

UNIT 1 CLASSICAL AND KEYNESIAN APPROACHES

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1.0 OBJECTIVES

After going through this unit you should be in a position to

- explain the concepts of aggregate demand and aggregate supply;
- identify the factors influencing aggregate demand and aggregate supply;
- explain the Classical approach to determination of equilibrium output and prices; and
- explain the Keynesian approach to determination of equilibrium output and prices.

1.1 INTRODUCTION

Macroeconomics concerns with the study of aggregate behaviour in an economy. The need for a special branch of macroeconomics arises because what holds for the individual unit may not hold good for the aggregate. For example, a firm may be in a position to increase its output level in the short run to meet the increased demand for its product. But if all firms want to increase their output level, in the short run it would not be possible

because of limited availability of resources (say, labour) unless there are unemployed resources in the economy. Thus the increase in demand may result in hike in prices without any increase in output.

Through the intersection of aggregate demand and aggregate supply we obtain aggregate output and aggregate price level for the economy. A change in aggregate demand or aggregate supply would influence the levels of output and prices. Economists differ on the mechanism and speed with which such change takes place in the economy. In this unit we will discuss the classical and Keynesian approaches to determination of output and prices in an economy. However, we begin with some basic concepts before we deal with these approaches.

1.2 SOME CONCEPTS

We begin with the definition of certain important concepts, which we will be using in this course.

1.2.1 Aggregate Supply

Aggregate supply of an economy is the amount of output produced by firms in the economy. With the objective of profit maximization firms decide on the quantity of output they supply to the market. The total output produced depends upon two factors: i) level of inputs, and ii) level of technology. The demand for inputs by firms depends upon input prices. We assume that there are two primary factors, viz., labour (L) and capital (K) used in the production process. Of these two inputs, labour is supplied by households while capital is the stock of equipment and structure used in production and available in the market. Machineries, building and vehicles are examples of capital input. Through 'investment' we can increase the level of capital input in the economy. On the other hand, labour supply depends on population growth. We will learn more about the production function, which shows a technical relationship between inputs and output in Block 2.

As the quantity of input used increases there is an increase in output, and therefore the quantity supplied (Q^s). Aggregate supply curve (AS) is plotted on a graph (see Fig. 1.1) where x-axis denotes quantity of labour supplied and y-axis denotes price of output (P). Recall from microeconomics that individual supply curve is upward sloping in prices. In the case of aggregate supply curve, however, there is disagreement among economists – whether it is a vertical straight line or an increasing curve in prices. Usually it is assumed that in the short run aggregate supply is upward sloping while in the long run it is vertical.

1.2.2 Supply of and Demand for Labour

The quantity of labour supplied (L^s) by households depends upon the prevailing wage rate. If wage rate is too low certain individuals may opt out of the market while at higher wage rate individuals may put in more working hours. Thus there is a direct relationship between labour supply and wage rate. Remember that when we talk of unemployment, we mean 'involuntary unemployment'; we exclude voluntary unemployment. The 'labour force' or 'workforce' is the sum of employed and unemployed persons. Unemployment rate is defined as the percentage of labour force that is not employed.

The quantity of labour demanded (L^D) is a downward sloping curve of wage rate. By interaction of the supply and demand curves of labour the equilibrium wage rate is determined. Wage rate can be measured in nominal or real terms. By nominal wage (w)

we mean wage accounted in money terms. On the other hand, by real wage we mean nominal wage adjusted for price change ($\frac{w}{P}$). Thus if there is an increase in price level (P) and nominal wage rate does not increase then there is a decrease in real wage rate.

1.2.3 Aggregate Demand

In macroeconomics we use the term aggregate demand (AD) to include the total demand for goods and services produced in the economy. Aggregate demand is an inverse function in prices depicted by a downward sloping curve. Thus, as prices increase, aggregate demand decreases.

Aggregate demand is viewed in terms of expenditure or spending on goods and services. There are four major components of aggregate demand: i) consumption expenditure, ii) investment, iii) government expenditure, and iv) net exports. Thus

$$Q^D = C + I + G + (X - M) \quad \dots(1.1)$$

where Q^D is aggregate demand, C is consumption expenditure, I is investment, G is government expenditure, X is exports and M is imports. Thus $(X-M)$ indicate net exports. In a closed economy, where there is no foreign trade, X and M are equal to zero and thus do not get included in (1.1). The behaviour of these constituents will be discussed later.

1.2.4 Equilibrium Output and Price

It is mentioned above that aggregate supply curve (AS) is upward sloping (in the short run) while aggregate demand curve (AD) is downward sloping. Through the intersection of aggregate supply and aggregate demand curves we obtain equilibrium levels of output and prices.

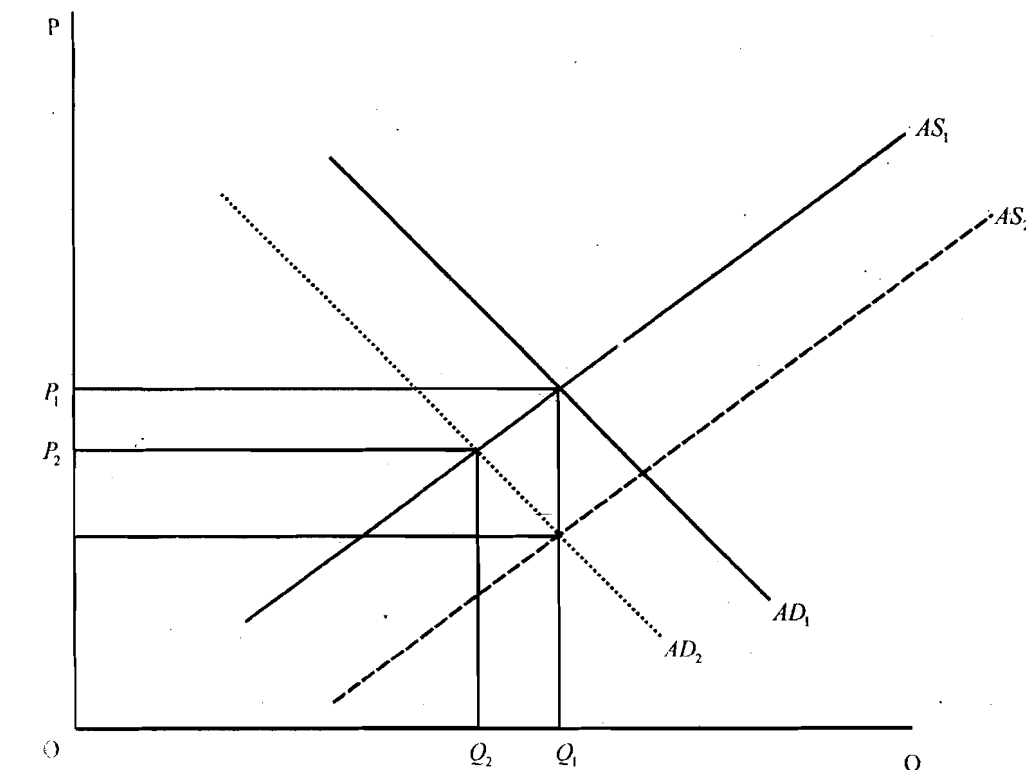


Fig. 1.1: Equilibrium Output and Price Levels

In Fig. 1.1 aggregate supply is given by the line AS_1 and aggregate demand is given by the line AD_1 . Corresponding to the equality between AS_1 and AD_1 we find that the equilibrium level of output is Q_1 and equilibrium price level is P_1 . Suppose there is a downward shift in aggregate demand from AD_1 to AD_2 due to changes in the levels of its components. Accordingly, the equilibrium levels of output and price will change to Q_2 and P_2 .

Certain questions may be shaping up in your mind at this point. How soon does such a change in output level take place? What is the impact of such a change on the level of employment? If Q_1 represents full employment equilibrium, does the economy ever regain its full employment output level?

When there is a decline in AD the immediate impact is a downward shift in the output level. Consequently, there is a rise in unemployment in the economy which pushes the wage rate downward. The decline in wage rate is likely to reduce cost of production and hence price level. As a result, the AS curve will shift downward. The whole process, however, takes time as the decline in nominal wage and prices is not instantaneous. Therefore, in the short run output declines below full employment level but in the long run it returns to its full employment level. So long as output remains below full employment level, there is a tendency for wage rate to decline. Through adjustments in wage rate and prices the output level recovers to its full employment level, although with considerable delay. Once full employment is realised, increase in AD will result in price rise. Thus fluctuations in output, wage rate and price level are a part of the process. Such fluctuations are often systematic and called business cycles.

1.2.5 Measurement of Aggregate Output

You may have heard of the concept gross domestic product (GDP), which is measured in current prices or in constant prices. Empirically aggregate output (Q) of an economy is given by GDP at constant prices. Thus GDP at market prices represents $P \times Q$.

GDP can be measured by three approaches: i) sum of final output (Q), ii) sum of factor income (Y), and iii) sum of final expenditure (E). All three measures provide the same value of GDP. Therefore, we will use Y and Q interchangeably to represent aggregate output.

If we subtract net taxes (T) from total income (Y) we obtain personal disposable income ($Y-T$), which is a determining factor in consumption expenditure (C).

While dealing with time series data we would use subscript ' t ' to represent time period. For example C_{t-1} is total consumption for period $(t-1)$.

1.2.6 Circular Flow of Income

There are basically three economic agents in the economy: households, firms and government. The households receive income by selling their labour and capital inputs in the factor market. This income is used on three heads: i) payment of taxes to the government, ii) consumption of goods and services, and iii) saving through financial markets. Firms use the revenue obtained by selling goods and services for factor payments. The government receives revenue from taxes, which is used for purchase of goods and services. If government revenue is less than its purchases (that means if there is a deficit) then the government borrows from the financial markets.

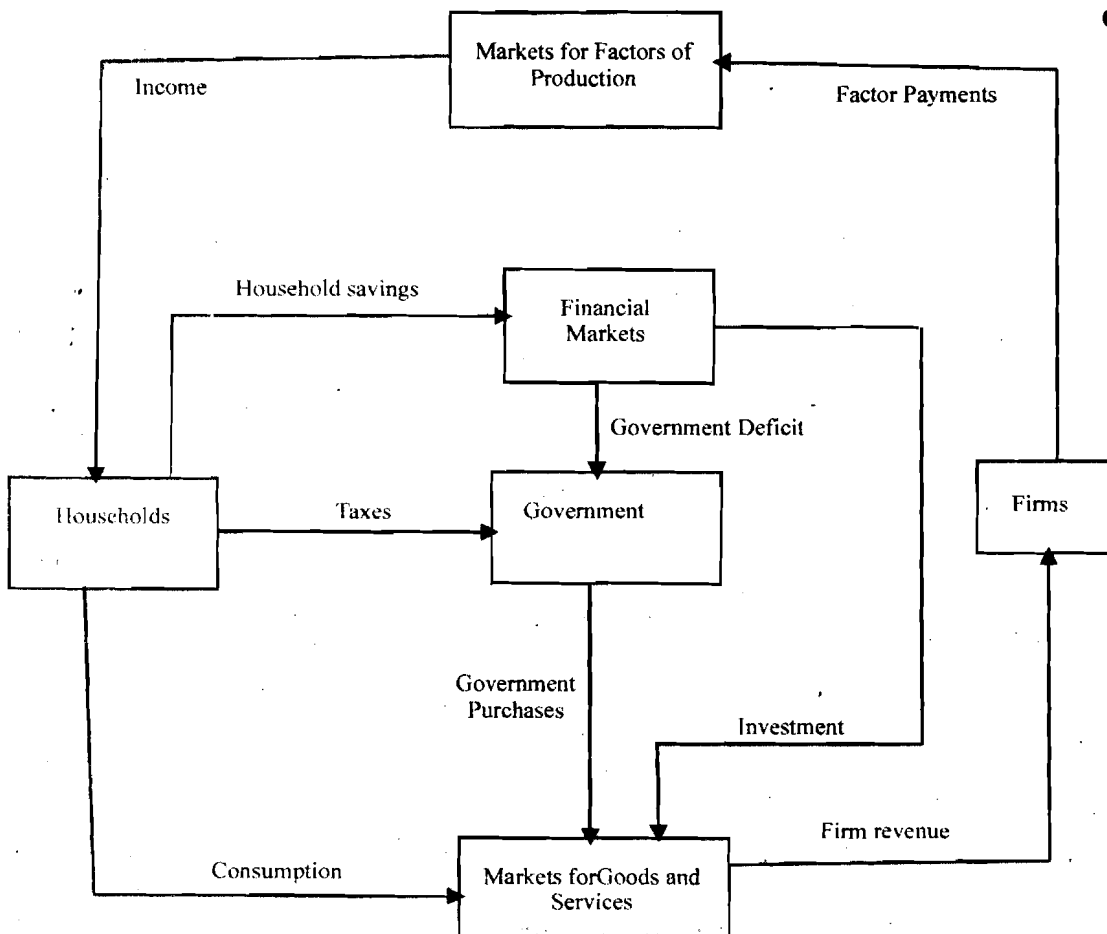


Fig. 1.2: Circular Flow of Income

Thus there is a circular flow of income and expenditure from one economic agent to others in a closed economy. If foreign trade is allowed, the model presented at Fig. 1.2 needs modification and external sector needs to be introduced. Remember that the circular flow depicted in Fig. 1.2 is a simplification of reality even for a closed economy. Here we assume that households own labour and capital. In practice, firms also own capital, make investment, and pay taxes to the government. Government transfers money to households as social security measures.

1.3 VARIOUS SCHOOLS OF THOUGHT

Among economists there is no agreement on how adjustments in equilibrium levels of output, prices and employment take place. There are also differences in views on the sources of economic fluctuations. Basically there are two important schools of thought: classical and Keynesian. Classical approach is a term coined by John Maynard Keynes to reflect the ideas presented by economists prior to him. Prominent among classical economists are Adam Smith, David Ricardo, Thomas Malthus and John Stuart Mill. The classical and Keynesian economists differ on: i) the relative roles played by supply and demand in determination of output, employment and prices, ii) the flexibility of prices and wage rate in the economy, and iii) the dichotomy between real sector and monetary sector. The mainstay of classical economics has been the basic assumption that 'supply creates its own demand'; often referred to as 'Say's law', named after J. B. Say. The Keynesian economists rule out such a possibility, particularly during periods of recession.

In fact, Keynesian economics evolved on the aftermath of the 'Great Depression' during 1929-34 with the publication of 'The General Theory of Employment, Interest and Money' in 1936 by Keynes. As we will notice below, the classical economists failed to

explain the prevailing unemployment and decline in output during the 'Great Depression'. In an attempt to explain the down turn Keynes suggested that the Great Depression occurred mainly due to inadequate demand. In Keynesian view 'demand creates its own supply' so long as unemployment exists in the economy.

The classical economists believed in free trade and minimum intervention by the government on economic activities. They suggested a 'laissez-faire' (French for 'leave us alone') economy where government should confine itself to law, defence and governance. In such an economy 'market forces' will determine real variables such as output, employment and prices. This is made possible by flexibility in price and wage levels. The classical economists believed that the aggregate supply curve is vertical, so that there is no change in equilibrium level of output and employment (see Fig. 1.3).

For example, suppose there is a downward shift in aggregate demand from AD_1 to AD_2 due to reduced consumption expenditure by households. This will result in excess supply at the prevailing price P_1 . Consequently, prices will decline to P_2 while there will be no decline in output level, and market gets cleared. In the factor market, wage rate will decline so that full employment is maintained. According to classical economists there is a 'self-correcting mechanism' behind the 'market-clearing model' of the economy. The process of change in wage rate and prices are achieved instantaneously. The classical economists also assume dichotomy between real variables (such as output and employment) and nominal variables (such as money supply and prices). Thus changes in money supply (M) do not influence output or employment. If there is a decrease in money supply, levels of prices and wage rate will decline.

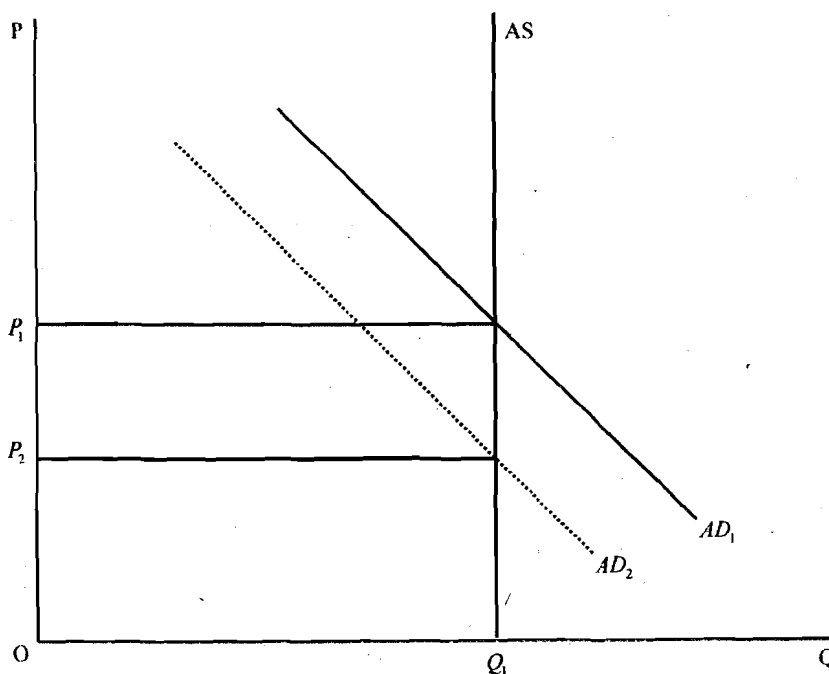


Fig. 1.3: Classical Approach to Output and Price Determination

The Keynesian approach, however, does not subscribe to the vertical AS curve. Keynes points out that in the short run there are price and wage 'rigidities' so that prices and wage rate do not decline when there is a downward shift in aggregate demand. Wage rigidities arise because of various contracts and labour legislation. Due to wage rigidity, wage rate is maintained at a higher level. Consequently, the output level declines and there is 'recession' in the economy. In the short-run the AS curve is either horizontal or upward sloping (in Fig. 1.1. we have presented an upward sloping AS curve so that downward shift in AD results in decline in both output and price levels). In the Keynesian

model, however, the AS curve is assumed to be vertical in the long run so that output supplied is fixed. Thus we can say that the classical model explains the long run while the Keynesian model explains the short run.

In response to the Keynesian economics the 'neoclassical economists' (John Hicks, Paul Samuelson, Robert Solow among others) attempted to imbibe the important ideas of Keynesian economics in a classical framework. The pioneering efforts by Sir John Hicks paved the way for the synthesis of classical and Keynesian ideas on real and nominal macro-variables, popularly known as IS-LM model. The neoclassical growth model by Solow helped in analysis of long run growth of an economy.

The 'new classical economics' is a term broadly used to describe the challenges posed to the Keynesian orthodoxy. This school of thought suggests that economic fluctuations can be explained while maintaining classical assumptions. Some of the topics based on new classical economics that we will discuss in later Units are real business cycle theory (Unit 14) and rational expectations hypothesis (unit 7). The new classical economists (prominent are Robert Barro and Robert Lucas) endorse the price and wage flexibility assumed by classical economists.

The 'new Keynesian economics' is of the view that wages and prices adjust slowly to shocks. As a result, fluctuations in aggregate demand cause short run fluctuations in output and employment. New Keynesian economists (Gregory Mankiw among others) suggest that 'menu costs', 'aggregate demand externalities' and coordination failure cause sticky prices.

Check Your Progress 1

- 1) Explain the interaction between household and firms through a circular flow diagram.

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- 2) Distinguish between the classical and Keynesian models of output and price determination in terms of demand and supply curves.

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1.4 CONSUMPTION EXPENDITURE AND SAVING

For households the personal disposable income (that is, income after payment of taxes and adding transfer payments) is allocated on either consumption expenditure (C) or saving (S). Thus we have $C + S = Y$.

1.4.1 Average and Marginal Propensity to Consume

Consumption expenditure is the major head of spending by households and depends upon personal disposable income. It is generally observed that for a household the level of consumption increases as income level increases. However, there is a minimum level of consumption required for survival. Thus, in order to survive, a household has to spend a minimum amount on consumption even if its income level is zero. The household may borrow for consumption expenditure or may draw upon past saving. Secondly, poorer households spend less on consumption than richer households do. But as a percentage of household income, it is observed that poorer households spend a higher percentage of their income on consumption.

We introduce two concepts: average propensity to consume (APC) and marginal propensity to consume (MPC). APC is defined as the ratio of consumption expenditure

to income ($\frac{C}{Y}$). For example, if a family has an income of Rs. 8000 and spends Rs.

5000 on consumption, then APC is $5000/8000 = 0.625$. Marginal propensity to consume (MPC) is defined as the amount spent on consumption out of every additional

Rupee earned. In symbols it is given by $\frac{\Delta C}{\Delta Y}$. As an example, MPC = 0.65 for a family if consumption expenditure increases by Rs. 65 Paise when income increases by Rs. 100.

1.4.2 Consumption Function

Consumption function shows the relationship between c and y . Our consumption function should depict the above features. If we ignore taxes and subsidies by the government, then consumption function in its simplest form is given by

$$C_t = \bar{C} + cY_t \quad \dots(1.2)$$

where C_t is current consumption and Y_t is current income. The consumption function given at (1.2) is a straight line with intercept $\bar{C}$ and slope c . Here $\bar{C}$ is the threshold or minimum consumption when income is zero. Since a household spends only a part of its income on consumption the value of c should be less than 1. Moreover, c cannot be negative. Thus c remains between 0 and 1, that is, $0 < c < 1$. We observe that c is the

MPC since $c = \frac{\Delta C}{\Delta Y}$. Notice an important feature of the consumption function, that is,

the average propensity to consume (C_t / Y_t) falls as income rises.

In Fig. 1.3 (panel-a) we depict the consumption function. Here we draw a 45° line along which whatever is earned is consumed, that is, $C = Y$. When income level is Y_1 , consumption equals income as the consumption function intersects the 45° line. This

level of income is called 'break-even income', and on the average, a family having income Y_1 consumes whatever it earns. When income is less than Y_1 , consumption level of the household is more than its income. On the other hand, when income is more than Y_1 , consumption is less than income. For example, in Fig. 1.3 (a) when income is Y_2 consumption is C_2 . Notice that when income exceeds Y_1 , we have $C < Y$.

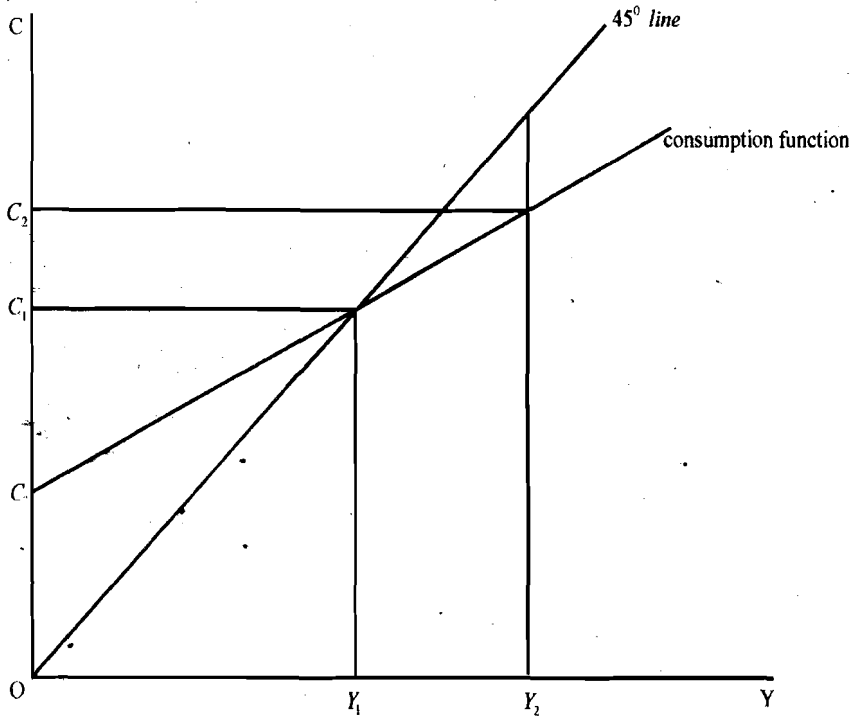


Fig. 1.4 (a): Consumption Function

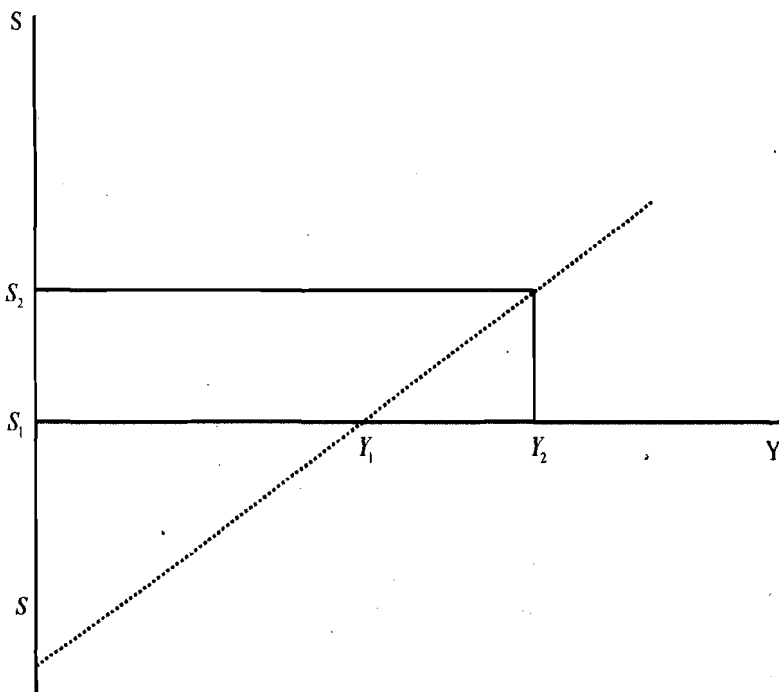


Fig. 1.4 (b): Saving Function

1.4.3 Saving Function

As we noted earlier, income is the sum of consumption and saving. Thus in the simplified model that we discussed above, that part of income which is not consumed is saved. In Fig. 1.3 (panel-b) we have presented the saving function. Notice that when income is Y_1 ,

there is no saving, as consumption is equal to income. When income is less than Y_1 , there is dis-saving, that is, the household is expected to borrow or draw upon past saving in order to finance its current consumption expenditure. On the other hand, when income is more than Y_1 , a part of income is channelised towards saving. Accordingly, in Fig. 1.3 (b) saving function intersects x-axis when income is Y_1 . Since the consumption function is a straight line, the saving function also is an upward sloping straight line with slope s , which is called the marginal propensity to save (MPS). The intercept term is negative since saving is negative when income is zero. Moreover, MPS is positive and remain between zero and one. In equation form the saving function is given by

$$S_t = \bar{S} + sY_t \quad \dots(1.3)$$

where $\bar{S} < 0$ and $0 < s < 1$.

Remember that MPC and MPS add up to unity, that is, $c + s = 1$.

1.4.4 Determinants of Consumption and Saving

A crucial issue before a household is to decide on how much to allocate towards current consumption out of its current income. Apart from the level of income another factor influencing the level of saving is the rate of interest, that is, higher the interest rate higher is the saving.

We know that when we save money (in the form of bank deposits or in bonds) we receive interest. Thus when we look beyond the current period we expect a flow of income over different time periods. Thus expected future income plays an important role in our decision on consumption and saving in the current period as well as in future time periods. Based upon the simple framework discussed above there are quite a few inter-temporal consumption models, which we will discuss in Block 4.

A second issue is the determination of aggregate consumption and saving for the economy as a whole. What we have explained above is the behaviour of households. It is true that all households have different income levels and MPC, which pose certain complexities. It is usually seen that young adults have a low MPC largely due to lesser responsibilities compared to old people. Economic models that stress the presence of old and young households are referred to as 'overlapping generations model'.

You may have observed that saving rate varies across economies and over time. In India, for example, saving rate was around 10 per cent of GDP during 1950s while it is around 25 percent of GDP at present. There has been a three-fold increase in per capita income during 1950-51 and 2004-2005. However, higher per capita income does not translate into higher saving rate always. We observe that among developed economies saving rate is not uniform. For example, saving rate is much higher in Japan (about 30 per cent) compared to the United States (about 14 percent). Thus there may be certain other factors apart from income, which influence consumption and saving decision. However, in cross-country analysis we see that there is a positive and strong correlation between saving rate and per capita income. Thus we can say that the consumption function at aggregate level would also depict the same features as the household consumption function.

Here we first established a relationship between consumption and saving of individual households and based upon that attempted to explain the behaviour of aggregate consumption and aggregate saving. In other words, we projected the behaviour of macro

variables on the basis of micro variables. This sort of research strategy is called 'micro-foundation' of macroeconomic analysis.

We assumed above in the consumption (and saving) function that consumption depends upon the level of income. However, there are certain other determinants of consumption. The re-distribution of income in favour of low-income households will result in an increase in MPC while the opposite will happen if there is growing inequality in the economy. Second, the availability of credit with ease also increases consumption. Third, expectations regarding price and income changes also affect consumption expenditure by households. If people expect prices to decline in coming days they postpone purchases which results in a downward shift in aggregate demand curve, and decline in equilibrium output. Fourth, as pointed out by Fisher individuals face a 'money illusion' if prices and income change in the same proportion — the real income of people does not change but they may not perceive the price rise and increase consumption as income increases. Fifth, when prices fall, there is an increase in real value of fixed income yielding assets (such as bonds), which may increase consumption.

1.5 FIXED PRICE KEYNESIAN MODEL

The classical economists suggested that there should be free trade in the economy based on market mechanism and little intervention by the government, as it would be ineffective. Keynes, however, advocated intervention by the government in macroeconomic variables in order to correct the disequilibrium in the economy.

For equilibrium to be realised there should be equality between aggregate demand and aggregate supply. As we have seen earlier, aggregate supply is the total output produced in the economy while aggregate demand is the sum of consumption, investment and government expenditure. Keynesian model assumes that there is price rigidity so that adjustment takes place through changes in output level.

In Fig. 1.4 we depict the adjustment process in the economy when price is fixed. On the x-axis we measure aggregate supply (level of output) while aggregate demand ($C+I+G$) is measured on the y-axis. In Fig. 1.4 we have drawn a 45° line on which $AS = AD$. We assume that investment (I) and government expenditure (G) are exogenous variables in the sense that their levels do not depend upon the level of output or income. Thus the aggregate demand function will be a parallel shift in the consumption function, the difference between the two indicating the sum of investment and government expenditure ($I+G$).

In Fig. 1.4 we observe that equilibrium level of output is Y_1 as the line indicating ($C+I+G$) crosses the 45° line at this level of output. We know that the slope of the consumption function is equal to MPC. Suppose there is a decrease in the MPC from c to c' (implies an increase in the propensity to save). It implies that for one Rupee increase in income, a lower amount will be spent on consumption and more will be devoted to saving. In Fig. 1.4 such a decline in MPC will result in a downward rotation of the consumption function from C to C' (see the dotted line). Accordingly, ($C'+I+G$) will also rotate downward and the new equilibrium output level will be Y_2 . Notice that an increase in the propensity to save is resulting in a decline in output.

We observe that aggregate demand changes if there is change in C , I or G . Therefore, increase in business investment or government expenditure will increase aggregate demand, and thus equilibrium output will increase. Similarly, a decline in investment or government expenditure will dampen aggregate demand and result in a decline in equilibrium output.

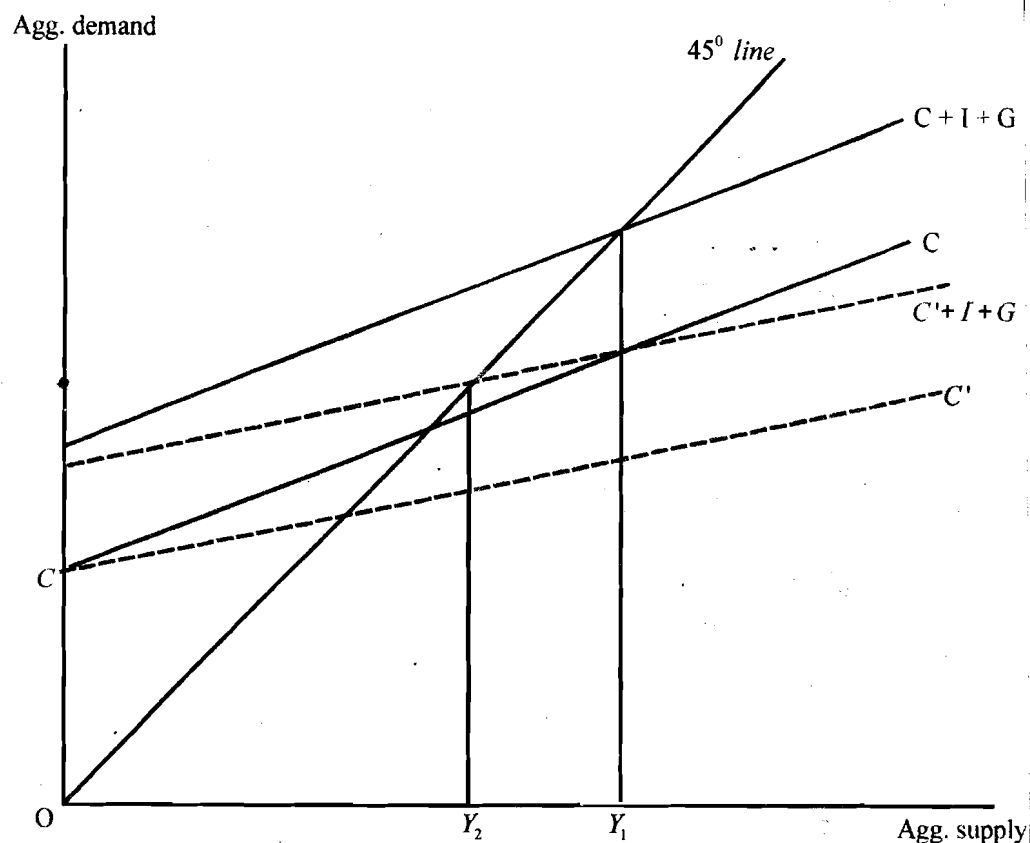


Fig. 1.5: Fixed-Price Keynesian Model

1.6 INVESTMENT MULTIPLIER

We pointed out above in Sub-section 1.2.1 that aggregate demand is seen in the context of aggregate spending in the economy. Due to the circular flow of income when one economic agent spends certain amount (say one Rupee), it causes an increase in the income of another economic agent by the same amount (by one Rupee). Based on this simple logic Kahn developed the theory of multiplier, often known as 'investment multiplier.'

Let us explain the multiplier effect through a hypothetical example. Suppose the government issues a bond of Rs. 100 in the market so that government expenditure can be increased by Rs. 100. As a result, a sequence of events will take place.

- 1) The additional expenditure by the government will increase the income of households by Rs. 100. Out of this increased income the household consumes an amount equal to $100 \times c$ and saves the residual (if $MPC = 0.65$, then the household will spend Rs. 65 and save Rs. 35).
- 2) Suppose the household getting the income of Rs. 100, spends Rs. 65 on purchase of bread. Consequently, the income of the bread-seller will increase by Rs. 65.
- 3) When the income of the bread-seller increases by Rs. 65, she will save Rs. 22.75 and spend Rs. 42.25 (since $MPC = 0.65$).
- 4) The spending of Rs. 42.25 by the bread-seller will increase the income of another person by Rs. 42.25. The sequence will continue further with the amount spent or earned shrinking further in subsequent rounds.

Recall that the initial spending by the government is Rs. 100. But it has a ripple effect in the economy, generating income of Rs. $100 + Rs. 65 + Rs. 42.25 + \dots$. Thus, the increase in aggregate demand due to a spending of Rs. 100 by the government would be much more than Rs. 100.

How much the whole sequence would add up to? If c is the marginal propensity to consume then the series adds up to

$$100 + c \times 100 + c^2 \times 100 + c^3 \times 100 + \dots = 100 \times \frac{1}{1-c} \quad \dots(1.4)$$

In (1.4) above the term $\frac{1}{1-c}$ is called the 'investment multiplier' since aggregate demand increases by a multiple of $\frac{1}{1-c}$ for an initial spending by the government. In our example above when government expenditure increased by Rs. 100 and $MPC = 0.65$, the increase in aggregate demand would be $\text{Rs. } 100 \times \frac{1}{1-0.65} = \text{Rs. } 285.71$.

We draw a few inferences from the above.

- 1) Government spending has the beneficial effect of boosting up aggregate demand by a higher amount than the initial spending.
- 2) An increase in MPC will result in an increase in the value of the multiplier. Conversely, decrease in MPS would result in a higher multiplier value.
- 3) We assumed that government spending is financed by borrowing from the market.

If it is tax financed then the multiplier will be 1, not $\frac{1}{1-c}$ since increase in tax will have the multiplier effect in the opposite direction. Consequently aggregate demand will increase an amount equal to the initial spending by the government. It is called 'balanced budget multiplier' and is equal to 1.

- 4) It is assumed that households spend according to their MPC and do not hoard the money.

Keynes projected the Great Depression as a consequence of demand deficiency. There was decline in income because of increase in unemployment. Decline in income gave rise to decrease in consumption demand. Inadequate demand resulted in excess supply in the market and inventories got piled up, which discouraged further production. With curtailment in production there was further unemployment and further decline in income. Secondly, people expected prices to decline further so that they postponed their purchases which reduced aggregate demand further. There was an overall gloomy period of falling output, income and prices, and rising unemployment. Keynes suggested that the government should increase its spending so that people get employment, which will generate income and demand.

In the above analysis we observe that government expenditure is an exogenous variable so that its level can be increased. There can be similar multiplier effects if the export of the country goes up. Also, if firms could increase their investment, a multiplier effect will take place.

Check Your Progress 2

- 1) Explain the important features of consumption function.

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- 2) In the Keynesian model, what is aggregate demand? How does a change in aggregate demand affect output?

- 3) With an example explain the concept of investment multiplier.

1.7 LET US SUM UP

In this unit we discussed some basic concepts such as aggregate demand, aggregate supply and circular flow of income. We also provided a brief idea on different schools of macroeconomic thought.

The classical economists assumed flexibility in price and wage so that the possibility of unemployment in the economy was ruled out. The economy adjusted to demand shocks through changes in price level so that economic fluctuations were not there. There was no need for government intervention in the classical model as supply was inelastic at full employment level. However, the Great Depression demolished the classical beliefs, as there was widespread unemployment associated with declining prices and output.

Keynesian economics suggested that deficiency in aggregate demand could trigger a recession and the remedy is to increase aggregate demand. Keynes advocated increased government spending so that aggregate demand would increase simultaneously giving income and employment to people. We discussed consumption and saving functions and investment multiplier, which are important concepts in Keynesian economics.

1.8 KEY WORDS

Average Propensity to Consume The ratio of consumption to income ($\frac{C}{Y}$).

The theoretical separation of real and nominal variables in the economy. It assumes that money is neutral and does not influence output and employment levels.

Classical Model

A model of the economy derived from ideas of the pre-Keynesian economists. It is based on the assumption that prices and wages adjust to clear markets and that monetary policy does not influence real variables such as output and employment.

Keynesian Model

A model based on the ideas contained in Keynes' General Theory. It assumes that demand creates its own supply so long as unemployment exists and that prices and wages do not adjust instantaneously to clear markets.

Marginal Propensity to Consume

The increase in consumption resulting from a one-Rupee increase in income. It is given by

$$\frac{\Delta C}{\Delta Y}$$

Menu Costs

When a firm wants to change prices of products, certain additional costs are to be incurred. For example, restaurants reprint their menu cards, shops print their price catalogues and taxis adjust their meters. These costs may be small but they take time and deter firms from changing prices frequently.

Multiplier

The increase in output due to a unit increase in certain exogenous variable (such as investment, government spending and net exports).

Model

A simplified representation of reality to show the interaction among variables. It is presented through diagrams or equations.

New Classical Economics

The school of thought projecting the view that economic fluctuation can be explained while maintaining classical assumptions.

New Keynesian Economics

The school of thought which says that economic fluctuation can be explained only by admitting sticky prices and wage rate.

Open economy

An economy that allows free trade with other economies. It is different from 'closed economy' where foreign trade is not allowed. In real world no economy is a closed one.

1.9 SOME USEFUL BOOKS

Mankiw, N. G., 2000, *Macroeconomics*, Fourth Edition, Macmillan, New Delhi.

Samuelson, P. A. and W. D. Nordhaus, 2005, *Economics*, Eighteenth Edition, Tata McGraw Hill, Delhi.

1.10 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) See Sub-section 1.2.6 and find out the flows of goods, inputs and money between households and firms through various markets. Draw a diagram similar to Fig. 1.2 and explain the flows.
- 2) The difference between classical and Keynesian models can be explained in terms of i) the relative importance of supply and demand, ii) flexibility in price and wage levels, and iii) the time period under consideration (short-run or long-run). Elaborate these points.

Check Your Progress 2

- 1) Explain the behaviour of APC and MPC. Show the consumption function in terms of a diagram. Go through Sub-section 1.4.2.
- 2) Explain the components of aggregate demand, viz., C, I and G. Draw a diagram similar to Fig. 1.4. Explain the change in aggregate demand and its impact on output.
- 3) Go through Section 1.6. Take numerical value for MPC and level of investment. Explain the process of increase in income at various rounds.

UNIT 2 NEOCLASSICAL SYNTHESIS

Structure

- 2.0 Objectives
- 2.1 Introduction
- 2.2 Investment Function
- 2.3 Demands for and Supply of Money
- 2.4 Equilibrium in Real Sector – IS Curve
- 2.5 Equilibrium in Monetary Sector - LM Curve
- 2.6 Synthesis of Real and Monetary Sectors
- 2.7 Let Us Sum Up
- 2.8 Key Words
- 2.9 Some Useful Books
- 2.10 Answers/Hints to Check Your Progress Exercises

2.0 OBJECTIVES

After going through this unit you should be in a position to

- explain the equilibrium in real and money markets in an economy;
- explain the underlying ideas behind IS curve;
- explain the underlying ideas behind LM curve;
- explain the interaction of IS and LM curve; and
- apprise the effectiveness of monetary and fiscal policies in an economy.

2.1 INTRODUCTION

In the previous Unit we discussed the classical and Keynesian views on the determination of output and prices in an economy. According to the classical economists supply creates its own demand and full employment prevails through adjustments in prices and wage rate. The Keynesian view, however, assumes that price level and wage rate are sticky in an economy due to various factors such as labour contracts and labour laws so that adjustment to demand shocks takes place not through adjustments in prices and wage rate but through changes in output and employment levels. In fact, Keynesian economics presents a view opposite to the classical economists that demand creates its own supply so long as unemployment exists in the economy.

The classical economists assumed a dichotomy between the real and monetary sectors of an economy. According to them an increase in money supply (M_s) in an economy with output and employment levels unchanged, will translate into a proportionate increase in prices. Therefore, through increase in price level and wage rate the adjustment process will begin and full employment will be maintained.

The difference in views between classical and Keynesian economists is due primarily to the time horizon considered. In the Keynesian view in the long run price level and

wage rate will adjust to equilibrium levels. But in the short run due to price and wage rigidities full employment equilibrium will not be realised. The neoclassical economists, particularly Sir John Hicks, have attempted to combine the ideas contained in both the schools of thought and to bring a synthesis between the real sector and the monetary sector of the economy.

We should remember that the classical economists did not bother about the quantity of money supplied, as it did not affect output and employment according to them. The Keynesian economists, however, projected an active role for money supply as it can influence the levels of output and employment.

In continuation of the basic ideas presented in the previous Unit we discuss the behaviour of investment function below.

2.2 INVESTMENT FUNCTION

The classical economists did not pay much attention to the increase in capital stock due to investment taking place in an economy. We know that investment results in an increase in the level of capital input. In the production process the inputs are transformed to output with the help of technology. It is an important feature of capital input that it is durable in nature, that is, it does not get exhausted in a single use. However, certain depreciation (that is, wear and tear) to capital stock is involved when production takes place.

The level of capital stock increases when net investment (gross investment *minus* depreciation) is incurred. We will look into the growth of capital stock and consequent rise in output in Block 2.

Investment takes place in an economy because it provides certain returns to the investor and there is a profit motive involved. The return to investment can be measured by the marginal product of capital (MPK), which is defined as the increase in output when capital stock increases by a single unit. Simultaneously, business firms or households have to borrow by paying certain rate of interest in order to undertake investment. Even in cases when a household or business firm do not require borrowing, the implicit cost of the investment is the interest foregone. For example, if I construct a new house (that is, I undertake some investment), I have the option of taking a loan from a bank on the condition that I repay the principal along with interest. Similarly, business firms undertake investments to produce goods and services. In doing so they take into account two factors: i) the return from investment which is determined by MPK, and ii) prevailing rate of interest. If return to investment is higher than interest rate they undertake the investment project, otherwise it is not profitable to them. The equilibrium level of investment will be achieved when the rate of interest is equal to the rate of return from investment.

It is a common feature of the aggregate production function that as we increase the level of capital input the marginal productivity of capital decreases. Thus as investment increases the return to investment decreases. Increased level of investment, therefore, can be undertaken only when the rate of interest is relatively lower.

In Fig. 2.1 we present the investment function as a downward sloping straight line. We measure the level of investment (I) on x-axis and the rate of interest on y-axis. When the rate of interest is r_1 the level of investment is I_1 . In case the rate of interest declines to r_2 the level of investment increases to I_2 .

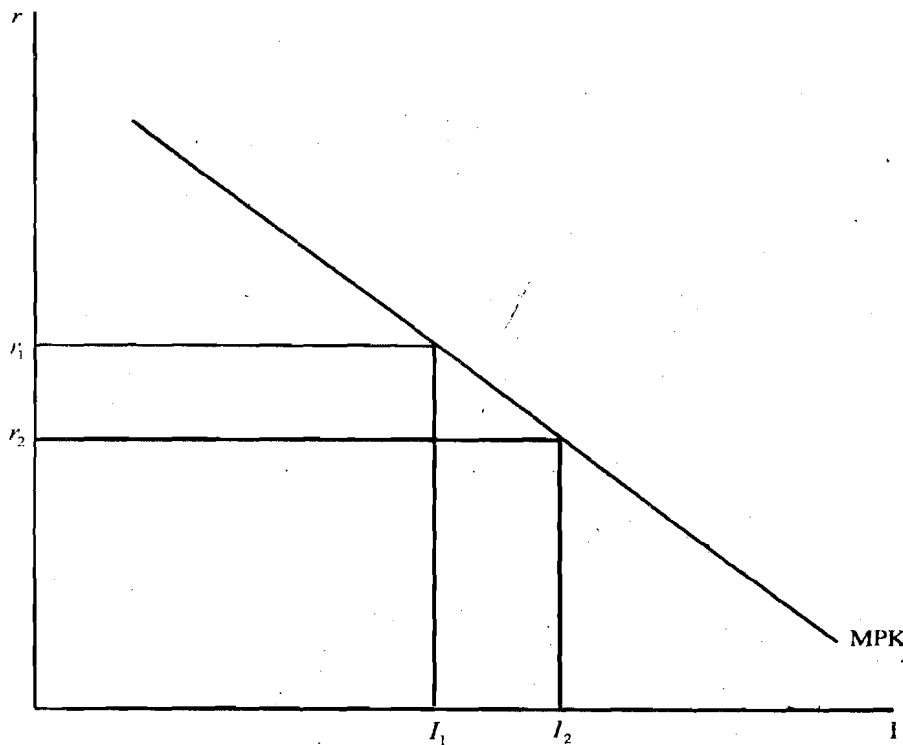


Fig. 2.1: Investment Function

Apart from the prevailing rate of interest (r) the decision to invest depends to a great extent on expectations about future movements in prices, resources availability, government policy, competition from rival firms and product, etc. Since investment involves creation of capital stocks which remains in use for a longer period of time, the element of uncertainty plays a vital role in investment decisions.

Economists have found it quite difficult to explain the pattern of investment spending. There are several econometric models to explain investment behaviour and none of the models have been proved to be superior over others.

The *accelerator model* of investment states that rate of investment depends upon changes in aggregate output. It states that desired level of capital stock in the economy is a constant fraction of output level, that is, $k = h Q$. Thus, as output level changes capital stock also changes. In periods of increasing economic activity, when growth rate in GDP is higher, there is a sense of security in the minds of entrepreneurs and they undertake investments. On the other hand, in periods of recession, there is not much increase in investment. Thus investment not only influences output (recall multiplier model), it is influenced by the changes in output.

The *adjustment cost model* states that a firm undertakes feasibility studies, machines analysis and financial arrangements before implementing an investment decision. Secondly there is a cost involved in installation of new machinery, training of workers to operate the new technology and disruption of production chain. These costs are called adjustment costs and rise if the change is done in a short period of time. Thus firms make gradual changes in their capital stock even though the requirement is much higher. According to adjustment cost models of investment, there is always a gap between desired level of capital stock and actual level of capital stock.

2.3 DEMAND FOR AND SUPPLY OF MONEY

Money serves three important functions in an economy, viz., medium of exchange, unit of account, and store of value. In an economy without money it would be extremely difficult to exchange goods and services through 'barter' as was the case before 'paper money' was invented. Modern money has significantly eased the mode of exchange — we can go to the market and buy or sell goods and services in exchange for money. Secondly, money serves as a unit of account in the sense that the value of goods and services are measured in terms of money. Thirdly, paper money although does not have any intrinsic value it is stored because it commands certain purchasing power in the market.

Demand for money (M_D) arises as it performs the above-mentioned functions — all of us want to have more money. The classical economists put more importance on the medium of exchange function of money and suggested that people demand for money, as it is required to carry out transactions in the market. We receive our income on a monthly or weekly basis (it can be highly irregular also) while we make purchases in a routine manner. Thus there is no synchronisation between the time we receive our income and we carry out monetary transactions¹.

Keynes recognised that there are three types of demand for money, viz., transaction demand, precautionary demand and speculative demand. People store money as a precaution in order to meet exigencies in day-to-day life, which is different from transaction demand. Precautionary demand for money depends upon the perception of the person concerned with respect to periodicity of income, stability in income flow and uncertainty in future income stream. Let us denote the sum of transaction demand and precautionary demand for money as M_D^T . We assume that M_D^T is a constant proportion of total income.

The third type of demand for money, according to Keynes, is the speculative demand (M_D^A), which is used largely for purchase of financial assets. These assets could be interest-yielding bonds or dividend-yielding shares (of a firm). The speculative demand for money depends upon the portfolio of assets that we need to maintain. If we hold money in the form of cash the return to money is zero. Moreover, if there is inflation in the economy then there is a decline in purchasing power. However, if we put it in stocks (that is, shares) there is considerable risk involved as stock prices vary and we lose part of our money when stock prices decline. We can keep money in some fixed deposit or fixed income-yielding asset, but in that case we have to compromise with liquidity in the sense that it may not be possible to get back cash immediately.

According to classical economists, when there is excess of loanable funds (that is, saving available for investment) in the market compared to demand for it (that is, investment requirement) then there is a decline in the rate of interest. The increase in money supply by the central bank (for example, Reserve Bank of India) increases loanable fund in the economy. If there is no corresponding increase in demand for money, equilibrium in money market can be achieved only through a decline in the rate of interest. In fact, the classical economists assumed flexibility in interest rate for realisation of equilibrium in money market.

¹ The demand for money according to classical economists was determined by the 'quantity theory of money', according to which $MV = PY$, where M is money supply, V is velocity of money, P is price level and Y is output level. When V and Y are given, P is proportional to M . Thus when money supply increases there is a proportional increase in price level.

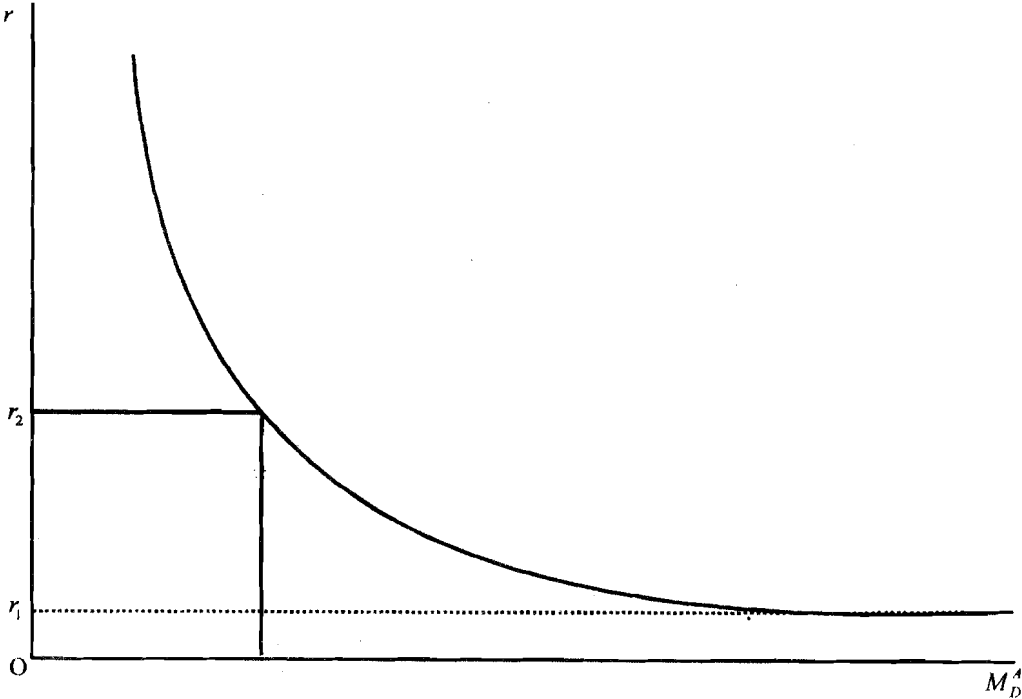


Fig. 2.2: Liquidity Trap

The precautionary and transaction demand for money may be a fixed proportion of income and dependant upon certain psychological factors apart from basic requirement.

The speculative demand for money (M_D^s), on the other hand, depends upon rate of interest. When rate of interest is high, people keep a relatively lower amount in the form of cash, as they would be losing out interest otherwise. On the other hand, when the rate of interest is low people prefer to keep a relatively higher amount of cash with them. Thus speculative demand for money is an inverse function of interest rate (see Fig. 2.2). According to Keynes when rate of interest is sufficiently low (say r_1 in Fig. 2.2) people prefer to keep their income in the form of cash with themselves instead of financial assets. The loss due to interest that their income could have earned is minimal when interest rate is very low.

In terms of Fig. 2.2 the curve representing speculative demand for money becomes infinitely elastic (horizontal) when rate of interest is low. This segment is called 'liquidity trap' because people prefer liquidity to keeping their money in financial assets.

Recall from Unit 1 that income serves two purposes: it is either consumed or saved. Therefore, it is implicitly assumed that whatever is not saved is consumed. Thus a higher saving means reduced consumption. Unless the higher saving translates into higher investment there would be a decline in aggregate demand and consequently a fall in output level. When Keynes talks of liquidity trap he means that there is an increase in saving but there is no corresponding increase in investment. Thus government policy of injecting money into the system or increasing income of people does not have any impact, as it is diverted towards saving without increase in consumption.

You may be wondering whether such situations take place in reality. During late 1990s Japanese economy went through severe recession with decline in output, prices and interest rate. For quite some time in the year 2003 the rate of interest was 0.03 per cent per annum. In such situations monetary policy becomes ineffective.

The supply of money constitutes the currency in circulation and deposits in banks. Money is usually supplied by the central bank of a country and there are various measures of money supply depending upon its liquidity. In India for example we

have money supply measures such as M1, M2 and M3 which are distinct from each other.

Check Your Progress 1

- 1) What are the types of demand for money? What are the factors on which the demand for money is dependent upon?

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- 2) Explain the concept of 'liquidity trap'? Why does monetary policy become ineffective if the economy is on passing through a phase of liquidity trap?

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2.4 EQUILIBRIUM IN REAL SECTOR – IS CURVE

In Fig. 1.4 in Unit 1 we have shown the equilibrium output at a level when aggregate demand equals aggregate supply. In a simple model aggregate demand (AD) comprises $C+I$, here we club government expenditure investment for simpler exposition, while aggregate supply (AS) comprises C and S . Thus at the equilibrium level of output $I = S$. In Fig. 1.4 we assume the level of investment to be fixed so that it is depicted as a horizontal straight line. In Fig. 2.3 we present the interaction of saving (S) and investment (I) functions. When investment is I_1 and saving function is represented by S , then equilibrium output is Y_1 .

We notice a basic difference between ex Fig. 2.1 and Fig. 2.3. In Fig. 2.1 investment depends upon the rate of interest (r) such that more is invested when a lower interest rate prevails in the economy. In Fig. 2.3 investment is shown to be a function of Y . Both the saving and investment functions can be integrated so that we obtain equilibrium levels of r and Y . The IS curve based on neoclassical ideas shows the equilibrium in the real sector of the economy (see Fig. 2.4)

Saving, investment

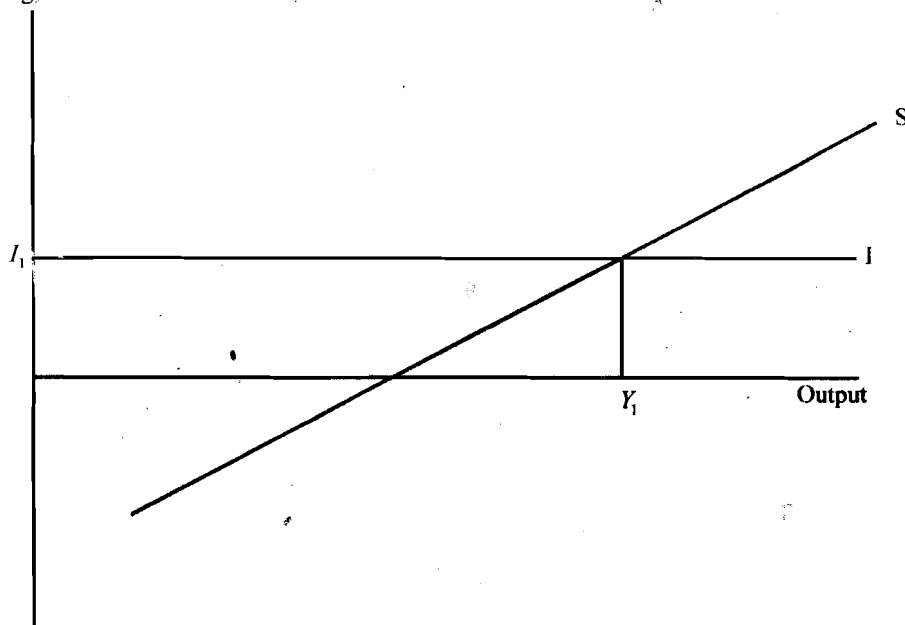


Fig. 2.3: Equilibrium Output Level

In order to explain Fig. 2.4 let us begin with the second quadrant (north-west corner of the diagram). This represents the investment curve presented in Fig. 2.1. The only change here is that we measure investment on x-axis in the opposite direction. The farther a point to the left from the origin, higher is the level of investment. In the third quadrant (that is, south-west corner) we measure I on x-axis and S on y-axis. We have drawn a 45° line so that $S = I$ (implies equilibrium level of output) along this line. In the fourth quadrant x-axis measures income (Y) and y-axis measures savings. Here we have drawn the saving function (Fig. 2.3 in inverted position) and it gives the level of saving for different levels of income (remember that x-axis measures income here). Thus once we know the required level of saving we know the level of income from the saving function. In the first quadrant (north-east corner) we have the IS curve, which we derive by using the information contained in other three quadrants. In the first quadrant we have the rate of interest on y-axis and income on x-axis.

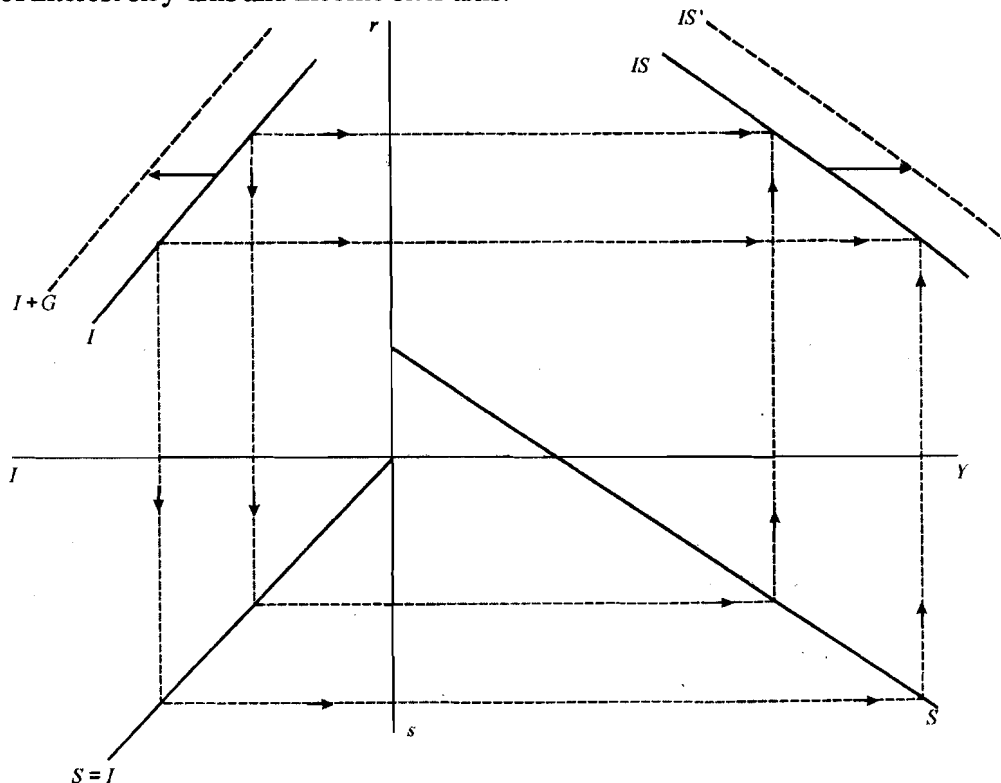


Fig. 2.4: IS Curve

Now let us explain how we obtained the IS curve. Let us assume that investment is given to us (see second quadrant). By looking into the third quadrant we find the equilibrium level of saving (since S should be equal to I at equilibrium). Next, if we look into the fourth quadrant, given the required level of saving, we obtain the equilibrium level of income by drawing a perpendicular line from the saving function to the x-axis. By combining different levels of investment and saving we derive the IS curve. Thus every point on the IS curve represents equilibrium levels of income and interest rate.

When there is change in the level of investment there is a whole sequence of changes – the required level of saving will change, the required level of income will change. An implication of the IS curve is that the goods market (real sector) can be at equilibrium in any combination of lower interest rate and higher income, or a higher interest rate and lower income.

2.5 EQUILIBRIUM IN MONETARY SECTOR – LM CURVE

The derivation of LM curve utilises the Keynesian view that speculative demand and transaction demand for money are separate. The LM curve is presented in Fig. 2.5.

In order to explain Fig. 2.5 we again begin with the second quadrant. Here we measure interest rate on y-axis and speculative demand for money on x-axis. It is a re-presentation of Fig. 2.2 with the difference that M_D^A is measured in the opposite direction. Thus further a point from the origin higher is the level of speculative demand for money. From the speculative demand function, given the prevailing rate of interest, we can find out the quantity of speculative demand. The third quadrant shows that equilibrium in the money market can be achieved when demand for money is equal to supply of money. Here we measure M_D^T on y-axis and M_D^A on x-axis. We know that total demand for money is

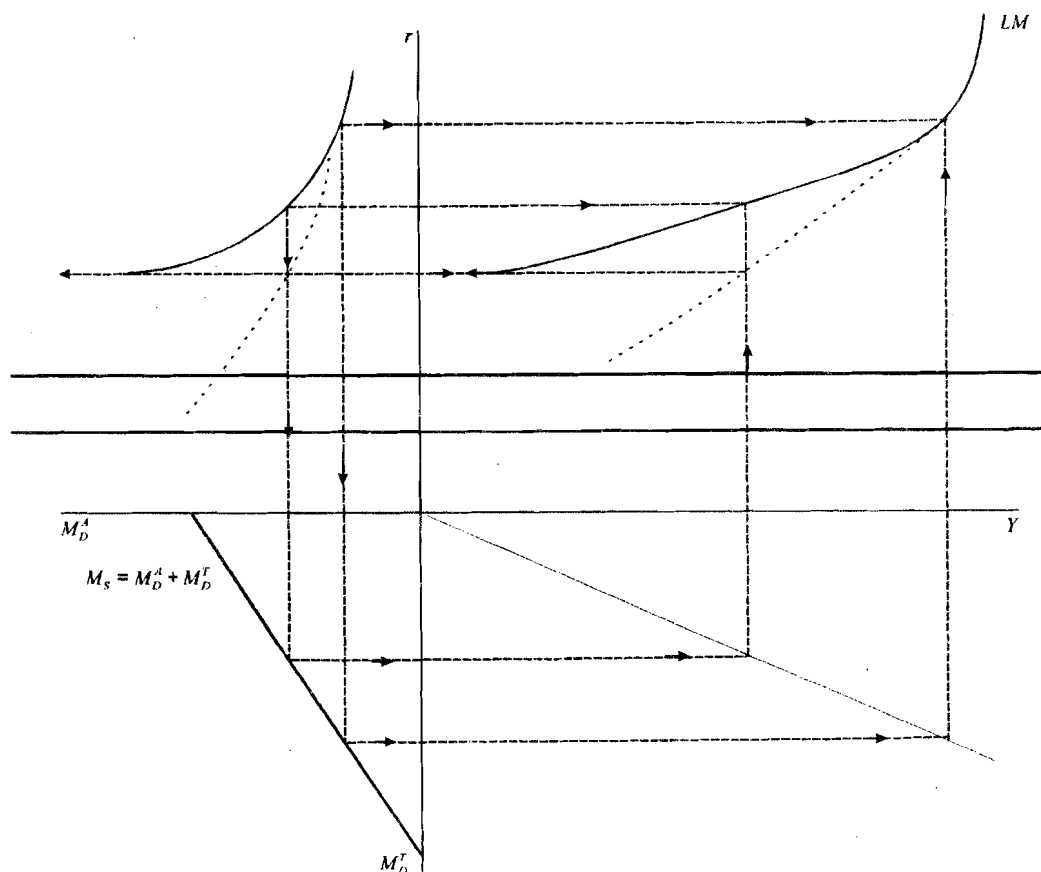


Fig. 2.5: LM Curve

given by $M_D^A + M_D^T$. For equilibrium in the money market to be realised (that is, $M_D = M_S$) we have drawn a straight line, which touches y-axis at M_D^T (since $M_D^A = 0$ at this point) and touches x-axis at M_D^A (since $M_D^T = 0$ at this point). If rate of interest is low more money is demanded for speculative purposes, which implies less money is left for transaction demand. Recall that transaction demand for money is a constant proportion of income. Thus higher level of M_D^T corresponds to higher level of Y. This behaviour is represented in a straight line in the fourth quadrant.

In the first quadrant the LM curve is given which is upward sloping. Along y-axis we measure the rate of interest while income is measured on the x-axis. Remember that each point on the LM curve represents equilibrium in the money market. An implication of the LM curve is that money market equilibrium combines lower r with lower Y and higher r with higher Y.

2.6 SYNTHESIS OF REAL AND MONETARY SECTORS

Now let us combine IS and LM curves as shown in Fig. 2.6. Such integration of IS-LM gives a unique combination of r and Y, which represents equilibrium in both real market and money market. In Fig. 2.6 we find that r_1 and Y_1 is such a combination for the IS and LM curves. Remember that we have maintained fixed prices in the model, which is simplistic but convenient. In this model it is not necessary that equilibrium income and interest rate guarantee full employment. In such a case the government needs to intervene.

There could be two policy instruments for intervention by the government: fiscal policy and monetary policy. Fiscal policy refers to taxation and expenditure measures by the government. When the government increases its expenditure there is an increase in investments, which results in an upward shift in the investment schedule. We have shown in Fig. 2.4 a shift in the investment schedule by a dotted line. Due to the shift in the investment schedule there is an outward shift in the IS curve also and equilibrium level of output increases. We have shown such a shift in the IS curve in Fig. 2.4 by a dotted line. Another measure under fiscal policy is the reduction of tax rates on income. Such a measure will change the nature of consumption function (also saving function) and leave people with more income. Such a measure will shift the IS curve upward. The opposite effect takes place when government expenditure is curtailed or tax rates are increased. Remember that changes in fiscal policy affects IS curve.

Monetary policy refers to changes in money supply in the economy by the central bank (for example, Reserve Bank of India). It will effect a shift in the LM curve. When there is an increase in money supply, an increase in real balances takes place, which decreases rate of interest. When rate of interest declines for each level of income there is a downward shift in the LM curve (dotted line in Fig. 2.6) accordingly there will be a change in equilibrium levels of r and Y (not shown in the figure).

Through appropriate changes in fiscal policy and monetary policy the government can intervene and steer the economy towards full employment equilibrium level.

We have mentioned earlier in Section 2.3 that monetary policy becomes ineffective when the economy is passing through a liquidity trap. In fact, the difference between the classical and Keynesian positions can be shown through the IS-LM model.

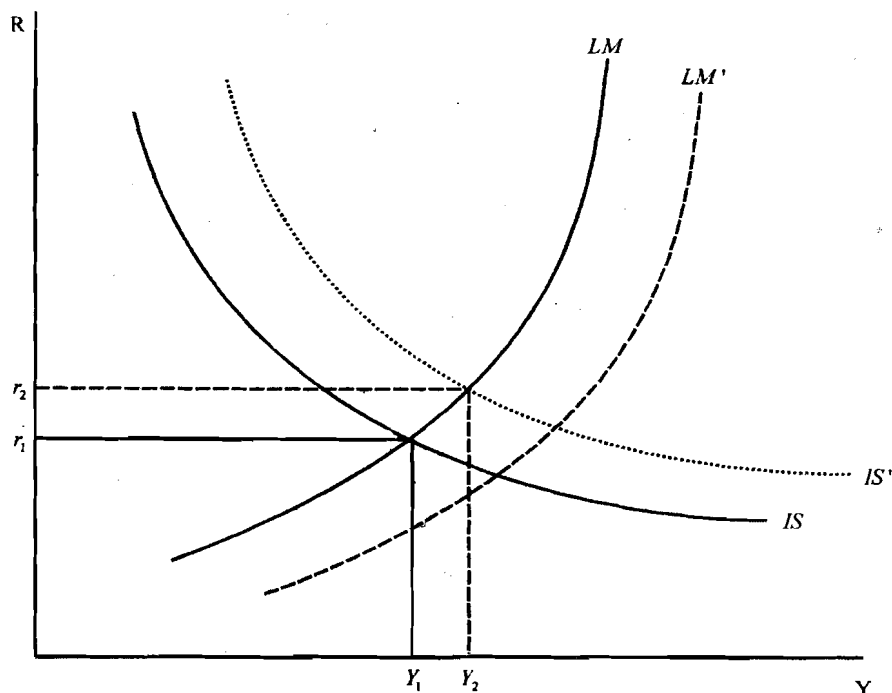


Fig. 2.6: IS-LM Model

In Fig. 2.7 we have shown the classical and Keynesian range in the LM curve. We have positioned the IS curve at different segments of the LM curve. Let us begin with the case when the economy is operating at income level Y_1 . At this point LM curve is infinitely elastic. If the government increase its expenditure by borrowing from the market there is no increase in interest rate as there is sufficient idle speculative balances in the economy. There is an increase in income level due to shift in IS curve from IS_1 to IS'_1 . This is the Keynesian range where the economy is operating in a phase involving liquidity trap. In such situations monetary policy becomes ineffective and the government should intervene through appropriate fiscal measures.

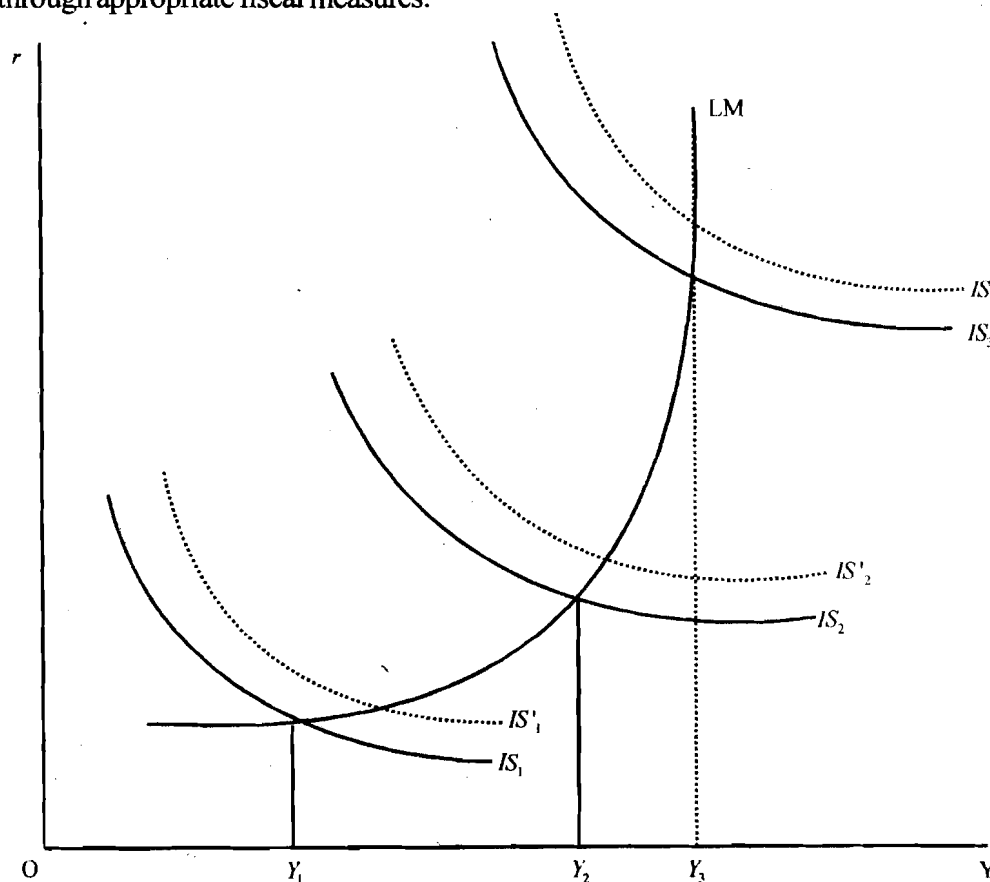


Fig. 2.7: Classical and Keynesian Range

Now let us look into the other extreme when the economy is operating at income level of Y_3 . At this level an increase in government expenditure results in a shift in the IS curve from IS_3 to IS'_3 . See that at this level the LM curve is perfectly inelastic, the rate of interest is already very high, and real balances in the economy is low. When government borrows from the market, it competes with private investment and there is an increase in interest rate-income level does not increase. This is the classical range.

In practice, however, the economy usually operates at a moderate level of income, Y_2 . At this level, the economy has not reached full employment equilibrium level. When the government borrows from the market it competes with private investment but it does not 'crowd out' private investment completely. As a result of increase in government expenditure the IS curve shifts from IS_2 to IS'_2 . There is an increase in the rate of interest as well as the income.

Check Your Progress 2

- 1) Explain the process of determination of equilibrium in the real sector of the economy.

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- 2) What does the LM curve signify? Why is it upward sloping? Explain through suitable diagram.

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- 3) Explain through IS-LM curve the ineffectiveness of monetary and fiscal policies.

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2.7 LET US SUM UP

There are three types of demand for money: transaction demand, precautionary demand and speculative demand. While transaction and precautionary demand are considered to be dependent upon level of income, speculative demand for money depends upon prevailing rate of interest. When rate of interest is too low, speculative demand is perfectly elastic and additional income in the hands of people in the form of idle cash balances without any increase in consumption expenditure. Such a situation is called liquidity trap and intervention through monetary policy becomes ineffective and government should resort to appropriate fiscal policy.

Through the IS-LM model we determine a unique combination of interest rate and income in the economy where both real sector and monetary sector are in equilibrium. However, such equilibrium may not be at full employment level. In order to bring in full employment the government should intervene by increasing its expenditure.

2.8 KEY WORDS

Liquidity Trap	A situation of very low rate of interest when people do not increase consumption expenditure and additional money income is saved.
Speculative Demand	That part of demand for money which depends upon rate of interest and used for investment in financial assets.
Inflation	A period of sustained rise in overall prices.
Production Function	The technical relationship between inputs and output.

2.9 SOME USEFUL BOOKS

Mankiw, N. G., 2000, *Macroeconomics*, Fourth Edition, Macmillan, New Delhi.

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2.10 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) Go through Section 2.3. Discuss transaction, precautionary and speculative demand for money.
- 2) See Section 2.3 and answer.

Check Your Progress 2

- 1) Discuss the method through which we obtain the IS curve. See Section 2.4.
- 2) LM curve signifies equilibrium in the money market. Explain Fig. 2.5.
- 3) Go through Section 2.6 and Explain Fig. 2.7.