demand function of all wealth holders in the community.

THE QUANTITY THEORY OF MONEY

For generations economists have been engaged in answering the question : What causes changes in the price level or the value of money? Right from **Davanzatti** and **Jean Bodin** in the 16 century to David Hume (1752) in the 18th century, to Simon Newcomb (1886), and Knut Wicksell (1898) in the 19th century to Irving Fisher (1911), Alfred Marshall (1923), A.C. Pigou (1917), Keynes (1930 and 1936), Patinkin (1948) and Friedman (1957) in the 20th Century, economists believed that the quantity theory of money explains the causes of changes in the price level or the value of money. Before we study the views of some of the economists on the relationship between money and prices it is essential to know the relation between the price level and the value of money.

By value of money is meant the purchasing power of money over goods and services within a country. The relation between value of money and the price level is an inverse one. When the price level rises, the value of money falls, and vice versa. The various versions of the quantity theory of money are attempts at explaining the causes of changes in the value of money.

Fisher's Cash Transactions Approach

In the words of **Fisher,** "Other things remaining unchanged, as the quantity of money in circulation increases, the price level also increases in direct proportional and the value of money decreases and vice versa." If the quantity of money is doubled, the price level will also double and the value of money will be one half. On the other hand, if the quantity of money is reduced by one half, the price level will also be reduced by one half and the value of money will be twice.

Fisher has explained his theory in terms of his equation of exchange :

$$PT = MV + M'V'$$

where
P = price level of 1/P = the value of money;
M = the total quantity of legal tender money;
V = the velocity of circulation of M;
M' = the total quantity of credit money;
V' = the velocity of circulation of M;
T = the total amount of goods and services exchanged for money or transactions performed by money.

This equation equates the demand for money (PT) to the supply of money (MV + M'V'). In order to find out the effect to the quantity of money on the price level or the value of money, we write the equation as

$$P = \frac{MV + M'V'}{T}$$

Fisher points out that the price level (P) varies directly as the quantity of money (M + M'). Provided the volume of trade (T) and velocity of circulation (V, V') remain unchanged.

Assumptions of the Theory

Fisher's theory is based on the following assumptions :

1. V and V' are assumed to be constant and are independent of changes in M and M'.
2. The proportion of M' to M remains constant.
3. T also remains constant and is independent of other factors such as M, M', V and V'.
4. P is a passive factor in the equation of exchange which is affected by the other factors.
5. It is assumed that the demand for money is proportional to the value of transactions.
6. The supply of money is assumed as an exogenously determined constant.
7. The theory is applicable in the long run.
8. It is based on the assumption of existence of full employment in the economy.

Fisher's quantity theory of money is explained with the help of a numerical example. Suppose the quantity of money is Rs. 5,00,000 in an economy, the velocity of circulation of money (V) is 5; and the total output to be transacted (T) is 2,50,000 units, the price level (P) will be :

$$P = \frac{MV}{T}$$

$$= \frac{500000 \times 5}{250000} = \text{Rs. } 10 \text{ per unit}$$

If now, other things remaining the same, the quantity of money is doubled, i.e., increased to Rs. 1000000 then :

$$P = \frac{10000 \times 5}{250000} = \text{Rs. } 20 \text{ per unit}$$

We thus see that according to the Fisher's quantity theory of money, price level varies in direct proportion to the quantity of money.

The Cambridge Cash Balances Approach

As an alternative to Fisher's quantity theory of money, *Cambridge economists* Marshall, Pigou, Robertson and Keynes theory, they regarded the determination of value of money in terms of supply and demand.

The supply of money is exogenously determined at a point of time by the banking system. Therefore, the concept of velocity of circulation is altogether discarded in the cash balances approach because it 'obscures the motives and decisions of people behind it.' On the other hand, the concept of demand for money plays the major role in determining the value of money. The demand for money is the demand to hold cash balances for transactions and precautionary motives.

Thus the cash balances approach considers the demand for money not as a medium of exchange but as a store of value. The Cambridge equations show that given the supply of money at a point of time, the value of money is determined by the demand for cash balances. When the demand for money increases, people will reduce their expenditure on goods and services in order to have larger cash holdings. Reduced demand for goods and services will bring down the price level and raise the value of money. On the contrary, fall in the demand for money will raise the price level and lower the value of money.

The Cambridge cash balances equations of Marshall, Pigou, Robertson and Keynes are discussed below.

Marshall's Equation

Marshall's equation can be stated as :

$$M = K.PY$$

where

M = the exogenously determined supply of money;

K = the fraction of the real money income (PY) which people wish to hold in cash and demand deposits;

P = the price level;

Y = the aggregate real income of the community.

Thus, the price level $P = \frac{M}{K.Y}$ or the value of money (the reciprocal of price level) is $P = \frac{K.Y}{M}$.

Pigou's Equation

Pigou was the first Cambridge economist to express the cash balances approach in the form of an equation :

$$P = \frac{KR}{M}$$

where

P = the purchasing power of money or the value of money;

K = the proportion of total real resources or income (R) which people wish to hold in the form of titles to legal tender;

R = the total resources or real income;

M = the number of actual units of legal tender money

The demand for money, according to Pigou, consists not only of legal money or cash but also bank notes and bank balances. In order to include bank notes and bank balances in the demand for money, Pigou modifies his equation as

$$P = \frac{KR}{M}\left[c + h(1-c)\right]$$

where

c = the proportion of total real income actually held by people in legal tender including token coins;

$(1 - c)$ = the proportion kept in bank notes and bank balances;

h = the proportion of actual legal tender that bankers keep against the notes and balances held by their customers.

Pigou points out that when K, R, C and h are taken as constants then the two equations give the demand curve for legal tender as a *rectangular hyperbola*. This implies that the demand curve for money has a *uniform unitary elasticity*. This is shown in Figure 1.16 where DD_1 is the demand curve for money and Q_1M_1, Q_2M_2 and Q_3M_3 are the supply curves of money drawn on the assumption that the supply of money is fixed at a point of time. The value of money or Pigou's purchasing power of money P is taken on the vertical axis. The Figure shows that when the supply of money increases from OM_1 to OM_2 the value of money is, reduced from OP_1 to OP_2. The fall in the value of money by P_1P_2 exactly equals the increase in the supply of money by M_1M_2. If the supply of money increases three times from OM_1 to OM_3, the value of money is reduced by exactly one-third from OP_1 to OP_3. Thus the demand curve for money DD_1 is a rectangular hyperbola because it shows changes in the value of money exactly in reverse proportion to the supply of money.

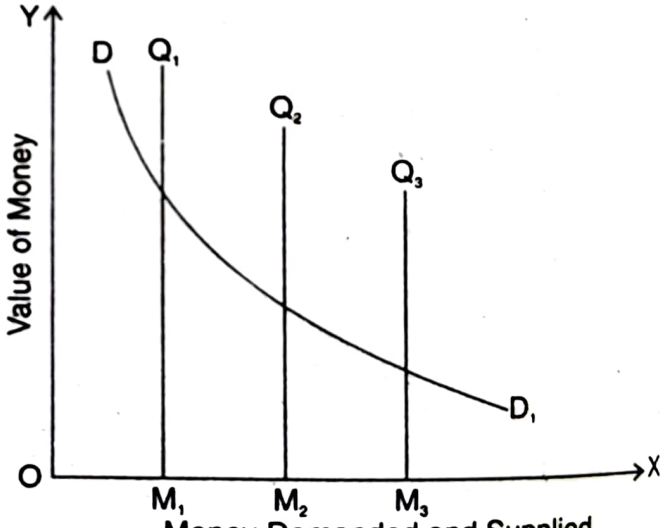

Fig. 1.16

Robertson's Equation

To determine the value of money or its reciprocal the price level, Robertson formulated an equation similar to that of Pigou. The only difference between the two being that instead of Pigou's total real resources R, Robertson gave the volume of total transactions T. The Robertsonian equation is

$$M = PKT \quad \text{or} \quad P = \frac{M}{KT}$$

where

P = the price level;

M = the total quantity of money;
K = the proportion of the total amount of goods and services (T) which people wish to hold in the form of cash balances;
T = the total volume of goods and services purchased during a year by the community.

Keynes's Equation

Keynes in his *A Tract on Monetary Reforms (1923)* gave his Real Balances Quantity Equation as an improvement over the other Cambridge equations. According to him, people always want to have some purchasing power to finance their day to day transactions. The amount of purchasing power (or demand for money) depends partly on their tastes and habits, and partly on their wealth. Given the tastes, habits and wealth of the people, their desire to hold money is given. This demand for money is measured by consumption units. A consumption unit is expressed as a basket of standard articles of consumption or other objects of expenditure.

If K is the number of consumption units in the form of cash, n is the total currency in circulation, and p is the price for consumption units then the equation is

$$n = pk$$

If K is constant, a proportionate increase in n (quantity of money) will lead to a proportionate increase in p (price level.)

This equation can be expanded by taking into account bank deposits. Let K' the number of consumption units in the form of bank deposits, and r the cash reserve ratio of banks, then the expanded equation is

$$n = p\,(K + rK')$$

Again, if K, K' and r are constant, p will change in exact proportion to the change in n.

Keynes regarded his equation superior to other cash balances equations. The other equation fail to point how the price level (p) can be regulated. Since the cash balances (K) held by the people are outside the control of the monetary authority, p can be regulated by controlling n and r. It is also possible to regulated bank deposits K' by appropriate changes in the bank rate. So p can be controlled by making appropriate changes in n, r and K' so as offset changes in K.

CASH BALANCES APPROACH VERSUS TRANSACTIONS APPROACH

The Cambridge cash balances approach to the quantity theory of money is superior to Fisher's transactions approach in many respects. They are discussed as under.

The cash balances approach emphasises the importance of holding cash balances rather than the supply to money which is given at a point to time. It thus led Keynes to propound his theory of liquidity preference and of the rate of interest, and to the integration of monetary theory with the theory of value and output.

The cash balances version of quantity theory is superior to the transactions version because the former determines the value of money. But in the transactions approach, the determination of value of money is artificially divorced from the theory of value.

The cash balances approach is superior to the transactions approach because it altogether discards the concepts of velocity of circulation of money which 'Obscures the motives and decisions of people behind it.'

Again the cash balances version is more realistic than the transactions version of the quantity theory, because it is related to the short period while the latter is related to the long period.

In the cash balances equation, transactions relating to final goods only are included where P refers to the price level of final goods. On the other hand, in the transactions equation P includes all types of transactions. This creates difficulties in determining the true price level. Thus the former equation is simpler and realistic than the latter.

RELATIONSHIP BETWEEN MONEY AND PRICES : FRIEDMAN AND OTHER MONETARIST'S VIEW

The relation between money and prices put forward by crude quantity theory of money was based on two assumptions, namely, (1) the velocity of money (V) is constant, and (2) the real national product (Y)

remains fixed at the full-employment level. But both these assumptions are questionable. Monetarists led by Milton Friedman have restated and modified the quantity theory of money and have presented a more sophisticated version of it. These monetarists continue to assume that velocity of money (V) remains constant but they recognise that in the short-run the economy is often at less than full employment level and as a result the real national output (Y) may change considerably. They restate their quantity theory of money in the following way :

$$MV = PT$$

where

M = Money supply

V = Velocity of circulation of money

PY = Nominal national product or national income in money form; P is the price level and Y is the real national product.

It follows from the above equation that given the constant velocity of money (V), the nominal national product (PY) would be proportional to the money supply. The increase in money supply will lead to increase in expenditure on purchase of final goods and services. That is, increase in money supply directly causes increase in aggregate demand for final goods and services. To the extent the real national product (Y) which consists of final goods and services increases, the effect on price level (P) is less. Thus, when their is slack in the economy, that is, there exist a lot of idle productive capacity or capital stock and a large magnitude of unemployment of labour, as it happens during period of recession, the real aggregate output will increase considerably with relatively little effect on the price level. But when the economy is at full employment level of output, the expansion of money supply will have its full effect on raising the price level, the real national Product (Y) remaining constant.

KEYNES'S REFORMULATED QUANTITY THEORY OF MONEY

The Keynesian reformulated quantity theory of money is based on the following assumptions :

1. All factors of production are in perfectly elastic supply so long as there is any unemployment.

2. All unemployed factors are homogeneous, perfectly divisible and inter changeable.

3. There are constant returns to scale so that prices do not rise or fall as output increases.

4. Effective demand and quantity of money change in the same proportion so long as there are any unemployed resources.

Given these assumptions, the Keynesian chain of causation between changes in the quantity of money and in prices is an indirect one through the rate of interest. How the increase in money supply can lead to the rise in aggregate expenditure and price level can be represented by the following scheme:—

$$Ms\uparrow \rightarrow r\downarrow \rightarrow I\uparrow \rightarrow AD\uparrow \rightarrow Y\uparrow$$

Where M_s stands for supply of money, *r*, I, AD, andY stand for rate of interset,investment, aggregate demand and income respectively.

According to this, when the quantity of money is increased, its first impact is on the rate of interest which tends to fall. Given the marginal efficieny of capital, a fall in the rate of interest will increase the volume of investment. The increased investment will raise effective demand through the multiplier effect there by increasing income, output and employment. Since the supply curve of factors of production is perfectly elastic in a situation of unemployment, wage and non wage factors are available at constant rate of remuneration. There being constant returns to scale, prices do not rise with the increase in output so long as there is any unemployment.

Under these circumstances, output and employment will increase in the same proportion as effective demand, and the effective demand will increase in the same proportion as the quantity of money. But "Once full employment is reached, output ceases to respond at all to chages in the supply of money and so in effective demand". The elasticity of supply of output in response to changes in the suppy, which was infinite as long as there was unemployment falls to zero. The entire effect changes in the supply of money is exerted on prices, which rise in exact proportion with the increase in effective demand.

Thus so long as there is unemployment, output

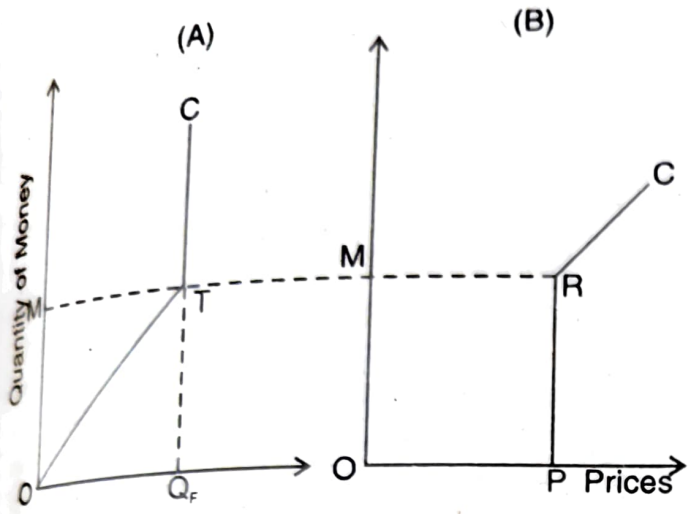

Fig. 1.17

will change in the same proportion as the quantity of money, and there will be no change in prices; and when there is full employment, prices will change in the same proportion as the quantity of money. Therefore, the **reformulated quantity theory of money stresses the point that with increase in the quantity of money prices rise only when the level of full employment is reached, and not before this.**

The reformulated quantity theory of money is illustrated in figure 1.17 (A) and (B) where OTC is the PRC is the price curve relating to the quantity of money. Panel A of the figure shows that as the quantity of money increases from O to M, the level of output also rises along the OT portion of the OTC curve. As the quantity of money reaches OM level, full employment output OQ_f is being produced. But after point cannot raise output beyond the full employment level OQ_f

Panel B of the figure shows the relationship between quantity of money and prices. So long as there is unemployment, prices remain constant whatever the increase in the quntity of money. Prices start rising only after the full employment level is reached. In the figure, the price level OP remains constant at the OM quantity of money corresponding to the full employment level of output OQ_f But an increase in the quantity of money above OM raise prices in the same proportion as the quantity of money. This is shown by the RC portion of the price cutve PRC.

SUPERIORITY OF THE KEYNESIAN THEORY OVER THE TRADITIONAL QUANTITY THEORY OF MONEY

The Keynesian theory of moeny and prices is superior to the traditional quantity theory of money for the following reasons.

1. Keynes's reformulated quantity theory of money is superior to the traditional approach in that he discards the old view that the relationship between the quantity of money and prices is direct and proportion. Instead, he establishes an indirect and non-proportional relationship between quantity of money and prices.

2. In establishing such a relationship, Keynes brought about a transition from a pure monetary theory of prices to a monetary theory of output and employment. In so doing, he integrates monetary theory with value theory. He integtates monetary theory of output and employment through the rate of interest. The Keynesian theory is, therefore, superior to the traditional quantity theory of money because it does not keep the real and compartments with 'no doors or windows between the theory of value and theory of money and prices.

3. The traditional quantity theory is based on the unrealistic assumption of full employment of resources. Under this assumption, a given increases in the quantity of money always leads to a proportionate increase in the price level. **Keynes,** or the other hand, believes that full employment is an exception.

4. Further, the Keynesian theory is superior to the traditional quantity theory of moeny in that it emphasises important policy umplications. The traditional theory believes that every increases in the quantity of money leads to inflation. Keynes,on the other hand, establishes that so long as there is unemployment, the rise in prices is gradual and there is no danger of inflation.