The earliest explanation for determining the general price level or its reciprocal, the value of money, was provided in terms of classical quantity theory of money. The most significant contribution in this field was made by Irving Fisher who developed his cash transactions approach that established a direct and proportional relation between the quantity of money and the general price level in an economic system. The present chapter deals with Fisher's transactions approach to money and prices.

1. THE QUANTITY THEORY OF MONEY —FISHER'S CASH TRANSACTIONS APPROACH

The value of money or general price level was first of all explained in the sixteenth century by Mercantilists followed by John Locke and David Hume in terms of the quantity theory of money. More elaborate expositions of the theory, however, were given by Mill, Ricardo and Irving Fisher. These writers tried to establish a direct and proportionate relation between quantity of money (M) and price level (P) or an inverse proportionate relationship between M and the value of money. To quote J.S. Mill: "The value of money, other things being the same, varies inversely as its quantity ; every increase of quantity lowers the value and every dimunition raises it in a ratio exactly equivalent."

David Ricardo expressed exactly similar views regarding the relationship between the value of money and M. Irving Fisher presented the theory in a more refined way in his book, *The Purchasing Power of Money,* in 1911. This exposition became most widely known, when it was offered as an explanation of the effects of the great inflations of the 1920's on the value of money. **Fisher** stated the relationship between M and P in these words, "The

quantity theory asserts that [provided the velocity of circulation and the volume of trade are unchanged] if we increase the number of dollars whether by renaming coins or by increasing coinage, prices will be increased in the same proportion."

The special points in Fisher's analysis of quantity theory were as follows : *Firstly,* he made a distinction between bank deposits and common money : and *secondly,* he presented the relation between M and P in the form of an algebraic equation called the *Equation of Exchange* which is written as

$$MV = PT$$

where M is the total quantity of money including coins and bank notes ; V is the velocity of circulation of money (the average number of times that a unit of money changes hands during a specified period); P is the general price level which is the weighted average of the average sale prices of all individual commodities and services ; and T refers to the total volume of transactions.

Since PT represents the total value of transactions or the value of goods sold out and MV is the amount of money paid out for them, MV = PT simply states that the demand for money is equal to the supply of money. Thus, the exchange equation is a mere truism. The general price level

$$(P) = \frac{MV}{T}$$ and the value of money $\left(\frac{1}{P}\right)$ is equal to $\frac{T}{MV}$.

If M = Rs. 100 crore, V = 5 and T = Rs. 200 crore, then MV = 100 × 5 = Rs. 500 crore and

$$P = \frac{MV}{T} = \frac{Rs.500\,crore}{Rs.200\,crore} = Rs.\ 2·5 \text{ and the value o}$$

money or $\dfrac{1}{P} = \dfrac{Rs.200\,crore}{Rs.500\,crore} = \dfrac{2}{5} = 0.4$

The exchange equation MV = PT is called as the *transactions cash equation*, since M refers to the primary money (coins and bank notes). The credit money or demand deposits with banks also help in affecting transactions in the same way as currency. Fisher, therefore, extended the cash transactions equation to include also the bank deposits. The extended equation of exchange can be expressed as :

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

In this equation M' is the amount of bank money and V' is the velocity of circulation of bank money. The price level is determined as :

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

or Value of money or $\dfrac{1}{P} = \dfrac{T}{MV + M'V'}$

If V, V' and T remain constant and the ratio of M to M' also remains the same, the price level will change in direct proportion to the quantity of money and the value of money in an inverse proportion to it. Suppose M = Rs. 200 crore, M' = Rs. 300 crore, V = 5 V' = 6 and T = Rs. 200 crore.

$$P = \frac{MV + M'V'}{T} = \frac{200 \times 5 + 300 \times 6}{200}$$

$$= \frac{1000 + 1800}{200} = \frac{2800}{200} = Rs.\,14$$

$$\frac{1}{P} = \frac{T}{MV + M'V'} = \frac{200}{2800} = \frac{1}{14}$$

If now M is doubled to Rs. 400 crore and to maintain the ratio of M and M', the demand deposits of banks go up to Rs. 600 crore, while V, V' and T' remain unchanged, P will be :

$$P = \frac{MV + M'V'}{T} = \frac{400 \times 5 + 600 \times 6}{200}$$

$$= \frac{2000 + 3600}{200} = Rs.\,28$$

$$\frac{1}{P} = \frac{T}{MV + M'V'} = \frac{2000}{5600} = \frac{1}{28}$$

Thus, a doubling of M results in a doubling of the price level and value of money is reduced to one half of what it was before.

Fisherine relation between M and P can also be explained through Fig. 1.
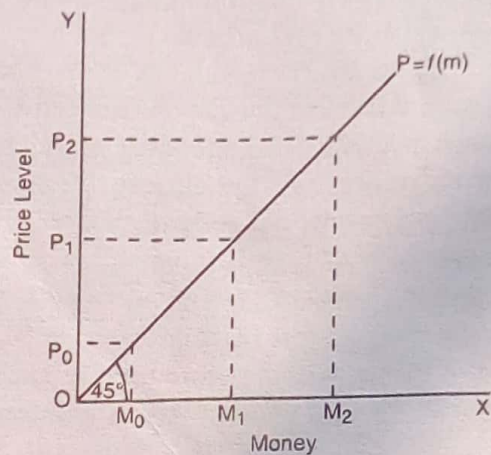

Fig. 1

Fig. 1 shows equi-proportionate changes between M and P. As quantity of money increases from M_0 to M_1, price level rises from P_0 to P_1. Since quantity of money function OM traverses a 45° line, $OM_0 = OP_0$ and $OM_1 = OP_1$ and δM or $(M_1 - M_0) = \delta P$ or $(P_1 - P_0)$, the proportionate change in money $\dfrac{M_1 - M_0}{M_0}$ is equal to the proportionate change in the price level $\dfrac{P_1 - P_0}{P_0}$. Similarly when the quantity of money increases from M_1 to M_2 and price level from P_1 to P_2, the proportionate change in money, i.e., $\dfrac{M_2 - M_1}{M_1}$ is equal to the proportionate change in the price level $\dfrac{P_2 - P_1}{P_1}$.

2. ASSUMPTIONS OF FISHER'S TRANSACTIONS VELOCITY MODEL

The equi-proportionate relation between M and P postulated in Fisher's model assumes that 'other things' should remain equal. The main assumptions of this analysis are given below :

(i) The general price level (P) is a passive element. It is determined by other elements or variables and it does not determine them.

(ii) The bank money (M') remains in a fixed relation with M. The inclusion of M' does not normally disturb the quantitative relation between money and price.

(iii) V, the velocity of circulation of money, is constant and is an independent element in the exchange equation. Fisher believes that a change in M is unlikely to affect the velocity of circulation of money, since it is determined by the subjective factors like people's saving and spending habits and the objective factors like the state of banking and financial institutions, methods of payment, growth and composition of population, central bank credit policy and government's policy in respect of taxes and public spending. A mere increase in M, in the opinion of Fisher, will therefore leave V unchanged. Similarly V' remains constant and is independent of M'.

(iv) The volume of transactions T, is also assumed as constant and independent of M in the short period. The magnitude of T depends not upon M but the state of technology, the quantity and quality of the productive factors, the proportions in which the factor inputs are employed, degree of labour specialisation, extent of integration or disintegration of the business units and the levels of employment. A special mention needs to be made of the level of employment. Fisher implicitly assumes that there is full employment of all resources in the economy. Since the level of output cannot by stepped up further at full employment, the volume of transactions too is unlikely to change.

(v) Fisher's theory assumes a highly monetised economic system where all transactions take place through the medium of money and the barter transactions are completely absent.

(vi) Money acts only as a medium of exchange and no part of it is hoarded by the people.

(vii) The theory assumes that money-price relationship is a long run phenomenon.

(viii) There is full employment of resources in the economic system.

(ix) The demand for money is proportional to the value of transactions.

(x) The supply of money is exogenously given.

Given these assumptions, Fisher established a direct and proportional relation between the quantity of money and price level. To quote him, "One of the normal effects of an increase in the quantity of money is an exactly proportional increase in the general level of prices.... we find nothing to interfere with the truth of the quantity theory that variations in money (M) produce normally proportional changes in prices."

Taussig has given expression to Fisher's money-price relation in this way : "Double the quantity of money and, other things being equal, prices will be twice as high as before, and the value of money one half. Halve the quantity of money and, other things being equal, prices will be one half of what they were before and the value of money double."

3. CRITICAL EVALUATION

The traditional quantity theory of money has been severely criticised by many writers on the following grounds :

(i) *Truism* : The equation of exchange fails to prove anything. MV = PT is a mere truism since what it states is that the amount of money paid out for the goods and services is equal to the value of goods sold out. Thus, by definition, there is an identity between MV and PT and as such there is no practical or analytical usefulness of this equation. To quote Keynes, "The quantity theory of money is a truism which holds though without significance."

(ii) *Over-simplifying assumptions* : Fisher's model is based on over-simplifying 'ceteris paribus' assumptions. It assumes that T, V, V' and the relation between M and M' remain unchanged which is unrealistic. These elements undergo variations not only in the long period, but also over relatively shorter periods. The business conditions, payment practices, consumers' and producers' expectations, banking policies etc., do change from time to time and, therefore, no sound basis exists for assuming the constancy of T, V and V'.

(iii) *Independence of variables* : The transactions model assumes that the variables involved in the equation of exchange are independent of each other so that P changes in exact proportion to M. But as a matter of fact, P is influenced in significant way by V, V' and T and the price level may change more or less than proportionate.

compared with the change in the quantity of money. For instance, during the German hyper-inflation of 1923, the phenomenal rise in price index was not so much due to the increased supply of money as to the increase in the velocity of circulation of money (V). Similarly during the Great Depression (1929-33), the cause of fall in price index was not so much a contraction in the supply of money as the sharp decline in the velocity of circulation of money. P, in addition, is influenced by the volume of transactions. During the period of prosperity, the price level may be pushed up by an increase in T and vice-versa. Thus it is wrong to assume that the only influence upon the price level or the value of money is the quantity of money.

(*iv*) *Technical inconsistency* : The importance of Fisher's exchange equation is limited by the technical inconsistency implicit in it. M refers to the stock of money at a *point* of time whereas V refers to its velocity of circulation over a *period* of time. George N. Halm considers it technically inconsistent to multiply these two non-comparable factors, unless M is treated as an average amount of money in circulation over the period in question. But such an assumption is not compatible with Fisher's transactions model.

(*v*) *P is not a passive factor* : The price level, P, is not a passive factor as has been assumed in this analysis. It is a very active and dynamic force. An increase in the price level provides profit incentive to the businessmen. The volume of transactions may, as a result, increase which in turn may push up the velocity of circulation of money. Thus P can influence all the variables involved in Fisher's exchange equation.

(*vi*) *Constant ratio between M and M′*: Fisher's theory assumes that the ratio between currency and demand deposits remains constant and an increase in currency by 50 % will involve a 50% increase in demand deposits too. But this assumption is also unrealistic. During the period of brisk business activity, there is an expansion both in currency and demand deposits but the change in the two is not equi-proportional. During depression, there is a general lack of confidence in the banking system. Therefore, bank deposits and currency may move in the opposite directions. Even if the currency is expanded, demand deposits may fail to rise.

(*vii*) *Neglect of variations in V* : The theory fails to take into account the variations in the magnitude of V and the factors which cause variations in it. Over the different phases of the business activity in a country, the magnitude of V continues to undergo changes. The theory does not explain why money is spent in a specific ratio and in what way the motives for spending decisions affect the speed at which money circulates.

(*viii*) *Failure to explain the determination of value of money* : J.L. Hanson has raised the objection that Fisher's theory attempts to explain only how changes in the value of money (or price level) are brought about. It offers no explanation how the value of money is determined in the first place.

(*ix*) *Contra-quantity theory causation* : As against the relationship between M and P propounded by Fisher, Lord Keynes advanced the contra-quantity theory causation. He stressed that M is not necessarily a variable determining P. The relationship between M and P can as well be looked from an opposite angle. The monetary authorities sometimes increase the quantity of money in order to remove the money stringency following a rise in the price level.

(*x*) *Neglect of real determinants of price level*: The theory is based on the belief that price level is determined entirely by the factors included in the equation of exchange. Keynes' basic objection against the theory is that it overlooks some of the important determinants of price level, viz., income expenditure, investment and saving. Benham also is of the opinion that the "real causes of a change in the value of money may lie right outside its (quantity theory's) field of vision." He regards growth of population as a very significant factor that determines price level. An increase in population, given the total amount of output, lowers the per capita output causing a general rise in prices. Fisher himself recognized that the general price level is affected by a number of non-monetary factors.

(*xi*) *No proportional relation between M and P* : The proportional relation between the quantity of money and price level has been severely criticised by writers like Keynes and Samuelson. This type of relation is based on two unrealistic assumptions.

Firstly, total spending changes in exact proportion to the quantity of money. *Secondly,* prices change in exact proportion to total spending. The first of the two assumptions can be valid only when money is regarded purely as a medium of exchange and no part of the additional issue of money is held as a store of value. It is quite absurd to think that the entire stock of money is used exclusively for conducting transactions. People actually have preference for liquidity which sometimes becomes so strong that the entire additional issue of money supply is absorbed by them. The second assumption concerning proportional relation between total spending and prices is based on another unrealistic assumption of constant total output. If an increase in the supply of money is associated with some increase in output, the increased supply of goods will restrict any rise in prices. It is only when the level of output remains unchanged in the face of expanding purchasing medium that the prices have a tendency to move up. It is thus obvious that the quantity theory analysis is based on unsound and invalid assumptions.

(xii) Static theory : The theory is static in nature. $P = MV/T$ reflects the final position of equilibrium and accepts no variations in the magnitude of P so long as there is no change in M. It fails to explain the causal process by which this equilibrium price level is determined and adjustment that the system has gone through to arrive at this specific position of equilibrium. Fisher's theory fails altogether in analyzing the problem in a dynamic way. Keynes' in this context remarked, "The real task of such a theory is to treat the problem dynamically, analyzing the different elements involved in such a manner as to exhibit the causal process by which the price level is determined and the method of transition from one position of equilibrium to another."

(xiii) Neglect of short run equilibrium : Fisher's transactions approach cannot explain the short run price phenomenon. It can, no doubt, be regarded as a useful attempt to explain the long run equilibrium. Even Fisher admitted that the assumption of the constancy of V and T may not be true in the short periods. As the economy achieves the long run equilibrium, these magnitudes tend to become constant. But it must be noted that long run equilibrium is an unreality. Long run equilibrium, like tomorrow, never comes. Moreover, Keynes has also indicated the futility of long term phenomena by saying, "in the long run we may all be dead". Crowther, in this connection, comments that the quantity of money in existence seems to be the most dominant influence on the price level on the average of long period. This is the maximum that can be stated about money-price relationship propounded in the quantity theory. In the short period, the theory may or may not influence the price movements.

(xiv) Failure to explain cyclical variations in prices and production : The quantity theory of money fails to explain the cyclical behaviour of production and prices. The cyclical evidences amply suggest that prices have failed to rise despite increase in the supply of money during depressions. The basic cause for such money-price relationship is a severe decline in the velocity of money (V) which more than neutralises the increase in money supply. Consequently, the price level, instead of rising has, on the contrary, declined during the slumps. In certain cases, the price level has fallen even when there is no decrease in the quantity of money because of a rise in liquidity preference. Similarly, during boom conditions, despite a tight money and credit policy, the prices continue to rise at a phenomenal rate. Thus Fisher's quantity theory does not assist in formulating a sound anti-cyclical monetary policy. Crowther believes that the theory can, at best, be regarded only as an imperfect guide to the causes of the trade cycle.

(xv) Failure to explain relative prices : The theory has come to be criticised at the hands of,. Hayek on the ground that it neglects the fact that the monetary factors can influence the economic system through many single price-making decisions. The theory concentrates too much on explaining the absolute price level and fails to explain the changes in the structure of relative prices which is much more significant than the general magnitude of the price level or the absolute price level.

(xvi) One-sided theory : Another objection against the theory is that it is one-sided. In the determination of the value of money, it simply takes the supply of money into account and tends to neglect the demand

for money, since the latter has been assumed as constant.

(xvii) *No necessity of a separate theory* : It is also stated that the value of money can be determined by the forces of demand and supply exactly in the same way we determine the values of other commodities. Therefore, there is no particular necessity to build up a separate theory based on so many restrictive and unrealistic assumptions.

(xviii) *No direct relationship between M and P* : The crude quantity theory establishes a direct and proportional relationship between the quantity of money and price level. A mere increase in money cannot increase the price level, unless it affects the spending of the community. This lacuna concerning the effect of quantity of money upon spending and prices was removed by Knut Wicksell, when he pointed out that the new money increases the liquid assets of the banks. They utilize these funds for the extension of their loan operations to the business firms. Thus money flows into the economy through bank loans, and thereafter raises the level of spending and prices.

(xix) *Lack of integration between the theory of money and the theory of prices* : A very prominent flaw in Fisher's quantity theory is that it fails to integrate the theory of money with the general theory of value. Keynes observes that these two essential parts of economic theory can be integrated through the theory of aggregate demand and the theory of output. If an increase in the money supply raises the level of aggregate demand, there can be a possibility of a rise in the price level and the extent by which it will increase is conditioned by the elasticity of output. But the quantity theory does not take notice of this relationship.

(xx) *Inadequate theory* : J.L. Hanson remarks that the quantity theory cannot be regarded as an adequate theory since it fails to take cognizance of the effect of an increase in the quantity of money upon the rate of interest. To quote Joan Robinson, "Changes in the quantity of money are of the utmost importance, but their importance lies in their influence upon the rate of interest, and a theory of money which does not mention the rate of interest is not a theory of money at all."

Dillard has explicitly stated that the relation between M and P is not direct one. The rate of interest is the missing link between the two. What happens to the price level in response to a change in M has to be determined through the effect of increased money supply upon the rate of interest. If the issue of additional money lowers the rate of interest, it may stimulate investment spending, output, income and consumption spending. Through the changes in these variables, the price level is likely to be affected. If an increase in M leaves the rate of interest unaffected, as it happens during depression, no change in spending and hence in price level will be possible.

(xxi) *Neglect of real balance effect* : Fisher's cash transactions approach was attacked by Don Patinkin on the ground that it failed to consider the real balance effect. An increase in price level may reduce the real value of cash balances. As a consequence, saving may increase and aggregate spending, income, output and employment may decline. Such an effect was completely overlooked in Fisher's quantity theory.

J.L. Hanson believes that "there has been a tendency to over–criticise the theory and to try to read into it more than writers like Irving Fisher really intended." He goes on to add that "the crux of the matter is that the Quantity Equation illustrates a static position of equilibrium which is assumed to prevail at a given moment either before or after a change has taken place and shows the relationship which exists between M,V,P and T."

In a situation where the economy has achieved the state of full employment and the level of output has become fixed, the conclusion given by Fisher's theory is an inevitable outcome and it will hold true in season and out of season. The empirical studies made by the writers like Kemmerer and Cassel have supported the Fisherine generalisation about money-price relationship.