M.A. (ECONOMICS) PART--I **PAPER- II**

MACROECONOMIC ANALYSIS

SEMESTER-I

Unit-2

LESSON NO :

Department of Distance Education

Punjabi University, Patiala

Neo-Classical Theory of Investment

The Neo-Classical Theory of Investment Or Jorgenson' s Theory of Investment

2.1.1 Introduction: The firm would like to invest in the capital stock up to a point till the marginal product of capital equal to rental cost of capital. The neo-classical theory of investment is associated with the names of the writers like D.W. Jorgenson, C.D. Siebert and R.E. Hall. This theory is also known as Jorgenson's Theory of Investment.

2.1.2 Assumptions: The neo-classical investment theory rests upon the following main assumptions:

(i) There are perfectly competitive conditions in product market and capital market.

(ii) A firm attempts to maximize the present value of its net profits, subject to a variety of market and non-market constraints.

(iii) There is possibility of substitution between labour and capital.

(iv) The capital equipment is either purchased or rented by the business firms.

(v) The depreciation of capital stock takes place at a constant rate, δ per period.

(vi) The production function is linear homogenous of the form of Cobb-Douglas production function.

(vii) There is a state of full employment in the economy.

In Jorgenson's theory of investment, the investment function stated as below:

$$I_t = K_t — K_{t-1} + \delta K_{t-1} \quad \ldots(i)$$

$$Q_t = AK_t^{\alpha} L_t^{\beta} \quad \ldots(ii)$$

2.1.3 User's Cost of Capital

Jorgenson's model of investment gives much importance to the concept of user's cost of capital. It is the net cost of holding a unit of capital stock for one period. Capital is generally purchased in one period and used over a number of periods. As a consequence, the value of marginal product of capital in the current period cannot be equal to its supply price. If a firm does not buy the unit of capital asset but takes it on rent from another firm, the rental payment could be termed as user's cost. In this case, the profit-maximizing firm would hire capital services upto a point where the marginal product of capital becomes equal to the rental cost of capital.

The user cost of capital (C) is a function of different variables such as the supply price, of a unit of capital (C_R), the rate of interest (r), the rate of depreciation (δ) of capital, the corporate income tax (t_c), the speed of depreciation (d) and the proportion of current investment expenditure permitted to be deducted from the tax liabilities of the firm (k)

$$C = f [C_R, r, \delta, t_c, d, k]$$

The user cost (C) is a direct function of C_R, r, δ and t_c. The importance of supply price of capital assets (C_R) and the rate of interest (r) has already been assessed through MEC and MEI approaches. Higher the supply price of a capital asset (C_R), higher is the user cost or rental value of it and vice- versa. Similarly a

higher rate of interest (r) means the higher user cost of asset and vice-versa. In this connection, it should be remembered that the rate of interest is taken as a real rate of interest rather than the nominal rate of interest. The real rate of interest is the rate which is net of the rate of inflation. It can be computed by deducting the rate of inflation from the nominal rate of interest. The user cost varies directly also with the real rate of depreciation (δ). Higher the rate of depreciation, higher is the maintenance and replacement cost per unit of capital and vice-versa. Similarly the user cost of capital is contingent upon the corporate income tax rate (t_c). Higher the corporate income tax rate (t_c), lower is the net return from the use of capital or higher is the extra cost of using capital as more outlay is involved for a given level of capital usage. Lower the corporate income tax rate, higher is the rate of return and lower the cost of usage of per unit of capital.

The user cost of capital is an inverse function of the speed of depreciation (d) and the proportion of current investment expenditure permitted to be deducted from the tax liability of the firm (k). If the firm allows the capital to depreciate rapidly, higher is the present value of the deduction due to depreciation and therefore lower is the user cost of capital and vice-versa. If the tax credit proportion (k) is higher, it signifies a lower user cost of capital and vice-versa. In other words, it implies that the user cost will rise with a rise in C_R, ρ, δ and t_c and vice-versa. On the other hand, it will be lower if d and k are higher and vice-versa.

The optimal capital stock will correspond with the maximization of profit. The firm will hire the units of capital up to a point where the user cost of capital gets equalized with the value of the marginal product of capital.

$$C_t = P_t \frac{\partial Q_t}{\partial K_t} \qquad \text{(iii)}$$

Where C_t is the user cost of capital in the current period; $\partial Q_t / \partial K_t$ is the marginal product of capital in the current period and; P_t is the overall price level in the current period.

2.1:4 Cobb- Douglass Production Function

Given the Cobb – Douglass production function, the marginal product of capital is proportional to the average product of capital..

$$Q_t = AK_t^{\alpha} L_t^{\beta}$$

$$\frac{\partial Q_t}{\partial K_t} = \alpha A K_t^{\alpha-1} L_t^{\beta}$$

Multiplying both sides by $\frac{K_t}{Q_t}$,

$$\frac{\partial Q_t}{\partial K_t} \cdot \frac{K_t}{Q_t} = \alpha A K_t^{\alpha-1} L_t^{\beta} \times \frac{K_t}{Q_t}$$

$$= \frac{\alpha A K_t^{\alpha-1} L_t^{\beta} \times K_t}{Q_t}$$

$$= \frac{\alpha A K_t^{\alpha} L_t^{\beta}}{A K_t^{\alpha} L_t^{\beta}} = \alpha$$

$$\frac{\partial Q_t}{\partial K_t} = \alpha \frac{Q_t}{K_t} \quad \ldots\ldots \text{(iv)}$$

Substituting (iv) into (iii),

$$C_t = P_t \alpha \frac{Q_t}{K_t}$$

$$K_t = \alpha \frac{P_t Q_t}{C_t} \quad \ldots\ldots (v)$$

Here K_t is the desired optimum stock of capital which is related positively to aggregate output or income and the general price level and inversely to the user cost of capital.

Similarly, $K_{t-1} = \alpha \frac{P_{t-1} Q_{t-1}}{C_{t-1}}$ …. (vi)

Substituting (v) and (vi) in (i), the net investment in the current period can be determined as

$I_t = K_t - K_{t-1} + \delta K_{t-1}$

$$= \alpha \frac{P_t Q_t}{C_t} - \frac{\alpha P_{t-1} Q_{t-1}}{C_{t-1}} + \partial K_{t-1}$$

$$I_t = \alpha \left[\frac{P_t Q_t}{C_t} - \frac{P_{t-1} Q_{t-1}}{C_{t-1}} \right] + \partial K_{t-1}$$

2.1.5 Differences between Jorgenson's Neo-Classical Theory and Keynesion Theory

The Neo-classical theory differs from Keynes theory of investment in some important areas:

(i) Jorgenson's explicitly dynamic approach emphasizes upon the purchase or sale of assets as necessary for maximization. On the other hand, Keynes' present value model stresses upon the holding of an asset for a fixed time period.

(ii) Neo-classical theory has much significance from policy point of view. It implies that tax changes can influence investment. Keynes' model, on the contrary, fails to consider the effect of tax changes upon investment.

(iii) Jorgenson's theory considers the effect of changes in prices of capital goods upon investment but Keynes model, tends to overlook the effect of changes in the prices of capital goods upon investment.

(iv) Neo-classical theory relates investment to a large number of variables but Keynes' theory emphasizes only upon the supply prices of capital assets and the rate of interest.

(v) This theory has been considered better than the flexible accelerator theory and Keynes' theory also on the empirical grounds. This conclusion was confirmed by Jorgenson and Siebert on the basis of data related to 1946-63 period.

2.1.6 Criticisms: This investment model has, however been subjected to criticism on certain grounds:-

(i) This model relies upon the C-D production function. It is open to objection whether this form of production function is a proper description of conditions of production.

(ii) The impact of different variables concerning taxes, depreciation, capital gains upon investment is considered only indirectly through the composite variable, C.

(iii) The Neo-classical model assumes the conditions of perfect capital and product markets. Such an assumption is not realistic.

(iv) Jorgenson fails to explain the process through which actual stock of capital adjusts to the optimal stock of capital.

(v) This model assumes that expected quantities produced and prices are perfectly foreseen. Such an assumption is not true in actual reality.

(vi) Jorgenson's assumption that charges in current prices produce proportional changes in future prices is very simplistic.

2.1.7 Conclusion: In the nut shelf, it is difficult to conclude that this approach is a definite improvement upon the alternative theories of investment or not. However, Venieris and Sebold, in this regard, have commented, "….each theory has its own purpose and its own use. Nevertheless, it does help to establish the neo-classical model as one of the most viable description of the investment approaches.

2.1.8 Technical Terms-

1. User cost of capital- net cost of holding a unit of capital stock for one period.

2. Cabb- Douglas Production Function- A Linear homogenous production function, which implies, that the factors of production can be substituted for are another up to a certain extent only

Questions:

1. Discuss the Neo- Classical theory of Investment.

2. Write notes:

a) User' cost of capital

A) Difference between Neo- Classical Theory and Keynesian Theory

References:

1. Post Keynesian Economics by R.D. Gupta

2. Monetary Economics by Suraj B.Gupta

3. Monetary Economics by M.L Jhingen

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NEO-CLASSICAL AND KEYNESIAN THEORIES OF INTEREST

2.2.1 Neo-classical & theories of Interest

2.2.1 Introduction:

The neo-classical economists formulated a new theory of interest, generally known as loanable funds or neo-classical theory of interest. This theory was first given by K. Wicksell and was later elaborated by many economists such as B. Ohlin, D. H. Robertson, G. Myrdal, Jacob Viner etc. According to this theory non-monetary factors such as thriftness, waiting, time-preference, productivity of capital etc. are not the only factors that determine the rate of interest. But monetary factors such as hoarding, dishoarding of money, bank money, monetary loans for consumption also play an important role in determining the rate of interest. This theory is sometimes also called monetary theory of rate of interest though it is partly monetary because it also accepts the role of non-monetary (real) factors in determining the rate of interest.

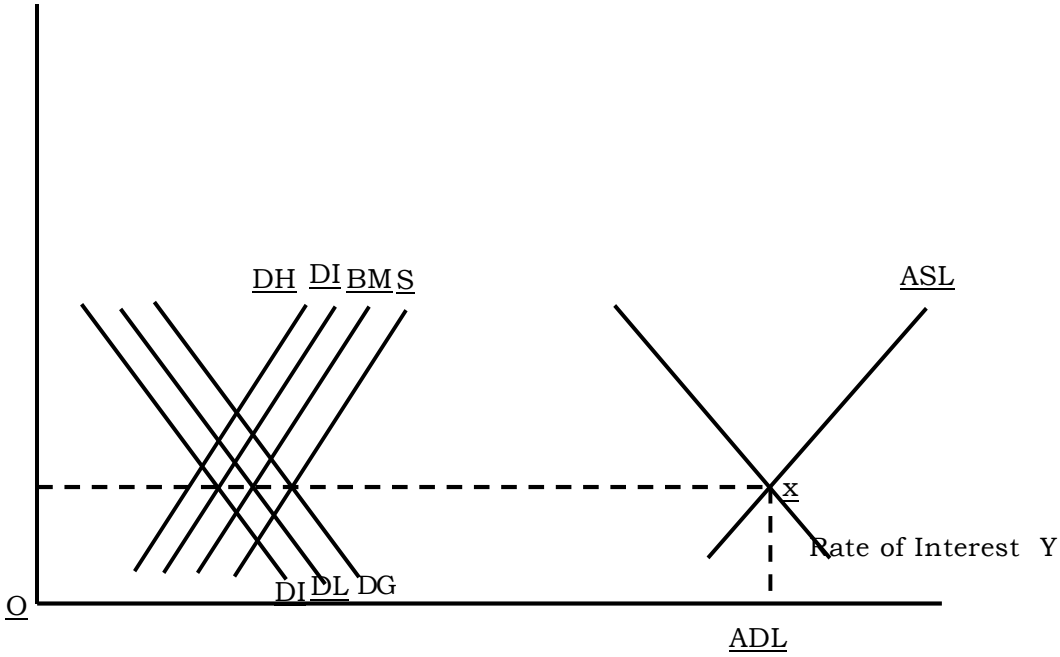
2.2.2 Demand for Loanable Funds :

In an economy money is demanded mainly for three purposes i.e., hoarding investment and consumption. Firstly, people demand some amount of funds in the liquid form for hoarding so that it can be used in some emergency requirements. This money lying at the disposal of a person can be quickly used and these funds are interest elastic. Secondly, loanable funds are also demanded for the purpose of durable consumer goods such as scooter, car, television, etc. These funds are more in demand if the rate of interest is lower. Thirdly, businessmen demand the loanable funds for investment purposes. There would be more demand for this purpose if the rate of interest is low and vice-versa.

2.2.3 Supply of Loanable Funds :

The supply of loanable funds comes from savings (S), dishoarding (DH), credit (BM) and disinvestment (DI). Private savings, individual and corporate sector savings account for the main source of savings. These savings are interest elastic, e.g., if the rate of interest is higher, it would increase the inducement to increase the supply of savings and vice-versa. Similarly, if the rate of interest is higher, more funds would come up for lending out of hoarded money and vice-versa. In the same way, lenders compare their income from investment with the prevailing rate of interest. If the income from rate of interest is higher than that of the income (technically called marginal efficiency of capital) from the investment, the owners of money would prefer to lend their money on interest by disinvesting from their business. So disinvestment is also a source of

supply of funds for loanable funds. The fourth source of supply of loanable funds is bank credit i.e., known as bank money (BM). It is also interest elastic. Bankers would like to supply more money if rate of interest is higher and vice-versa. So these are four sources (S+DH+DI+BM) of supply to loanable funds. According to the neo-classical (Loanable Funds) theory, the rate of interest would be determined at the equilibrium point where demand for loanable funds equals the supply of loanable funds. This has been shown in the diagram No. 2 given below. In the diagram all the individual demand curves for loanable funds have been represented by ADL. On the other hand, all the sources of supply of loanable funds have been added and have been shown by the aggregate supply curve known as ASL.



It is clear from the given diagram that equilibrium takes place at point E where aggregate supply curve for loanable funds (ADL) is equal to the aggregate demand curve for loanable funds. At this equilibrium point L, the rate interest has been determined in market at Or as depicted in the diagram.

2.2.4 Criticism:

The founders of neo-classical theory regarded it as superior to the classical theory of interest. But still this theory is not free from its shortcomings.

Firstly, Prof. Hansen says that neo classical theory of interest is indeterminate. Accordingly to him, savings, a component of supply of loanable funds, change with previous income and change in the current income. It implies that the total supply

of loanable funds, change with previous income and change in the current income. It implies that the total supply of loanable funds also change with income. It is because of this change, the loanable funds theory becomes indeterminate unless the income level is already known.

Secondly, this theory has been criticized on the ground that it makes use of both real as well monetary factors. But it is not correct to combine monetary factors such as dishoarding and bank credit with real factors such as savings and investment without making changes in income level. Besides this, there is difference in the nature of real and monetary factors.

Thirdly, according to the loanable funds theory the supply of loanable funds can be increased by increasing the quantity of cash balances of savings and decreased by absorbing cash balances into savings. It reveals that cash balances are fairly elastic. But it is not true because the total cash balances available with the nation are fixed and are equal to the total supply of money at any time. Actually, the variations in cash balances are due to the variations in the velocity of circulation of money rather than in the quantity of cash balances.

Fourthly, savings are not always interest elastic as the theory emphasizes. But there is a general tendency that people save not to earn rate of interest, but to fulfil their precautionary motives.

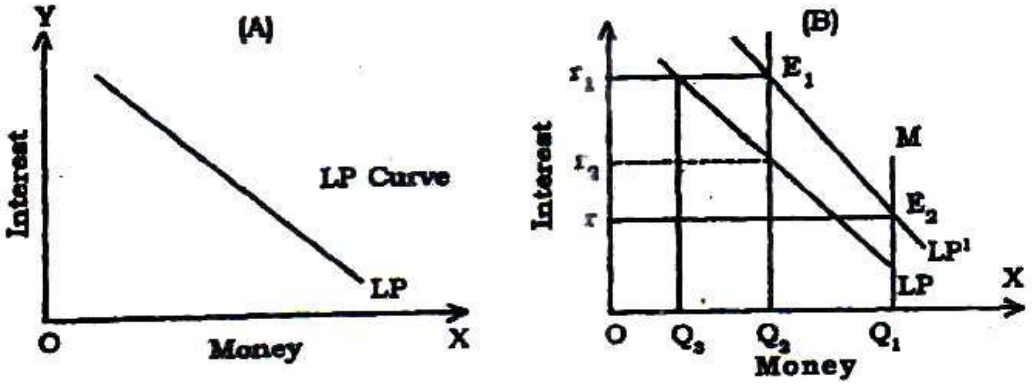
2.2.2 **Keynesian Theory of Interest**

Keynes' theory of interest or Liquidity Preference Theory', according to which the rate of interest is determined by the demand for and supply of money of cash. Keynes' theory based on liquidity preference is called monetary theory of the rate of interest as against the classical real theory of the rate of interest. It is also called because money plays an active role in it. Interest, according to Keynes, is a payment for the use of money.

To Keynes, money is not a medium of exchange, but also a store of value. He laid more emphasis on the latter function of money. In his opinion, people have great liquidity (liking for holding cash) on account of the fact that it (cash) gives them ready command (purchasing power) over goods and services. People and business firms want to hold cash (liquidity) in order to meet day-to-day requirements to provide against unforeseen contingencies and to earn from the future fluctuations of prices of bonds and securities (speculative motive). Thus, those who have surplus money can either keep it in the form of ready cash (liquidity) or they may invest it in fixed income yielding assets like bond and securities on which people earn a rate of interest. They may spend on immovable like house on which they get rent. The desire to hold money as a store of wealth measures the extent of our distrust in our own

calculation concerning the future. "The possession of actual money lulls our disquietitude and the premium which we require to make us part with their wealth in interest bearing forms because interest instruments are less liquid than cash and the value of these is not fixed, but varies from month to month, from week to week even from day to day. A general rise in interest rates means a fall in the market value of any particular bond. On account of these reasons, it is more rational to "hoard" money than 'lend' it. It is, therefore, clear that people need a lot of case to meet the transaction, precautionary, and speculative motive. Interest, according to Keynes, is the reward which must be paid to overcome the desire for liquidity. The higher the liquidity (desire of people to hold cash), the higher is the reward (interest) which must be paid. Interest, therefore, is a reward for parting with the liquidity.

We have known that the rate of interest being a monetary phenomenon is determined by the demand for and supply of money. The supply of money is determined by the Central Bank. It may be noted that the supply of money is different from the supply of commodities, the former being stock and the latter a flow. Money is not continuously produced and simultaneously consumed as happens in case of commodities. The supply of money can be controlled by the monetary authority (Central Bank) and is more or less fixed. The monetary authorities can influence the rate of interest by increasing the supply of money (other things remaining the same), whereas they have no control over liquidity preference of the people. Thus, the demand for liquidity, together with the supply of money, determines the interest rate. The relationship between the rate of interest and the liquidity preference (liquidity function) is shown in the diagram below :



1. In figure (A), LP is the liquidity preference curve. It declines towards

the right.

2. We measure rate of interest vertically and money horizontally.
3. Given the level of income, the demand for money varies with the interest rate.

In other words, liquidity preference is a function of the interest rate increasing as the interest rate falls and decreasing as the interest rate rises. It is just like a demand curve, rate of interest being the price. The reason for this inverse relation between liquidity preference and the interest rate is that at a lower rate of interest, people find it more profitable to hold their savings in the form of cash balances (higher liquidity preference) than at a higher rate of interest. That is why LP Curve slopes downwards to the right.

4. It is clear from the diagram that the larger quantities of money are associated with lower rates of interest as long as the liquidity preference schedule remains unchanged.
   (i) In figure (B), LP is the liquidity preference curve (demand for money) which slopes downwards to the right showing that at lower interest rate more money will be held.
   (ii) The Q_1 M curve shows the total amount of money which is assumed to be more or less fixed and inelastic with respect of interest rate (since it is fixed, the curve Q_1 M is vertically straight).
   (iii) At Or rate of interest, the amount of money which people wish to hold is OQ_1, (liquidity preference) and the amount of money in existence, coincide and the rate of interest is determined at or, i.e., where the demand for money (LP) is just equal to the supply of money E_2Q_1 is called an equilibrium rate of interest i.e., people have no desire to increase or decrease stock of money lending or investing.
   (iv) At higher rate of interest Or^1, people would hold less money (OQ_3) and lend or invest the left (Q_3Q_1). Thus, at a higher rate people's liquidity preference is low because they gain more by lending or investing.
   (v) On the other hand, when the rate of interest falls to Or, people's liquidity preference would increase from OQ_3 to OQ_1 (i.e., O_3Q_1) because they gain more by lending or investing.

(vi) Further when the LP curve shifts (rises) from LP to LP' (quantity of money remaining the same), the rate of interest also rises to E_1, Q_2 from E_2Q_1.

(vii) Moreover, when the liquidity preference remains the same, but the quantity of money increases from Q_3 to OQ_2, the rate of interest will fall from Or_1 to Or_2.

2.2.2.1 Motives for Liquidity

Lets have a thorough knowledge of the factors affecting the demand for money (liquidity preference). According to Keynes, the demand for money (liquidity preference) arises primarily from three motives which are as follows:

(i) Transaction Motive

People and firms do not need money for its own sake, but need because it can fetch them the necessary goods and services. In other words, money is demanded because it is a good medium of exchange. There is a gap between the receipt of wages, salaries or incomes and their expenditure. Not only individuals and households need money to meet daily transactions, but business firms also need to meet daily requirements like payment of wages, purchase of raw materials and to pay for transport etc. The demand for transaction purpose depends upon income and the general level of business activity and the manner of the receipt of income. If every one received income in cash and simultaneously paid it in cash, there would be no need for holding cash balances, but that is not the case in actual practice. Individuals do not receive money income as frequently as they make payments; lot of time, elapses between their receipt of income and its expenditure. Thus, the transaction demand for money is a function of income and may be expressed as $M_1 = f(y)$, where M_1 is transaction demand for money, and (y) denotes it to be the function of income.

i.e., $M_1 = f(y)$

(ii) Precautionary Motive

Individuals, households and business firms find it a good practice to hold more money because they want to take proper precaution against unforeseen future contingencies like sickness, unemployment, accident, fire, old age etc. An individual who goes for shopping will keep more money than what he thinks proper for planned purchases. How much cash a person will hold on account of such unforeseen events will depend upon his psychology and his views about the future and the extent to which he wants protection or insurance

against such event. Likewise, individual business firms also hold cash to safeguard against future uncertainties. The cash balance held on account of precautionary motive will differ with individuals and business firms according to their degree of confidence, wave of optimism or pessimism, access to credit end finance and the facilities for the quick conversion of liquid assets like bonds and securities into cash. As long as individuals and business firms have an easy access to ready cash, the precautionary motive to hold money will be relatively weak. This type of demand for money is also determined by income and the general level of business activity. Keynes has taken the transaction and precautionary demand for money together, as they both are income elastic and is expressed as M_1 =f (y) , where M_1 is the precautionary demand for money and f(y) denotes it to be the function of income. Since both the transaction and precautionary motives are income elastic, we merge them together and show as M_1, = f(y)

(ill) Speculative Motive

Keynes emphasised speculative demand for money as he felt that people kept cash to take advantages of the rise and fall in prices of bonds and securities. It is this demand for money which plays a vital role in the functioning of the economic system for it is through such a demand for money that prices of fixed income-yielding assets (bonds and securities) are affected and the rate of interest changes. The speculative demand for money arises on account of the uncertainly regarding the future rate of interest. The individual investors are not sure of the terms and conditions on which debts owned can be converted into cash. Suppose one expects a fall in the prices of bonds, one will like to hold more cash with a view of spending it in future, when prices actually fall. In this way, individuals protect themselves from possible losses. Similarly, people purchase bonds in anticipation of a rise in their prices. This is called speculative demand for money. Speculative motive is different from other motives as the sole object of holding money under it is to earn profits by “knowing better than the market what tine future will bring. These speculative holdings are specially sensitive to changes in the rate of interest. It is uncertainty regarding future market rates of interest on different bonds and securities of varying lengths and maturities that enable people to do speculation and if their guesses regarding future turn out to be true, they stand to gain.

Under the circumstances, where there is no uncertainty, no basis would exist for liquidity preference for the speculative motive. That is why in the classical theory,

resting upon static assumptions, no importance is given to speculative motive because the element of uncertainly is ruled out of the theory. It is here that Keynes theory differs in a fundamental sense from the classical theory of interest. “By assuming all kinds of knowledge about the future which we do not and cannot possess, the classical theory rules out the liquidity preference for the speculative motive, and with this outgoes the basis for a theory of interest".

The speculative demand for money introduces a dynamic element in an analysis of the general price level and the volume of employment through a relationship between the current and prospective rates of interest and profitability of investment. If the total quantity of money remains unchanged, speculative transactions affect output and employment by changing the rates of interest. The size of the cash for speculative motive that will be held will be determined by future changes in the rate of interest rather than by the current rate of interest. Thus, speculative demand for money is interest elastic and is expressed as $M_2 = f(r)$, where M_2 is the speculative demand for money and f(r) denotes to be the fund ion of the rate of interest.

Thus, all the three motives give us the total demand for money (M_1+M_2). The liquidity preference (demand for money) on account of transaction motive and precautionary motive is more or less stable and is almost interest inelastic (except when interest rate is very high). On the other hand, demand on account of speculative motive is specially sensitive to changes in the rate of interest. If the total supply of money is represented by M we may refer to that part of M held for transaction and precautionary motives as M_1 and to that part held for speculative motive M_2 so that $M = M_1+M_2$. Sometimes money held under M, (transaction and precautionary motives) is termed as active balance or active money, whereas money held under M_2, (speculative motives) is termed as idle money or passive balances. Since the amount as money held under M_1 depends upon income, it is expressed as $M_1 = f(Y)$ or $M_1=L_1(Y)$. Similarly, $M_2=f(r)$, or $M_2=L_2(r)$. Therefore, the equation $M=M_1+M_2$ may be written as,
$M=L_1(Y)+L_2(r)$. Thus, we find that given the supply of money (M) the rate of interest is determined by the liquidity preferene (M_1+M_2) and only that rate of interest is prevailing which brings its liquidity in equilibrium with the supply of money. It may, however, be noted that although interest is related to the speculative motive only, yet other two motives cannot be overlooked because money held under one motive is perfect substitute for money held under the other motive.

2.2.2.2 IMPLICATIONS OF LIQUIDITY PREFERENCE THEORY

It will be useful to understand a few implications of Keynes’ theory called liquidity

preference theory of the rate of interest. These implications highlight the theoretical and practical elements of such a theory. Implications are as follows :

(a) Rate of Interest and Supply of Money

The monetary authority under Keynesian economics is expected to stimulate employment by following a cheap money policy i.e., lowering the rate of interest by increasing the supply of money. The idea behind the cheap money policy is that an increase in the total supply of money (other things remaining the same), will increase the money available for speculative motive (M_2), thereby causing a fall in the rate of interest and stimulating investment which, in turn, will increase income. How effective monetary stimulation will be depends upon how much the rate of interest falls in response to an increase in M_2 (upon elasticity of the L_2 function) : how responsive investment is to fall in the rate of interest and the elasticity schedule of the marginal efficiency of capital; and how much a given increase in investment will increase income (the size of the investment multiplier). But such a policy of monetary management is beset with important limitations. An increase in the quantity of money (other things remaining the same) will lower the rate of interest, it will not do so if the liquidity preference is increasing more than the quantity of money. Similarly, a fall in the rate of interest (other things remaining the same) will increase investment and employment, but it may not be so if the marginal efficiency of capital is declining more than the rate of interest. When an economy is passing through the depth of chronic depression, when liquidity preference is high and expectations of profitability low, monetary policy may prove quite ineffective to break the economic deadlock. Thus, from that practical point of view, monetary policy as based on Keynes' liquidity preference analysis encounters serious limitations.

(b) Inverse Relationship between the Rate of Interest and Bond Prices

Another implication of the liquidity preference theory as given, by Keynes is that bond prices are inversely related to interest rates. In other words, bond prices and interest rates move in opposite direction i.e., when interest rates fall, bond prices rise and vice-versa. Suppose a bond pays a fixed income of Rs. 50 per year at 5% rate of interest and sells at Rs. 1000 in the market. Now if the rate of interest falls 4% the **price** of bonds will increase to Rs. 1250 in order to earn an income of Rs. 50 a year and vice-versa. Similarly, if the rate of interest rises to 6%, the prices of the bonds will fall to about Rs. 850 to give us a fixed income of about Rs. 50. Thus, changes in the prices of bonds in the organised securities markets reflect themselves in the changes in the liquidity preference of the people. A decline in liquidity preference is

reflected in an increased desire on the part of the public to buy bonds at current prices raising the prices of bonds and lowering the rate of interest. On the other hand, an increase in the liquidity preference is reflected in an increased desire on the part of the public to sell bonds to get more cash, as a result of which price of the bonds will fall and interest rates will rise. Thus, we find an inverse relationship between the prices of bonds and the interest rate.

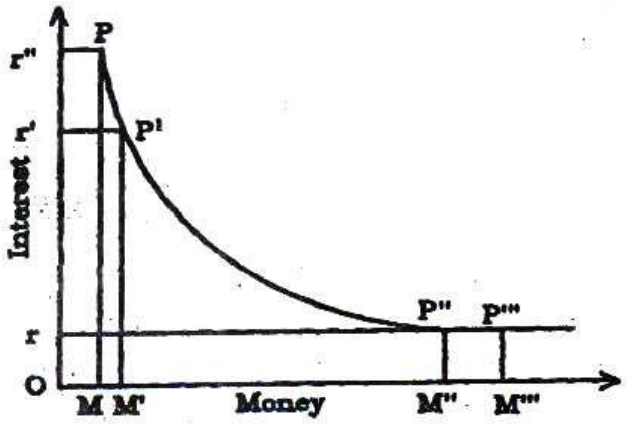
(c) Long-Term versus Short-Term Rate of Interest

A distinction between the short-term and long-term rate of interest constitutes an important implication in Keynes liquidity preference theory. Interest is a reward for parting with liquidity and given to the wealth holder who surrenders control over money (liquidity in exchange for debt, bond or a security. The rate of interest reward for parting with liquidity), differ on debts of varying length and maturities. The rate of interest on daily loans will be different from the rates of interest on weekly, monthly or yearly loans. Debts of longer maturity like three, five or ten years will have different rates of interest. Although these rates of interest vary in amount, they are of the same specie. For the sake of convenience, understanding and simplicity, we do speak of the rate of interest without mentioning debt of any particular maturity. This, however, does not mean that what really exists in the market is not a complex structure of interest rates. In order to overcome this difficulty, a distinction is made between the short-term rate of interest paid on bank loans and the long-term rate of interest paid on bonds and securities. In Keynes' theory, however, real investment in durable capital assets plays an important role and makes the long-term rates of interest on loans, bonds and securities used to finance these investments, of primary significance. It may be noted that it is much easier to bring down the short-term rate of interest than long-term interest, as the commitments on the former type do not result in huge losses even if expectations prove wrong. Thus, a distinction between short-term interest and the long term rates of interest has important policy implications.

fb) The Liquidity Trap

A close scrutiny of liquidity preference schedule in the figure given below brings forth another important implication of the liquidity preference theory by showing the behaviour of the demand for the ideal cash balances in response to decline in the interest rate. It shows as the interest rate falls (from Or" to Or' to Or) the LP curve becomes more and more elastic, until finally, it becomes perfectly elastic. It

shows that the rate of interest is more difficult to lower and becomes increasingly



resistant to further reductions at every step on its downwards path, where the demand for money becomes perfectly elastic. For example, after Or rate of interest, no further reduction in the rate of interest may be possible. The reason for this is the increasing risk of loss in the interest income at lower rates of interest. Moreover, the low interest rate does not adequately compensate for incidental expenses and inconvenience of buying bonds. Further, there is reason to expect that if bond prices change at all, they must decline. For all these reasons, the liquidity preference curve becomes perfectly elastic showing that no further reduction in the rate of the interest is possible merely by increasing quantity of money, for example, in figure given above no further reduction in the rate of interest is possible, even though the quantity of money is increased from OM" to OM"', the rate of interest remains the same (Or = P"M"=P'"M'"). When this stage is reached, the demand for money has become absolute in the sense that everyone prefers to hold money rather than bonds or securities yielding a return of Or (Interest) or less. Since bonds and securities are no longer purchased with added money (M"M'"), bond prices will not be raised and the interest rate is trapped at Or.

It is to avoid such a loss in the value of bonds and securities that people like to keep more cash at a lower rate of interest. This is because people are more or less convinced that the rate of interest has fallen to the minimum and do not expect it to fall further. If it all, they expect any change, it is in the upward direction, causing a fall in the price of bonds. It is, therefore clear that on account of psychological and institutional reasons, the rate of interest becomes stricky and does not (or cannot) fall to zero (or becomes negative). A conclusion that can be drawn from this (liquidity

trap) feature of liquidity preference is that the rate of interest is not likely to fall below a certain level. From the practical point of view, it means that it is not even desirable or possible to depress it below that level, even though such a fall may be warranted in the public interest. In other words, it means that the rate of interest cannot fall to zero and if it does not fall to zero, it cannot become negative.

J.R. Hicks, however, does not agree to the explanation given by Keynes as to why the rate of interest cannot fall to zero. According to Prof. Hicks, the chief reason (as to why the rate of interest cannot fall to zero) is not the uncertainty regarding the rate of interest at low levels, but the basic quality of money as being most liquid. Money being the medium of exchange, if kept in the form of ready cash (liquid form), can be readily put to any kind of use, unless the cost and inconvenience to turn the same into cash have been incurred. An excess of supply over demand of commodity may cause its price to fall to zero, for as long as money is the only important medium of exchange to obtain goods and services to satisfy our unlimited desires, it is bound to be demanded and carry a price (interest) even though at a lower rate. In any case, interest cannot fall to zero. Hicks' explanation as to why the rate of interest cannot fall to zero is considered more satisfactory than Keynes by some economists.

2.2.2.3 Criticism of Keynes' Theory

Although Keynes has criticised the classical theory of the rate of interest, yet his own theory of liquidity preference has also been criticised on the following grounds :

1. Indeterminate

Keynes liquidity preference theory is also indeterminate like the classical theory of the rate of interest. This is because the liquidity preference curve itself shifts up and down with changes in the level of income. Keynes' liquidity preference curve includes three motives L,, (Y), L_2 (r). The first part of the liquidity preference curve (L,) comprising transactions and precautionary motives cannot be known unless we know the level of income, therefore, we cannot know the relevant liquidity preference curve and hence the rate of interest. The theory is indeterminate because liquidity curve is difficult to locate without the level of income. What the Keynesian version regarding the rate of interest tells us is the various schedules of liquidity preference at various levels of income and not what the rate of interest is. Hence Keynes own theory becomes indeterminate.

2. Narrow Version

Keynes' theory of liquidity preference has been criticised on the ground that it is too narrow as an explanation of the rate of interest, because it unduly treats interest rate as the necessary to overcome the desire for liquidity. In actual practice, liquidity (desire for money) arises on account of many factors and not only on account of motives mentioned by Keynes. As such it becomes too narrow explanation of the rate of interest. Further, the rate of interest influences and, in turn, is influenced by other important factors like the rate of saving, propensity to consume and marginal efficiency of capital, which the liquidity preference theory completely ignores.

3. Hoarding

It has been argued that the idea of hoarding has not been properly explained in Keynes' theory of interest. The factors that go to increase the propensity to hoard and the value of hoarding are not sufficiently analysed and given their due place.

4. Liquidity

The distinction between liquidity is not so simple as has been assumed by Keynes. In actual practice, there are different degrees of liquidity. Keynes unnecessarily restricted his theory by simplifying the distinction between liquidity and illiquidity, ignoring the complex system of rates of interest depending on the difference in the degree of liquidity. In other words, he completely ignored the time element involved. In actual practice, we find that the rates of interest of daily weekly or monthly loans differ from the long-term rates of interest. Thus, his theory based on uniformity of liquidity is not acceptable.

5. Inconsistent

It is said that Keynesian theory is inconsistent in as much as it goes against the very facts that it attempts to explain. According to his theory, in depression period, the rate of interest should be the highest because people like to hold maximum, cash in depression and a high rate of interest must be offered to induce people to part with, liquidity. But in depression period, price of everything including the rate of interest is the lowest. Thus, liquidity preference theory becomes inconsistent with facts.

6. Waiting Leading to Saving

According to Keynes, rate of interest is not reward for waiting or saving. He forgets that saving or waiting is a necessary means to obtain funds for liquidity as Jacob Viner has pointed out "there can be no liquidity without saving" Prof. D.A.

Robertson has expressed similar views. A man first earns an income, then saves a part of it, and thereafter, decides whether to keep it in liquid (cash form) or in illiquidity (bonds and securities) forms. It is obvious that there can be no liquidity without saving.

7. Productivity

According to critics, interest is not the only reward for parting with liquidity (as claimed by Keynes) the rate of interest also arises because capital is productive. The demand for funds comes not only for speculative motive, but also for investment. Hence the rate of interest is paid because capital is productive.

8. Limited Validity

Even from the side of supply, Keynes theory of interest has been found to be of limited validity, because it is not always possible to bring down the rate of interest by increasing the supply of money. It is just possible that as soon as the supply of money is increased, liquidity preference may also rise and rate of interest may remain unaffected. Thus, from the practical point of view, his theory suffers from this limitation.

9. For Advanced Economies

His theory of liquidity preference is applicable primarily in advanced economies, where the money market is wide, well organised and people make choices in speculative markets amongst different types of securities. As such it does not apply in backward developing economies, where the choice of assets is limited.

10. One Sided

Moreover, this theory is essentially one sided and, therefore, cannot be general. It lays more emphasis on liquidity preference, i.e., demand side and completely ignores the analysis of factors on supply side.

2.2.3 Technical Terms-

1. Loanable Funds: is the sum total of all the many people and entitites in an economy have decided to save and lend out ot barrowers as an investment rather than use for personal consumption
2. Liquidity Trap: A sitution in which interest rates are low and saving are high, rendering maretary policy ineffective.

Suggested Questions

Q.1 Critically Examine the Keynesian theory of Interest rate

Ans .....

.....

Q.2 What are the implications of liquidity preference theory?

Ans .....

.....

Lesson No. 2.3 **AUTHOR : DR. R.D. GUPTA**

IS-LM MODEL AND ITS EXTENSION

2.3.1 Introduction

How the rate of interest gets determined continues to be a debatable question. None of the earlier theories whether classical or neo-classical or Keynesian gives us a complete answer. However, we may restate the proposition as follows : *There are four determinants of income and the rate of interest (i) productivity, (ii) thrift, (iii) desire for cash (iv) the quantity of money.* An equilibrium condition (income) is reached when the MEC is equal to the rate of interest and finally, when the volume of investment is equal to the normal or desired volume of cash (L) equals the quantity of money (M), when the MEC is equal to the rate of interest and finally, when the volume of investment is equal to the normal or desired volume of saving (i.e., L=M, r=M.E.C, S=I) and therefore, (Y =C+1). All these factors are inter-related. Let us study analytically the inter-relationship of these factors.

The classical or neo-classical formulation of loanable funds does not give us a determinate theory of the rate of interest. It treats productivity and thrifts as essential elements in any theory of interest, but it does not tell us how the rate of interest gets determinated. It throws no light on the most crucial question whether the rate of interest is determinant of the system or the determinate? All that the

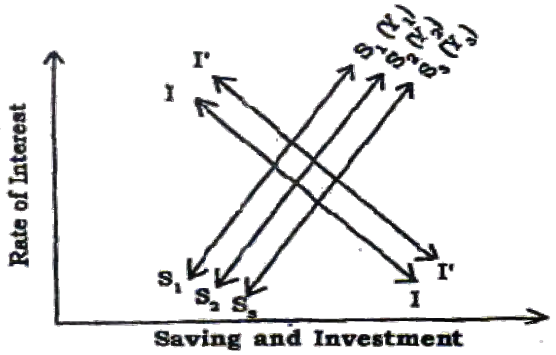


Fig. 10.1

loanable funds formulation gives us is family of loanable funds (or saving schedule in the Keynesian Pigovian sense) at various income levels-showing how much people will save at different rates of interest and different levels of income. In the figure these are shown at S_1 (Y_1), S_2 (Y_2), S_3 (Y_3) etc. The shape of these schedules implies that people will save more at higher rate of interest than at low rates. The fact that there are different schedules for different assumed levels of national income shows the classical's belief that people will save more given the rate of interest, the higher their income. IT is investment-demand curve showing how much businessmen would wish to invest at different rates of interest. The position and shape of these schedules depend, among other things, on the physical productivity of capital. The figure is meant to show not what the rate of interest will be, but what level of income will be associated with different rates of interest.

The same criticism applies to Keynesian theory of liquidity preference of the rate of interest, it also fails to provide us a determinate theory of the rate of interest; because the liquidity preference schedule will change up or down with change in income level, therefore, the theory is equally indeterminate. From the Keynesian formulation what we get is family of liquidity preference schedules at various income levels and not a theory of the rate of interest. In the figure below, each liquidity preference curve is associated with one level of income and shows the demand for money at the level of income which respond to changes in the rate of interest. With every rise in income, more money is required for 'transactions' and to satisfy the 'precautionary' motives and the liquidity preference schedules, therefore, move to the right. In fig. 2, L_1, L_2 and L_3 are the liquidity preference schedules at different levels of income. On this family of liquidity preference schedules we superimpose a schedule of money supply. It is assumed that the money supply is fixed (by the Central Bank) and the money schedule is, therefore, a straight vertical line. The figure, thus, contains the essence of the Liquidity Preference Theory.

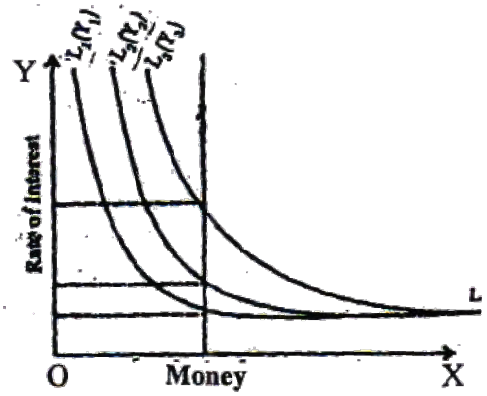


Fig. 10.2

2.3.2 The LM Schedule

In the money market, the economic activities centre around the demand for and supply of money to hold. These activities are lumped together because they include the different forms in which wealth holders seek to hold economic value over time.

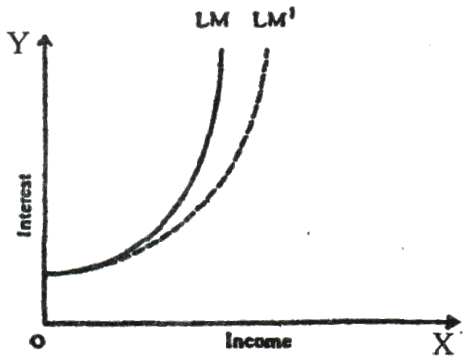
The demand for money consists of transactions demand (L_t) and the asset demand (L_a). Therefore, $L = L_1 + La$ = The money supply also consists of two parts for transaction purpose (Mt) and for holding it as an asset (Ma). Therefore, $M=M_t$ +Ma. Hence the essential condition for monetary equilibrium is :

$L_t + La = M_t + Ma$

The total demand for money (L), is a function of both income and the rate of interest and one of its components, Lt is a function of income while the other component, the asset demand (La) is a function of rate of interest. In other words, equilibrium with respect to Lt is linked to income and equilibrium with respect to La is linked to the rate of interest. Therefore, general equilibrium in the economy is defined in terms of both, income and the rate of interest.

The liquidity preference function L and the money supply function M also establish a relation between income and the rate of interest. Given a certain liquidity preference (demand schedule for money and certain supply of money fixed by monetary authority) the rate of interest will be low when the income is low and high when the income is nigh. The curve showing this relation, we call the LM curve. It is also a functional curve and shows the relation between income and interest (given L function or supply of M) when the desired cash equals the actual cash, or when L=M. The LM curve presupposes equilibrium between L and M just as IS curve presuppose equilibrium between I and S. The LM curve is shown in the figure 10.3.

The LM curve shows (assuming the money supply rigidly fixed by the monetary authority) that a low level of income will mean a relatively abundant supply of money and so a low rate of interest: a high income will mean a relatively small money and so a high rate of interest. At high levels of income, there is large transaction demand for the limited quantity of money and so the rate of interest rises steeply; the LM curve becomes highly inelastic with respect to the rate of interest at high income levels. On the other hand, at low income levels, there is small 'transaction demand' for the fixed quantity of money, and so large part of the money may be held as ideal balance; the effect is to lower the interest rate. The LM curve at low level is interest inelastic. There is a limit to the extent that rate of interest can fall because (as we have seen in the last chapter) the asset demand function becomes



10.3

inelastic at relatively low rates of interest. This is a liquidity trap. Once we reach the critical level at which interest rates do not respond to further increases in the quantity of money for holding ideal balances, then LM curve becomes perfectly elastic with respect to the rate of interest.

The dotted curve LM' represents a shift in the LM schedule caused either by (i) increase in the quantity of money controlled by the monetary authority or (ii) decrease in LP. Assuming no change in the quantity of money will shift the LM curve to the right; and similarly, assuming no change in the quantity of money, any decrease in the demand for money (the L function) will ease the situation and tend to lower the rate of interest at any given income level, or conversely, raise the level of income consistent with any given rate of interest Thus, either a decrease in LP or an increase in the quantity of money will shift the LM curve to the right as shown by LM^1.

2.3.3 The IS Schedule

We know that the rate of interest, investment and income are all interrelated. Investment is a form of 'income generating' expenditure. It creates income not only directly, but indirectly also through its effects on consumption. Every given level of investment has a corresponding level of equilibrium income defined as the level of income attained when the 'multiplier' process has worked itself out (what this equilibrium level of income is, depends on the size of the 'multiplier' which, in turn, depends upon the MPC). The fact is that for a given level of investment = savings, there is a particular and corresponding level of equilibrium income and the rate of interest is represented through what Hicks calls the IS curve. The IS curve is a functional curve and shows the relation of income and the rate of interest when the multiplier has fully worked itself out, investment and saving are then in equilibrium. Saving and investment are always equal, but only when the full multiplier effect has been reached that saving and investment are in equilibrium. At this point actual savings

equal normal savings as determined by normal marginal propensity to save.

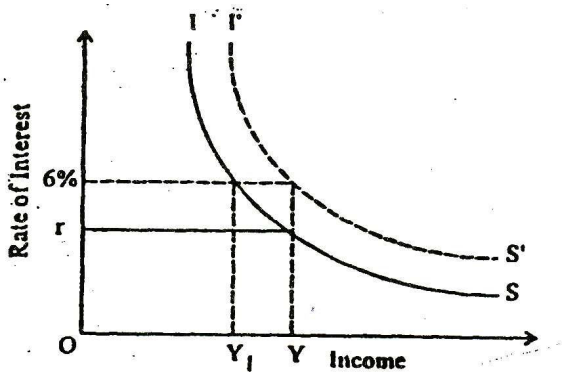


Fig. 10.4

The figure given above shows income on the horizontal and rate of interest on the vertical axis. Given a certain marginal efficiency of investment schedule, a high rate of interest will permit only a little investment. This mean a low level of income, even where account is taken of the multiplier. At a low rate of interest, however, investment would be larger, and so the level of income (account being taken of the multiplier) will be relatively high. Accordingly, the IS curve slopes downward to the right. Given the investment function and the consumption function (from which later the multiplier is derived); income is high (OY), at low rates of interest (or) and low (OY,) at high rate of interest (6%). The IS curve shows the relation, with a rate of interest at 6%, the level of investment will be such that the MPC being what it is, the equilibrium , level of income will be OY_1. The various points on the IS curve shows the equilibrium between S and I (given the MPC) at different rates of interest giving rise to different level of income. If, however, the investment or MPC increases due to some reason, the IS curve will shift to the right as I'S'. It means that at the same rate of interest of 6% saving and investment are equalised at a higher level of income OY. To repeat, the IS curve depends upon the level (and slope) of the MEC (investment function) and equally upon the level (and slope) of the MPC (consumption function). An upward movement in MPC, or both, will raise the level of income corresponding to each rate of interest.

2.3.4 The General Equilibrium (The Intersection of IS and LM Curves.)

We have now two curves IS and LM which relate income and the rate of interest. Neither of them can by itself tell us either the rate of interest or the level of income. We know what the level of income will be, given the rate of interest, but we cannot say what the rate of interest will be unless we know the level of income. But by combining

the IS and LM curves, we can determine simultaneously both the rate of interest and income. This is shown in the figure given further. This figure shows that given MEC and MPC embodied in the IS curve, the supply and demand for money embodied in the LM curve, the rate of interest is determined as Oi and income as Ynp. This means a macroeconomic equilibrium (general) economy, in which the monetary and goods sector are simultaneously in equilibrium. In other words, Oi is that unique rate of interest, which brings about equality between saving and investment in the goods market, and equality between the demand for and the supply of money in the money market that is I = S and L = M, combining the LM and IS curves in a general model. In the figure given further we get an understanding of the manner in which the money market and the goods market are linked together. IS and LM curves intersect at a point where income is OYnp and rate of interest is Oi, these are equilibrium levels with respect to income and the rate of interest. There are any number of levels of both income and rate of interest, i.e., that are compatible with equilibrium of either S and I alone or L and M considered alone, but there is only the one unique rate of interest (the interest) and only one unique level of income that is consistent with equilibrium in both the monetary and goods sectors. The actual level of both income and interest that is consistent with equilibrium in the two sectors depends on the shape and the level assumed for the LM and IS curves. At the point of inter-section of these curves, the output level (OY) and the rate of interest (Oi) are such that S and 1 are in equilibrium and the demand for money (L) and supply of money (M) are also in equilibrium.

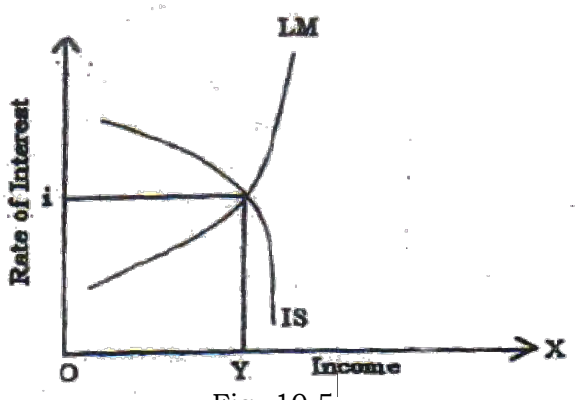


Fig. 10.5

Thus, a determinate theory of interest is based on investment, demand function, the saving, consumption function, the liquidity preference function and the quantity of money. The Keynesian analysis looked as a whole, did contain all these

elements. In this sense Keynes, unlike neo-classicals, did have a determinate theory of interest, but Keynes failed to bring together all these elements in a comprehensive manner to formulate an acceptable integrated theory of interest. He failed to point out the specific fact that LP plus the quantity of money can give us not only the rate of interest, but also the LM curve. It was Hicks who made use of Keynesian tools as to present them in such a manner as makes it impossible to forget the whole picture that productivity, thrift, liquidity and money supply are all essential elements in a comprehensive general and determinate theory of interest and income.

2.3.5 Shifts in IS and LM Curves

A change in the equilibrium level of income and rate of interest comes about as a result of a shift in the position of either IS or LM curve. Such shifts or changes may be either due to real or monetary factors. Real changes originate in the goods sector and come about because the IS curve has shifted. Monetary changes, on the other hand, originate in the monetary sector and manifest themselves through a change in the position of the LM curve.

The fundamental explanation for a rightward shift in the IS curve is an increase in the aggregate demand function. The main reasons for an upward movement in the ADF are : that there may be an autonomous increase in the investment demand function; there may be an autonomous increase in government expenditure on goods and services; there may be an autonomous upward shift in the consumption function; there may be an increase in exports relative to imports. The effect on the income of an upward shift in ADF will depend upon the extent to which the IS curve will shift to the right and also on the impact that a rising rate of interest will have upon the forces which determine equilibrium in the goods sector. The factors which govern the magnitude of the shift in the IS curve are those which influence the size of the multiplier effect, given an increase or decrease in the ADF, if there is no change in the position of the LM curve with a given shift to the right in the IS curve, the result will be rise in the rate of interest.

The LM curve may also shift to the right because there may be an autonomous increase in the supply of money, there may be a downward shift in the assets demand component (La) of the total demand for money (on account of general decline in the demand for liquidity throughout the economy), there may be a shift in the LM curve because of a shift or fall in the general price level (assuming no change in money supply). In general, the effect on the equilibrium income level of a shift to the right in the LM curve and also on the responsiveness of forces in the goods sector to a decline

in the rate of interest. However, it may be noted that barring the changes taking place, in the range of interest rates equal to or below, the horizontal position of the LM curve, shift to the right in LM curve will always reduce interest rate.

For further analytical purpose, see figure 6.

(i) In the figure the ISo curve, which is relatively elastic intersects LMo curve, which is interest inelastic. At this point interest iO and income Y_2 are mutually determined.

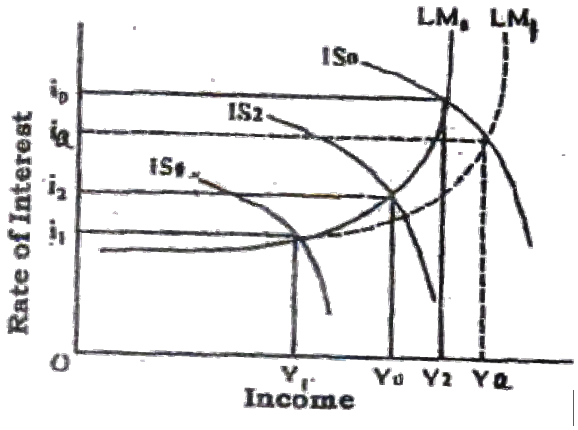


Fig. 10.6

(ii) Assume for the sake of argument that income at Yo is less than full employment income. In order to increase income to full employment level, the monetary authority would increase the money supply, so that LMo is shifted to LM1, the rate of interest would fall to ia and the income would rise to Ya. This will mean boom conditions because income Yo already represents high level of employment (though not full employment). It is, therefore, clear that if the IS curve is interest elastic, while LM curve is interest inelastic, an increase in the quantity of money will have an expansionary effect.

(iii) Consider, on the other hand, the inter-section of IS, curve which is relatively interest-elastic, with LMo curve which is highly interest elastic. Obviously, under these circumstances, income and employment cannot be raised by increasing the quantity of money; monetary policy, in other words, is ineffective. In order to raise income from OY_1 to OY_2 it is necessary to shift to IS_2 and this will be possible only when there is a rise in MEC schedule or by shifting upwards the consumption function.

Such a situation, does arise in advanced countries-rich in capital accumulation

and, therefore, at least having low marginal efficiency of capital - low rate of interest in such circumstances fail to induce new investment. The investment function being interest - inelastic, the IS curve would also tend to be interest inelastic. As such investment outlets would have to wait for an upward shift i.e., MEC caused by technological innovations of new products, development of regional resources, urban development, housing construction, rural electrification, technology etc. This will shift IS, curve to IS_2.

(iv) Now at the point of intersection of IS_2 curve with LM curve where IS_2 curve (now is relatively interest-inelastic), the monetary policy designed to increase the quantity of money would shift the LMo curve to LM, this will bring down the rate of interest and expand income a little. But the real expansionary effect on income will be only when conditions in (ii) above are fulfilled.

2.3.6 Technical Terms

1. IS Schedule- is a functional curve and shows the relation of income and the rate of interest when multiplier has fully worked itself out, investment and saving are then in equilibrium.
2. LM Schedule- is a functional curve which shows the relation between income and interest when the desired case equals the actual case.

Suggested Questions:

Q.1 Define:

a) IS Schedule

b) LM Schedule

Q.2 Diagrammatically Explain the changes in Equilibrium with shift in IS & LM curves.

Post- Keynesian Approaches to Demand for Money and Patinkin's Real Balance Effect:

2.4.0 Post- Keynesian Approaches to Demand for Money

Before Keynes, a mechanistic approach to the demand for money was generally emphasized, where the basic assumption was that money was used as a medium of exchange and the amount of money needed for this purpose was determined by the technical factors like the period of pay, the degree of development of banking etc. This too mechanical a structure failed to face the onslaughts of the Great Depression and Keynes redefined the demand for money as constituted by the active and passive (idle) balances. So far as active balances were concerned, the traditional assumption and technical and social conditions were retained. His theory was, therefore, regarded as "a rather awkward hybrid of two theoretically inconsistent approaches, with the transactions demand being regarded as technologically determined and the assets demand being treated as a matter of economic choice." For the removal of dichotomy in Keynes' analysis and for expressing the demand function for money in a more generalized manner, a number of serious studies have been attempted by economists like Baumol, Tobin, Turvey, H.G. Johnson, Gurley and Shaw, M. Friedman and many others. Some of the prominent studies on money demand are discussed below.

2.4.1 Baumol's Approach: W.J. Baumol, in his article, The Transactions Demand for Cash: An Inventory Theoretic Approach, published in the Quarterly Journal of Economics in November, 1952 stressed that the transactions demand for money is also a function of the rate of interest. For the determination of optimum cash balances which may be held for

the transactions purposes, he applied the principle of determining the optimum stock of inventories. In his theory, he proceeds with a set of simplifying assumptions:

(i) The transactions are supposed to be perfectly foreseen and that they occur in a steady stream in a prefect bond market.

(ii) The bond market is perfect and there is easy conversion of bonds into money and vice-versa.

(iii) The conversion of bonds into money and vice-versa can be easily facilitated.

(iv) The holding of cash, however, involves two types of costs – interest costs and the non-interest costs. While the former are in the nature of an opportunity cost because the holding of cash involves the sacrifice of interest return, the latter include broker's fee, postage fee and book-keeping expenses etc.

(v) The rate of interest remains fixed for a given period.

(vi) Although some elements of non-interest costs vary with the magnitude of funds involved, yet on the whole broker's fee is supposed to be fixed over a period of time and is denoted by b.

(vii) During the course of a given period, the value of transactions is T that occurs in a steady stream.

(viii) The cash for conducting transactions may be obtained either by borrowing or by disinvestment.

Let us suppose C is the cash withdrawal during the year. Then T/C withdrawals occur over the course of the year. Since each time the firm withdraws C units of money, it spends the amount in a steady stream and draws out a similar amount the moment it is gone. The average cash holding will be C/2 and the annual interest cost of holding cash will be rC/2 where r is the rate of interest. Given T/C withdrawals over the year, the broker's fee amounts to bT/C. The total cost equation can now be stated as

$$\eta = \frac{bT}{C} + \frac{rC}{2}$$

Here η denotes total cost of holding cash for transactions. This requires that the investor holds cash at the minimum cost. That will determine the optimum level of C which can be determined by setting the derivative of η with respect to C as equal to zero.

$$\frac{d\eta}{dC} = -\frac{bT}{C^2} + \frac{r}{2} = 0$$

Or $$\frac{r}{2} = \frac{bT}{C^2}$$ Or $$C^2 = \frac{2bT}{r}$$

Or $$C = \sqrt{\frac{2bT}{r}} \qquad \text{…. (ii)}$$

Dividing both the sides by the price level P,

$$\frac{C}{P} = \sqrt{\frac{2(b/P)(T/P)}{r}}$$

$$M' = \frac{C}{P} = \sqrt{\frac{2b/T}{r}} \qquad \text{…. (iii)}$$

Where

M' = transactions demand for real balances

b' = real non-interest opportunity cost

T' = real income

The equation (iii) signifies that the transactions demand for cash varies directly with real income and inversely with the rate of interest (r). Thus, the dichotomy between the transactions demand and asset demand for money stands ruled out because for both purposes, the demand for money is related inversely to the rate of interest.

2.4.2 James Tobin's Approach: Keynes' analysis of demand for money attaches much importance to the speculative demand for money because it is presumed to be influenced significantly by the uncertainty about the future course of interest rate. His interpretation of uncertainty was not related to the subjective doubt in the mind of an individual investor. He appeared to mean by it simply the disagreement among investors concerning the future level of the interest rate. In his words, "It is interesting that the stability of the system and its sensitiveness to changes in the quantity of money should be so dependent on the existence of a variety of opinions about what is uncertain. Best of all that we should know is the future. But if not, then if we are to control the activity of the economic system by changing the quantity of money, it is important that opinions should differ.

In his article , Liquidity Preference as Behavior Towards Risk, published in the Review of Economic Studies in February 1958, James Tobin rightly explained uncertainty in subjective terms of risk involved in the exercise of different investment options by the investors, most of which are beyond their control. Tobin transformed Keynes' liquidity preference theory from a theory of uncertainty to that of risk In his opinion, it is the element of risk that influences strongly the portfolio decisions of the investors. The holding of entire income in the form of cash involves no risk of capital loss. On the opposite, the holding of bonds may entail capital loss, should the rate of interest go up. The investment in such assets can be possible only when the risk of capital loss is adequately offset by the return from them. This tendency towards risk- aversion makes the investors to decide as to what proportion of their assets is held in the form of cash and in the form of bonds etc. In this connection, Tobin suggests the use of subjective risk certainly- equivalent-return function. This function represents different combinations of risk and return which are considered equivalent by the investor.

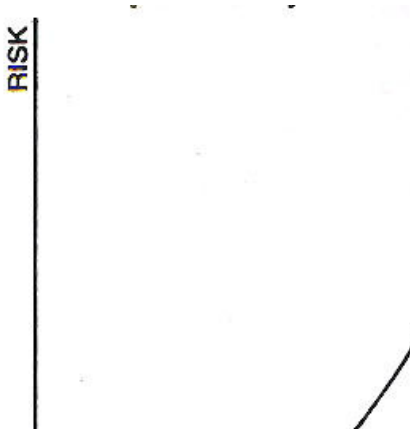


Fig 2.4.1

In Fig. 2.4.1 AB is the risk certainty-equivalent return function which slopes positively. It indicates a direct relationship between risk and return. Greater the risk, greater must be the return to ensure a particular type of investment and vice-versa. OA is the certainty-equivalent-return because here the risk is zero. If the investor decides to choose the prospect C, risk is CQ and the return is OQ. Since OA is the return at zero risk, AQ is the premium for risk. Unless this premium AQ is available to the investor for off-setting CQ risk, he is unlikely to make the choice of prospect C and will prefer the prospect A where no risk is involved.

In this connection, the most pertinent question is as to how to measure return and risk. The measure of return is the mean values of interest returns (r) and capital gains (g) and that of risk is the standard deviation of return (σ_R). Let us suppose that a portfolio consists of a proportion a_1 of cash and a_2 of bonds such that a_2 lies between 0 and 1 and the sum of a_1 and a_2 is equal to unity. The return on bonds is determined as.

$$R=a_2 (r+g) \qquad ...(i)$$

Since g is a random variable, the expected value of which is zero, the expected return on portfolio (μ_R) will be

$$\mu_R = a_2 r \qquad ....(ii)$$

The risk involved is to be measured by the standard deviation of R, (σ_R). It is a measured of dispersion of possible returns around the mean value μ_R. A high or low σ_R means high or low probability of larger deviations respectively from μ_R.

The standard deviation of R depends upon the standard deviation of g, i.e., (σ_R) and the proportion of funds invested in bonds (a_2)

$$\sigma_R = a_2\sigma_g$$

Or $a_2 = \sigma_R/\sigma_g$ …. (iii)

Substituting the value of a_2 in equation (ii)

$$\mu_R = \frac{\sigma_R}{\sigma_R} r$$

The trade off between the return and risk can be analyzed through Fig. 2.4.2

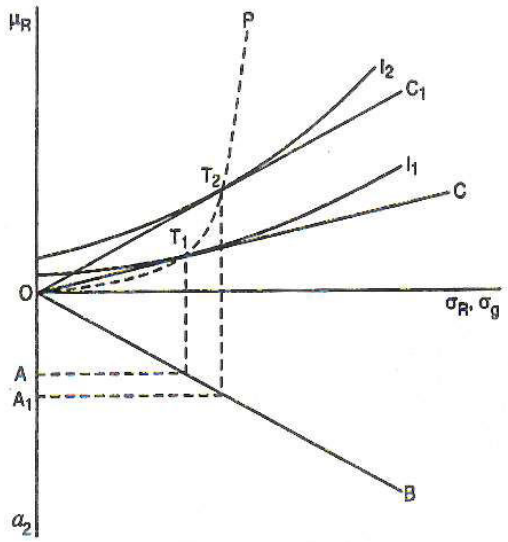


Fig. 2.4.2

The relationship between risk and return can be expressed through the opportunity line OC, the slope of which at a given rate of interest is r/σ_R. As r increases, the opportunity line shifts up to the position OC_1. The relationship between risk and investment in bonds is shown through line OB in the lower half of the figure. I_1 and 1_2 are the indifference curves such that the investor is indifferent about the different combinations of μ_R and σ_R on the same indifference

curve. The combinations of risk and return on a higher indifference curve are preferable to those on a lower indifference curve. T_1, T_2 are the points of tangency between the opportunity lines and the indifference curves. These are the optimum combinations between the risk and return at different rates of interest. By joining these points with origin, the optimum portfolio curve OP can be drawn. It slopes positively signifying that risk and expected return move in the same direction. As the rate of interest rises so that the opportunity line shifts from OC to OC_1, a_2 increases from OA to OA_1. This implies that there is an inverse relationship between the rate of interest and the holding of cash denoted in this analysis by proportion a_1, which tends to fall as a_2 increases.

2.4.3 Turvey's Approach: Ralph Turvey brought about a significant improvement in Keynes' liquidity preference theory by treating wealth as one of the determinants of demand for money. His analysis makes a distinction between two liquidity preference curves—(i) constant number of bonds liquidity preference curve, and (ii) open market operations liquidity preference curve. When the variations in the quantity of money are brought about through the open market operations, the latter type of liquidity preference curve becomes relevant. Otherwise, the constant number of bonds liquidity preference schedule is relevant.

In his model, Turvey attempted to explain the relationship of the asset prices with the quantity of money, number of bonds and the rate of interest. The wealth owned by private sector (W) consists of the quantity of money (M) and the value of bonds which is determined as *n*P where *n* is number of bonds and P is the price of bonds. Thus

$$W=M+ nP \qquad \ldots(i)$$

Since the demand for bonds is determined by the amount of wealth and the bond price, the demand for bonds (D_8) can be expressed as

$$D_B = \alpha W+BP \qquad \ldots(i)$$

Here α is the ratio of demand for bonds to wealth and it is presumed to be less than unity and β is the incremental ratio of demand for bonds to bond price. The bond supply (S_B), on the other hand, is equivalent to the value of bonds (nP).

$$S_B = nP \qquad \ldots.(iii)$$

The equilibrium in the bond market is determined when the demand for bonds equals the supply of bonds.

$$D_B = S_B$$

or $$\alpha W+\beta P = nP \qquad ...(iv)$$

Substituting (i) in (iv)

$$nP = \alpha(M+nP)+ \beta P$$

$$nP = \alpha M+\alpha nP+\beta P$$

$$\alpha M = nP—\alpha nP-\beta P$$

$$\alpha M = P[n—\alpha n-\beta]$$

$$P = \frac{\alpha M}{n(1-\alpha)-\beta} \qquad \ldots(v)$$

Equation (ν) shows that bond price (P), given the co-efficient α and β, varies directly with the quantity of money (M) and inversely with the number of bonds (n).

The distinction between the constant number of bonds liquidity preference curve and the open market operations liquidity preference curve can be explained through Fig. 2.4.3

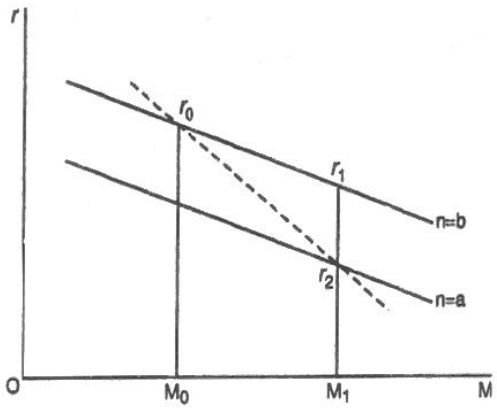


Fig. 2.4.3

Assuming a constant number of bonds b, the constant number of bonds liquidity preference curve is n=b. This curve is negatively sloped because an increase in M from M_0 to M_1 brings about an increase in the amount of wealth (W). An increase in W also raises the demand for bonds (D_B). The rise in demand for bonds results in a rise in bond prices and a fall in the rate of interest from r_0 to r_1. The quantity of money is related inversely with the rate of interest. If the monetary authority starts the open market purchase of bonds, the number of bonds will decrease and the relevant liquidity preference curve is n = a and the decrease in bonds is measured by (b - a). In this case, the rate of interest falls from r_1 to r_2. Thus the fall in interest rate is much more, when the quantity of money is expanded through open market operations than in case it is expanded through fiscal operations. Give these two liquidity preference curves, an expansion in money from M_0 to M_1 through open market purchase of bonds causes an overall fall in the rate of interest from r_0 to r_2.

2.4.4 Gurley and Shaw Approach: Gurley and Shaw attempted to demonstrate the impact of an expansion of non-banking financial institutions upon the demand function of money. Since the NBFI primarily convert the primary securities into indirect securities for the portfolio of ultimate lenders, they attempt to provide such substitutes for money as are most suited to the requirements of ultimate lenders. Their activities cause a decrease in the demand for money and consequently influence significantly the liquidity preference function. This is explained through Fig. 2.4.4

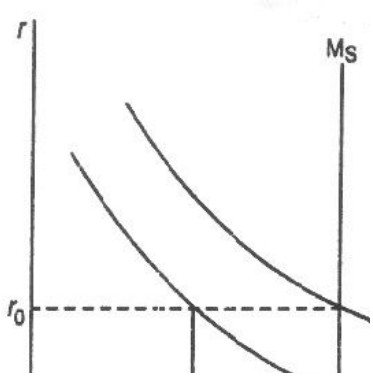


Fig. 2.4.4

Given the demand for real money balances curve M_D and the real supply of money curve (M_S), the equilibrium in the money market is determined at r_0 rate of interest. In the absence of NBFI, M_D is the liquidity preference curve. Since the NBFIs provide near-money assets, therefore the provision of money- substitutes

causes the money demand function to shift to M_{D1}. In this base, the demand for real money balances decreases from M_0 to M_1 at the equilibrium rate of interest r_0. As the- supply of money remains unchanged, the excess of money supply over its demand will be bridged up only at a lower rate of interest r_1.

The operations of NBFI influence the liquidity preference theory in the following two ways:

Firstly, Keynes' liquidity preference theory prescribes a minimum limit below which the rate of interest is not likely to fall. This is the state of liquidity trap and at this minimum rate of interest; the liquidity preference function becomes perfectly elastic. Since the NBFL are able to get more and more funds without liquidating their assets, they are capable of depressing the interest rate even lower than its possible level in the liquidity trap. To quote Gurley and Shaw, "One apparent effect of indirect finance is to reduce this irreducible minimum.

Secondly, Gurley-Shaw thesis has considerably weakened the relationship between the rate of interest and the velocity of circulation of money.

2.4.5 DON PATINKIN'S APPROACH OR PATINKIN AND REAL BALANCE EFFECT:

Don Patinkin has challenged the traditional QTM where MV= PT. He has been able to show the validity and rehabilitation of the classical QTM through Keynesian tools with the help of certain basic assumptions:

1. It is assumed that an initial equilibrium exists in an economy i.e., the system is stable.

2. Consumption function remains stable i.e. the ratio of the flow of consumption expenditure on goods to the stock of money must be stable.

3. It is further assumed that there are no distribution effects i.e. the level and composition of aggregate expenditures are not money in distributed among creditors and debtors.

The term "real balance effect" was coined by Don Patinkin to denote the affect of changes in real stock of money on consumption expenditure, which is a change in consumption expenditure as a result of changes in the real value of the stock of money in circulation. The analysis of the real balance effect listed three motives why people prefer for their spending and demand for money in response to a change in the aggregate stock of money. First, the demand for money is a

function of the level of wealth. The wealthier the people, the more expenditure on goods.

Second, they hold money for security as a part of their diversified portfolios. Thirdly, just as the demand for superior goods increases with a rise in income, so does the demand for money.

Thus, individuals usually desire their cash balances which should bear a given relation to their annual income. Therefore, other tings being equal-wealth, portfolio structure and income determine the demand for money as the spending decisions. Hence corresponding to these three motives of DM (demand for money) there are three different aspects of the real balance effect each of which may function either directly on the demand for commodities or may function indirectly by stimulating the demand for financial assets (securities) raising their prices, lowering the interest rates, stimulating investments, increasing incomes, resulting in a rise in demand for commodities.

D_M = f (Real balances)

Real balances means real balance effect which further depends upon net wealth effect, portfolio effect and Cambridge effect.

Net Wealth Effect: It is the first must important aspect of the real balance effect. Painkin states that an increase in real balances produces an increase in spending because it changes one's not wealth holding. It includes currency net claims of the private domestic sector on foreigners and net claims of the private sector on the government sector. Hence,

Consumption = F (net wealth)

Rising or falling as real balances increase or decrease.

Portfolio Aspect: James Tobin is the main builder of this view who is supported by Metzler. According to this aspect, a decrease in price level results investors portfolio to consist of more money then desired in proportion to the portfolio. A distinguishing feature of this aspect is that people increase or decrease their expenditures in order to restore their stock of money to the optimum level with respect to their asset portfolio.

Cambridge Aspect: It is the third aspect of real balance effect. It differs from others i.e. the demand for money primarily as a function of income. According to this aspect, an increase in the stock of real balances increases

relative to income. If one has previously cash balances equal to 1/10th of annual income, then after an increase in real balances one would hold cash balances equal to 1/5th of annual income.

Hence, the wealth effect, portfolio effect and Cambridge aspect of real balance effect are all interrelated and it is merely for the sake of convenience that a division amongst the three aspects of the real balance effect is determined. Patinkin's solution to the problem has not been accepted i.e., it is formally considered as incomplete because it fails to provide an explanation of full long run equilibrium, yet the integration of product and monetary markets through the real balance effect represented a significant improvement over previous theories of money.

Questions:

1. Describe the Post Keynesian approaches to demand for money.
2. Write notes:

   A) Baumol'Approach

   B) Gurley Shaw Approach

   C) Real Balance Effect

References:

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2. Monetary Economics by Suraj B.Gupta

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LESSON NO. 2.5 **AUTHOR : ROSHAN KHOSLA**

Friedman's Quantity Theory of Money

2.5.1 INTRODUCTION

The Classical Quantity Theory of Money and Prices was strongly criticized by J.M. Keynes. His criticism was mainly based upon two points. In the first place, he pointed out that the assumption of constant velocity of money was unrealistic. Keynes and his followers were able to demonstrate that the velocity of money in a real world economy fluctutates and sometimes fluctuates violently. Secondly, he also pointed out that change in the price level is not a direct one but it comes about indirectly through changes in the rate of interest. In consequence of the Keynesian criticism the Classical Quantity Theory had come under a cloud like so much else of the classical and neo-classical economics.

However, a very important and interesting development in the monetary theory has been the restatement of the Quantity Theory by Milton Friedman in his now famous paper, "The Quantity Theory of Money: A Restatement'. In this paper, he has tried to rehabilitate the Quantity Theory of Money by making a distinction between the velocity of money and the velocity of money function. While he concedes the Keynesian contention of money being not constant and stable, he nevertheless, holds that the velocity of money function is much more stable than the Keynesian consumption function which is said to be the corner-stone of the Keynesian multiplier theory of income and employment.

In what follows here under we shall explain how Friedman arrives at what he describes as the velocity of money function which is, in fact, a type of money demand function and how he makes use of it to arrive at a conclusion similar to that of the Classical Quantity Theory.

It has been said in the very beginning that although Friedman's statement of the quantity theory can be presented as an alternative to the Keynesian model, yet, in a sense, it represents refinement of a trend which was started by Keynes. It is because Keynes was perhaps the first economist to approach the analysis of the demand for money in terms of the capital theory and Friedman's approach in his Restatement is along the same line of the capital theory.

2.5.2 FRIEDMAN'S RESTATEMENT

Friedman first analyses the individual household's demand for money in order to discover its determinants. He observes that the demand for money of a wealth owning unit depends on the following factors :-

(A) The total wealth of the wealth owning unit which is similar to the income or expenditure constraint of theory of consumer's demand; (B) the relative prices of the alternative assets in which wealth can be kept and relative yields from these alternative assets; (C) the preference scale of the wealth-owning unit. The usual neo-classical assumption of maximising behaviour is made which implies that the wealth-owning unit will distribute his total wealth among alternative types of assets in a manner so as to maximise its "utility" which, unlike in the case of a consumer, is not wholly subjective. Since money can be kept in various forms, the demand for money, according to Friedman, depends on these considerations.

(A) According to Friedman, total wealth includes all sources of income or consumable services. The rate of interest expresses the relation between the stock which is wealth and the flow which is income. Thus if Y is the total flow of income, and r, the interest rate, total wealth is

$$W = \frac{Y}{r}$$

As already mentioned, this wealth can be held in numerous forms, and the ultimate wealth owning unit is to be regared as dividing his wealth among them so as to maximize utility. This implies that he will seek an apportionment of his wealth such that the rate at which he can subsitute one form of wealth for another is equal to the rate at which he is just willing to do so. The rate at which one form can be substituted for another is then simply $1.00 worth for $1.00 worth, regarless of the forms involved. But then, the holding of one form of wealth instead of another involves a difference in the composition of the income stream. Thus, to describe fully the alternative combinations of forms of wealth available to an individual, we have to take into account not only their market prices, but also of the form and size of the income streams they yield.

Friedman has identified five different forms in which wealth can be held :

(i) money (M), i.e. the claims or commodity units that are accepted in payment of debts at a fixed nominal value ;

(ii) bonds (B), i.e. claims to time streams of payments that are fixed in nominal units;

(iii) equities (E), i.e. claims to stated pro-rata shares of the returns of enterprises;

(iv) physical non-human goods (G);

(v) human capital (H).

(B) Let us now consider the yield from each form.

(i) Money (M) :- Although money can yield a return in the form of interest on demand deposits, yet Friedman chose to simplify his analysis by considering that money yields

its returns sololy in the form of convenience and security, the real magnitude of this return thus depends on the volume of goods that unit (of money) corresponds to, i.e. on the general price level. This is designated by P.

(ii) Bonds (B) :- Let us suppose that \$1.00 worth of a bond yields r_b per year, where r_b is simply the coupon sum divided by the market price of the bond. So $1/r_b$ is the price of the bond promising to pay \$1.00 per year. Thus Friedman designated the market bond interest rate as r_b. However, in case of expected change in price, the yield must take into account the return in the form of expected appreciation or depreciation of the bond. The nominal income stream purchased for \$1.00 at time zero then can be written in a simplified manner as

$$r_b - \frac{1}{r_b}\frac{dr_b}{dt}$$

(iii) Equity (E) :- The standard unit of equity can be taken to be a claim to a perpetual income stream of constant 'real' amount. The nominal return to the holder of the equity can be regarded as taking three forms: the constant nominal amount the equity holder would receive per year in the absence of any change in P; the increment or decrement to this nominal amount to adjust for changes in P; and any change in the nominal price of the equity over time, which may arise from changes either in interest rates or in price levels.

Friedman defined r_e as the market interest rate on equties, so $\frac{1}{r_e}$ is the price of an equity promising to pay \$1.00 per year if the price level does not change, or to pay $\frac{P(t)}{P(0)}.1$ if the price level varies according to P(t).

The nominal stream purchased for \$1.00 at time zero can be written in a simplified manner as :

$$r_e + \frac{1}{P}\cdot\frac{dP}{dt} - \frac{1}{r_e}\frac{dr_e}{dt}$$

(iv) Physical goods (G) :- Physical goods yield on annual stream in kind rather than in money. This return depends on the behaviour of prices. Thus, at time zero, $\frac{1}{P}\cdot\frac{dP}{dt}$ is the size of this nominal returns per \$1.00 of physical goods.

(v) Human Capital (H) :- In the present non-slave societies, there is only a limited market in human capital. Friedman opined that it was therefore, difficult to define in market prices the terms of substitution of human capital for other forms of capital. He was of the view that although there were some possibilities of substituting non-

human capital for human capital in an individual's wealth holdings, but mainly,

shifts between human capital and other forms must take place through direct investment and disinvestment in the human agent. At any one point in time, according to Friedman, there is some division between human and non-human wealth in an individual's portfolio of assets. Let w be the ratio of non-human to human wealth, or equivalently of income from non-human wealth to income from human wealth. Thus, this variable needs to be taken into account so far as human wealth is concerned.

(C) The tastes and preferences of wealth owing units for the service streams arising from different forms of wealth must simply be taken for granted as determining the form of the demand function. Friedman considered that tastes are constant over significant stretches of space and time. However, he made allowance for some changes in tastes in so far as such changes are linked with objective circumstances.

Let us suppose u stands for any such variables that can be expected to effect tastes and preferences.

Friedman then combined (A), (B) and (C) to arrive at the following demand function for money :

$$M = \left(f\ P,\ r_b - \frac{1}{P}\frac{dr_b}{dt};\ r_e + \frac{1}{P}\frac{dP}{dt} - \frac{1}{r_e}\frac{dr_e}{dt};\ \frac{1}{P}\frac{dP}{dt};\ w;\ \frac{Y}{r};\ u \right)$$

In this function, Friedman then dropped r as an additional explicit variable, treating its influence as fully taken into account by the inclusion of r_b and r_e. He further simplified the function as :

$$M = f\left(P, r_b, r_e, \frac{1}{P}\cdot\frac{dP}{dt}, w, Y, u\right) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Thus, according to Friedman, how much of its total wealth a wealth-owning unit will prefer to hold in the form of nominal cash balances depends on the variables mentioned within the brackets on the right-hand side of the above equation (1). It may be noted that Friedman's money demand function as given in equation (1) is a form of the liquidity preference function that Keynes had given.

It is interesting as well as important to note that Friedman's money demand function implies the absence of "money illusion" and, therefore, the wealth-owning units are assumed to be guided by the real values of the variables and not by the monetary values of the variables as such. An important result follows from it which is that a change in the monetary unit alone will not change the demand for real balances; however, it will change the demand for nominal balances in the same direction and the same proportion as the change in the monetary unit. In other words, Friedman's money demand function is homogeneous of the first degree in money prices and incomes. This means that if the monetary unit changes by a given proportion, say then Friedman's money demand function as contained in equation

(1] above will take on the following form :

$$\lambda M = f\left(\lambda P,\ r_b,\ r_e, \frac{1}{P}\frac{dP}{dt}\ W,\ \lambda Y,\ U\right) \quad \text{..... (2)}$$

If we put $\lambda = 1/P$, then equation (2) will be transformed as follows :

$$\frac{M}{P} = f\left\{r_b,\ r_e, \frac{1}{P}\frac{dP}{dt}\ W,\ \frac{Y}{P},\ U\right\} \quad \text{..... (3)}$$

Now M/P is real balances. Therefore, equation (3| demonstrates what we have already stated above as a special attribute of Friedman's money demand function, namely, the demand for real balance remains unaffected by a change in the monetary unit; it is determined by the real variables in the monetary unit which will change the demand for nominal money denoted by M in the same direction and in the same proportion.

If we put $\lambda = 1/Y$ in equation (2), we have

$$\frac{M}{Y} = f(r_b, r_c, 1/P.\ dP/dt, W, P/Y, U) \quad \text{..... (4)}$$

Which is but a form of the familiar quantity theory of money. How is it a form of Quantity Theory ? It can be demonstrated as follows :

We can rearrange equation (4) as

$$M = f(r_b, r_e, 1/P.dP/dt, W, P/Y, U)\ Y \quad \text{..... (5)}$$

Which is similar to the Cambridge form of the Quantity Theory as expressed in the following equation :

$$M = kPY \quad \text{..... (6}\}$$

Lest there should be any confusion, it should be remembered that Y in equation (5) and equation (6) does not denote the same variable. Y in (5) is money income while, in (6) it is real income. Therefore, Y in (5) equals PY in (6). That makes the two equations (5) and (6) similar, though not identical. It is because for k (in (6)) we have an elaborate function $f(r_b, r_e, 1/P.dP/dt, W, P/Y, U)$ in (5), while k of the Cambridge Quantity Theory is the so-called Marshallian proportionality coefficient which is assumed to be determined by institutional factors and is; therefore; constant. The latter is the elaborate money demand function which depends on economic variables, even though it is similar to k.

In fact, as mentioned earlier k is the reciprocal of the income velocity V, of the Fisher's version. Therefore, we can rewrite equation (5) as follows :-

$$M = \frac{1}{r_b, r_e, 1/P.dP/dt, W, \frac{Y}{P}, U}\ Y \quad \text{.....(7)}$$

This is similar to Fisher's version of the Quantity Theory as contained in the

following equation :-

$$M = k\,Py \quad \ldots\ldots\ldots\ldots (8.1)$$

or $$M = 1/V.Py \quad \ldots\ldots\ldots\ldots (8.2)$$

Here too, we should remember that Y in (7} is money income while y in (8.1) and (8.2) is real income so that Y in (7) equals Py in (8.1) or (8.2).

We may mention here that the money demand function of Friedman as derived above does not take note of the demand of firm's money, based as it is on analysis of the money demand of the "ultimate" wealth-owning units or the households owning wealth. However, Friedman believed that introducing of business demand for money will not change the form of his money demand function significantly. Therefore, Friedman's money function as stated above in the equation (1) may be regarded as valid even for the economy as a whole, provided we interpret 1/P. dP/dt, as an average expected rate of change in prices ; W as the ratio of total income from non-human wealth to total income from human wealth for the economy as a whole and Y as the aggregate national money income.

2.5.3 Special Features of Friedman's Theory

We have explained above the Quantity Theory as it has been reformulated by Friedman. We can now try to pinpoint some of its special features which makes it different from the Traditional Quantity Theory.

In the first place, the modern Quantity Theory of Friedman makes a meaningful distinction between the demand for money and the "demand function" for money (or, alternatively, between "velocity of money and the "velocity of money function") Secondly, Friedman and his followers believe that their money demand function or its inverse, the velocity of money function, is stable. Infact, they believe it to be much more stable than the consumption function which is the key function in the rival Keynesian model. Thirdly, this reformulation of the Quantity Theory has also led the modern monetarist to assert the stability of the money demand function, or its inverse the velocity of money function need not imply that the real quantity of money demanded per unit of output that is, the value of Marshallian constant k or of Fisher's constant V does not fluctuate in a short period. On the other hand, they affirm that while the velocity-of-money function of money demand function is stable, the velocity of the money as such may fluctuate and even rise violently in times of hyper inflation. Fourthly, the followers of new Quantity Theory also believe that putting in additional variables in the money demand function will not be rewarding, for in their opinion, "to expand the number of variables regarded as significant is to empty the hypothesis of its empirical content." Fifthly, the new quantity theorists also believe that their money demand function is of vital importance in determining the variables which are of great importance for the economy as a whole, viz. level of income and prices. Sixthly, the new Quantity Theory assumes that the money demand function and money supply functions are independent of each other, otherwise

Friedman's money demand function will fail to predict the consequences of changes in the supply of money on income and prices in the economy. Seventhly, even though Friedman asserted that the Quantity Theory of Money is neither an income determination nor a theory of the general price level but merely a theory of the demand of money, yet it has become a firm foundation of an alternative theoretical structure for analysing the determination of income and prices.

2.5.4 Critique of the New Quantity Theory

Freidman's reformulation of the Quantity Theory, no doubt, has a lot of refinement to show. But it need not imply that it has no drawbacks. The various critique's of it have highlighted the following deficiencies in it.

It has been pointed out that the money demand function, which is the hallmark of the new Quantity Theory takes an explicit note of the asset demand for money. Only the transactions demand for money has not been adequately analysed. This makes the theory rather incomplete.

Secondly, Friedman's theory is based on the assumption that the different forms of assets considered by him are close substitutes of one another. But the basis of this strong assumption is not spelt out. How the transaction cost, different holding periods for wealth and desire for risk avoidance may affect the degree of substitutability between different assets and how this, in turn, may effect the demand for money are some of the matters which have not been analysed.

Thirdly, Friedman has not followed any scientific procedure for selecting and dropping out the independent variables for arriving at his money demand function. Two scientific criteria for it, each supplementing the other, could be the degree of elasticity of money demand with respect to the various independent variables and the degree of the variability of the variables themselves. But none of such scientific procedures was followed by Friedman.

Fourthly, the assertion of Friedman and his followers that his money demand function was much more stable than the Keynesian consumption function has not been demonstrated beyond doubt. While the empirical study of Friedman and Meiselman, "The Relative Stability of Monetary Velocity and the Investment Multplier in the United States, 1897-1958" lent support to Friedman's thesis, another empirical study of Ando and Modigliani, "The Relative Stability of Monetary Velocity and the Investment Multiplier", did not lend support to it.

Fifthly, the contention of the new quantity theorist that there is a very regular and strong relation between the supply of money income and prices has also been challenged.

Lastly, on the very strong policy implications derived by the quantity theorists, namely, the control of money supply as the only effective method of controlling money income and prices, there is hardly any agreement among the economists. The economists belonging to the Liquidity School such as R.S. Sayers and the authors

of the Radcliffe Report are highly critical of this contention of the new quantity theorists. In their view, the emergence of non-banking financial intermediaries and near money has completely changed the picture. We will study more about it in the next lesson.

2.5.5 COMPARISON WITH KEYNESIAN THEORY OF MONEY AND PRICES

Before we are able to compare the Keynesian Theory of Money and Prices with the Quantity Theory of Money, old and new, we should first have at least a bird's eye view of the Keynesian Theory.

At a very simple level, Keynes' Theory of Money and Prices, holds that an increase in the quantity of money will have no effect on the prices in a situation of general excess capacity and unemployment. It is because even though an increase in the supply of money may lead to a proportionate increase in the aggregate effective demand yet it need not lead to a rise in prices, for the increased demand for goods will be met by the increased supply of goods at constant prices. In such a situation excess productive capacity is available and increased suply of labour at the current wage rate is also available. Hence the aggregate output is perfectly elastic.

However, as soon as full employment is reached, the situation completely changes and there is no excess capacity. In this situation, an increase in the quantity of money will lead to a proportionate rise in the price level. Keynes assumed that in the full employment situation, an increase in the quantity will normally cause a proportionate increase in aggregate effective demand implying unit elasticity of aggregate effective demand with respect to change in the quantity of money. It was also assumed that the output elasticity with respect to change in the aggregate effective demand is zero. Thus, Keynes did indicate that the Quantity Theory might begin to operate, once the full employment was reached.

Keynes theory of money and prices is obviously superior to the old quantity theory. Due to the unrealistic assumption of the classical Quantity Theory that the economic system is in equilibrium only at the full employment level, it arrived at the wrong conclusion that every increase in the supply of money causes rise in prices. Keynes' theory denies this conclusion. It, on the other hand, shows that during depression when a lot of excess capital and labour supplies are available, an increase in money supply will not raise prices.

Another difference between the two approaches is that while the quantity theorists believe that a change in the money supply has a direct impact on prices of goods, the Keynesian theorists believe this relationship to be indirect. In fact, in Keynesian model a change in money supply first affects the rate of interest which in turn, influences the investment. Then the change in investment affects the income through the multiplier effect which further affects the aggregate demand for goods and this, in turn, influences the level of prices. The quantity theorists, old or new, do not depend, on this indirect mechanism and pay no heed to the structure and level of interest rates.

A further point of difference between the Keynesian approach and specially the new quantity theorists approach is that while the former relies on the investment or income multiplier, the latter rely on the monetary multiplier which relates the changes in money income to changes in the money supply, Consequently, while the validity of the Keynesian theory depends on the stability of the consumption function, the validity of new quantity theory depends on the stability of the money demand function or the velocity of money function.

Still another difference between the two schools of thought which accounts for the quantity theorists neglect of interest rate mechanism is that the quantity theorists believe that income, wages and interest rate are determined by real factors alone and monetary factors affect only the money values of these variables. But for Keynesians, rate of interest is a monetary phenomenon which is influenced by changes in the supply of money. A change in the supply of money causes a change in the rate of interest which, in turn, changes investment and consequently the level of income through the multiplier effect. Thus, in the Keynesian mode, the level of income is not determined by real factors alone, money also matters.

In terms of policy implications, the quantity theorists stress the need to control the stock of money in order to control prices, while the Keynesian approach focuses on the interest rate policy as, in the Keynesian view, changes in money stock do not affect aggregate expenditure directly, but they affect it indirectly through changes in the interest rate. However, the Keynesian approach also emphasises that at a certain critical minimum rate of interest the demand for money stock will not lower the rate of interest further. This is what is known as Liquidity Trap Hypothesis. This is the situation that is common during economic depression. Hence, according to this view, monetary policy is ineffective in such situations. But the monetarists have no doubts, with regard to the efficacy of monetary policy as a remedy for even economic depression.

Classical, Structural and Monetarist Approaches to Inflation

2.6.1 Introduction

During the post-war period, inflation has been the worst malady to infect the economic structures of almost all countries of the world. Rightly, therefore, it has remained a source of much controversy among the contemporary economists, politicians and the general public. The controversies relate to different aspects of inflation- What is inflation? What are its main causes? How does it affect the working of the economic system and the lives of common people? What are the most appropriate policies to counteract it? To what extent should the economic policies be directed to stem it particularly when these policies are likely to interfere with other economic and social goals? In this lesson it is an attempt to understand the different study theories of inflation.

2.6.2 Classical Theory : Excess demand or demand pull inflation is generally characterized by a situation in which there is "too much money chasing too few goods." The first theory which analyses inflation in these terms is the traditional quantity theory. It imputes changes in price level to changes in the quantity of money. It presumes a proportionate relationship between M and P. If $\delta M/M$ is 15% per annum, the prices also move along by 15% per annum. But the major shortcoming in the crude form of this approach was that it failed to relate an increase in M with an increased spending by the people and thus could not provide a satisfactory and logical explanation of how the prices are bid up when, given a constant level of output, the mere stock of money is raised. This flaw was rectified by Knut Wicksell. He contends that new money flows into the economy in the form of bank advances to the businessmen for financing investment in excess

of the current rate of saving. This represents an increase in the aggregate demand which, given the fixed supply of goods (the economy being at full employment), will bid up the prices. The phenomenon of rising prices may also compel the consumers to increase their purchases. Thus a state of competitive buying will lend more and more momentum to the price increase. This theory fell into disrepute during the crisis of 1930's because of the steep fall in the velocity of circulation (V), which the traditional approach had assumed as nearly constant. However, the money supply continued to be considered as the major single determinant of price level under full employment and over the long run. Warburton, in his restatement of the quantity theory for the short run, showed that the changes in M cause changes in V. He regarded changes in the quantity of money as the causal force in fluctuations of the price level partly directly through a change b in income and spending ($\delta M \rightarrow \delta Y \rightarrow \delta P$) and V partly indirectly through a change in the velocity of money ($\delta P \rightarrow \delta V \rightarrow \delta Y \rightarrow \delta P$).

2.6.3 Excess Demand Analysis: The essence of the excess demand inflation is that the process of rising prices is initiated and perpetuated by the conditions of excess demand for goods and services over the level of their supply. The pure excess demand inflation can be indicated through Fig. 2.6.1

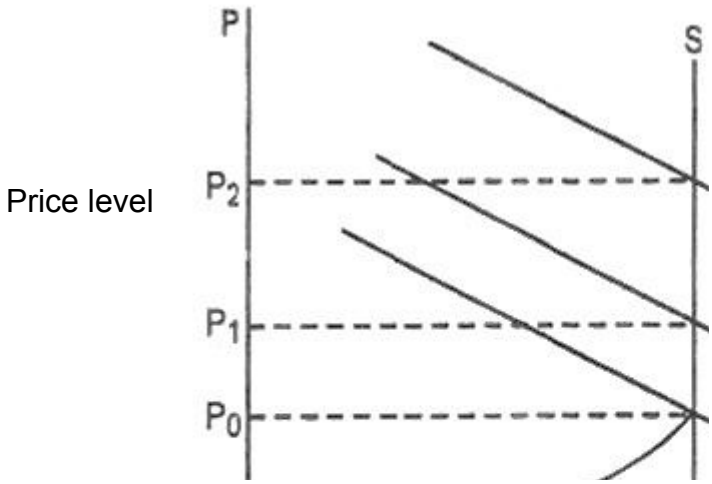

Fig. 2.6.1

The horizontal axis in Fig. 2.6.1 measures real income (Y) and vertical axis, the price level (P). The aggregate demand curves D_0, D_1, and D_2 have been shown sloping downwards. Such a slope is based on the real balance effect of Don Patinkin with a constant nominal money supply and static price expectations. The aggregate supply function (S) rises upwards from left to right and becomes vertical at the level of full employment. Given the aggregate demand D_0 and the full employment level of real output, the price level is P_0. As the aggregate demand function shifts up, the aggregate supply being fixed, the price level moves up from P_0 to P_1 and then to P_2.

The excess demand inflation can also be analyzed in terms of IS and LM functions. An increase in consumption or investment or government spending may shift the IS function upwards creating a state of excess demand over the full employment output or income. The increased transactions requirements due to higher prices will necessitate the diversion of cash from passive balances to the transactions balances. This may cause a decrease in the LM function. The general equilibrium may be established again at the full employment income where the price level and the rate of interest are higher than that at the original position. This can be shown through Fig.2.6.2.

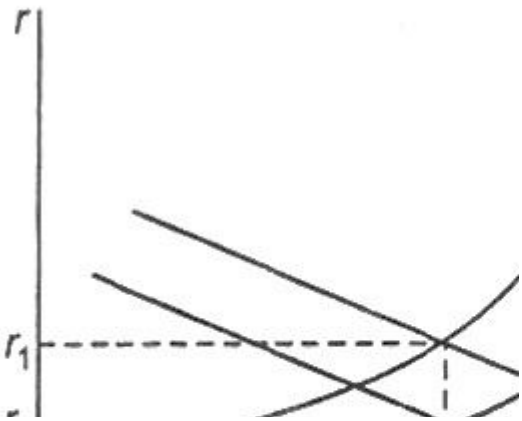

Fig.2.6.2

Given the investment-saving function IS_0 and the liquidity preference of money curve as LM_{P0}, the equilibrium income at full employment is Y_0 and the rate of interest is r_0. As a result of increased government expenditure or the liberalization of controls on consumption or investment spending, the IS curve may get shifted to IS_1. This raises the level of income to Y_1. The excess of Y_1

over Y_0 denotes the excess demand gap which will bid up the prices. A rise in prices will shrink the real supply of money and cause a shift in the LM schedule to the left. The new LM schedule may be LM_{P1}. The general equilibrium is again established through the intersection between IS_1 and LM_{P1} at full employment income Y_0 but at a higher rate of interest r_1 and a higher price level P_1.

2.6.4 Structural Approach of Inflation

The economists like Raul Prebisch and R.D.O. Campos attributed the inflationary phenomenon in the less developed countries to the existence of rigidities in their economic and social structure. According to Raul Prebisch, since inflationary phenomenon is the manifestation of socio-economic rigidities, unless there are appropriate changes in the structure of the economy, the process of rising prices can not be controlled.

The main rigidities in the structure of the less developed countries include:

(i) Inelasticity of production functions in agriculture.

(ii) Low rate of growth of exports.

(iii) Lower actual growth rate than the warranted or required rate of growth.

(iv) Foreign exchange constraint.

(v) Protectionist trade policies.

(vi) Secular deterioration in the terms of trade for developing countries.

(vii) Persistent balance of payments deficit.

(viii) Rigid structure of tax revenues and prolonged lag related to tax collections.

(ix) Rigid structure of government expenditure.

(x) High growth rate of money supply relative to growth rate of productivity in industries.

(xi) Immobility of factors of production.

The presence of rigidities in the structure of the economy is responsible for the supply-inelasticity, retardation of growth process and consequent inflationary pressures of the cost-push type. The process of structural inflation may be shown through Fig. 2.6.3.

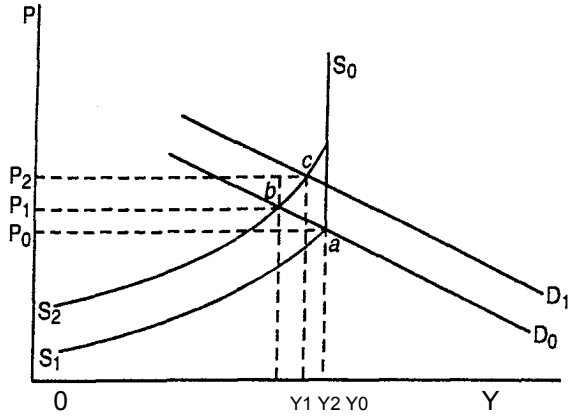

Fig. 2.6.3

In Fig. 2.6.3 given originally the aggregate demand function D_0 and the aggregate supply function S_1S_0, there is full employment income Y_0 and price level P_0. The structural rigidities shift the aggregate supply function to S_2S_0 which becomes perfectly inelastic at full employment. The equilibrium shifts from a to b where economic system faces unemployment gap Y_0Y_1 coupled with rise in price level from P_0 to P_1. If there is increase in wages to maintain the real purchasing capacity of labour intact or there is monetary expansion by the central bank to remove unemployment, the aggregate demand function shifts to D_1. Its intersection with S_2S_0 takes place at c where the unemployment gap gets reduced to Y_2Y_0 but the price level rises further from P_1 to P_2. Thus structural inflation in the less developed countries manifests itself in the co-existence of unemployment and inflation. The process of rising prices is initiated and perpetuated by the rigidities in the structure of the economic system.

While the structuralists recognize that inflationary phenomenon is the outcome of structural rigidities, the monetarists hold the view that the structural problems in the economy are actually the result of inflation rather than the cause of it. According to them, an increase in money supply causes distortion in purchasing power and inequity in the distribution of income and wealth. As a consequence, rigidities appear in the structure of the economy. Monetary expansion, in their opinion, can accelerate the process of growth and have the effect of dismantling the structural rigidities and moderating the process of inflation.

The structuralists do not accept this line of reasoning. In their opinion, given the presence of economic and social rigidities, the increased supply of money cannot be productively absorbed by the economic system. As a result, the

growth process fails to get stimulated and the only effect of monetary expansion is the intensification of inflationary pressures. Unless the economic policies can positively affect the process of growth, the structural inflation is unlikely to be overcome.

Criticisms: The structural approach to inflation is criticized on the following grounds:

(i) In the conditions of less developed countries, the structural rigidity is, undoubtedly, an important cause of inflation, yet it is not the only cause of inflation.

(ii) One of the prominent factors, leading to inflation in the under-developed countries is the strong excess demand. This theory gives only secondary importance to this factor.

(iii) The structural rigidities are present in all the less developed countries, yet all of them do not suffer from the problem of hyperinflation.

(iv) This approach has given major importance to two types of rigidities (a) inelasticity of production function in agricultural sector, more specifically the inelastic supply of food grains and (b) low rate of growth of exports. In fact, both these rigidities may not be of structural character. The inelasticity of supply of foodgrains may be on account of poor techniques, faulty price policy, defective control measures and the faulty system of distribution of food. The low rate of growth of exports, in the same way, may not be due to Structural reason but on account of inadequate exploration and exploitation of export possibilities, over-valued exchange rate and faulty export promotion policies.

2.6.5 Monetarist Approach to Inflation

The monetarist approach to inflation holds that inflation is a monetary phenomenon. The process of inflation, according to this approach, is initiated by an increase in the supply of money and credit. Even subsequently, the expansion of money and credit continue to push up the price level,

* There are two main view points related to inflation in this approach,

(1) Quantity theory viewpoint: The classical quantity theory of money can be regarded as the original monetarist view of the process of inflation. It recognized a direct and proportional relation between the money stock and price level. The exchange equation in that theory was started as :

$$MV = PT$$

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

Where M = quantity of money, P = average price level, V = velocity of circulation of money and T = volume of transactions.

If V and T remain constant, P will increase exactly in the same proportion in which M increases. Suppose M is raised by 15 percent, with the increase in money stock, the cash balances meant for spending on goods and services get enlarged. If output remains fixed at the full employment level and the entire money income is spent on the purchase of goods and services, the aggregate demand increases in the same proportion in which the quantity of money increases. The state of excess demand leads to a proportionate increase in price level. Thus the quantity theory of money led to the conclusion that inflation is a monetary phenomenon. Every increase in money stock continues to raise the price level exactly in the same proportion.

(ii) Friedman's Viewpoint: Friedman and several other economists gave importance to the monetarist approach to inflation. According to Friedman, "Inflation is always and every where a monetary phenomenon that arises from a more rapid expansion in the quantity of money than in total output." In the opinion of Friedman, the price level and economic activity are both affected by the stock of money. The money demand function is stable. Given the demand function of money, the rate of inflation is determined by the increase in the stock of money. If the money stock is expanded, it brings about a fall in the rate of interest and an increase in the consumption and investment spending. An increase in total spending raises the level of aggregate demand but there is a less than proportionate increase in price level than the increase in money supply before full employment. Since the aggregate supply function becomes fixed after full employment, the price level increases in the same proportion in which the supply of money increases. Thus the increase in money supply not only initiates inflation but continues it also in future. As the price level rises, the consumers and producers expect that prices will rise even in future. They start making anticipatory purchases. Consequently, the aggregate demand function continues to shift up and the process of rising prices also continues to push ahead.

The process of inflation, according to the monetarist approach, can be explained through Fig.2.6.4

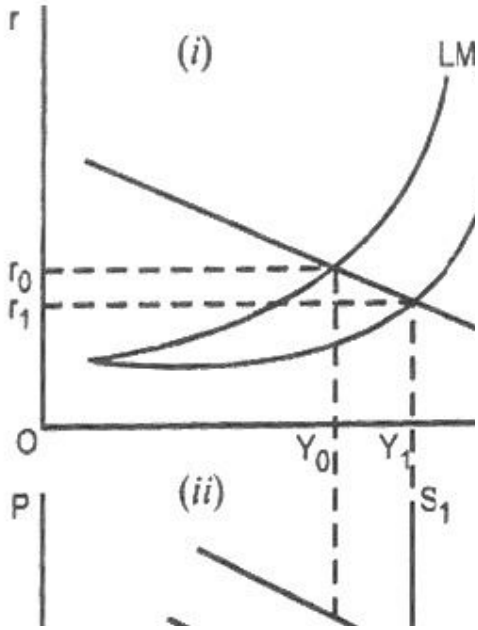

Fig. 2.6.4

The fig.2.6.4 part (i), IS_0 and LM_0 originally intersect each other to determine Y_0 income and r_0 rate of interest. If supply of money is increased, the LM function shifts from $I.M_0$ to LM_1. Income rises from Y_0 to Y_1 and rate of interest falls from r_0 to r_1. In part (ii) of the Fig. these changes indicate an increase in total spending or aggregate demand from D_0 to D_1. S_0S_1 is the aggregate supply function which becomes perfectly inelastic at Y_1 level of income. It signifies that Y_1 income corresponds with a state of full employment. Before full employment, an increase in money supply raises real income by Y_0Y_1, on the one hand and the price level from P_0 to P_1. The economy is in a state of full employment at income or output Y_1. If the consumers and producers expect that prices will rise in future, they will raise their spending. It will lead the price level to rise further from P_1 to P_2 and increase in money supply and excess demand will make the process of inflation to proceed continuously.

Friedman's analysis gave a highly significant conclusion that the rate of inflation depends on the difference between the rates of growth of money supply and the real income or output. It is explained as under:

Given the equilibrium in money market, the money demand (M_d) is equal to the stock of money (M_S).

$$M_d = M_s \qquad \text{(i)}$$

Further $$M_d = P_i^{\alpha} Y^{\beta} \qquad \text{(ii)}$$

Where P = price level, i = rate of interest, Y = real income, α = co-efficient relating money demand and rate of interest and β = income elasticity of demand for money.

$$\therefore \quad M_S = M_d = P_i^{\alpha} Y^{\beta} \qquad \text{(iii)}$$

Differentiating equations (iii) with respect to time (t), we have

$$\frac{dMs}{dt} = i^{\alpha} Y^{\beta} \frac{dP}{dt} + Pi^{\alpha}\, \beta Y^{\beta-1} \frac{dY}{dt} \qquad \text{(iv)}$$

Dividing on both sides by M_s, we have

$$\frac{1}{M_S} \cdot \frac{dM_S}{dt} = \frac{1}{P} \frac{dP}{dt} + \beta \frac{1}{Y} \frac{dY}{dt}$$

$$\text{or } \frac{1}{P} \cdot \frac{dP}{dt} = \frac{1}{M} \frac{dM_S}{dt} - \beta \frac{1}{Y} \frac{dY}{dt} \qquad \text{(v)}$$

Thus the rate of inflation is equal to the rate of growth of money supplies minus β times the rate of growth of real income.

If the difference between growth rate of money supply and the growth rate of real income is large, the rate of inflation is also high and vice-versa.

An important contribution to the monetarist approach has also been made by HG Johnson. According to him, even when inflation is induced either by excess demand or the push of costs, it can continue only if the monetary authority continually increases the supply of money. If the monetary authority does not increase the supply of money, inflation whether initiated by excess demand or cost push, cannot continue. In fact, if the supply of money is not increased, the process of inflation will get terminated. Similarly, if inflation gets started due to the inter-sectoral shifts of demand, even this inflationary process will come to an end if the central bank decides not to expand the supply of money. It is thus obvious that inflation is a monetary phenomenon.

Criticisms: The monetarist approach to inflation is criticized on the following grounds:

(i) In this approach, increase in the quantity of money has been recognized as the most dominant cause of inflation. In fact, there are several such elements of both the demand and supply sides that generate inflation. This approach has over-looked all these elements.

(ii) Many often prices level rises despite a fixed supply of money. The monetarist approach cannot explain even this situation

(iii) In this analysis, the increase in money supply is supposed to be the cause and increase in price level as the effect. However, there are sometimes such situations in which the monetary authority is forced to increase the supply of money due to a rise in price level. In such situations, the increase in money supply is not the cause but the consequence of inflation.

(iv) The monetarists have held the belief that the supply of money is an exogenous factor. The variations in it depend upon the discretion or policy of the central bank. In fact, the supply of money is affected also by the activities of the commercial banks and the non-bank financial intermediaries.

(v) The process of inflation is affected also by the structural and institutional factors. The monetarist approach has ignored even these factors.

2.6.6 Technical Terms:

1. Inflation: a quantitative measure of the rate at which the average price level of a basket of selected goods and services in an economy increase over a period of time.

Questions:

1. Explain the Classical, Structural and Monetarist Approaches to Inflation.
2. Write notes:
   a) Monetarist 'Approach
   b) Classical Approach

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Lesson No. 2.7 **AUTHOR : DR. C.S. NAGPAL**

PHILLIPS CURVE ANALYSIS

2.7.1 Introduction

Contemporary economic thought has highlighted two macroeconomic problems in a very dominating manner and they are inflation and unemployment. In all variants of macroeconomic policy these two variables are taken as its objectives and still at the same time, these are contradictory also. The process to eradicate unemployment leads to inflation and to control inflation, we have to bear unemployment. Most of the economies today are faced with these twin problems. A full theory of stagnation, a combination of stagnation and inflation, has been developed. Underdeveloped countries are facing this problem of stagnation at a massive scale.

2.7.2 Objectives

A.W. Phillips was an American economist, who in 1958 studied the relationship between inflation and unemployment and tried to find out effects of one variable over the other. He collected data for the period 1911 to 1957, pertaining to British Economy and analysed it. Major objectives of A.W. Phillips, in studying this relationship were to :

(1) Identify whether the demand-pull or cost push has been strong in the British economy.

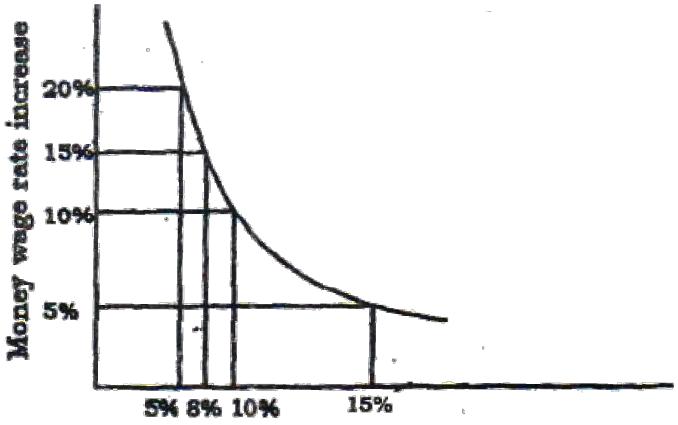
(2) Determine the extent to which restrictive monetary and fiscal policies could be appropriately used to control inflation.

While analysing the second objective, Phillips found that monetary and fiscal policies could appropriately check demand pull inflation, but when they were used to control supply inflation it led to counter-productive results by checking investments and slowing down rise in productivity of labour. A restrictive economic policy would, no doubt, check wage push inflation, but in the process will create large unemployment or employment at the cost of price stability. M.B Relationship between inflation and unemplyment.

2.7.3 Relationship between inflation and unemployment

A.W. Phillips attempted at a statistical relationship between rates of inflation and unemployment and found that there is inverse relationship between these two. A. Phillips curve may be derived from an economy's data for a period of years by plotting for each year, the percentage of money wage rate increase $\frac{\Delta W}{W}$ on vertical

axis and the percentage of the labour force that is unemployed, on horizontal axis. A curve so plotted shall slope downward to the right as shown below :



Unemployment Feg. 14.1

The above diagram shows that there is an inverse relation between rates of inflation and unemployment. A 5% level of inflation if coupled with 15% unemployment. If we adopt the policy to reduce unemployment rate from 15% to 10%, we will have to bear 10% rate of unemployment with an increase in wage rates. This inverse relationship between wage (inflation) and unemployment may be due to the following three factors :

1. The Organized Labour Force

Sometimes an organised form of labour force compels the government or the employees for an increase in wage, even when productivity does not increase. This is more true in the case of public sector where increase in the wages is more as a ritual and norm rather than its link with productivity. This leads to a wage push type rise in prices of goods. The extent to which trade unions can force wages to push varies inversely with the unemployment percentage and their bargaining power. Organised labour becomes more aggressive with lower rates of unemployment and tighter labour market. A tight labour and high unemployment rate is generally coupled with buoyant demand for goods and abundant profits. So the entrepreneurs and business houses will generally bow to this pressure for higher wages.

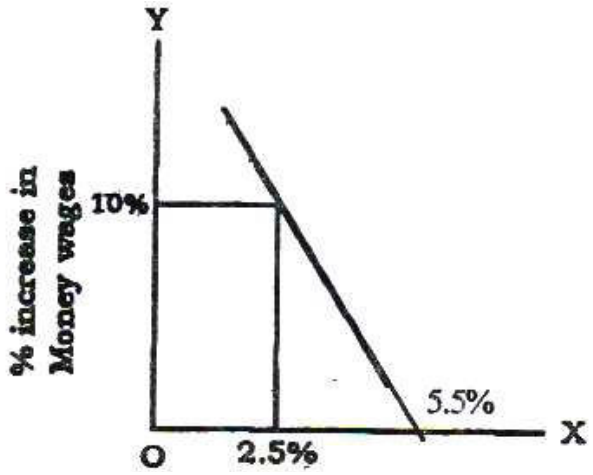
2. Increased Labour Demand

The situation of higher wages can also occur when there is excess of demand for labour over its supply. This divergence between demand and supply of labour may not be associated with the activities of trade unions. There are many instances when wages increase due to increase in demand for labour, purely as a market phenomenon and not as an organised trade union's action.

3. Labour Market Imbalance

A divergence between demand and supply of labour in a particular market or segment of the economy sometimes causes imbalance in the labour market. There is a possibility of migrating labour from one sector to another. Occupational movement is possible from one place to another (geographical movements). Such a movement is possible theoretically, but there are some social and other non-economic restrictions in it. Thus, shortage of labour in a particular market/sector may push up wages in a situation of substantial unemployment in other sectors of the economy.

A.W. Phillips studied these factors and found the following type of relationship in England.



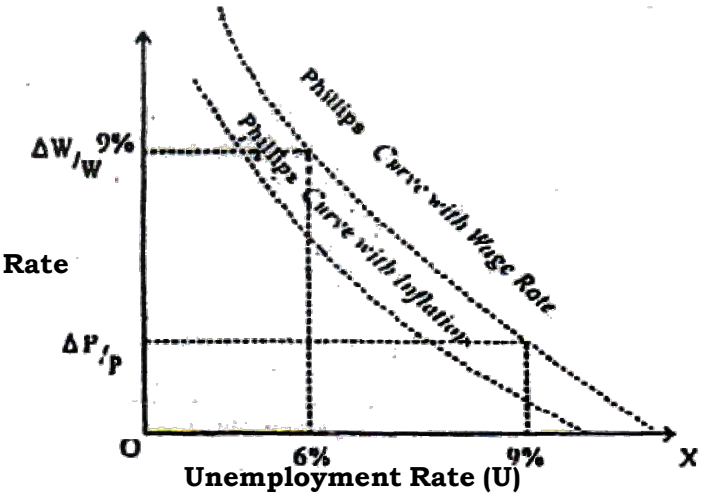
Feg. 14.2

The curve shows that the number of vacancies exceeded the number of job seekers, when the unemployment percentage was below 5.5%. The existence of an excess demand for labour caused wages to rise. When, on the contrary, the employment percentage was greater than 5.5%, the excess supply conditions in the labour market brought down the wage rates. The shape of the curve shows that the demand pull element was stronger than the cost push during the period covered by Phillips. Through the use of this curve, Phillips determined that a rate of 5.5% unemployment in U.K. is needed to keep wages constant and a rate of 2.5% unemployment is needed if prices are to be maintained at 10%.

2.7.3.1 Generalisation of the Relationship

Phillip's curve suggested a very fundamental relationship between wage rates and price levels. This relationship is so close that this curve can also be presented in a generalised form as a relationship between inflation and unemployment. The

relationship between wage ratio and inflation rate is found through labour productivity. If labour productivity grows at a rate of 3% per year, there will be a zero rate of price increase. This generalisation can be expressed with the help of the following diagram :



feg. 14.3

In this diagram, we measure wage rate $\frac{\Delta W}{W}$ and inflation rate $\frac{\Delta P}{P}$ on the vertical axis and unemployment rate (U) on the horizontal axis. The right hand curve is a Phillip's curve expressing relationship between wage rate and unemployment, whereas the left hand curve is a generalised form of Phillips curve expressing relationship between inflation rate and unemployment. The upper curve shows that $\frac{\Delta W}{W}$ will be 3 per cent per year, if it is 9%. The lower curve reveals that $\frac{\Delta P}{P}$ will be 0%, if U is 9%. The reason behind the difference is that at least 3% increase in wages is absorbed by the economy because of the same increase in labour productivity. In simple words, the Phillips curve relating $\frac{\Delta P}{P}$ and U lies 3% point below the Phillips curve relating $\frac{\Delta W}{W}$ and U.

2.7.4 Phillip's Curve and Macroeconomic Policy

Phillip's curve, suggested in the fifties became very popular during the sixties. But after that it had played hide and seek with the economists, getting favoured at one time and being discarded at other. Still it continues to be an essential device used by the economists to organise their thinking on inflation and unemployment and suggesting a suitable macroeconomic policy to control the prevailing situation.

Philip's curve can be used for determining the effectiveness of monetary and fiscal policies to check inflation as shown in the following figure :

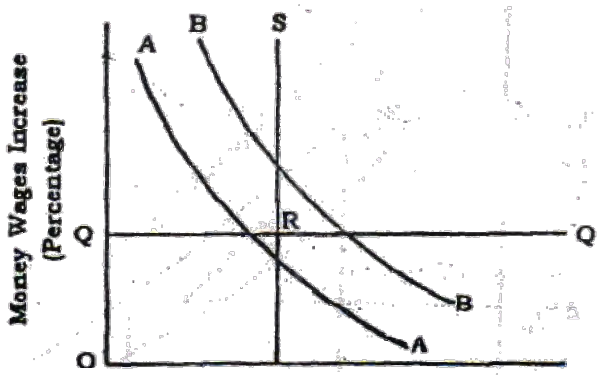


Fig. 14.4

In this diagram, QQ is the ceiling of the money wages that could be absorbed by the economy without causing inflation. A vertical line SS represents the maximum acceptable unemployment rate. If the Phillip's curve passes between R and the point of origin as does AA in the diagram, the supply inflation of the wages-push type can be checked through monetary and fiscal policies without inflicting unacceptably high unemployment on the economy. If, on the other hand, Phillip's curve passes through the area right of R, like BB, the wage push pressure can be held in check with the growth of productivity. In such a situation restrictive monetary and fiscal policies fail to provide an acceptable solution.

The applicability of Phillip's curve to analyse the effectiveness of macro economic policy has been widely discussed and a lot of controversy has emerged. A lot of empirical work has been attempted in recent years on the relationship between wage rate and unemployment rate. It is accepted that there exists inverse relationship between inflation and unemployment, but the exact form of relationship is still a matter of controversy. One very important controversy is regarding the stability of the relationship. Some economists believe that when the wage rate changes and price also changes, associated with the given rate of unemployment depend upon the time path followed by the economy in reaching the rate of unemployment. W.L. Smith studies the behaviour of US economy about the period 1965-68 and found that wages increase rapidly when unemployment fell rapidly than in the case where the same decline in unemployment had occurred more gradually.

Milton Friedman and Edmund Phelps are of the view that Phillip's curve is applicableonly in the short period. They believe that there is a long-term natural rate of unemployment in an economy. This rate varies from country to country and time to time and depends on the degree of labour mobility, the extent of trade union pressure and many other non-economic factors.

R.E. Lucas also found that long-term trade off between unemployment and inflation was missing and the rate of output responded more to price level changes in countries with lower and stable rates of inflation than it did in countries with more rapid inflation.

Harry G.Johnson also does not believe about the applicability of Phillip's curve to the formulation of economic policies. He has termed this analysis as nothing, but a statistical exercise. This analysis, to him, has no theoretical foundation behind it.

Joseph Pechman also criticised this analysis. He asserted that this statistical relationship is not supported by empirical data. This, however, does not mean that the relationship does not exist. It simply underlines the fact that the relationship that exists is more complicated and is influenced by a large number of factors like, wage rates, productivity changes, trade union activities and overall macroeconomic policies, etc.

2.7.5 Appraisal of Phillips Curve

In the economic history of any country, we find many sharp upward movements in prices. This trend has been very acute sometimes, especially after IInd World War. To understand the causes and process of inflation, we have two distinct models. The aggregate demand - aggregate supply model and the Phillips curve inflationary pressure curve model. The former is the simpler of the two models. The Phillips curve model enable us to see things that cannot be seen through the simple aggregate demand-aggregate supply model, especially the way, in which inflation rate and the employment rate change related to each other under different conditions.

This model, like the aggregate demand-aggregate supply model also permits us to deal with demand side and supply side inflation, though from a different perspective. Phillips curve explains the supply side. Most important of the reasons is the upward shift in the Phillips curve which is caused by the operation of the economy below the natural unemployment rate. In this kind of disequilibrium situation, an expected inflation rate above the actual inflation rate result in a wage-induced upward shift in the Phillips Curve as labour obtains wage rate increases to catch up with the earlier rise in the actual inflation rate. There are also those shifts in the Phillips curve that occur even when the economy operates at a unemployment rate or in a equilibrium situation as a

result of some supply shocks.

But then there are some situations developed in recent years, which are contrary to the general trade off as suggested by Phillip's curve. Stagflation or the phenomenon of a rising unemployment rates with a rising inflation rate, is one such situation. Economists are continuously at work to offer scientific explanation and suggest suitable policy for such situation.1

2.7.5.1. Robert Solow's View

Robert Solow does not believe that the Phillips curve is vertical at all rates of inflation. According to him, the curve is vertical at positive rates of inflation and is horizontal at negative rates of inflation, as shown in the Figure given below. The basis of the Phillips curve LPC of the figure is that wages are sticky downward even in the face of heavy unemployment or deflation. But at a particular level of unemployment when the demand for labour increases, wages rise in the face of expected inflation. But since the Phillips curve LPC becomes vertical at that minimum level of unemployment, there is no trade-off between unemployment and inflation.

2.7.5.2. Tobin's Modified Phillips Curve

James Tobin suggested a compromise between the negatively sloping and vertical Phillips curves. He believes that there is a Phillips curve within limits. But as the economy expands and employment grows, the curve becomes even more fragile and vanishes until it becomes vertical at some critically low rate of unemployment. Thus, Tobin's Phillips curve is kinked-shaped, a part like a normal Phillips curve and the rest vertical, as shown in the Figure given below. In the figure Uc is the critical rate of unemployment at which the Phillips curve becomes vertical where there is no trade-off between unemployment and the inflation. According to Tobin, the vertical portion of the curve is not due to increase in the demand for more wages, but emerges from imperfections of the labour market. At the Uc level, it is not possible to provide more employment because the job seekers have wrong skills or wrong age or sex or are in the wrong place. Regarding the normal portion of the Phillips curve which is negatively sloping, wages are sticky downward because labourers resist a decline in their relative wages. For Tobin, there is a wage-change floor in excess supply situations. In the range of relatively high unemployment to the right of Uc in the figure, as aggregate demand and inflation increase and involuntary unemployment is reduced, wage-floor markets gradually diminish. When all sectors of the labour market are above the wage floor, the level of critically low rate of unemployment Uc is reached.

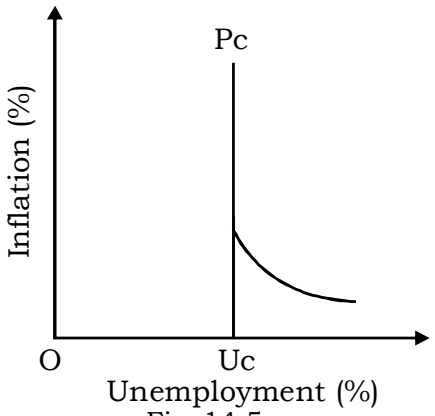


Fig. 14.5

In nutshell the vertical Phillips curve has been accepted by the majority of economists. They agree that at unemployment rate of about 4 per cent, the Phillips curve becomes vertical and the trade-off between unemployment and inflation disappears. It is impossible to reduce unemployment below this level because of market imperfections.

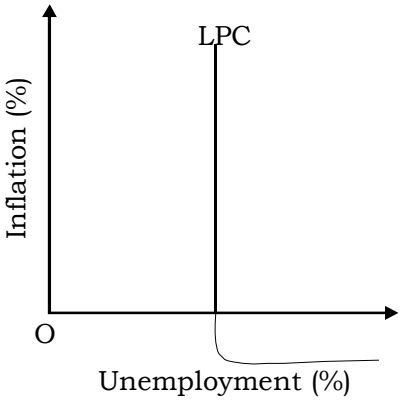


Fig. 14.6

2.7.6 Technical Terms:

1. Phillips Curve- Shows inverse relationship between the level of unempolyment and rate of inflation.

Suggested Questions:

Q.1 Write a note on:

a) Phillips curve

b) Long-run National rate of unemployment

Q.2 Explain the relationship between inflation and unemployment with reference to phillips curve.

Lesson No. 2.8 **AUTHOR : DR. PARMOD KUMAR AGGARWAL**

SAMUELSON'S THEORY OF TRADE CYCLES

I. INTRODUCTION:

Prof. Samuelson in his article, "Interaction between the Multiplier and Acceleration Principle", May, 1939 pointed out that the movements in business activity depend on the values of the multiplier and accelerator. The greater the values of these concepts, the greater would be the cyclical changes. According to Samuelson, "the different phases of trade cycles can be explained with the help of interaction between multiplier and accelerator".

II. OBJECTIVES OP THE LESSON:

In this lesson you would be able to understand Samuelson's model which is considered as a first approximation for the understanding of basic forces which determine the behaviour of the economy and know the true structure of the, model estimated from the nature of lags and the coefficients a and b which relate the variables in the equation.

III. SAMUELSON'S THEORY OF TRADE CYCLES:

He developed the interaction between the multiplier and accelerator which gives rise to cyclical fluctuations in economic activity.

(i) MEANING AND ASSUMPTIONS:

Samuelson's model is regarded as the first step in the direction of integrating theory of multiplier with the principle of acceleration. His model shows how multiplier and accelerator interact with each other to generate income, to increase consumption and investment demands more than expected and how this causes economic fluctuation. To understand Samuelson's model, let us first distinguish between autonomous investment and derived investment Autonomous investment is the investment undertaken due to exogenous factors such as new inventions in techniques of production, production process, and of new market etc. Derived investment is the investment in capital equipment which is undertaken due to increase in consumer demand necessitating new investment. To describe the interaction process briefly, when autonomous investment takes place in a society, income of the people rises and the process of multiplier begins. Increase in income leads to increase in demand for consumer goods depending on the marginal propensity to consume. If there is no excess production capacity, the existing stock of capital would prove inadequate to produce consumer goods to meet the rising demand. Producers trying to meet the growing demand undertake new investment Thus, increase in consumption creates demand for investment. This is derived investment. This marks the beginning of acceleration process. When derived investment takes place, incomes rise further, in the same manner as it happens when autonomous investment takes places. With increase in income, demand for consumer goods rises. This is how the multiplier and the accelerator interact with each other and make the incomes grow at a rate much faster than expected. In brief, exogenous factors lead to autonomous investment. This results in multiplier affect. The multiplier effect creates derived investment. This is acceleration of investment. Derived investment creates multiplier effect leading to acceleration. This is called multiplier-acceleration interaction.

In this analysis of interaction process, Samuelson makes the following assumptions:

(i) no excess production capacity;

(ii) one-year lag in consumption;

(iii) one-year lag in increase in consumption and investment demand; and

(iv) no government activity and no foreign trade.

(ii) MATHEMATICAL EXPLANATION:

Samuelson's model is reprinted in "Readings in Business Cycle Theory", 1944

as an article "Interaction between the Multiplier Analysis and the Principle of Acceleration". In this article, he proved that with different values of the marginal propensity to consume on the one hand and the acceleration on the other, if we denote mpc as a (Alpha) and acceleration coefficient as b (Beta), the five types of cyclical fluctuations can be determined:

Samuelson's model and his conditions for economic fluctuations is briefly presented below. Given the assumption (iv), the economy will be in equilibrium when $Y_t = C_t + I_t + G_t$ .....(1)

Where Y_t = national income, C_t = total consumption expenditure, I_t = investment expenditure, all in period t and G_t = government expenditure.

Given the assumptions (ii), the consumption function may be expressed as

$$C_t = \alpha Y_{t-1} \text{ .....(2)}$$

Where Y_{t-1} is income in period t-1, and a is mpc or DC/DY. (Recalled that DC/DY determines the multiplier).

Investment is a function of c consumption with a one-year lag, i.e.,

$$I_t = \beta (C_t - C_{t-1}) \text{.....(3)}$$

Where b represents capital/output ratio. It is important to note here that the parameter 'b' determines the accelerator.

By substituting Eq. 2 for C_t and Eq. 3 for I_t, the equilibrium Eq. 1 can be rewritten as:

$$Y_t = \alpha Y_{t-1} + \beta (C_t - C_{t-1}) + G_t \text{.....(4)}$$

Note that C_t = a Y_{t-1} and C_{t-1} = a Y_{t-2}. By substitution, Eq. 4 can be written as:

$$Y_t = \alpha Y_{t-1} + \beta (\alpha T_{t-1} - \alpha Y_{t-2}) + G_t \text{.....(5)}$$

By simplifying Eq. 5, we get:

$$Y_t = \alpha (1+\beta) Y_{t-1} + \alpha\beta Y_{t-2} + G_t \text{.....(6)}$$

Eq. 6 is the final for of equilibrium equation. This equation reveals the two necessary information for analysing the business cycles.

(i) that if values for a and b, and incomes of two preceeding years are known, then income for any past or future year can be determined, and

(ii) that the rate of variation in income would depend on the values of parameters a and b.

If the values of a and b and the autonomous government expenditure for any time period and the amount of consumption for the current and preceeding period are known then we can determine equilibrium income for that period by substituting values in equation 6. Assuming values of a, b, and Gt, we can compute values of

table which show the growth of national income.

Let mpc(a)=0.5

Accelerator (b) = 1

Gt= 1

and the national income of previous periods say t-1 and t-2 are zero:

1. In time period t, income will be

   Yt = 0.5(0) (1+1) - 0.5(1) (0) + 1 = 1

2. In t+1 period, income will be:

   Yt-1 = aYt (1+b) - ab. Yt-1 + Gt = 0.5 × 1 (1+1)-(0.5) x 1 (1+1)-0.5(1)(0)+1=2

3. In t+2 period, income will be

   Y_{t-2} = a Y_{t+1} (1+b) - ab Y_t + Gt = 0.5 (2) (1+1) - (0.5 (1) (1) + 1).- 2.5

4. Similarly, in t+3 period, income will be: — *X*

   Y_{t-1} = a y_t+$_2$ (1 + b) - ab Y_{t+1} + G_t = 0.5 (2.5) (l+l) - 0.5 × 1 × 2 + 1 = 2.5

   The detail is given in the following table:

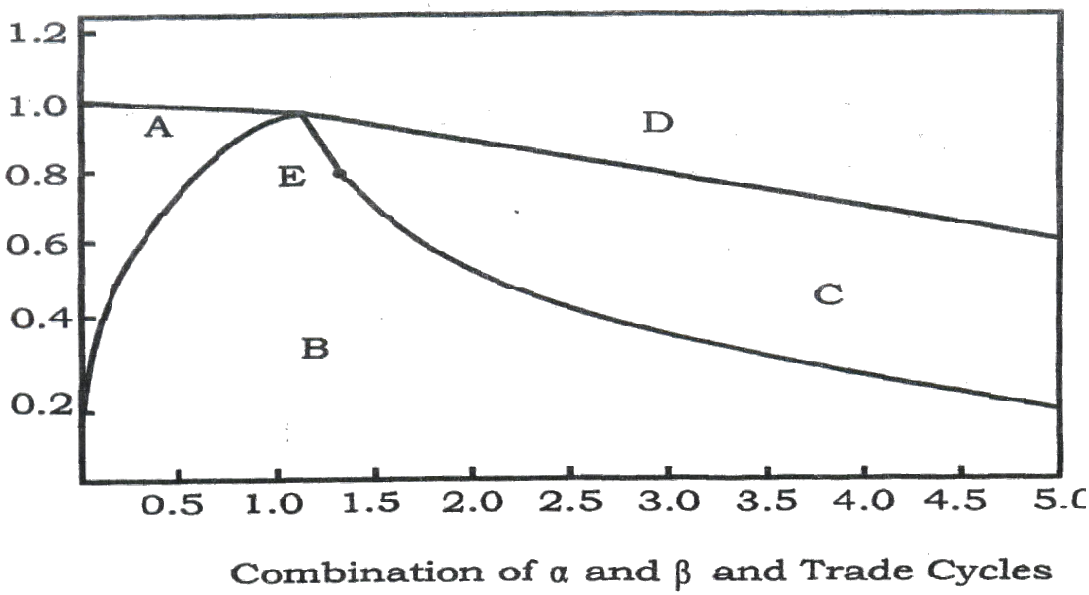


Fig. 16.1

(iii) **EXPLANATION WITH DIAGRAMS:**

Samuelson has shown in his poineering work the various kinds of cycles that would be generated by different combinations of α and β. Through a diagram (Fig. 1), he has shown the various types of cycles caused by the different combinations α and β. The different patterns of business cycles by different contributions of α and β in areas A, B, C and D are shown in four parts of Fig. 2.

Area A. All the combinations of α and β falling in area A make the incomes move upward or downward at decreasing rates asymptotically reaching a new equilibrium. In this area, rise or fall is one-way. It creates damped nonoscillation, as shown in part (A) of Fig. 2.

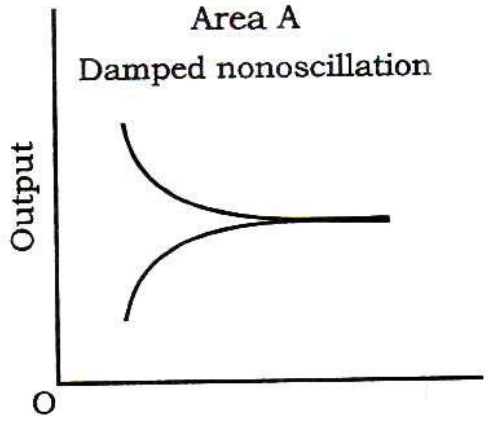


Fig. 16.2

Area B. The combinations of α and β in area B produce cycles of amplitude growing smaller and smaller until the cycles disappear and the economy ultimately stabilizes. That is the case of damped cycles or damped oscillation as shown in part (B).

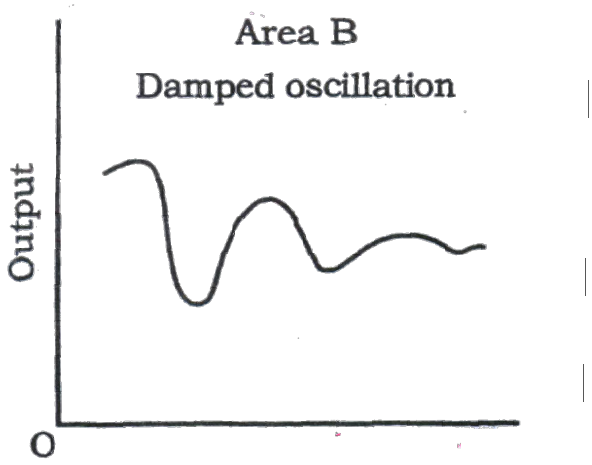


Fig. 16.3

Area C. Combinations of α and B in area C produce a series of trade cycles with larger and larger amplitude. This area is of explosive cycles, as shown part (C) of Fig.

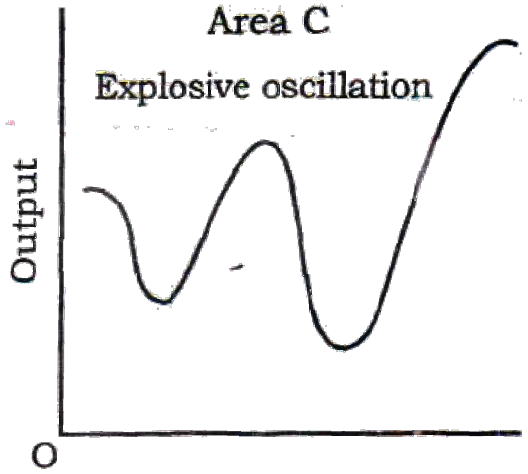


Fig 16.4

Area D. Combinations of α and β falling in area D make the income increase (or decrease) at an exponential rate until the ceiling (or bottom) is hit. This is case of one-way explosion, this creates explosive oscillation as shown in part (D).

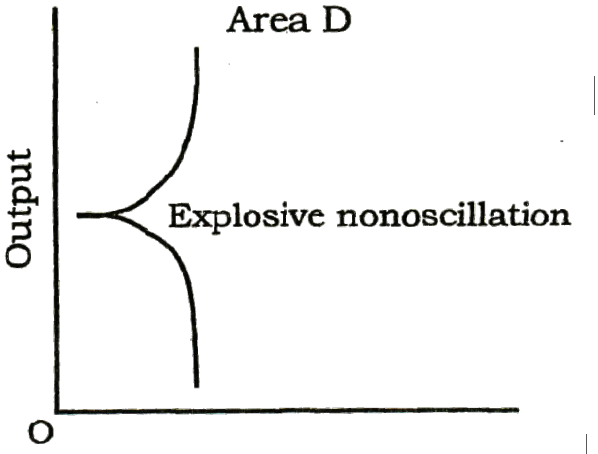


Fig. 16.5

Point E shows a special case in which cycles are of equal amplitude and continue forever.

Short-Answer Type Questions

Question 1: Distinguish between autonomous and induced investment.

Question 2: Derive assumptions of Samuelson's model mathematically.

Question 3: Explain effects of a and b on trade cycles.

(iv) IMPORTANCE OF THEORY

Samuelson's model of interaction of multiplier and accelerator of trade cycles occupies significant place on account of its undernoted merits. They are:

1. The study of the interaction of the two principles has paved the way for a more accurate analysis of the nature of the cyclical process.
2. This analysis helps to explain turning points in business cycles without resorting to special explanation. These factors are, a marginal propensity to consume of less than one plus acceleration effect.

The importance of the concept has been well explained by Prof. K. Kurihara According to him, "It is in conjunction with the multiplier analysis based on the concept of the marginal propensity to consume (being less than one) that the acceleration principle serves as a useful tool for business cycle analysis and as a helpful guide to business cycle policy."

(v) CRITICISMS OF THE THEORY

Although Samuelson's model explains very nicely the rise and fall in the level of national income through the interaction of multiplier and accelerator, yet he faces certain shortcomings :

1. **No Study of Time Lag:** Samuelson explains five types of cycles, but he fails to explain the time lag between them. This makes the model impractical.
2. **Assumption of Constancy of MPC:** Samuelson assumes marginal propensity to consume (α) and accelerator (β) as constant. In practical life, these dc not remain constant.
3. **Capital-output Ratio:** Samuelson theory assumes constant capital-output ratio for the principle of accelerator. In practical life, capital-output ratio has a changing tendency. So, the principle rests on wrong assumption.
4. **Practical Limitations:** Interaction of multiplier and accelerator shows significant cyclical effects, but in reality there are many practical limitations in actual calculations of the total effects of the principle.
5. **Historically Wrong:** Samuelson's model is historically wrong as it explains business cycles in a static economy. It ignores fluctuations in a growing economy.

6. A Mechanical Model: Prof. Duesenberry has criticised the model due to its mechanical nature. He remarked, the basic concept of multiplier-accelerator is an important one, but we cannot nearly expect to explain observed cycles by a mechanical application of that concept."

Short-Answer Type Questions

Question 4: Explain criticisms of Samuelson's model.

Question 5: Explain importance of Samuelson's model.

(IV) SUMMARY : Multiplier - accelerator is capable of generating various types of cycles and fluctuations : mild, damped and explosive. These cycles or fluctuations have varying fluctuations depending upon the value of a and b. Hence, we can say that an analysis of the interaction shows that it is possible to explain turning points in business cycles. Although this model shows that it is very easy to raise national income and take out the depths of depression by having a small increase in autonomous investment. But in actual practice interaction process does not go to raise national income to higher levels i.e., it is a great illusion.

On the basis of the interaction of multiplier and acceleration, the two categories of trade cycle theories have been developed one category assumes the values of multiplier and accelerator which generate explosive cycles it includes Hick's theory. On the other hand, Hansen has propounded a business cycle theory based on the interaction of multiplier with a weak accelerator which produces only damped oscillations. Further, the interaction theory has been modified either by incorporating in the analysis erratic shocks or random disturbances or by including so called buffers which check upward movement of income and output by imposing ceiling on expansion and checking a downward movement by imposing a floor on the contraction of output.

(V) KEYWORDS:

Autonomous, Amplitude, Accelerator, Exogenous, Consumption, Induced, Multiplier, Propensity, Depression, Oscillation, Induced.

(VI) SUGGESTED QUESTIONS:

1. How interaction of multiplier and accelerator generates trade cycles?
2. Explain Samuelson's model.
3. Explain the following short questions:
   (i) Assumptions of Samulson's model.
   (ii) Distinction between autonomous and induced Investment, according to Samuelson.

(iii) Importance of Samuelson's model.

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Lesson No. 2.9 AUTHOR : DR. PARMOD KUMAR AGGARWAL

HICKSIAN THEORY OF TRADE CYCLES

I. INTRODUCTION

John Hicks formulated his theory of trade cycles in his book 'A Contribution to the Theory of Trade Cycles' published in 1950. The theory is based against the background that provides a theory of growth. Business cycles - fluctuations in the economy's real output - have historically appeared as movements above and below a rising trend of growth. Hicks considers business cycles as a problem of an expanding economy. He defines a long-run equilibrium growth path for the economy which is determined by the growth rate of autonomous investment. He also assumed that autonomous investment tends to grow at a fairly constant percentage rate over the long-run. The ratio of equilibrium income to autonomous investment depends on the magnitude of multiplier and accelerator. According to Hicks, "the theory of the acceleration and the theory of multiplier are the two sides of the theory of the fluctuations, just as the theory of demand and the theory of supply are two sides of the theory of value." Prof. Hicks recognises the significant concepts which are the warranted rate of growth, autonomous and induced investment, and the interaction of the multiplier and the accelerator.

A distinction is made between autonomous investment and induced investment the latter is a function of changes in the level of output and the former a

function of the current levels of output. Under autonomous investment Hicks includes "public investment, investment which occurs in direct response to inventions and much of the long range' investment (as Harrod calls it) which is only expected to pay for itself over a long period". He assumes that investment increases at a regular rate so that it remains in progressive equilibrium if it were not disturbed by extraneous forces. On the other hand, induced investment depends upon change in the level of output or income and is a function of an economy's growth rate. Hicks agrees that whereas the monetary mechanism may greatly influence the course of the cycle, the fundamental causation of the cycle lies in the multiplier-accelerator relationship, and except in rare instances, the effective ceiling is the full employment level and the effective floor, the trend levels of autonomous investment. In short, according to Hicks, trade cycle is the explanation in real terms of a mechanical or technological sort in which monetary factors are left out or admitted as a modifying factor and where, apparently, human judgement or varying business expectations and decisions play little or no part. Investment plays the leading role but is based on formula, not judgement.

II. OBJECTIVES OF THE LESSON:

In this lesson you would be able to know Hicks's model based on objective of saving-investment relation, the acceleration principle and Harrod's notion of the cycle as a problem of an expanding economy. The process of expansion is explained in terms of the multiplier and accelerator which operate with a time lag. According to him, "the theory of the acceleration and the theory of multiplier are the two sides of the theory of the fluctuations, just as the theory of demand and the theory of supply are the two sides of the theory of value". Hence, autonomous investment, which to Hicks represents the growth factors due to increase of population and the progress of technology, plays a significant part in the determination of the cycle. Thus, the useful concepts which play an important part in Hicksian model of trade cycle are the warranted rate of growth, induced and autonomous investment and the relation of the multiplier and the accelerator.

III. HICKS' THEORY OF TRADE CYCLES:

Hicks has developed a theory mainly by combining the principles of the multiplier and acceleration, which he has borrowed from keynes, and has combined concepts of autonomous and induced investment, a distinction was made by- Harrod.

(i) ASSUMPTIONS:

The multiplier is related to the autonomous investment of the

government. The acceleration principle is based on induced investment. Hicks' theory of business cycle is based upon the following fundamental assumptions:

1. Hicks has assumed a progressive economy in which autonomous investment is increasing at a uniform rate.
2. Any upward displacement from equilibrium path (or the warranted rate of growth) results in a movement of saving and investment away from equilibrium through this movement may be lagged.
3. A large amount of durable equipment, contraction must follow expansion in a capitalist economy. There is a direct limit on the upward movement of the economy provided by the ceiling of full employment. Expansion cannot maintain itself beyond full employment.
4. There is no limit to contractionary movement. As the cycle proceeds on its downward path, the accelerator loses its strength. Since disinvestment does not exceed the rate of depreciation, this provides an indirect restraint or floor on the downward fall of the economy.
5. There are fixed values for the multiplier and the accelerator throughout the different phases of a cycle. However, it is only the multiplier that remains active throughout all the phases of the cycle, having forward operation during expansion and working backward during contraction. The accelerator on the contrary, remains passive and inoperative during the depression phase. The upswing is, thus, the result of the combined action of the multiplier and the accelerator, whereas downswing is largely a product of multiplier only.

Short-Answer Type Questions

Question 1: Distinguish between autonomous and induced investment according to Hick's Theory.

Question 2: Explain assumptions of Hick's Theory.

(ii) GRAPHICAL PRESENTATION OF HICKS' THEORY OF TRADE CYCLE:

Hicks has explained his theory of trade cycle in a diagram (see Fig. 17.1). The vertical axis measures the logarithms of output and employment and the horizontal axis measures time by its semi-logarithmic scale. In Fig. 17.1 line AA shows the course of autonomous investment, increasing at a constant rate. The line EE is the equilibrium path of output which is a constant multiple of autonomous investment. The line FF is the full employment ceiling. The line LL shows the equilirbium path during the period

of slump, assuming the output level will never go below this level.

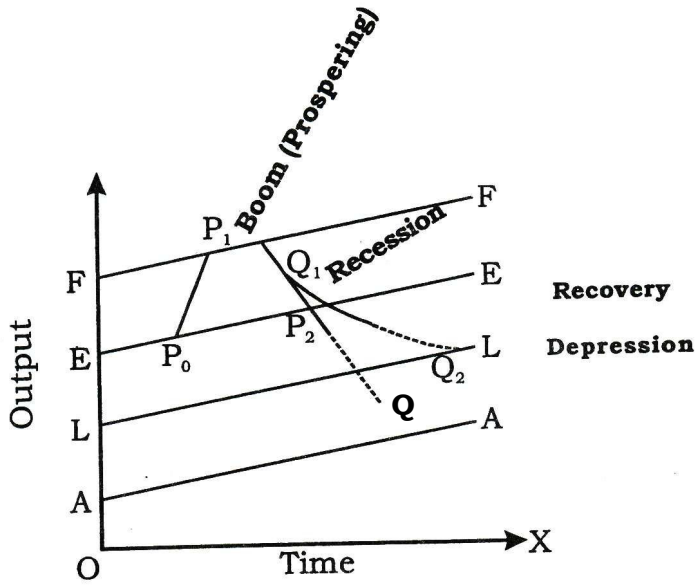


Fig. 17.1 **Hicks' Model of Trade Cycles**

Let us suppose that the economy has been progressing on the dynamic equilibrium path and reaches point P_0. Suppose also that at this juncture autonomous investment takes place due to some invention. Consequently, output increases and the economy leaves the equilirbium path EE and moves upward. After a certain lag begins the multiplier process caused by the autonomous investment. As a result, output and employment increase. Increase in output leads to induced investment which, in turn, brings the accelerator in action. This interaction between the multiplier and accelerator causes expansion in the economy which then moves along the expansion or oscillation path P_0P_1 until point P_1 is reached. The expansion beyond P_1 will not be possible because of full employment constraint. The most it can do is to creep along the ceiling FF. But is cannot do so for long. For, the initial burst of autonomous investment was supposed to be shortlived; thus on the upper part of the path P_0P_1 no more than the normal amount of autonomous investment is taking place. It implies that the expansion along P_0P_1 has been mainly on account of the induced investment during the preceding periods.

However, once the ceiling is hit, the expansion sustained by the induced investment along FF is bound to end and a downswing becomes inevitable sooner or later. For, increases in output along FF is not high enough to induce investment

and hence the induced investment ceases to take place. The downswing may be prolonged if output investment (induced) relation has a 3 or 4 year lag. But the downfall in output is inevitable. Once the downfall has started, it must continue till it hits line EE. Since there is nothing in the process to stop it at EE, the downfall will continue further. The rate of fall, however, should be lower since the disinvestment is limited to the rate of depreciation which goes on decreasing following the decrease in output. That is, the reverse accelerator does not work as fast as it does during the upswing: there is a marked lack of symmetry. Even though the process of decline in output may be slower, a situation characterised by slump does take place in the due course. Here, the autonomous investment is reduced a little below the normal level, while induced investment is zero.

The course of slump is shown by curve Q_1Q_2. That is, the magnitude of output decreases along the curve Q_1Q_2 towards the slump equilibrium line LL. Another course of possible slump is shown by Q_1Q when the output plunges downward indefinitely, which is a rare possibility. The normal course of slump is Q_1Q_2. Turning to recovery, when the downswing hits the bottom, it starts moving along the lower equilibrium line LL. This line is geared to the autonomous investment line AA, and rises with it. Thus, at this stage output will again have started to rise. This increase in output should bring the accelerator back into action. This marks the beginning of recovery. Once the autonomous investment starts coming in, the process of multiplier and later, its interaction with accelerator makes the economy grow on the path of expansion towards equilibrium path EE. This completes the cycle.

Short-Answer Type Questions

Question 3: Explain interaction between multiplier and accelerator with diagram.

(iii) CRITICAL APPRAISAL OF THE THEORY:

Hicks theory of trade cycles occupies a significant place in explaining ups and downs in business activities, yet it is not free from certain defects. The main criticisms of the theory, especially noted are as under:

(1) Assumption of a Constant Multiplier. Hicks has assumed a stable consumption function in assuming a fixed value of multiplier. But many recent empiricial studies have shown that the value of the MPC changes from one stage of the cycle to another. In Friedman's view, there is no certain relationship between the transitory income and MPC. Therefore, the multiplier-accelerator interaction constituting the core of Hicks' theory is not acceptable.

(2) Based on Accelerator. Professor Kaldor considers the use of accelerator as

misleading in that it presupposes the absence of excess capacity in capital-goods industries and permanent nature of demand for capital goods. In Kaklor's view the evidence is on the contrary.

(3) A Mechanical Explanation. Kaldor has criticised the theory on the ground that it incorporates the acceleration principle in a rigid form. He does not accept this rigid form. If so, he cannot accept Hicksian model. As Duesenberry has put it, "the basic concept of multiplier-accelerator interaction is an important one, but we cannot really expect to explain observed cycles by a mechanical application of that concept."

(4) Constant Ceiling. Hicks' theory is based on the assumption that ceiling remains constant does not find favour with critics. He considers that ceiling represents the stage of maximum production and this ceiling changes with the change in the size of income.

(5) Induced Investment Plays an Active Role. Hicks gave all preference, to the role of induced investment. He called autonomous investment as inactive, according to many critics. But it has been observed in underdeveloped economies that autonomous investment plays a dominant role to activate private investment.

(6) Overlooks Monetary Factors. The true explanation of the theory of trade cycles cannot be rendered by ignoring or overlooking the monetary factors. A complete theory is one which makes a mix of fiscal and monetary factors. Therefore, true explanation of the trade cycles cannot be rendered by ignoring the monetary factors.

(7) 'Floor Expansion' not Convincing. Professor Harrod has doubted that autonomous investment is likely to be advancing in a slump. The possibility is more that the depression retards. In this study of the American business cycles in the nineteenth century readings, it was found that the revivals were not due to the wearing out of excess capacity. But in many cases expansion started in spite of the existence of excess capacity.

(8) Invalid Distinction between Autonomous and Induced Investment. Some critics have challenged the validity of the distinction, on empirical level. In the short period much of investment is autonomous which becomes induced investment from the long period viewpoint. This fact limits the possibility of confronting the theory with facts.

Although Hicks' theory of trade cycles has many limitations, yet this is a valuable contribution to the theory of trade cycles. Even its critics such as Kaldor indicates some of its weaknesses acknowledge its merit. Thus, Kaldor writes that Hicks' theory provides us many brilliant and original piece of analysis. Duesenberry Considers it as an ingenious

piece of work,

(iv) SUGGESTIONS OF HICKS' THEORY:

Hicksian model also suggests that the duration of depression depends upon the rate of technical progress. There are two reasons for this. First, without technical progress, autonomous investment may not rise overtime and, thus, a positive change in income, needed to set the accelerator in motion, will not take place until equipment has worn out to the point where some replacement investment is necessary. Second, if there is no technical progress, the time at which the replacement is necessary will be defused because no help is obtained from the obsolescence of existing equipment. The whole burden of starting the accelerator is, thus, placed on the wearing out (depreciation) of equipment. Small wonder that depressions are more severe and long lasting during periods when long-run growth factors seem to be in abeyance.

While the Hicksian model provides a framework within which to analyze fluctuations in a context of growth, it does not really deal with the interaction of trend and cycle. The full employment ceiling of Hicks defined as above is independent of the path of output. It depends rather on the growth of population, advances in technology, and the like; and it is therefore assumed to grow at the same rate as autonomous investment. But the full employment level of output depends on the magnitude of the resources that are available to the economy. The capital stock is one such resource. This implies that the ceiling is raised in any period during which the capital stock is increasing. Since the rate at which output increases determines the rate at which the capital stock changes, ceiling level of output will differ depending on the time path of output. One cannot, therefore, separate the long-run full employment trend from what happens during the cycle.

Hence the acceleration principle tells us that investment is a function of changes in demand and if the accelerator works, a small percentage change in demand can induce a significant magnification in the demand for capital goods. Similarly, if output fails to grow fast enough, investment may fall even though final demand is increasing. The acceleration principle clearly is a strong source of instability, provided accelerator works.

(V) SUMMARY OF THE THEORY:

Hicks provides a satisfactory explanation of turning points of trade cycle through accelerator and also sheds lights as to the periodicity of the cycle which may not be regular. Since the system has a hump or a ceiling and a floor or a bottom it must oscillate between these two limits like the pendulum of a clock. Hicks by

showing how the excess capacity delays the upswing makes an important contribution to the theory of trade cycle. Hicks model, while highly simplified as presented here, serves as a useful framework of analysis, which with modification, yields a fairly good picture of cyclical fluctuation within a framework of growth. It serves specially to emphasize that, in a capitalist economy characterized by substantial amounts of durable equipment, a period of contraction almost inevitably follows expansion. His model also pinpoints the fact that in the absence of technological development and other powerful growth factors the economy will tend to languish in depression for long periods of time. Hence Hick's Theory of Trade Cycles makes use of multiplier and acceleration principles which are combined to the fluctuations of autonomous and induced investment. It is induced investment which is finally responsible for the upward push and downward swing of output and income of prices and employment.

Hick's theory summarises in a capitalist system in which huge amount of durable capital equipment exists, contraction must necessarily follow expansion. Since the rate of growth of output is greater than the rate of the full employment output (otherwise full employment can never be reached) the ceiling retards the rate of growth of output. The induced investment is a function of the rate of change in output. When the rate of change in output is slowed down, induced investment falls causing an absolute fall in the level of investment. The model conveys that in the absence of technological improvements, population growth, increase in the capital stock and the growth factors, the economy will be in a state of depression for a long time. Because in the absence of technological improvement, autonomous investment may fail to increase over time. If it is so, induced investment, which is necessary to make the accelerator work, will not take place until the capital stock is depreciated and replacement becomes inevitable.

(vi) REFERENCES:

1. Rana and Verma : Macro Economics.
2. Ahuja, H.L. : Macro Economics
3. Dhingra, I.C. : Macro Economics
4. E. Shapiro : Macro Economic Analysis

(vii) SUGGESTED QUESTIONS:

1. How interaction of multiplier and accelerator generates trade cycle? Give Hick's model.
2. Explain short questions:
   (i) Define trade cycles.
   (ii) Give the characteristics of business cycles.

Lesson No. 2.10 **AUTHOR : DR. MANISHA**

GOODWIN'S THEORY OF TRADE-CYCLE

2.10.1 Introduction

Hicksian business cycle theory is related to the limiting cycles and the limits on fluctuations are laid down by certain factors outside the structure of the model. Richard M. Goodwin has attempted to explain the stability of the cycle on the basis of the conditions within the structure itself. His capital accumulation model is different from Hicks' linear model which becomes non-linear only when it meets ceiling and floor. Goodwin's model, on the other hand, is non-linear throughout. Allen, making a mention of these features of Goodwin's model, states: "The advantage of Goodwin's model is that the non-linear element is built in; the resulting oscillation maintains itself without any dependence on outside factors or on particular initial (or historical) conditions."

2.10.2 Objectives of lesson

In this lesson we will study Goodwin's model of economic cycle, how the capital accumulation leads to trade cycle.

2.10.3 Explanation of the theory

Almost without exception economists have entertained the hypothesis of linear structural relations as a basis for cycle theory. As such it is an over-simplified special case and, for this reason, is the easiest to handle, the most readily available. Yet it is not well adapted for directing attention to the basic elements in oscillations—for these we must turn to nonlinear types. With them we are enabled to analyze a much wider range of phenomena, and in a manner at once more advanced and more

elementary.

By dropping the highly restrictive assumptions of linearity, we neatly escape the rather embarrassing special conclusions which follow. Thus, whether we are dealing with difference or differential equations, so long as they are linear, they either explode or die away with the consequent disappearance of the cycle or the society. One may hope to avoid this unpleasant dilemma by choosing that case (as with the frictionless pendulum) just in between.

The main elements of the Goodwin model are a linear consumption function $C=C_0+\alpha Y$, where C_0 is autonomous consumption and a is consumption-income ratio and net investment is taken to be equal to the rate of change in capital stock. This net investment is the outcome of the adjustment between actual capital K and desired capital $\overline{K}$ where desired capital is proportional to output by $\overline{K} = \beta Y+\alpha$. The acceleration co-efficient has been introduced to explain net investment. The change in net investment stems from a change in output that causes a change in the desired level of capital. Thus accelerator, which is non-linear, produces an indirect dependence of investment on changes in output.

To explain the path of cyclical movement, we suppose that K' is the rate of capital goods capacity output and K" is the rate of scrappage. Let us start from the position $K= \overline{K}$ where the equilibrium level of output Y is determined by $Y=\frac{1}{1-\alpha}(C_0+I)$, and (the autonomous investment) I=a, so that the system proceeds along an equilibrium path. This path is analogous to the Hicksian EE line. While Hicks takes into account a steady rise in autonomous investment, Goodwin's model is based on an increase in desired capital that results from the continuously occurring technical change. Once a divergence from equilibrium occurs, the system will not tend towards equilibrium again and there will be continuous fluctuations around the equilibrium path.

Suppose that $K = \overline{K}$, an increase in investment takes place and the propelling forces of multiplier and accelerator will push the economic system in the upward direction. Since the accelerator in Goodwin's model is non-linear, investment is not related to the change in output but to the difference between the actual (K) and desired ($\overline{K}$) stocks of capital. The investment relationship being continuous, investment is instantaneously thrust into the extreme position corresponding to

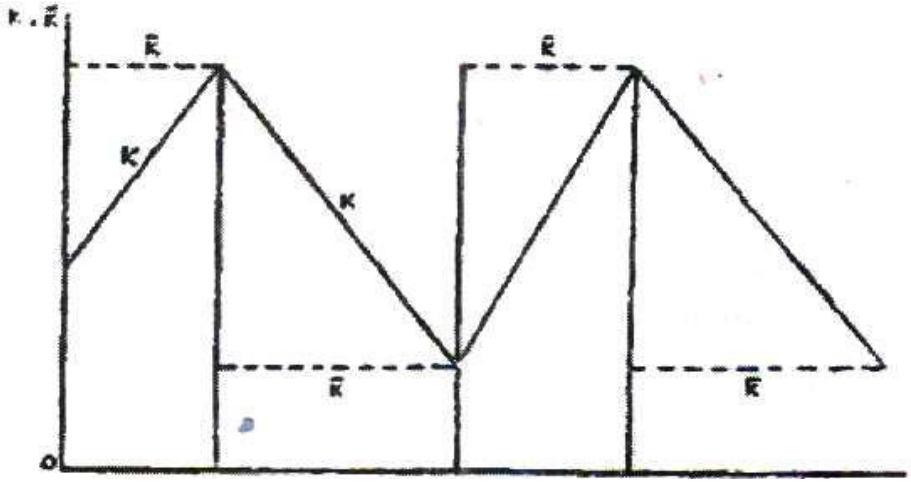
this phase. Thus, expansion brings about a situation where $I=\frac{\partial K}{\partial t} = K'$. This restricts the growth of output and accelerator is rendered discontinuous. Throughout the expansion $K < \overline{K}$, but at the peak K becomes equal to $\overline{K}$ due to a decline in the rate of investment. Once $\overline{K}$ tends to overtake K, the desired stock of capital will become equal to K", the rate of scrappage or the replacement rate. Thus $\overline{K}$ falls; the orders for capital stock also decrease; and consequently the economic system moves down along the contraction path.

During the contraction phase, $K > \overline{K}$ and the gap between K and $\overline{K}$ is to be closed by K". But at the same time desired capital has been rising by the amount of autonomous investment a. The closing gap between K and $\overline{K}$ has been explained by Goodwin in terms of a gradual reduction of excess capacity, through a failure to replace and a steady occurrence of capital-using innovations. In his words, "Excess capacity is being eliminated both through failure to replace, and the steady occurrence of capital-using innovations."

The use of capital-using innovations during contraction, however, seems to be highly questionable. At the lower turning point, Goodwin maintains that K is equal to $\overline{K}$. In order to initiate a recovery, it is essential to raise the level of $\overline{K}$. The stimulant may be provided by a technological change. As long as the technological progress exists, there is no danger of the economic system to get stranded at the lower turning point.

The disparities in the actual and desired stock of capital resulting in fluctuations may be indicated through fig. 1.

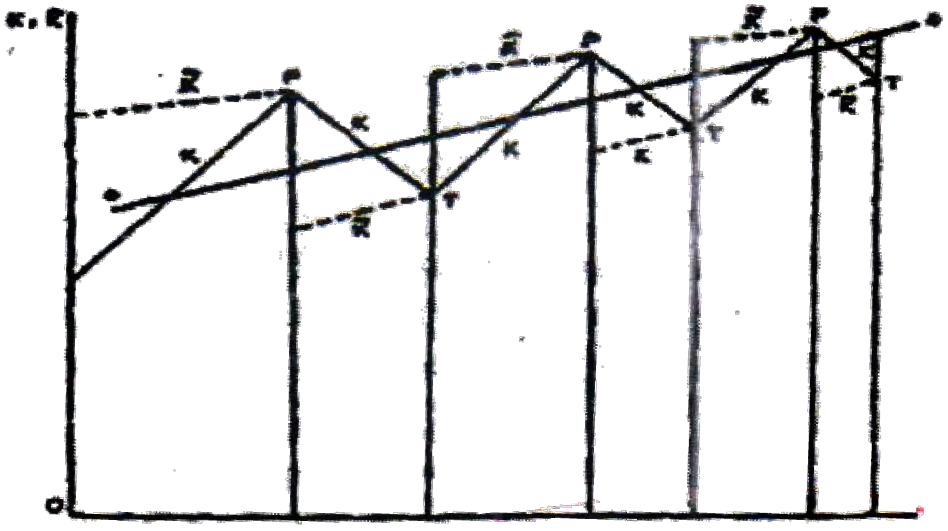
Fig. 1 shows that the expansion phase corresponds with a situation when $\overline{K}$ remains continuously above K, while over the entire downswing K remains throughout greater than $\overline{K}$. At peaks and troughs, K becomes equal to $\overline{K}$. When the growth factors are not reflected in technology change, there would be no net change in the stock of capital and the system will languish for a longer time in depression than it experiences the expansion.



Time

Figure 2.10.1

If growth factors involve technical progress, the expansion phase may be heightened since the time taken by K to overtake $\overline{K}$ will be considerably lengthened. Similarly, over the down swing the contraction may get shortened. When growth factors influence the cycle, the subsequent peaks and troughs will be at level higher than the earlier peaks and troughs. This has been shown through figure 2.



Time

Figure 2.10.2

The line aa in figure 2 represents the technology growth factor and it is analogous to the

Hicksian EE path. The upper and lower limits of $\overline{K}$, taking into account the technological growth factors, have been shown through dotted paths. P represents peaks and T troughs where $K = \overline{K}$. The contractions in this diagram are invariably shorter than the expansions.

2.10.4 Criticism of the theory

The following main flaws have been pointed out in the business cycle model propounded by Goodwin.

(i) **Nonlinear Accelerator:** Goodwin makes a departure from Hicks in his conception of accelerator which the former assumes as non-linear against Hicksian linear accelerator. The question has been raised about the reasonableness of this type of accelerator

(ii) **Shortcomings of Acceleration Principle:** Since Goodwin's theory is based upon the acceleration principle, the flaws of this principle regarding the assumption that the present level of output will be maintained even in future, affect this theory also. *

(iii) **Unrealistic Character of Theory:** Fig. 1 shows the desired stocks of capital through the rectangular blocks. This is unrealistic. In addition, it shows that the level of desired capital stock remains stationary over a time and that depressions are longer than expansions. All these are the objectionable features of this theory.

However, these can be easily overcome by introducing lags and by involving growth factors leading to technological progress.

(iv) **Recovery is a Slow Process:** Goodwin's model depicts that the system will be bounced back from ceiling or trough as soon as it touches the highest or the lowest point. The empirical evidence in a very large quantum is available to prove the opposite that the recessions and recoveries may be imperceptibly slow as analyzed by Hicks.

(v) **Fixed Productive Capacity of Capital Goods Industries:** This theory recognizes that the capital goods industries have a specific level of productive capacity. As a matter of fact, the productive capacity of these industries over a long period can be substantially improved or reduced.

2.10.5 Conclusion

In this lesson we have studied the Goodwin's model of trade cycle, that how capital accumulation leads to trade cycle and when actual capital and desired capital both are equal, then there is a need to raise the level of desired capital to initiate a

recovery, the stimulant may be provided by the technological change. At peaks and troughs, actual capital becomes equal to desired capital. Although Goodwin's model has got certain weaknesses, yet it is regarded as a big landmark in the endogenous explanations of the business fluctuations.

2.10.6 TRADE CYCLE THEORIES - A SUMMARY STATEMENT

A summary statement of the essential elements in the trade cycle models:

1. The role of fluctuations in the rate of investment (Tugan-Baranowsky, Spethoft, Gustay Cassel, Robertson).
2. The analysis of the determinants of investment: the natural rate in relation to the money rate, in current terminology the schedule of marginal efficiency of investment in relation to the rate of interest (Wickshell, Keynes).
3. The role of dynamic factors - technology, resources, territorial expansion and population growth - as determinants of investment (Spietlioff, Harrod).
4. The bunching of investment due to the herd-like movement induced by innovational activity (Schumpeter).
5. The capitalistic technique of production (the time element in the construction of fixed capital, the longevity of fixed capital) and the principle of acceleration (Aftalion, Pigou and Clark).
6. Initiating impulses and the propagation of cyclical movements conditioned by the structure of the economy (Wicksell, Pigou).
7. The investment multiplier and the consumption function (Kahn-Keynes).
8. Multiplier-accelerator interaction models of Paul A. Samuelson, Sir John Hicks, Godwin etc., facilitating econometrics in business cycle analysis.
9. Short-run monetary fluctuations are associated with similar economic fluctuations (Milton Friedman and Anna Schquartz)

The above is a bare outline, but gives all essentials in the theories of (and empirical studies) trade cycles proposed by the authors whose names are given in parentheses. There are, thus, four strands in relation to the rate of interest, (1) the effects of changes in income upon the rate of investment (the principle of acceleration), (2) the role of investment multiplier in income determination, (3) multiplier-accelerator interaction which causes economic fluctuations and finally (4) monetarist explanation of fluctuations. The above involve inter-relationships which

comprise the 'mechanics' of expansion of contraction.

2.10.7 Short Answer type questions

1. What are the disparities in the actual and desired stock of capital resulting in fluctuations?
2. What is the role of technical change in Goodwin's theory?
3. What are the criticisms of Goodwin's theory?
4. What is a linear consumption function?

2.10.8 Long Answer type questions

1. Critically evaluate Goodwin's theory of trade cycles.
2. How is Goodwin's theory different from Hicksian theory of trade cycles?

2.10.9 Recommended Books:

Macroeconomics	:	John. H. Makin
Business cycles	:	J.A. Schumpeter
Business cycles	:	J.A. Estey
Business cycle	:	S. Bober

SUGGESTED BOOKS

1.	Edward Shapiro	:	Macro Economics
2.	Demburg and Macdougal	:	Macro Economics
3.	W.C. Petersen	:	Income Employment and Economic Growth
4.	A Hanson	:	A Guide to Keynes
5.	A Wrightsman	:	Monetary Theory and Policy
6.	J.G. Ranleti	:	Money and Banking. An Introduction to Analysis and Policy
7.	K.K. Kurihara	:	Monetary Theory and Public Policy
8.	Gardner Ackley	:	Macro Economic Theory
9.	Harry O. Johnson	:	Selected Essay in Monetary Economics
10.	P.A. Samuelson	:	The Collected Scientific Paper (Vol. II) pp. 1100-07 & pp 1111-1122
11.	M.G. Mueller (Ed).	:	Reading in Economics, Part III, article entitled, " The Acceleration Principle and the Theory of Investment, A survey" by A.D. Knox and Part-VI, article "Multiplier Analysis and The Principle of Acceleration," by P.A. Samuelson.

12. J.R. Hicks : The Contribution to the Theory of Trade cycle.
13. Stanley Bober : The Economics of Cycle and growth
14. L.G. Reynolds : Macro Economics
15. K.C. Rana and K.N. Verma : Macro Economic Analysis

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