006-07, 2007-08 and 2010-11.

In the absence of intervention by RBI under the flexible exchange rate system, these large capital inflows will cause appreciation of Indian Rupee. In fact, though RBI has been intervening in foreign exchange market from time to time, its intervention has been only limited. As a result, between Oct. 2006 and Oct 2007, rupee appreciated by 15 per cent.

By making our exports relatively expensive the appreciation of rupee adversely affects our exports and therefore growth in GNP and employment. Besides, appreciation of rupee makes imports relatively cheaper and leads to large imports of goods and materials and thereby harms our domestic manufacturing industries.

To prevent the high appreciation of the Indian Rupee RBI purchases US dollars from the foreign exchange market from time to time. When RBI purchases dollars from the foreign exchange market, it pays rupees to the sellers of foreign exchange. To do so more rupee currency is printed by RBI to pay for US dollars purchased by it.

In this way more rupee currency (i.e., high-powered money) comes into existence in the economy. Thus intervention by RBI to prevent appreciation of rupee results in increase in money supply in the economy.

The effect of large capital inflows and its effect on appreciation of currency and money supply in the Indian economy is illustrated in Fig. 16.3 where exchange rate of rupee for US dollars (Rs. per US $) is measured on the Y-axis and number of US dollars are measured on the X-axis.

Initially the equilibrium between demand for and supply of dollars in the Indian foreign exchange market determines equilibrium exchange rate equal to Rs. 48 per US $. As a result of large capital inflows supply curve of US dollars shifts to the right to S'S'. With this, at the existing exchange rate of Rs. 48 per US dollar, EH is the increase in capital inflows.

Now, under a variable exchange rate regime as it exists today, if exchange rate is allowed to adjust freely, rupee will rise to Rs. 45 per US dollar. If Reserve Bank wants to manage it and tries to maintain it at Rs. 48 per US dollar, it will have to buy US dollars equal to EH from the market.

By buying US dollars equal to EH, RBI will cause the demand curve for US dollars to shift to the right to the new position D'D' and the new equilibrium is established at point H which corresponds to Rs. 48 per US dollar.

Fig. 16.3. *Capital Inflows and Appreciation of Rupee*
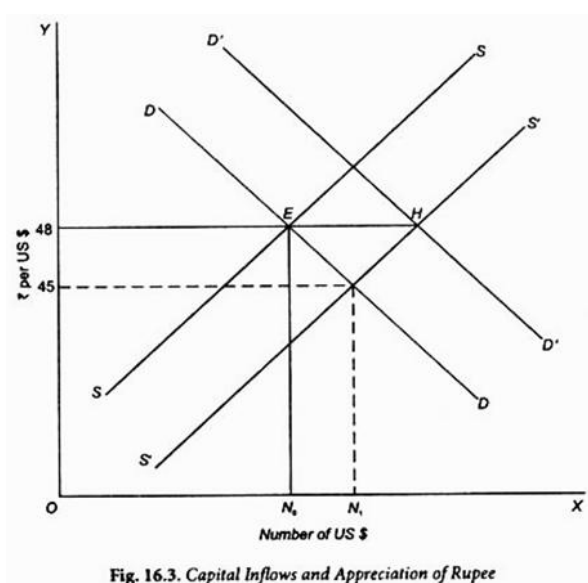
But for buying US dollars equal to EH, RBI will have to print new rupee currency to pay for US dollars. Thus more high-power money (i.e., rupee currency) would come into circulation in the Indian economy. Thus RBI did not intervene sufficiently to prevent the appreciation of rupee between Oct. 2006 and Oct. 2007.

This is because such intervention leads to the increase in money supply that is likely to cause inflation in the Indian economy. Therefore, RBI intervened only to a small degree and let the rupee appreciate to some extent.

On the other hand, in 2011 the RBI faced the opposite problem when after August 2011, there was net large capital outflow from India due to uncertainty caused by European debt crisis and economic slowdown in the US. The FIIs started selling Indian equity and bonds and converting rupee into US dollars.

This led to the increase in demand for dollars resulting in appreciation of US dollar and depreciation of Indian rupee. The value of rupee which was around Rs. 44 to a US dollar in the first week of September 2011 depreciated to around Rs. 53 in the second week of December 2011. This depreciation of rupee will make our imports costlier which will tend to raise inflation if not matched by fall in international commodity prices.

To prevent sharp depreciation of rupee the RBI intervened in the foreign exchange market by selling dollars in the market. Again its intervention was only limited. In fact, the RBI has no fixed target for maintaining exchange rate of rupee at any level and instead its policy is to allow exchange rate of rupee to fluctuate within a band. In fact, RBI faces a dilemma which we discuss below.

RBI Dilemma: External Balance and Internal Balance:

RBI faces a dilemma because if it does not intervene in the face of large capital inflows rupee will appreciate much which will adversely affect our exports and therefore growth of GNP and employment in our economy. On the other hand, if it intervenes and purchases enough US dollars from the market to prevent any appreciation of rupee, it will cause large increase in money supply that would cause higher rate of inflation.

A major objective of RBI is to control inflation. Therefore, RBI has to strike a balance between the two alternatives. It has been intervening in the foreign exchange market to prevent large appreciation of rupee. But it cannot buy inflows of foreign exchange indiscriminately as it leads to higher inflation.

RBI has also resorted to sterilization of increase in money supply by selling government securities to the banks and thereby getting back the money issued by it. But there is limit to this sterilization operation as it has not unlimited amount of government securities to sell them to the banks. Hence the dilemma faced by it. We explain the sterilization operations by RBI later.

It follows from above that the two objectives of external balance and internal balance clash with each other. External balance occurs when balance of payments is in equilibrium or close to it.

When external balance does not exist the Central Bank will either go on losing foreign exchange reserves which it cannot do so for long or it will be gaining foreign exchange reserves which also poses a problem as it leads to increase in money supply and causes inflationary pressures in the economy.

On the other hand, internal balance exists when the economy is in equilibrium at full employment or full productive capacity level without any inflationary pressures. Thus, to ensure internal balance requires that money supply should not be allowed to increase much. Since the two require different types of policy measure by the Central Bank, they clash with each other. Hence, the dilemma faced by the Central Bank.

Sterilization by the Central Bank:

Sterilization provides a way out of the problem of clash between the goals of external balance and internal balance. Sterilization refers to the action by the Central Bank of a country to offset or cancel the impact of its foreign exchange market intervention on the money supply through open market operations.

The sterilization measures can be used both to offset the reduction in money supply when in case of current account deficit the Central Bank of the country sells foreign exchange in the market and also when the Central Bank offsets the effect of increase in money supply when it buys foreign exchange from the market in case of surplus in balance of payments or when large capital inflows are coming into the economy.

Let us first explain sterilization operation by the Central Bank in case of deficit in current account of the balance of payments. The deficit in current account balance requires the Central Bank to sell foreign exchange from its reserves to prevent the depreciation of domestic currency (that is, to maintain the exchange rate constant).

The sale of foreign exchange in foreign exchange market by the Central Bank causes money supply in the economy to decrease that has deflationary effect on the economy. To avoid this adverse effect, the Central Bank buys government securities (i. e., bonds) through open market operations.

When it does so the Central Bank prints domestic currency to pay for the bonds it purchases. In this way money supply in the economy increases which offsets the decrease in money supply brought about by the Central Bank when it sells foreign exchange to prevent the depreciation of the domestic currency.

Thus, provided it has enough foreign exchange assets, with sterilization operations by the Central Bank persistent deficit in balance of payments is possible because it insulates the money supply changes in the domestic economy from the Central Bank intervention in the foreign exchange market.

Sterlization Operations in Case of Surplus in Balance of Payments or Large Capital Inflows:

Now, we take up the opposite case when there is surplus in balance of payments or when large capital inflows are taking place. This situation requires that Central Bank intervenes in the foreign exchange market and buys foreign exchange inflows from the market to maintain the foreign exchange rate or to prevent the appreciation of domestic currency.

In the two years (2006-08) due to large net capital inflows in the Indian economy there was quite a large appreciation of the Indian rupee against US dollar that produced undesirable effects. Therefore, Reserve Bank intervened in the foreign exchange market by buying US dollars to prevent too much appreciation of the Indian rupee.

The purchase of foreign exchange (US dollars) from the foreign exchange market by the Reserve Bank led to the increase in money supply in the Indian economy that caused inflationary pressures. To sterilize the effect of this increase in money supply RBI undertook open market operations by selling government securities to the banks which paid rupees to it.

In this way some rupee currency had been withdrawn from the economy. In this way inflationary pressures created by the original increase in money supply through intervention in foreign exchange market have been offset.

Monetary Supply: Definition and Determinants of Money Supply

The term public includes all economic units, i.e., households, firms and institutions except the producers of money, that is, the Government and the banking system.

The Government includes Central and the State Government. The banking system includes Reserve Bank of India and all banks that accept demand deposit.

This means, public includes all local authorities, non-financial institutions and non-departmental public sector undertakings and foreign and Central Banks who hold part of Indian money in India in form of deposits from RBI.

There are four alternative measures of money supply used in India:

Narrow Definition of Money:

1. $M_1 = C + DD + OD$

   $C \rightarrow$ Currency and coins with public excluding currency held by Government and banks

2. $M_2 = M_1 +$ Saving deposits with post offices

   $DD \rightarrow$ Demand Deposits of all commercial and co-operative banks excluding inter-bank deposits

   $OD \rightarrow$ Other Deposits with RBI *e.g.,* deposits by IMF, IBRD etc.

Broad Definition of Money:

3. $M_3 = M_1 +$ Net Time deposits of bank.

4. $M_4 = M_2 +$ total deposits with post office (excluding national saving certificate).

These 4 definitions are given in descending order of liquidity.

$M_1 \rightarrow$ most liquid measure

$M_4 \rightarrow$ least liquid measure of money supply

All economic theories are based on (M_1) but for policy prescriptions (M_3) is better measure than (M_1). This is because in M_3 measure the problem of dividing

Saving deposits into time and demand deposits does not arise. Therefore, (M_3), is a better measure than M_1.

Measures of Money Supply/H-Theory of Money Supply/High Powered Money Supply/Determinants of Money Supply:

Money is generally understood as :

$$M = C + DD \quad ...(1)$$

$C \rightarrow$ Currency

$DD \rightarrow$ Demand deposits

High powered money/Monetary base $(B)^1$.

$$B = C + R + OD \quad ...(2)$$

Where OD $\rightarrow$ Other deposit held by the banks since it constitutes only 1% of total B. therefore, for simplicity, it is ignored.

Difference between (1) and (2) is of the second component, i.e., in (1) we have DD and in (2) we have R. To produce demand deposits banks have to maintain reserves. Therefore, H is called the base money. This difference is of crucial importance for the theory of money supply.

According to monetary economists the single most important factor that determines money supply is (H). Therefore, it is called as (H) theory of money supply or money multiplier theory.

Money supply is a function of three exogenous variables:

1. Monetary base B: (B = C + R) → It is directly controlled by the bank. It is also known as high powered money.

2. Reserve Deposit Ratio: rr → It is the fraction of deposits that banks hold in reserve. It is determined by the business policies banks and the laws regulating banks.

∴ rr = R/D

3. Currency-Deposit Ratio, cr → It is the amount of currency held by people as a fraction of their holdings of demand deposits (D), Currency (C) and DD are the functions of level of income and interest rate. Therefore, C and DD are assumed to be highly correlated, i.e., C will be proportional to DD.

∴ cr = C/D

Money supply: M = C+D …(1)

Money Base: B = C+R …(2)

Dividing Equation (1) by (2) we obtain:

$$\frac{M}{B} = \frac{C+D}{C+R} \quad …(3)$$

Dividing the right hand side of the equation (3) by D we obtain :

$$\frac{M}{B} = \frac{\frac{C}{D} + 1}{\frac{C}{D} + \frac{R}{D}} \quad …(4)$$

Since
$$cr = \frac{C}{D}$$
$$rr = \frac{R}{D}$$

∴
$$\frac{M}{B} = \frac{cr + 1}{cr + rr}$$

Or
$$M = \frac{cr + 1}{cr + rr} \times B \quad …(5) \qquad \text{where : } m = \frac{cr + 1}{cr + rr}$$

$$M = m \times B \quad …(6) \qquad m \rightarrow \text{money multiplier}$$

Equation (6) shows that determinants of money supply are (a) those that effect B, (b) those that effect M

since, the monetary base has a multiplied effect on the money supply. Therefore, the monetary base is also called high-powered money.

Conclusion:

The money supply, therefore, depends on three exogenous variables:

1. B

2. rr

3. cr

Changes in these variables cause the money supply to change:

(i) Money supply is directly proportional to the monetary base (B), an increase in B

increases the money supply by the same percentage.

(ii) Money supply is inversely related with rr and cr.

Lower the rr, greater will be the loans given by the bank and thus greater will be the credit creation. Thus, a decrease in rr raises the money multiplier and the money supply.

(iii) Lower the cr, more is the credit creation

Reason:

Less currency will be held by public and more currency will be held by banks. Therefore, more money banks will be able to create. Thus, a decrease in the cr raises the money multiplier and the money supply.