Module 1

Unit-1

MACROECONOMIC ACCOUNTING - I

Unit Structure:

1.1 OBJECTIVES

a. To explore the knowledge of Macroeconomics and its one of the branches that is accounting
b. To understand the distinguish between concept of stock and flow
c. To know different types of equilibrium
d. To find variation in the concept of static and dynamic model

1.2 INTRODUCTION OF MACROECONOMIC ACCOUNTING

Meaning: Macroeconomics

Macroeconomics derive from Greek word Makros which means study of large unit. It is a branch of economics concerned with the performance, structure, behaviour, and decision-making of an economy as an aggregate. For **example**, using rates of interest, taxes and government expenditure to regulate an economy's progress and stability.

Macroeconomics considers to explain how and why the economy grows and fluctuate over time. The general increasing track of the economy is due to sluggish moving forces that is population increase, requirement of more factories, machines and better technology. Long run upward path is in oscillation form which is not smooth. Leading to series of trade cycle recurring in nature, with the phase in the path like recovery, prosperity, peak, recession, depression, trough and so on.

Macroeconomic accounting contains wholes and accounting characteristics, which is with Macroeconomic extents and how they relate to each other by definition. Macroeconomic accounting does not enlighten how each magnitude changes as a result of a change in other magnitudes.

Important function of national income accounting is to keep record of productive activity and income generating transactions in the economy. Macro accounting is the compilation of economic data for a nation. Also known as national accounting, the data form the basis for tracking and forecasting the nation's economic performance and development and is used to form government policy.

1.3 PRINCIPLES OF THE ACCOUNTS

1. The accounts should be related for economic study.
2. Current data considered while estimating the data of production, income, expenditure of things and amenities.
3. Output is valued at market price
4. Consistent with an individualistic view of welfare, consumer expenditure is counted as final demand, rather than as an input to the labour force.

1.4 STOCKS AND FLOW

Stock and flow are important concept influencing the accounting estimation of and business economic analysis.

Stocks and flows National accounting include data of the variables that describe the working of an economy.

1.4.1 Stock:

Stock is estimated at particular stated time and signifies a quantity prevailing at that point in time. Stock is well-defined as a variable that is restrained at a specific point of time. Stock does not have a time dimension involved with it. Stock is stationary in nature. Stock stimuluses the flow, as such greater volume of capital will lead to greater undertaking of services. Bank deposits, capital, wealth, population.

1.4.2 Flow:

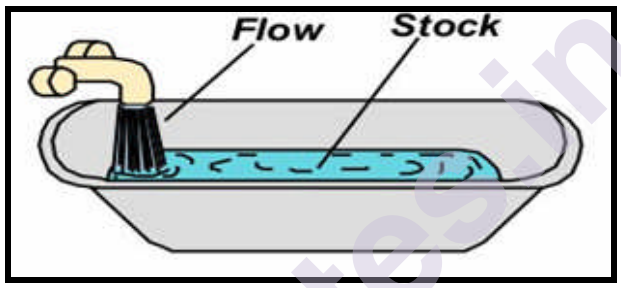
A flow of variable can be measured over an interval of time, which are defined for a particular time period. Transactions are always represented by flows over a period of time. The concept of Flow variable is well-defined as a variable which is measurable over a period of time. Examples of flow variables are: the cost of production in a nation throughout a specified year, the value of final consumption done by households in a country during a given month, the value of income earned by workers in a province during a given week, etc. Flow concept has a

time measurement attached with it. The Flow concept is dynamic in nature. Flow effects the stock, as in increased flow of money supply in an economy results in increase in the size of money. Capital formation, income, interest on capital, depreciation.

1.4.3 Stock and Flow accounting:

The Stock is the rate of an asset at a poise date whereas flow refers as the total charge of dealings of sale, purchase, revenue and expenditure during an accounting period. The number of businesses of a stock in that accounting dated can be measured by dividing the flow value of an economic activity by the average stock value during an accounting period. Profit or income is consider as flow concept whereas capital can be measured as both stock and flow.

Figure No. 1.1 Traditional Example of Stock and Flow



In figure 1.1 the bathtub shown, is the classical example used to illustrate stocks and flows. The quantity of water in the tub referred as stock: Which is given at a point in time. The amount of water coming out of the faucet is a flow: it is the quantity of water being added to the tub per unit of time. U.S investment was $2.5 trillion is flow concept and capital stock was $26 trillion is stock concept. The stock of water in the tub signifies the accumulation of the flow out of the faucet, and the flow of water represent the variation in the stock.

Examples of related stocks and flows:

- A individual's wealth is a stock; income and expenditure are flows
- The number of jobless people is a stock; the number of people losing their jobs is a flow.
- The volume of capital in the economy is referred as stock; the amount of investment is a flow.
- The government debt or borrowings is a stock; the government budget deficit is a flow.

Table 1.1 Stock and Flow Variables

Stock Variable	**Flow Variable**
Stock of Capital (K)	Gross National Product (GNP)
Supply of money (M)	Consumer Expenditure(C)
Business Inventories (BI)	Savings(S) and Investment(I)
Accumulated Savings	Export(X) and Import(M)
Labour Force	Change in Inventories
Total Employment	Government revenue(R) and Government Expenditure(G)

This table consist of variables of stock and flow under macroeconomics accounting.

1.4.4 Comparison of Stock and Flow

Stock and flow both are elastic in nature and the difference between them should be considered understand the development of the economic variables.

Generally, maximum economic variables that are studied are categorised either as stock or flow variable.

Both the stock and flow are reliant on each other. The concept of stock and flow is very crucial in Economics, as it helps to understand the development of economic variables.

1. Stock and flow have dissimilar unit so its problematic to add, subtract and compare. One can apply ratio, multiplication and subtraction for estimation.
2. The ratio of a stock over a flow has units of (units)/(units/time) = time.
3. Public Debt - GDP Ratio yields the interpretation of the debt to GDP ratio as "number of years to pay off all debt, assuming all GDP devoted to debt repayment" as an example.

   The ratio of a flow to a stock has units 1/time.

   Example: Velocity of Money = GDP ÷ Money Supply it has units of (dollars / year) / dollars = 1/year.
4. Stocks can only be changed via flows.
5. Mathematically a stock can be seen as an integration of flows over time – with outflows subtracting from the stock. e.g., the number of populations at a certain moment, or the quantity of water in a reservoir.

6. Flows classically are measured over a certain intermission of time – e.g., the number of births over a day or month.

1.5 EQUILIBRIUM AND DISEQUILIBRIUM

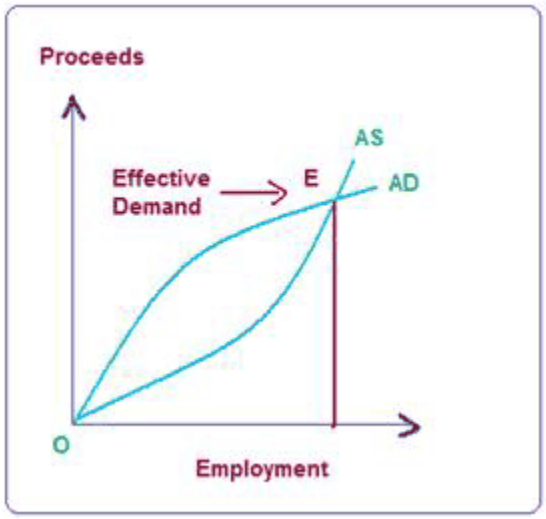
1.5.1 Equilibrium - In economic sense, equilibrium refers to a position in which contrary economic forces, e.g., demand and supply, are in balance and there is no natural tendency to depart from this position. Machlup defines equilibrium as a "constellation of interrelated variables so adjusted to one another that no inheritance tendency to change prevail in the model which they constitute." At macro level economy is said to be in equilibrium when aggregate demand is equal to aggregate supply and total investment equal total saving.

1.5.2 Disequilibrium – This is the state in which the opposite forces (e.g., demand and supply) are in imbalance. The factors causing disequilibrium arise out of the working process of economy. The working of a market economy is governed by such a large number of interrelated and interacting forces that a continuous balance between market forces – demand and supply can not be expected. Infact imbalance between economic forces are routine matter in a market economy. The reason is that economic activities are undertaken by millions of decision makers – consumers, producers, workers etc and their decision need not always coincide. The result could be disequilibrium.

1.5.3 Equilibrium and disequilibrium in Macroeconomics

It can be explained with the help of aggregate demand and aggregate supply variable of macroeconomics. Economy will be in equilibrium when AD = AS; which is leading to effective demand. At effective demand position the economy is at full employment that means the resources are optimally utilised.

Figure No. 1.2



AD = C+I+G+(X-M)
AS = N+L+k+T

In the above figure employment/income is on X – Axis and Proceeds on Y – axis. At point E in the figure – 2 Economy is at equilibrium level of employment. Any fluctuation from point E will lead to disequilibrium.

Example: 1. ADP > ASP when aggregate demand price is greater than aggregate supply price. There is scope of increasing employment because resources are idle unused so employment can be increased.

2. ADP < ASP when aggregate demand price is less than aggregate supply price it needs to reduce the employment to run the economy smoothly.

3. ADP =ASP thus the optimum level is when the aggregate demand price is equal to aggregate supply price.

1.5.4 Types of Equilibrium:

A. Partial Equilibrium

The state of economic equilibrium which is consider only portion of the market at equilibrium level.

1. Micro economics uses partial equilibrium analysis based on the assumption, other things remaining constant (Ceteris Paribus Condition).

Example: The Commodity price is certain and continuous for the consumers. Consumers' taste and preferences, habits, incomes are also considered to be constant. Prices of prolific resources of a commodity and that of other related goods (substitute or complementary) are known as well as constant.

Industry is easily availed with factors of production at a known and constant price compliant with the methods of production in use.

Prices of the products that the factor of production helps in producing and the price and quantity of related factors are known and constant.

There is perfect mobility of factors of production between occupation and places.

2. The micro analysis partial equilibrium analyses policy action of creating equilibrium for specific factor only.

3. Partial equilibrium studies the equilibrium of a consumer, a firm, an industry or a market.

B. General Equilibrium

It is on the basis of bottom-up approach. It explains equilibrium of demand, supply and price at aggregate level. It is basically broder concept. A general equilibrium beneficial as a basic guide as to how real economies function.

1. Macroeconomics uses general equilibrium.
2. It is not based on any` assumption.
3. It deals with the equilibrium position of the economy as a whole.
4. It deals with all the variables of the economic system simultaneously.
5. It is sophisticated.
6. There is interdependence between variables.
7. General Equilibrium is a bird's eye-view.

1.6 QUESTIONS

1. Explain the following:
a. Stock variable
b. Flow variable
c. Equilibrium
d. Disequilibrium
e. Macroeconomics
2. Is there any difference between stock and Flow variable, Justify?

1.7 REFERENCES

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Unit-2

MACROECONOMIC ACCOUNTING - II

Unit Structure:

2.1 OBJECTIVE

1. To understand the concept of Circular flow of income
2. To know two sector/close economy
3. To understand the functioning of three sector model
4. To know four sector/open economy
5. To understand the concept of real flow and money flow
6. To know the concept of leakages and injection
7. To understand the national income identities.

2.2 INTRODUCTION

During primitive period barter system was most popular for exchange of goods and services. But this system was not successful due to various difficulty faced by people for exchanging goods. Then the need of some invention felt and since then money is accepted as common measure of exchange. The modern economy is a monetary economy. In the modern economy, money is used in the process of exchange. Money acts as a medium of exchange. Money play various role in economy. In this chapter

we introduce the economy. An economy can be defined as an integral system of production, exchange and consumption.

The circular flow model describes, how money moves through society. Money flows from producers (Firm) toworkers (Household) as wages and flows back to producers as payment for products. This movement is recurring continuously between firm and household. Thus, this model is described as the circular flow of income model.

2.3 REAL INCOME AND MONEY INCOME –

1. Real Flow- The term real flow means the flow of factor services such as land, labour, capital and entrepreneur; from household to firms. Similarly, the flow of goods and services from firms to household. Real flow is also called as product flow or output flow. Real flow generate income for the nation thus it can correlated as real income of nation.
2. Real Income measures the volume of output. An increase in real output means that AD has risen faster than the rate of inflation and therefore the economy is experiencing positive growth. Real income is adjusted for inflation and measured at constant price. While estimating economic growth Real income/GDP is taken in to consideration.
3. Money Flow- The Money flow refers to the flow of factor payments such as – Rent ,wages, interest and Profit; from firm to household for factor services.

It involves two basic principles:

a. In an exchange process, the seller (producer) receives the same amount which the buyer (or consumer) spends.
b. Goods and services flow in one direction and the money payments to acquire them flow in the return direction giving rise to a circular flow.

The money flow is in opposite direction to real flow.

4. Nominal income measures income at current prices with no adjustment for the effects of inflation e.g. if my nominal income is £40,000 in 2012 and rises by 5% in the next year, then my nominal income will rise to £42,000

When we want to measure growth in the economy we have to adjust for the effects of inflation and consider data in real terms.

2.4 SIGNIFICANCE OF CIRCULAR FLOW OF INCOME

The concept of the circular flow shows functioning of the economy. We can know whether the economy is working effectively or

whether there is any disturbance in its smooth functioning. As such, the circular flow is of immense significance for studying the functioning of the economy and for helping the government in formulating policy measures.

1. Study of identifying the Problems of Disequilibrium:

It is with the help of circular flow that the problems of disequilibrium and the restoration of equilibrium can be studied. If any discrepancy in circular flow is their then policy framed accordingly to overcome from that disequilibrium.

2. Effects of Leakages and Inflows:

Circular flow of income is relevant in balancing in economic activity. The role of leakages enables us to study their effects on the national economy. For example, imports are a leakage out of the circular flow of income because they are payments made to a foreign country. To stop this leakage, government should adopt appropriate measures so as to increase exports and decrease imports, and will be effective in having equilibrium in balance of payment.

3. Linkage between Producers and Consumers:

The circular flow establishes a link between producers and consumers. It is through income that producers buy the services of the factors of production with which the latter, in turn, purchase goods from the producers.

4. Framework for Network of Markets:

As it is mention above point, the linking of producers and consumers through the circular flow of income and expenditure has created a network of markets for different goods and services where problems relating to their sale and purchase are automatically solved.

5. **Inflationary and Deflationary Tendencies:**

Leakages or injections in the circular flow disturb the smooth functioning of the economy. For example, saving is a leakage out of the expenditure stream. If saving increases, this depresses the circular flow of income. This tends to reduce employment, income and prices, thereby leading to a deflationary process in the economy. On the other hand, consumption tends to increase employment, income, output and prices that lead to inflationary tendencies.

6. **Basis of the Multiplier:**

Again, if leakages exceed injections in the circular flow, the total income becomes less than the total output. This leads to a collective decline in employment, income, output, and prices over time. On the other hand, if injections into the circular flow excel leakages, the income is increased in the economy. This leads to a cumulative rise in employment, income, output, and prices over a period of time. In fact, the basis of the

Keynesian multiplier is the collective movements in the circular flow of income.

7. **Importance of Monetary Policy:**

Circular flow is relevant for monetary policy making. With the help of circular flow monetary policy bring equality of saving and investment in economy. The equality between saving and investment comes about through the credit or capital market.

The credit market itself is controlled by the government through monetary policy. When saving exceeds investment or investment exceeds saving, money and credit policies help to stimulate investment spending. This is how a fall or rise in prices is also controlled.

8. **Significant to Fiscal Policy:**

The circular flow of income and expenditure play crucial role for maintaining stability through fiscal policy. For national income to be in equilibrium desired saving plus taxes (S+T) must equal desired investment plus government spending (I + G). S+ T represents leakages from the spending stream which must be balance by injections of I + G into the income stream. If S + T exceed I + G, government should adopt such fiscal measures as reduction in taxes and spending more itself. And inverse occur say; If I + G exceed S+T, the government should adjust its revenue and expenditure by encouraging saving and tax revenue.

9. **Importance of Trade Policies:**

Circular flow of income is significant not only to balancing close economy but also relevant for open economy as well. Imports are leakages in the circular flow of money because they are payments made to a foreign country. Which leads to deficit in balance of payment. To stop it, the government adopts such measures as to increase exports and decrease imports. Thus the circular flow indicates the need for adopting export promotion and import control policies.

10. **Basis of Flow of Funds Accounts:**

The circular flow helps in calculating national income on the basis of the flow of funds accounts. It is relevant in finding the GDP, GNP of economy. The flow of funds accounts are concerned with all transactions in the economy that are accomplished by money transfers.

They show the financial transactions among different sectors of the economy, and the link between saving and investment, and lending and borrowing by them.

To conclude, the circular flow of income possesses much theoretical and practical significance in an economy.

2.5 ILLUSTRATION CIRCULAR INCOME IN DIFFERENT SECTOR ECONOMY

In carrying out economic activity, people are engage in making transactions – they buy and sell goods and services.

Economic transactions include two kinds of flows:
1. Product or real flow that is the flow of goods and services, and
2. Money flow product and money flow in opposite direction in a circular fashion.

The product flow consists of
(a) Factor flow, i.e , Flow of factor services, and
(b) Goods flow, i.e, flow of goods and services.

In a monetised economy, the flow of factor services rewarded as money flow in the form of factor payments. Which is called as income flows.

The factor payments and expenditure on consumer goods and services take the form of expenditure flow. Expenditure flow is in the form of money flow.

Both income and expenditure flow in a circular form is in opposite direction. The entire economic system can therefore observe as Circular flows of income and expenditure. The extent of these flows, actually, determine the size of national Income. To present the flows of income and expenditure the economy is classified in to four sectors:

1. Household sector
2. Business Sector or the firms
3. Government sector
4. Foreign Sector

These four sectors are combined to make the models for the purpose of showing the circular flow of income.

A. Two - sector model including the household and business sectors

B. Two - sector model including the household and business sectors with saving as leakages and Investment as Injection close economy

C. Three - sector model including the household, business and government sectors

D. Three - sector model including the household, business and government sectors, with tax as leakage and government expenditure as injections close economy

E. Four - sector including the household, business and government foreign sectors.

F. Four - sector including the household, business and government foreign sectors. With import as leakage and export as injection, open economy

2.6 CIRCULAR FLOW OF INCOME - TWO SECTOR MODEL

The circular flow of income is explained by considering a simple model. The two-sector model includes only household and firm. It represents private close economy without government and foreign sector. This model is based on following assumptions.

1. There are two sectors(a) household and (b) firms
2. Households are owners of factors of production
3. Production takes place only in firms
4. There is no savings
5. There is no governmental intervention
6. There is no international trade

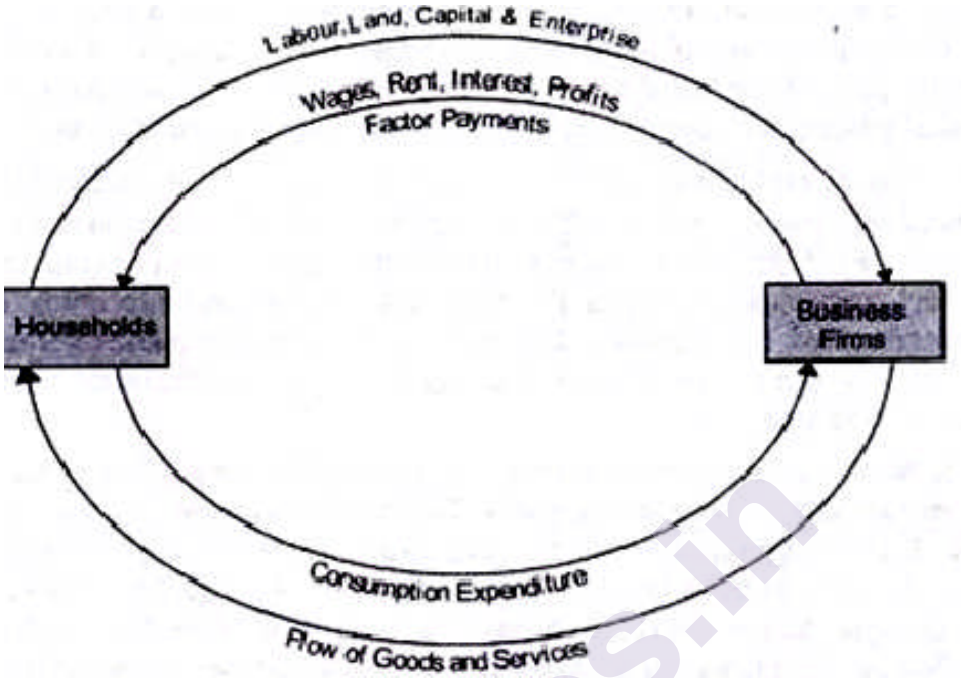
2.6.1 PARTICIPATION:

The primary participants in the circular flow of goods and services are firm and households. Households are made up of individuals who both spend money and are the recipients of money. Firms do the same—they spend money and also receive money from households. Real flows of resources, goods and services have been shown in Fig.2.1.In the upper half of this figure represents factor market, the resources such as land, capital and entrepreneurial ability flow from households to business firms as indicated by the arrow mark.

There are three different phases in circular flow of national income, viz. production, income and expenditure. They represent three related aspects, namely, production (i.e., generation of income), distribution (of income) and disposition (of income, i.e., expenditure).

In opposite direction to this, money flows from business firms to the households as factor payments such as wages, rent, interest and profits.

Figure No. 2.1
Circular Flow of Income in a Simple Two Sector Economy



In the lower part i.e. commodity market of the figure –, money flows from households to firms as consumption expenditure made by the households on the goods and services produced by the firms, while the flow of goods and services is in opposite direction from business firms to households.

Thus, we see that money flows from business firms to households as factor payments and then it flows from households to firms. Thus, there is, in fact, a circular flow of money or income. This circular flow of money will continue indefinitely week by week and year by year. This is how the economy functions. It may, however, be pointed out that this flow of money income will not always remain the same in volume.

In other words, the flow of money income will not always continue at a constant level. In year of depression, the circular flow of money income will contract, i.e., will become lesser in volume, and in years of prosperity it will expand, i.e., will become greater in volume.

This is so because the flow of money is a measure of national income and will, therefore, change with changes in the national income. In year of depression, when national income is low, the volume of the flow of money will be small and in years of prosperity when the level of national income is quite high, the flow of money will be large.

2.6.2Important Identities:

Y Ξ FP
FP Ξ w + r + I + p
W+r+i+p Ξ V Ξ M
V Ξ Y Ξ M

Where Y = household income, FP = factor payment, w = wages, r = rent, i = interest, p = profits, V = value of output, and M = money flow (at constant prices) Ξ = identities equal to sign.

In the final analysis, household income = factor payment = the money value of output.

That is Y Ξ FP Ξ V

The identity of circular flow of income is significant while estimating national income of economy.

2.7 CIRCULAR INCOME FLOW WITH SAVING AND INVESTMENT

It is assumed that income which is earned by household entire is spend for purchase of goods and services produced by firm. But let assume that which is reality as well that household save part of their earned income in the form of saving. We will now explain if households save a part of their income, how their savings will affect money flows in the economy.

When households save, their expenditure on goods and services will reduce to that extent and as a result money flow to the business firms will decrease. With reduced money receipts, firms will appointlessworkers or reduce the factor payments they make to the suppliers of factors such as workers.

Because of which it led to the fall in total incomes of the households. Thus, savings reduce the flow of money expenditure to the business firms and will cause a fall in economy's aggregate income. Thus, savings is considered as leakage from the money expenditure flow.

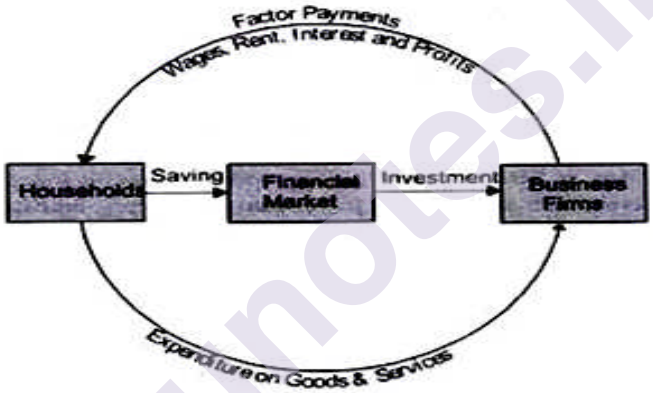
But savings by household can be restore by free market economies. There exists a set of institutions such as banks, insurance companies, financial houses, stock markets where households deposit their savings. All these institutions together are called financial institutions or financial market. We assume that all the savings of households come in the financial market. We further assume that there are no inter-households' borrowings.

Then business enterprise can borrow from these financial institution for further investment in capital goods such as machines, factories, tools and instruments, trucks. Firms spend on investment in order to expand their productive capacity in future.

Hence through investment expenditure by borrowing the savings of the households deposited in financial market, are again cumulated into the expenditure stream and as a result total flow of spending does not decrease.

Circular money flow with saving and investment is illustrated in Fig. 2.2 where in the middle part a box representing financial market is drawn. Money flow of savings is shown from the households towards the financial market. Then flow of investment expenditure is shown as borrowing by business firms from the financial market.

Figure No. 2.2
Circular Money Flow with Saving and Investment



Circular Money Flow with Saving and Investment

2.7.1 Condition for the Constancy of Circular Income Flow:

Saving a part of income means it is not spent on consumer goods and services. In other words, saving is withdrawal of some money from the income flow. On the other hand, investment means some money is spent on buying new capital goods to expand production capacity have in other words, investment is injection of some money in circular flow of income. For circular flow of money to be continuation without any disturbance it is necessary to have planned savings equal to planned investment if the constant money income flow in an economy is to be obtained.

Now, what will happen if planned investment expenditure falls short of the planned savings? As a result of fall in planned investment expenditure, income, output and employment will fall and therefore the flow of money will contract.

If the equality between planned savings and planned investment is disturbed by increase in savings, then the immediate effect will be that the stocks of goods unsold will increase, in the shops. Due to the deficiency of demand for goods and the collection of stocks, retailers will place small orders with the wholesalers. Consequently, lesser quantity of goods will be produced and therefore fewer capital goods like machinery will be indeed with the result that fixed investment will tend to fall.

Thus, the ultimate effect of either the fall in planned investment or the increase in planned savings is the same, namely, the fall in income, output, employment and prices with the result that the flow of money will contract.

On the other hand, if the equality between planned savings and planned investment is disturbed by the increase in investment demand, the result will be increase in income, output and employment. Consequently, the flow of money income will expand.

It is thus clear from the above analysis that the flow of money income will continue at a constant level only when the condition of equality between planned saving and investment is satisfied.

According to J.M. Keynes, since in a free-market capitalist economy, investment is made by business enterprises and savings are mostly done by households and for different reasons, there is no guarantee that planned investment will be equal to planned savings and thus fluctuations in income, output and employment are unavoidable.

As a result, circular flow of income does not continue at a steady level in a free-enterprise capitalist economy unless certain corrective and preventive steps are taken by the government to maintain stability in the economy.

2.7.2Saving-Investment Identity in National Income Accounts in a Two Sector Economy:

As we assume that people who save are household and investment is by business firms. In national income accounts savings are identical or always equal to investment in a simple two sector economy having no roles of Government and foreign trade.

In national income accounts we are concerned with actual saving and actual investment. It is these actual or realised saving and investment that are identical in national income accounts. We can prove their identity in the following way.

In a simple economy which has neither government, nor foreign trade, the value of output produced which we denote by Y is equal to the value of output sold. Since the value of output sold in a simple two sector

economy is equal to the sum of consumption expenditure and investment expenditure, we have

$$Y \equiv C + I \quad \text{(i)}$$

where Y = Value of aggregate output, C = Consumption expenditure and I = Investment expenditure $\equiv$ = identities equal to.

A pertinent question which arises here is what happens to the unsold output. The unsold output leads to the increase in the inventories of goods and in national income accounting increase in inventories of goods is treated as a part of actual investment. This may be considered as the firms selling the goods to themselves to add to their inventories. Thus, gross national product (GNP) produced is used either for consumption or for investment.

Now, look at the gross national product or income in the simple economy from the viewpoint of its allocation between consumption and saving. Since national income (which is equal to GNP) can be either consumed or saved.

$$Y \equiv C + S \quad \text{(ii)}$$

From the identities (i) and (ii) we get

$$C + I \equiv Y \equiv C + S \quad \text{(iii)}$$

The left hand side of the identity (iii), namely C + I = Y shows the components of aggregate demand (that is, aggregate expenditure on goods and services produced) and the right-hand side of the identity (iii) namely Y = C + S shows the allocation of national income to either consumption or saving. Thus, the identity (iii) shows that the value of output produced or sold is equal to the total income received. It is income received that is spent on goods and services produced.

Now subtracting the consumption (C) from both sides of the identity (iii) we have

$$I \equiv Y \equiv S$$

or I = S

In our two-sector simple economy with neither government, nor foreign trade, investment is identically equal to saving.

Thus, there is triple identity:

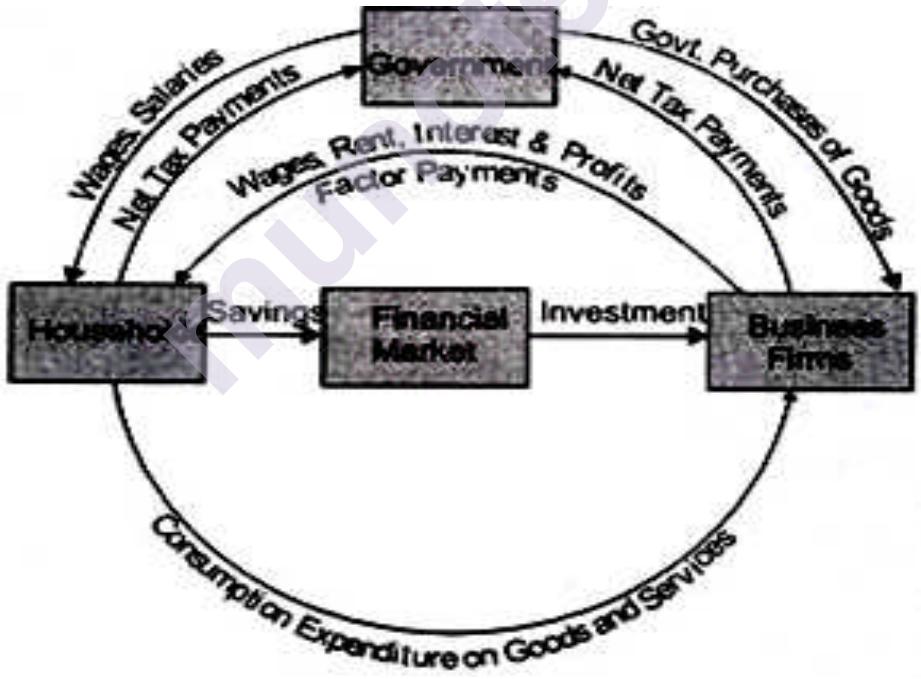
OUTPT = INCOME = EXPENDITURE

2.8 CIRCULAR INCOME FLOW IN A THREE SECTOR ECONOMY WITH GOVERNMENT

In two sector there is absence of government sector because of which it can be only hypothetical. This is quite unrealistic because government absorbs a good part of the incomes earned by households. Government affects the economy in a number of ways.

To study three sector economy important to know taxing, spending and borrowing roles of government. Government purchases goods and services just as households and firms do. Government expenditure takes many forms including spending on capital goods and infrastructure (highways, power, communication), on defence goods, and on education and public health and so on. These add to the money flows which are shown in Fig. 2.3 where a box representing Government has been drawn. It will be seen that government purchases of goods and services from firms and households are shown as flow of money spending on goods and services.

Figure 2.3
Circular Income Flow Market with Government



Government expenditure may be financed through public revenue and public debt that is through - taxes, out of assets or by borrowing. The money flow from households and business firms to the government is labelled as tax payments in Fig. 2.3. This money flow includes all the tax payments made by households less transfer payments received from the Government. Transfer payments are treated as negative tax payments.

Other way of financing Government expenditure is borrowing from the financial market. This can be represented by the money flow from the financial market to the Government and is labelled as Government borrowing. Government borrowing increases the demand for credit which causes rate of interest to rise.

The government borrowing through its effect on the rate of interest affects the behaviour of firms and households. Business firms consider the interest rate as cost of borrowing and the rise in the interest rate as a result of borrowing by the Government lowers private investment. However, households who view the rate of interest as return on savings feel encouraged to save more.

It is clear from above analysis that follows from above that intervention of Government sector affects overall economic situation. Total expenditure flow in the economy is now the sum of consumption expenditure (denoted by C), investment expenditure (I) and Government expenditure (denoted by G). Thus
Total expenditure (E) = C + I + G …..(i)
Total income (Y) received is allocated to consumption (C), savings (S) and taxes (T). Thus
Y = C + S + T … (ii)

Since expenditure) made must be equal to the income received (Y), from equations (i) and (ii) above we have
C + I + G = C + S + T … (iii)

Since C occurs on both sides of the equation (iii) and will therefore be cancelled out, we have
I + G = S + T …(iv)

By rearranging we obtain
G – T = S – I … (v)

If government budget is not balanced, that is, if Government expenditure (G) is greater than the tax revenue that is, G >T, the government will have a deficit budget. To finance the deficit budget, the Government will borrow from the financial market.

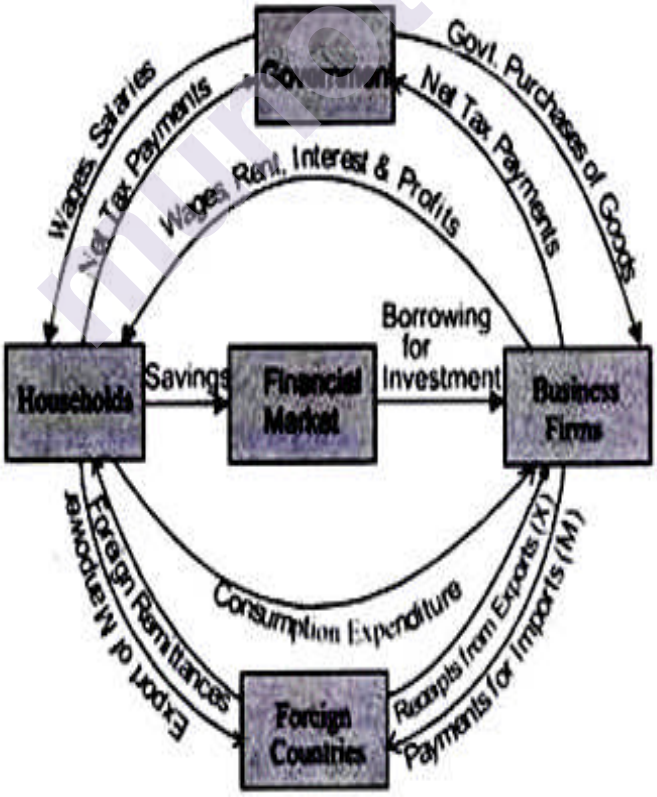
For this purpose, then private investment by business firms must be less than the savings of the households. Thus, Government borrowing reduces private investment in the economy. In other words, Government borrowing crowds out private investment. Government follow balance budget revenue is equal to expenditure (R = E), with the help of its constituent. Thus, completing the circular flow

2.9MONEY INCOME FLOWS IN THE FOUR SECTOR OPEN ECONOMY: ADDING FOREIGN SECTOR

Circular flow of money is open economy where international trading take place. Export and import of goods and services real flow of circular flow and receipt and payment of the same in money flow in the circle. We now turn to explain the money flows that are generated in an open economy, that is, economy which have trade relations with foreign countries. Thus, the inclusion of the foreign sector will reveal to us the interaction of the domestic economy with foreign countries. Foreigners interact with the domestic firms and households through exports and imports of goods and services as well as through borrowing and lending operations through financial market.

Figure 2.4 illustrates additional money flows that occur in the open economy when exports and imports also exist in the economy. In our analysis, we assume it is only the business firms of the domestic economy that interact with foreign countries and therefore export and import goods and services.

Figure 2.4
Circular Flow of Income in an Open Economy with Government and Foreign Sector



A flow of money spending on imports have been shown to be occurring from the domestic business firms to the foreign countries (i.e., rest of the world). On the contrary, flow of money expenditure on exports

of a domestic economy has been shown to be taking place from foreign countries to the business firms of the domestic economy.

Three different possibility can take place in open economy.

1. Balance of trade when E = M. If exports are equal to the imports, then there exists a balance of trade.
2. when E > M; If value of exports exceeds the value of imports, trade surplus occurs.
3. When E < M;if value of imports exceeds value of exports of a country, trade deficit occurs.

Generally, exports and imports are not equal to each other On the other hand in the open economy there is interaction between countries not only through exports and imports of goods and services but also through borrowing and lending funds or what is also called financial market. These days financial markets around the world have become well integrated.

When there is a trade surplus in the economy, that is, when exports (X) exceed imports (M), net capital inflow will take place. Which resultsin domestic savers acquisition for foreign financial assets.

Just opposite to it will take place, in case of import surplus, that is, when imports are greater than exports, trade deficit will occur. Therefore, in case of trade deficit, domestic consumer households and business firms will borrow from abroad to finance their excess of imports over exports. As a result, foreigners will acquire domestic financial assets.

From the circular flows that occur in the open economy the national income must be measured by aggregate expenditure that includes net exports, that is, X-M where X represents exports and M represents imports. Imports must be subtracted from the total expenditure on foreign produced goods and services to get the value of net exports. Thus, in the open economy

National Income = C + I + G + NX

where NX represents net exports, X-M.

Since national income can be either consumed, saved or paid as taxes to the Government we have

C + I + G + NX = C + S + T

Since C is common on both sides of the above equation, we have

I + G + NX = S + T (vi)

The above equation (vi) shows that sum of private investment (I), Government expenditure and net exports (X-M) is equal to the sum of savings and tax revenue.

2.10CONCLUSION:

Although this version of the circular flow is simple, it teaches us four key insights that remain true. Thus, we conclude that in circular flow of income all the sectors are interrelated with each other in the following way

1. Spending = production. The total value of all spending by households becomes an inflow into the firm sector and thus ends up on the revenue side of a firm's balance sheet. The revenues received by firms provide us with a measure of the total value of production in an economy.
2. Production = payments to inputs. Flows in and out of the firm sector must balance. The revenues received by firms are ultimately paid out to households.
3. Payments to inputs = income. Firms are legal entities, not people. We may talk in common speech of a firm "making money," but any income generated by a firm must ultimately end up in the hands of real people—that is, in the household sector of an economy. The total value of the goods produced by firms becomes an outflow of dollars from the firm sector. These dollars end up in the hands of households in the form of income. (This ownership is achieved through many forms, ranging from firms that are owned and operated by individuals to giant corporations whose ownership is determined by stock holdings. Not all households' own firms in this way, but in macroeconomics it is sufficient to think about the average household that does own stock in firms.)
4. Income = spending. We complete the circle by looking at the household sector. The dollars that flow into the household sector are the income of that sector. They must equal the dollars that flow out of the household sector—its spending.

The circular flow of income highlights a critical fact of national income accounting:

GDP = income = spending = production.
Leakages include Saving (S), Taxes (T), Imports (M)
Injection Includes Investment (I), Government Expenditure (G),and Export(X) Symbolically
S+T+M = I+G+X

Thus, from above we can conclude that economy will be in equilibrium when leakages are equal to injections

2.11KEY TERMS

1. Circular Flow of Income: The circular flow of income or circular flow is a model of the economy in which the major exchanges are represented as flows of money, goods and services, etc. between economic agents. The flows of money and goods exchanged in a closed circuit correspond in value, but run in the opposite direction.
2. Factor Market: Factor markets are markets in which households supply factors of production—labor, capital, and natural resources—demanded by firms. Our model is called a circular flow model because households use the income, they receive from their supply of factors of production to buy goods and services from firms.
3. Real Flow: Real flow or physical flow refers to the flow of factor services from households to firms and the corresponding flow of goods and services from firms to households.
4. Money Flow: money flows refer to the payments for the services (wages, for example) or consumption payments.
5. Leakages: Leakage is usually used in relation to a particular depiction of the flow of income within a system, referred to as the circular flow of income and expenditure, in the Keynesian model of economics. Within this depiction, leakages are the non-consumption uses of income, including saving, taxes, and imports.
6. Injection: Injection means introduction of income into the flow. When households and firms borrow savings, they constitute injections. Injections increase the flow of income. Injections can take the forms of investment, government spending and exports.
7. Closed economy: A closed economy is an economy that does not interact with the economy of any other economy. A closed economy is one without international trade i.e neither export nor import takes place.
8. Open Economy: A open economy is an economy in which international trade take place. In the open economy export and import as well as international payment and receipts are taken in to consideration.

2.12 QUESTIONS

1. What are the two main flow in an economy? How do they arise? what do they Signify?
2. Describe an economy as circular flow of income and expenditure. What determine the magnitude of the circular flow?
3. Illustrate graphically the circular flows of income and expenditure in a four-sector model. Explain also the effect of adverse and favourable balance of trade on the size of the circular flow.

4. If investment by business firms falls short of savings, how will it affect the circular flow of income?
5. What is meant by saving and investment? How do they affect circular flow of income in a free market economy?

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Unit-3

DETERMINATION OF NATIONAL INCOME AND PRICE LEVEL

Unit Structure :

3.1 OBJECTIVES

1. To understand the concepts of National Income
2. To understand how national income can be determine in two sector economy
3. To determine national income in three sector economy
4. To understand income determination in open economy
5. To estimate nation income given the values of saving and investment

3.2 INTRODUCTION

Determination of national Income and price level:

Macroeconomics deals with study off aggregates. The macro variables are aggregate demand, Aggregate Supply, National Income, national output, National expenditure, Inflation, unemployment, international trade, balance of payment, fiscal and monetary policy etc.

As from above it is clear that national income is macro Variable and it determines total income of nation. National income can be can be defined as total money value of final goods and services produced in a

country over a period of one year including income from abroad without duplication.

In India since 1955, Central Statistical organization took the responsibility of calculation of national income in closed economy basically when we consider two sector model the three factors are expressed as:

National Expenditure = National Product = National income or Dividend.

a. National Expenditure is total spending on the goods and services produced during a given year.
b. National product is total goods and services produced during one year and measured in money terms.
c. National income or dividend is total income earned by factors of production during given period of one year.

Definition:

1. According to A.C. Pigou, "National income is that part of objective income of the community, including of course income derived from abroad which can be measured in money."
2. According to Fisher, "The National dividend or income consists solely of services as received by ultimate consumers, whether from their material or from the human environments. Thus, a piano, or an overcoat made for me this year is not a part of this year's income, but an addition to the capital. Only the services rendered to me during this year by these things are income."
3. According to Marshall, "The labour and capital of a country, acting on its natural resources, produce annually a certain net aggregate of commodities, material and immaterial, including services of all kinds and net income due on account of foreign investments must be added in. This is the true net annual income or revenue of the country, or the national dividend."
4. As per national income committee the national income is defined as, "the value of commodities and services produced in an economy during a given period, counted without duplication."

3.3 FEATURES OF NATIONAL INCOME

1. **National income is macro economic concept:**
   As macroeconomic variables deals with aggregates i.e economy as a whole and not individual thus total income of nation will be macro concept.

2. **National income is flow concept:**
   Income of one become expense of other and it flow continuously in circular flow form thus it is consider as flow concept.

3. **National income is the money value of goods:**
   National income always expressed in terms of money value while calculating and it consider only those goods and services which can be exchange in money.

4. **Avoid double counting:**
   National income include value of only final goods and services in terms of money for the year, so that the error or problem of double counting can be avoided.

5. **Annually Estimated:**
   National income is estimated every financial year. Example for India it will be estimated from 1st April to 31st March.

3.4 CONCEPTS OF NATIONAL INCOME

1) Gross Domestic Product (GDP_{MP}) :

Gross Domestic product is the total money value of all final goods and services produced within the domestic territory of a country in a given year. This is measured at market price.

Hence, GDP = C + I + G + (X - M)

where,

C = Consumption expenditure
I = Investment expenditure
G = Government expenditure
(X - M) = Export - Import (Net Export)

2) Gross National Product (GNP_{MP}) :

Gross National Product refers to the total market value of all final goods and services produced during a given year including income from abroad.

(GNP_{MP}) = C + I + G + (X - M) + (R - P)

3) Net Domestic product at market price (NDP_{MP}) :

NDP_{MP} is obtained by deducting the value of depreciation from the GDP.

Hence, NDP_{MP} = GDP - Depreciation

4) Net National product at market price (NNP_{MP}) :

Net domestic product at market price is the net market value of all final goods and services produced, by the residents of a country, during a period of one year.

$NNP_{MP} = GNP_{MP}$ - Depreciation

Depreciation means wear and tear of machinery in the process of production.

5) Gross Domestic product at factor cost (GDP_{FC}) :

$GDP_{FC} = GDP_{MP}$ - Indirect Taxes + Subsides

$\therefore GDP_{(FC)} = C + I + G + (X - M) - IT + S$

GDP at factor cost refers to sum of factors income (rent, wages, interest and profits) generated within the domestic territory of a country in a year

6) Gross National Product of Factor Cost ($GNP_{(FC)}$) :

Gross National product at factor cost is the sum of money value of the income, produced by and accruing to the various factors of production in one year in a country. In order to get $GNP_{(FC)}$ we deduct indirect taxes from GNP at market prices and add subsidies to GNP at market prices.

$GNP_{(FC)} = GNP_{(MP)}$ - Indirect Taxes + Subsidies

7) Net Domestic Product at Factor Cost (NDP_{FC}) :

It is the net money value of all final goods and services produced, within the territorial boundaries of a country, during a period of one year.

$NDP_{(FC)}$ is also known as domestic income or domestic factor income.

$NDP_{(FC)} = GDP_{(MP)}$ -Net Indirect Tax - Depreciation or $NDP_{(FC)} = NDP_{(MP)}$ - Indirect Tax + Subsidies.

8) Net National Product of Factor Cost ($NNP_{(FC)}$) :

Net National product at factor cost is the net money value of all final goods and services produced by the residents of a country, during a period of year. It include income earned by factors of a production.

$$NNP_{(FC)} = NNP_{(MP)} \text{ - Indirect Tax + Subsidies}$$

9) National Income at current price and constant price :

- National Income at current price is net national product calculated on the basis of current market price. It is also called as Nominal National Income.
- National Income at constant price refers to the Net National product calculated on the basis of constant prices of a certain base year. It is also called as Real National Income.

10) Personal Income (PI) : = Personal Income is the sum of all incomes, actually received by all individuals or households from all the sources during a given year. It may be earned or unearned.

11) National Income at factor cost $\left(NI_{(FC)}\right)$:

National Income at factor cost means the sum of all incomes, earned by resource suppliers for their contribution of land, labour, capital and entrepreneurial ability, which go into the year net production.

$NI_{(FC)} = NNP_{(MP)}$ - Indirect Taxes + Subsidies

12) Personal Disposable Income (PDI) :

PDI is that part of personal income which is left behind after payment of personal direct tax like income Tax, personal property tax.

13) Personal Savings (PI) :

Personal savings refer to the difference between disposable personal income and personal consumption expenditure.

14) Per Capita Income (PCI) :

Per Capita Income is obtained by dividing National Income by the population.

$$Per\ Capita\ Income = \frac{National\ Income}{Population}$$

Per Capita Income highlight the average income of the people in the country.

15) Real Vs Nominal GNP :

- Nominal GNP is the total money - value of all the goods and services measured at the current years prices i.e. nominal GNP for the year 2018 will be measured at the market prices ruling in the year 2018.
- Real GNP is the total money value of all goods and services measured at the prices of some base year.

Thus we can say in other words GNP measured at current price is termed as nominal GNP. On the other hand GNP measured at constant prices ruling in some base year is termed as real GNP.

- Nominal GNP does not account for inflation but real GNP is inflation adjusted. It gives actual market value of products and services produced in an economy.
- Nominal GNP : $GNP = \sum ptqt$

where, P = Price, q = quantity and t = year (current year)

- Real $GNP = \sum pbqt$

  b = base year

$$GNP\ Deflator = \frac{\text{Nominal GNP}}{\text{Real GNP}}$$

$$\text{Real GNP} = \frac{\text{Nominal GNP}}{\text{GNP Deflator}}$$

GNP Deflator is one of measure of inflation.

16) PPP Income :

Purchasing power parity is a method of measuring the relative purchasing power of different countries currencies over the same types of goods and services.

Purchasing power parity is the exchange rate whereby a unit of any given currency should be able to buy the same quantity of goods in all countries. Economists generally prefer the use of PPP method for comparing income across countries.

3.5 DETERMINATION OF NATIONAL INCOME

In the short run, the level of national income is determined by aggregate demand and aggregate supply. Keynesian model of income determination assumed that price level in the economy remain unchanged.

3.6 DETERMINATION OF NATIONAL INCOME IN TWO SECTOR ECONOMY WITH FIXED PRICE LEVEL

In a two sector economy aggregate demand has two components i.e. consumption demand and investment Demand.

$$AD = C + I$$

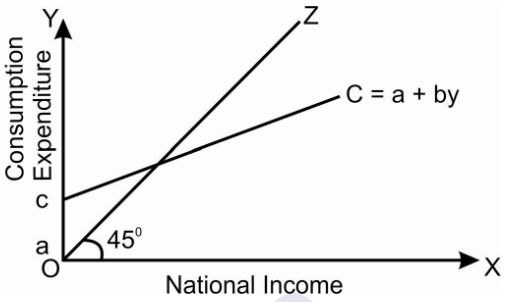
where AD = Aggregate Demand, C = Consumption demand and I = Investment demand.

- Consumption Demand - Consumption Demand depends upon propensity to consume. Given the propensity to consume, consumption demand is function of income.

Short Run consumption function is C = a + by
where, a is the intercept autonomous consumption, b is slope of function i.e. MPC marginal propensity to consume.

Figure 3.1

OZ = is Income Line
On x axis National Income
On y axis consumption expenditure
Curve CC - Consumption function curve



National Income = Consumption + Saving
Y = C + S

Consumption curve upward sloping indicating direct Relation with income.

If the gap between income and consumption widens showing that saving is increasing.

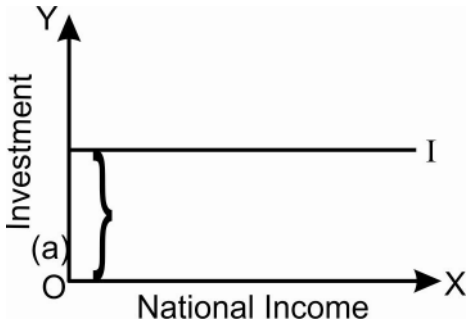
Investment Demand :

Important component of Aggregate demand is investment demand in determining equilibrium level of national Income.

Investment demand depends upon two factors :

a) marginal efficiency of capital
b) rate of interest

Figure 3.2
Autonomous Investment



In adjoing figure autonomous investment is those which does not depend on income. Investment is indirectly related to income.

Aggregate Supply - Aggregate Supply means total money value of goods and services produced in an economy in a year.

Constituents of Aggregate Supply

1) The supply or output of final goods and services
2) The output of capital goods

Keynes derived short run production function

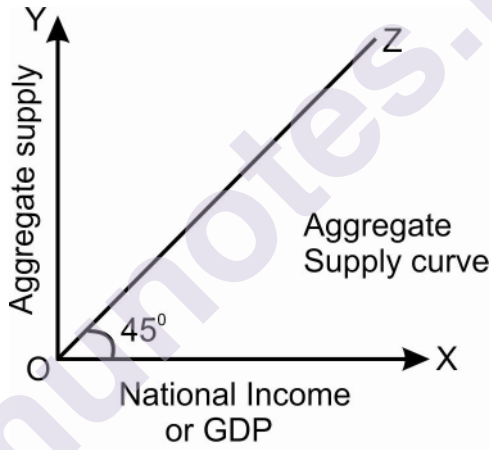
$Y = N, L, K, T$

In short run except labour all other factors remain same (constant) and only labour is variable factor.

45^0 line as Aggregate supply curve (with fixed prices) :

In the simple keynesion model of determination of national income price level is assumed to be given and constant.

Figure 3.3
Aggregate supply curve in Keyne's model of income determination with fixed price level

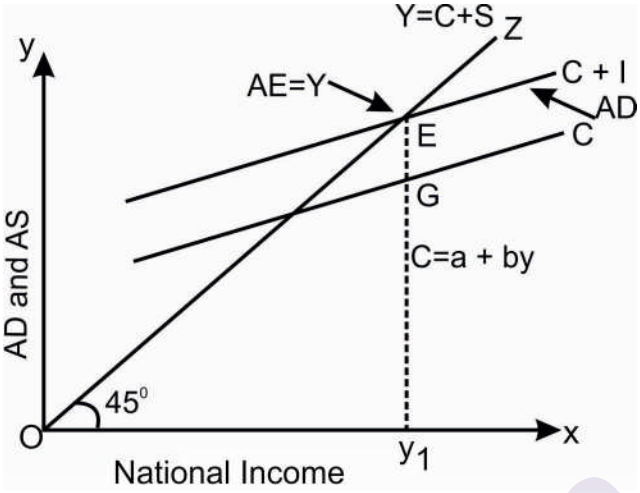


- at every point of 45^0 line from the origin, the vertical distance equals horizontal distance which measures real national income or GDP (i.e. aggregate supply of output at constant prices). This 45^0 line is also called income line along which $Y = C + S$.
- 45^0 line in adjoin figure shows two things (i) It shows varying level of aggregate production or the supply of goods that will be offered for sale at given price level. The greater the AD, the greater will be AS at given price level. (ii) It represents national income.

Equilibrium level of National Income :

The C + I curve in the given fig. is representing Aggregate demand curve and 45^0 OZ line represents aggregate supply of output. Both AD curve and AS curve intersects each other at point E in given figure which leads to OY_1 level of income. Any fluctuation towards above this equilibrium point or below this equilibrium point brings deficiency in the economy.

Figure 3.4
Determination of National Income: Basic Kevinson Model



If AS > AD leads to increase in inventories of goods with the firms beyond the desired levels. Thus firm will respond by cutting down production to keep their inventories at the desired level. Which will lead to fall in national income until the OY_1 level is reached where (C + I) Aggregate demand is equal to the value of Aggregate supply.

Hence, OY_1 is the equilibrium level of National Income.

Principle of Effective demand :

The particular aggregate demand which is equal to aggregate supply and therefore determines the equilibrium national income is called effective demand.

Keynesian model, we can express the principal of effective demand in symbolic terms as under :

$y = AD^*$
$AD^* = C + I$
$y = AD^* = C + I$

where,
Y = National Income, AD^* = Effective demand
C = Consumption Demand I = Investment

Thus it is clear that national income and employment in the short run are determined by effective demand.

Classical Economist believe that effective demand (AD = AS) is enough to ensure full employment. But Keynesian explained in his model that effective demand equilibrium is achieved before full employment equilibrium and due to involuntary unemployment there is gap between effective demand equilibrium and full employment equilibrium.

Numerical illustration of equilibrium level of income.

Problem 1 : Suppose in an economy, autonomous investment (I) is Rs. 600 crores and the consumption function is given :

$C = 200 + 0.8y$

given the above find out the equilibrium level of income.

Solution : The equilibrium level of income is

$y = C + I$
$C = 200 + 0.8y$
$I = 600$

Putting the value of (C) and (I) in the equation we have

$y = 200 + 0.8y + 600$
$y = 800 + 0.8y$
$y(1 - 0.8) = 800$
$0.2y = 800$
$y = 800/0.2$
$\therefore \boxed{y = 4000}$

Problem 2 : Suppose the consumption function of an economy is C = 0.8y. Planned Investment by entrepreneurs for a year is Rs. 500 crore find out what will be equilibrium level of income.

$Y = C + I$ (C = 0.8y, I = 500 crore)

Substituting

$y = 0.8y + 500$
$y - 0.8y = 500$
$y(1 - 0.8) = 500$
$y = 500/0.2$
$\therefore \boxed{y = 2500\ crores}$

3.7 DETERMINATION OF NATIONAL INCOME – SAVING - INVESTMENT APPROACH

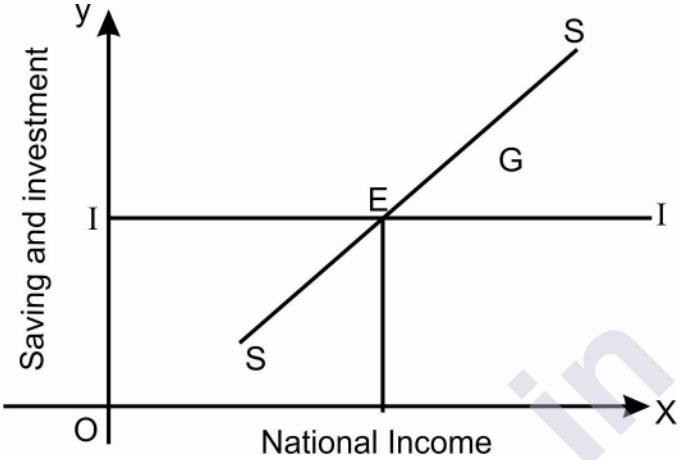
In (fig. 3.4) equilibrium level of National Income is OY, saving and investment are equal to GE.

Saving represent withdrawal of some money from the income stream and investment represent injection of money into the income stream.

If intended investment is greater than intended saving, it means that more money has been put into income stream than has been taken out of it as a result flow of National Income Expand. And just opposite to it

occur when investment is less than intended saving. National income will decrease. Thus at equilibrium level of national income will be determined at the level of which the intended investment is equal to intended saving.

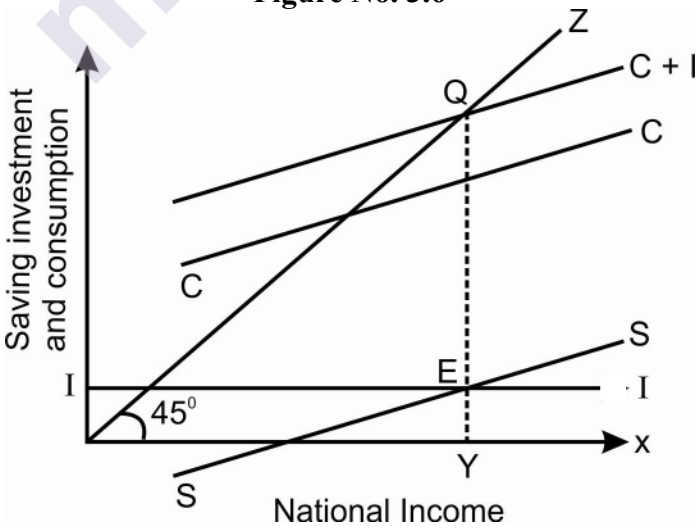
Figure 3.5
Determination of National Income Saving Investment approach



The determination of nation income by investment and saving is illustrated in (fig. 3.5). In X-axis National income, SS is saving curve intended saving at different level of income. II curve shows investment demand, intended investment, saving curve and investment curve intersect at point (E) i.e. investment and saving are in equilibrium at OY level of income in fig. 5.

Determination of National Income has been explained above by two method :

Figure No. 3.6



i) Aggregate Expenditure or Demand = Aggregate supply of output and
ii) Intended Investment = Intended savings.

In fig. 3.6 Aggregate Demand curve C + I intersects Aggregate Supply Curve OZ at point Q and thereby determines national income equal to OY. In the lower part of this diagram we have drawn intended savings curve SS and intended investment curve II. It is worth to note that saving curve SS has been derived from consumption function curve C and measure the gap between income and consumption at various level of income. Further investment curve II drawn in the lower part of figure represents the difference between consumption function curve C and Aggregate demand curve C + I. This difference is the amount of intended investment in this fig. 3.6. We thus see that both saving and investment curve drawn in the lower part are embedded in the upper part showing aggregate demand and aggregate supply. This is because of this, that intended saving and intended investment curve also determine the same level of National Income OY which is determined through the equality of Aggregate demand (C + I) and Aggregate supply.

Numerical problem on saving - Investment approach :

- Suppose the level of autonomous investment in an economy is 200 crores. The saving function is given as
  S = - 80 + 0.25y

  Find equilibrium level of income

Solution -According to saving investment approach the level of income is in equilibrium at which S = I

S = -80 + 0.25y
I = Rs. 200 crores

Substituting the value of S & I in equation

S = I
- 80 + 0.25y = 200
0.25y = 200 + 80
y = 280/0.25
$\therefore \boxed{y = 1120\ crores}$

3.8 DETERMINATION OF NATIONAL WITH GOVERNMENT

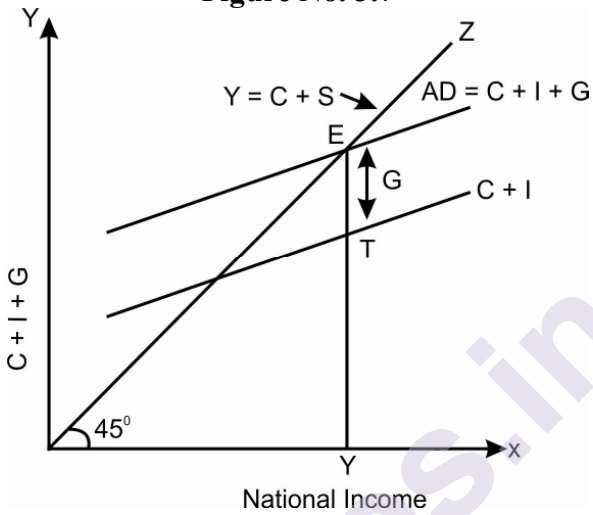
Government plays vital role in economic functioning. Government expenditure treated as autonomous expenditure and we denote Government expenditure by G. Three sector economy whenever take into account the income generating effects of Government expenditure, we get the following equation for equilibrium level of National Income :

Y = C + I + G

Y = National Income
C + I + G = Aggregate demand including government expenditure, G

To illustrate the determination of national income with three sector model i.e. C + I + G as effective demand. The equilibrium national income OY is determined at the level at which the aggregate expenditure curve (C + I + G) intersects 45^0 line, that is Aggregate Demand is equal to aggregate supply of output. Any discrepancy from this level will be ultimately restored at OY level of National Income.

Figure No. 3.7



In the presence of government expenditure, national income is determined at the level at which the saving gap is equal to the sum of private investment and Government expenditure (I + G)

In equilibrium Y = C + I + G
Y - C = I + G
Y - C = Saving (S)

Therefore, in equilibrium S = I = G

3.9 DETERMINATION OF NATIONAL IN AN OPEN ECONOMY : THE FOUR SECTOR MODEL

An open Economy is one which has not only trade relations with other countries but has financial capital flows between it and other economies of the world.

Foreign trade and National Income in an open Economy :

In the four sector model of determination of national income, we add the foreign trade sector to three sectors, namely Household, firms, Government. Volume of export and import of country affects the level of national income of a country.

Keynesian model of income determination export and import are autonomous that is independent of income. Increase or decrease in export and import affect aggregate expenditure.

When we include net export (X_m) in our analysis we get the following equation for equilibrium level of income.

$Y = C + I + G + (X - M)$

$C = a + b (Y - T) = a + by - bT$

$Y = a + by - bT + I + G + X_n$

$Y (1 - b) = a - bT + I + G + X_n$

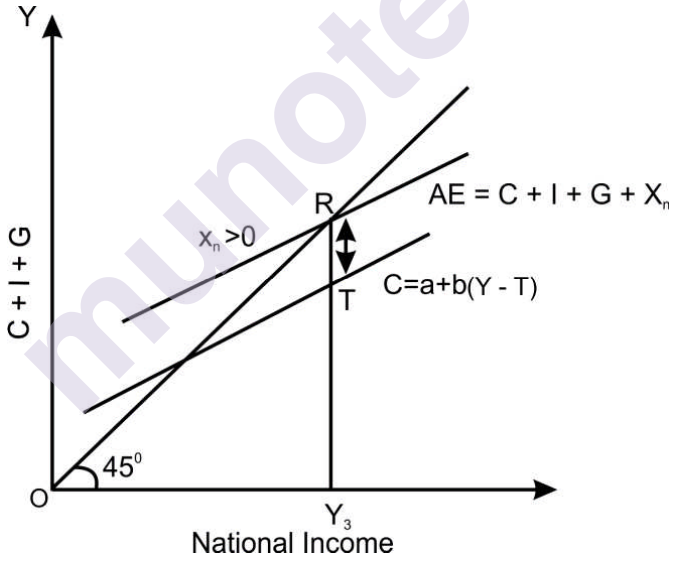
$$Y = \frac{1}{1-b}(a - bT + I + G + X_n)$$

Thus, the equilibrium level of income is the sum of all fixed autonomous expenditure (i.e. $a - bT + I + G + Xn$) times the value of multiplier $(1/(1-b))$.

In the four sector model, national income is determined at the level at which saving gap between consumption and income is equal to the sum of investment Government expenditure and net exports. (i.e. $I + G + Z_n$)

Graphical Illustration :

Figure No. 3.8
Determination of National Income with foreign Trade Four Sector Model:



In Fig. 3.8 we have depicted the determination of national income when there are positive net export (i.e., when exports exceed imports $X - M > 0$. To obtain the aggregate expenditure curve incorporation the positive net export (X_n) we add the $I + G + X_n$ to the consumption function curve to C to get the higher aggregate expenditure curve $C + I + G + X_n$ which intersects the 45^0 line at point R and determines a level of Income OY. If the net exports X_n were negative, i.e. import greater than export, $X - M < 0$, the aggregate demand curve incorporating net exports would lie at a lower level than C + I + G curve and determine a lower level of income.

3.10 QUESTIONS

1) Explain different concepts of National Income.
2) What are the features of National Income?
3) How to determine National Income in two sector model?
4) Illustrate determination of National Income in Open Economy.

3.11 REFERENCES

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Module - 2

Unit -4

IS - LM Analysis

Unit Structure :

4.1 Objectives

1. To understand the concept of IS – LM Market
2. To Know the Goods Market and Money Market
3. To Derive the level of equilibrium of saving and investment
4. To learn the factor responsible to get money market equilibrium
5. To Understand the concept of crowding out and liquidity trap

4.2 INTRODUCTION

The Goods Market and Money Market and link between them:

Macroeconomics deals with aggregates. Keynesian in his book, General theory of employment, interest and money Published in 1936. Where very beautifully explained the importance of effective demand for any economy to overcome from the problem of depression. Keynesian recommends that most of the macro variable are directly or indirectly related with each other. Example – Change in rate of interest will bring about change in variable like consumption and investment and national income as well. Just one year after in 1937 Hicks developed a model called IS – LM model. To explain goods market and money market attain equilibrium simultaneously at the similar level of income and interest rate. Thus the extended Keynesian model is known as IS -LM model. IS -LM model has become relevant instrument of macroeconomics and impact of the fiscal policy and monetary policy are consider using this IS – LM model.

In IS – LM model
I = Investment
S = Saving
L = Liquidity preference
M = Money Supply

- Hicks has obtain two curves Namely IS and LM. Where IS Stands for product/ goods market and LM represents money market. According to Neo Keynesian economist Hics, Hansen and Lerner there are four variables Viz., saving, investment, liquidity prefence and quantity of money that are consolidated with income. IS – LM Model relates how aggregate market of real and financial interact to balance interest rate and output/income.

4.3 GOODS MARKET EQUILIBRIUM: IS CURVE

Goods market achieve equilibrium when S = I ,Saving is equal to Investment.

Saving is positively related with income, higher the income more the saving and vice versa.

$S = f(Y)$

Where as investment is influenced by rate of interest prevailing in the market, Investment is inversely related with rate of interest.

$I = f(r)$

Derivation of How saving can be equal to investment,

$Y = C + S$ (i)

Income is what we consume and what we do not consume we keep it in the form of saving. If any two variable value is given we can obtain third example,

$C = Y – S,$
$S = Y - C$

Variable in two sector model of close economy with only household and firm with saving and investment,

$Y = C + I$ (ii)

Thus
From equation (i) and (ii) we get

$C + S = C + I$ (iii)

Substracting C from both the side we will get,

$S = I$ (iv)

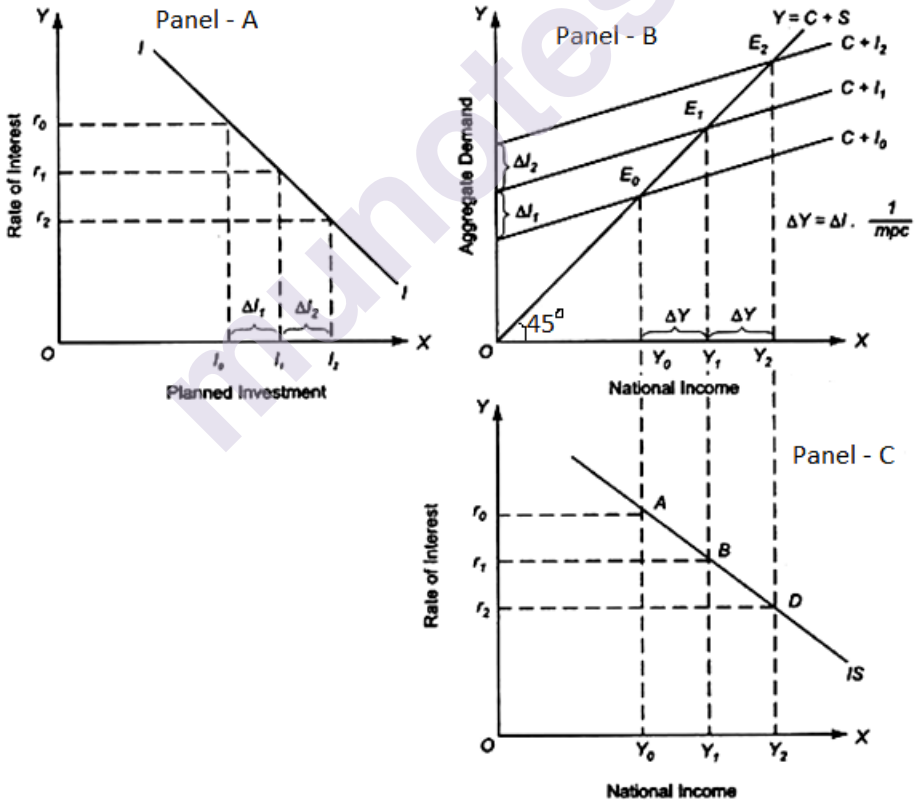
Saving investment identity, in short run saving must be equal to Investment.

4.3.1 Derivation of IS Curve:

IS Curve is graphical representation of product/goods market equilibrium. It derive due to endogeneous factor like income, output, consumption and interest rate. When rate of interest falls, investor encourage to invest, due to low cost of project to him. Investment will rise which will increase aggregate demand and thus eventually national income will rise. Thus IS curve is associated with different equilibrium levels of national income with various rate of interest.

IS curve is locus of combination of rate of interest and the level of national income that result in goods market equilibrium.

Figure –4.1



In the given figure in Panel A, investment is on X - Axis rate of interest is represented on Y – axis, when rate of interest is r_0 planned investment is I_0 and in Panel – B , we have 45^0 line shows that each and every point on it gives us the equality between the aggregate demand and the level of national income AD = Y aggregate demand is $C + I_0$ and

equilibrium $E_0$the national income of the economy is Y_0. therefore, at Panel – C the level of national income Y_0 is plotted against rate of interest.

Further if rate of interest is fall to r_1 due to which business man find project less costly and they prefer to invest more (ΔI) at I_1 level which induce to shift Aggregate demand curve shift upward. i.e at $C + I_1$ resulting in increase in national income at higher equilibrium level Y_1 at panel B. the effect of which we can find at panel -C rightside (ΔY) increase in national income at Y_1 .

If rate of interest decrease further at r_2 leading to further increase in investment I_2 which results in to increase aggregate demand $C+ I_2$ in panel B and higher level of equilibrium income E_2 generating more increase in national income Y_2.

By joining points A, B and C in Panel – C we derive downward sloping IS Curve evaluating that when interest rate falls national income increases.

4.3.2 Slope of IS Curve:

IS curve is downward sloping as rate of interest decrease national income increases.

The steepness of IS curve depends on:

1. The level elasticity of investment demand curve and
2. The optimum size of multiplier
    1. The level of elasticity of investment demand curve – if elasticity of investment demand is highly elastic to the change in rate of interest then due to fall in rate of interest causes drastic increase in investment because of which aggregate demand curve will also expand drastically and shift upward. Then the IS curve will be Flatter.
    When elasticity of investment is less elastic or not very sensitive to change in rate of interest then IS curve will be Steeper.

    2. The size of multiplier
    Slope of steepness of IS curve is also based on value of Multiplier. Marginal propensity to Consume (MPC) determines the value of multiplier.
    Example: If MPC is high then with the fall in rate of interest, investment increases due to greater effect of increased MPC will shift aggregate demand multiplier time and IS curve will be more flatter. Smaller value of multiplier will be brings about small increase in equilibrium income due to which IS curve will be more steeper.

2.3.2 Shift in IS Curve:

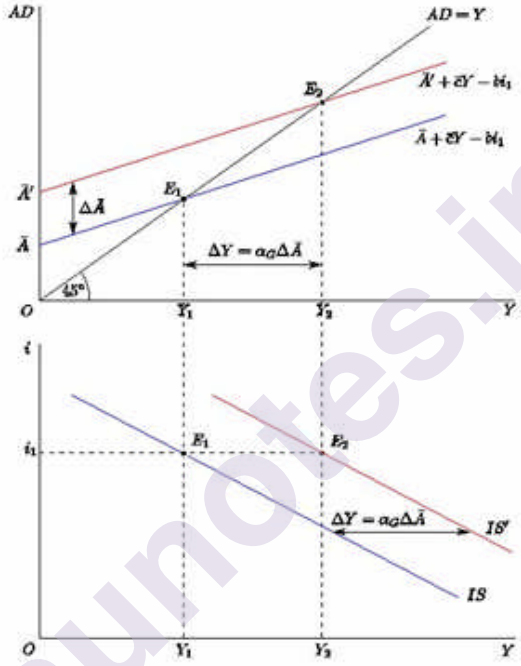
Position of IS curve is dependent on level of autonomous expenditure. Autonomous expenditure is those expenses which does not

dependent on income. So most of government expenditure on programmes and policies for welfare purpose does not depend on income and interest rate.

Example: Increase in population require more investment for school, building, roads, and various other facilities does not depend on income. So such autonomous increase in investment expenditure shift IS curve Upward and Vice versa.

The goods market and IS curve

Figure No. 4.2



a. Higher autonomous spending shift the IS curve to the right. As we cav see in figure – 2, IS curve shifted to right i.e IS^1

b. Decrease in autonomous spending will shift the IS curve towards left from original position.

c. The horizontal shift equals the multiplier times the increase in autonomous spending.

4.4 MONEY MARKET EQUILIBRIUM

4.4.1 Derivation of LM Curve :

The LM curve exhibit the relationship between the interest rate and national income. The LM – Schedule can be derived from money market equilibrium condition.

$M^s = M^d$

The neo – keynesian economist (Hicks, Lerner and Hansen) have derived the LM curve from Keynes liquidity preference theory. Where

M^d Keynes considered it as Liquidity preference - demand for money. And M^s

According to Keynesian theory demand for money based on different motive which is transaction motive, precaution motive and speculative motive of which transaction and precaution motive is dependent on income and speculative motive is influenced by rate of interest. The demand for money based on level of income as people need to fulfil their basic transactionary need of basic requirement. It also depend on rate of interest as it is cost of holding money.

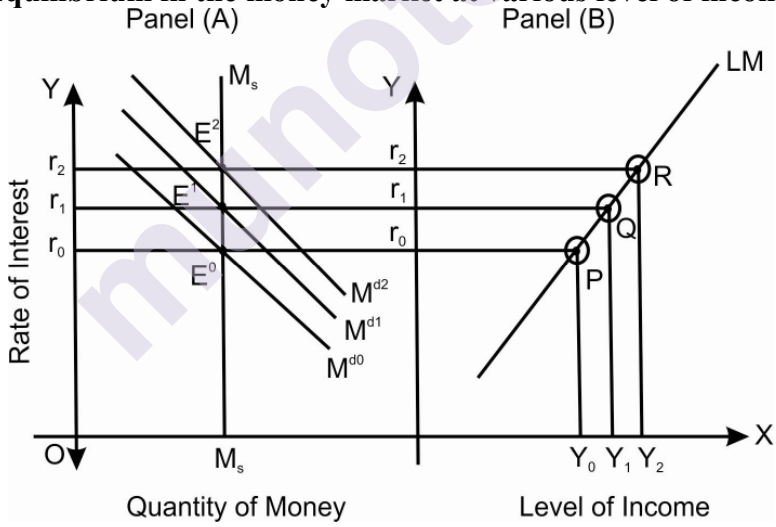
Hence demand for money can be expressed as:

$$M^d = L(Y,r)$$

M^d = demand for money
Y = Income
r = rate of interest

demand for money is function of income and rate of interest. Hansen states that from Keynesian formulation we get a family of liquidity preference at different income levels supply of money is fixed by monetary authority.

Figure No. 4.3
Equilibrium in the money market at various level of income



In above figure 4.3 we can see that major components to derive LM curve are Demand for money, supply of money rate of interest and level of national income. As per the Keynesian theory of liquidity preference the rate of interest is determined at the level where Demand for money is equal to supply of money.

Demand for money is derived from there different motives.

a) Transaction motive
b) Precaution motive
c) Speculation motive

Transaction motive is denoted by Lt that is liquidity preference for transaction motive. Precaution motive denoted by L_P and speculative motive is denoted by L_S thus conclusion of it is that

$$M_d = L_t + L_p + L_s \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(i)}$$

of which $L_t + L_p = L_1$ which affected by income. So, we can say that it is income.

$$\boxed{L_1 = f(y)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ii)}$$

elastic.

Ls is considered as L_2 for Keynesian formulation.

$$L_2 = f(r) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(iii)}$$

So, we can say that total demand for money i.e.

$$L = L_1 + L_2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(iv)}$$

Let assume L is denoted by letter M_d

$\therefore M_d = L_1 + L_2$

So thus it means Demand for money increases with the increases in income. The quantity of real money balances demanded is negatively related to the interest rate but positively related to income. Thus by using the theory of Keynesian liquidity preference curve, we can analyse what happen to the equilibrium interest rate when the level of income changes.

Explanation of Diagram for derivation of LM curve.

In figure 4.3 on x axis quantity of money and on y axis rate of interest panel (A) at panel (B) x axis we represent National Income and on y rate of interest. As in figure B when income increases from y_0 to y_1 and finally to y_2 on panel (B). This increase in income shift money demand is curve to the right with the supply of real money balances unchanged the interest rate must rise from r_0 to r_1 and then to r_2 to equilibrate the money market.

Therefore according to the theory of liquidity preference, higher income leads to higher interest rate.

When we join point A, point B and point C of panel (B) we derive upward sloping LM curve

The LM curve plots the relationship between the level of income and interest rate. The higher the level of income, the higher the demand for real money balances and the higher the equilibrium interest rate for this reason, the LM cure slopes upwards as shown in fig. 4.3.

4.4.2 Slope of LM Curve :

There are two factors on which the slope of the LM curve depends.

1) The liquidity preference of demand for money to the change in income.

Example : In panel (B) as income increases from y_0 to y_1 the demand curve of money shifts from M_0 to M_1 that is with an increase in income demand for money would increases for being held for transactions motive M^d to $L_1 = f(y)$. This will affect money market equilibrium. Thus rate of interest need to increases at new intersecting point on panel (A) at equilibrium E^1 to restore the money market at higher interest rate (r^1).

2) Elasticity or responsiveness of demand for money (i.e. liquidity preference for speculative motive) to the change in rate of interest.

The slope of LM curve is depend upon the income elasticity and the interest elasticity of the demand for money. The larger the income elasticity and the lower the interest elasticity of the demand for money, the steeper the LM cure will be.

Suppose the demand for money is relatively insensitive to the interest rate, the LM cure is nearly vertical. If demand for money is highly sensitive to the interest rate, LM curve is close to horizontal.

Lower elasticity of demand for money for speculation motive with respect to changes in the rate of interest the steeper will be the LM curve and if the elasticity of demand for money to the changes in the rate of interest is high the LM curve will be flatter.

4.4.3 Shifts in the LM Curve :

Demand for money is based on different motives. It increases with increase in income. The LM curve, the equilibrium points in the market for money, shift for two reason.

1) Change in money demand
2) Change in money supply

If money supply increases as we know with the help of Keynesian liquidity preference theory and determination of rate of interest. As money supply increases keeping Demand for money unchanged then rate of interest falls at each level of income. Thus, LM curve shift towards

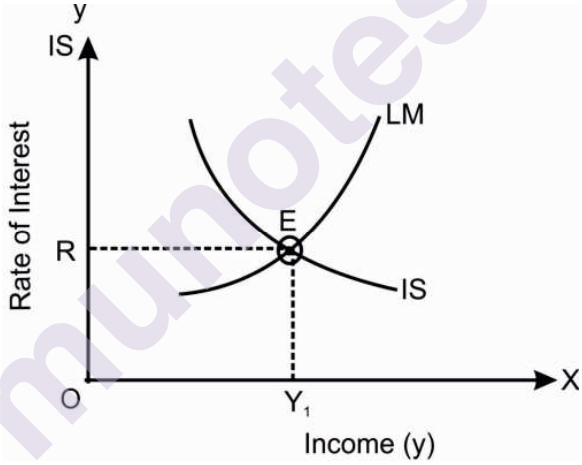
rightside and if money supply decreases then rate of interest falls and with the given level of income the LM curve shift left.

4.5 THE INTERSECTION OF IS AND LM CURVES : SIMULTANEOUS EQUILIBRIUM OF GOODS MARKET AND MONEY MARKET :

The IS curve represents goods market and LM curve represent money market. The IS curve reflect negative (inverse) relationship between rate of interest and national income. IS curve slopes downwards. On the other hand LM curve reflect positive relationship between rate of interest and national income. Thus LM curve is upward sloping curve. The intersection interest of the IS and LM curve is called equilibrium point, that determine the rate of interest and level of income.

In fig. 4.4 IS curves is a downward sloping curve and LM curve is an upward sloping curve.

Figure 4.4
Interest Rate & Income Determinination



The intersection of IS and LM curve is at point E which determines the rate of interest or OR in fig. 4.4 and National income OY.

At this point income and the rate of interest stand in such relation to each other that

i) Investment and savings are at equilibrium.

ii) Demand for money is in equilibrium with the supply of money. This is how the goods market and the money market are integrated by the neo-Keynesian economist in explaining interest rate and level of income determination in IS-LM model.

4.6 ALGEBRA OF IS-LM MODEL

4.6.1 Derivation of IS Function : Algebra Method

The IS function can be derived by using both the equilibrium conditions of the product market. The two equilibrium conditions are (i) AD = AS and (ii) I = S. We will show here the derivation of the IS curve by using both the conditions of product market equilibrium.

$$AD = Y = C(Y) + I(i) \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(i)}$$

$$C(y) = a + by \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ii)}$$

$$I = I - hi \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(iii)}$$

C = Consumption, a = autonomous consumption
b = Marginal propensity to consume, y = Income
I = autonomous investment, i = interest rate and $h = \Delta I / \Delta P$.

$$Y = a + by + \bar{I} - hi \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(iv)}$$

$$Y = \frac{1}{1-b}\left(a + \bar{I} - hi\right)$$

Assume that consumption function is given as

$$C(y) = 10 + 0.5y \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(v)}$$

Investment function is given as

Investment function is given as

$$I(i) = 200 - 2000i \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(vi)}$$

The product market equilibrium condition equation (iv) can be exposed in terms of (v) and (vi) as

$$y = 10 + 0.5y + 200 - 2000i \quad \ldots\ldots\ldots\ldots \text{(vii)}$$

$$= \frac{1}{1-0.5}(10 + 200 - 2000i)$$

$$= 2(210 - 2000i)$$

$$\boxed{y = 420 - 4000i}$$

4.6.2 Derivation of IS curve by equilibrium condition I = S

The IS schedule can also be derived on the basis of the other equilibrium condition of the product market; that is I = S

$$S(y) = y - c(y) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(viii)}$$

substituting the value of consumption function, we get

$$S = y - (10 + 0.5y) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ix)}$$

Given the investment and saving functions the equilibrium condition of the product market (I = S) can be expressed as

$$200 - 2000i = -10 + 0.5y \quad \ldots\ldots\ldots\ldots\ldots \text{(x)}$$
$$210 = 2000i + 0.5y$$

By multiplying both sides of equation (X) by 2, we get

$$420 = 4000i + y \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(xi)}$$
$$\boxed{y = 420 - 4000i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(x)}$$

4.6.3 Derivation of LM schedule : Algebraic method :

Money market is in equilibrium when

$$M_d = \overline{M}s$$

where,

$$M_d = M_t + M_{sp}$$
$$M_t = kY, (k > o)$$
$$M_{sp} = L(i)$$

In the Keynesian system, the M_{sp} demand function produces a curvilinear schedule with a part made of straight horizontal line that is, the part showing liquidity trap,

$$M_{sp} = \overline{L} - Ii \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(xi)}$$

where $\overline{L}$ and I are constant, and I is interest rate.
rate

Given the M_t and M_{sp} function, the aggregate money demand function can be expressed as

$$M_d = kY + (\overline{L} - Ii) \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(xii)}$$

The money supply $(\overline{M}s)$ assume to remain constant in the entire analysis of the money market equilibrium. If the price level also (P) is also assured to remain constant, then the nominal money supply $(\overline{M}s)$ equals to real money supply denoted as $\overline{M}s / p$. The money market equilibrium condition given in Equation (xii) can be now be expressed as

$$M_s = M_d$$

$$\overline{M}s = kY + \left(\overline{L} - Ii\right) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(xiii)}$$

equation. (xiii) gives the money market equilibrium at different level of income and the rate of interest. From this equation is derived the LM schedule. By manipulating Equation. (xiii), we get LM function as

$$Y = \frac{1}{k}\left(\overline{M}s - \overline{L} - Ii\right) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(xiv)}$$

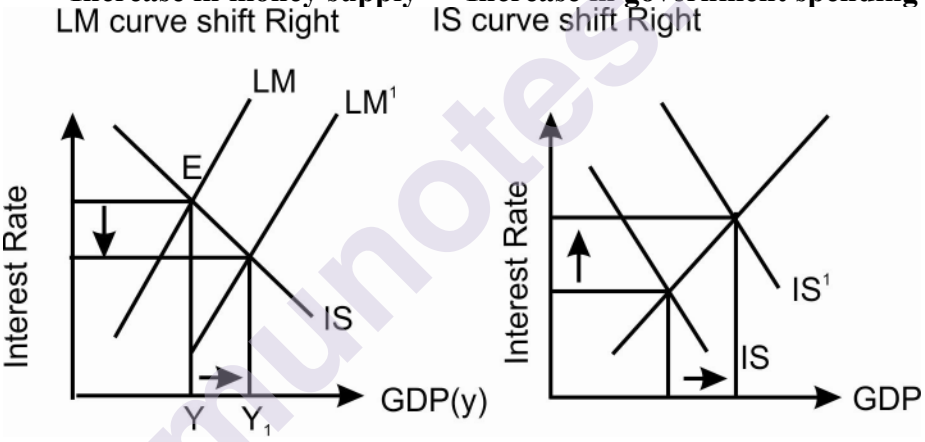
4.7 THE POLICY ANALYSIS WITH IS AND LM

4.7.1 Monetary Policy :

When central government increase the money supply, this increase money supply will shift curve to the right. The effect such change on the interest rate and income is shown in figure.

Figure No. 4.5

Increase in money supply **Increase in government spending**



As the left hand panel, indicates the theory predicts. that when the money supply increases the interest rate falls and GDP rises.

4.7.2 Effect of monetary and fiscal policies :

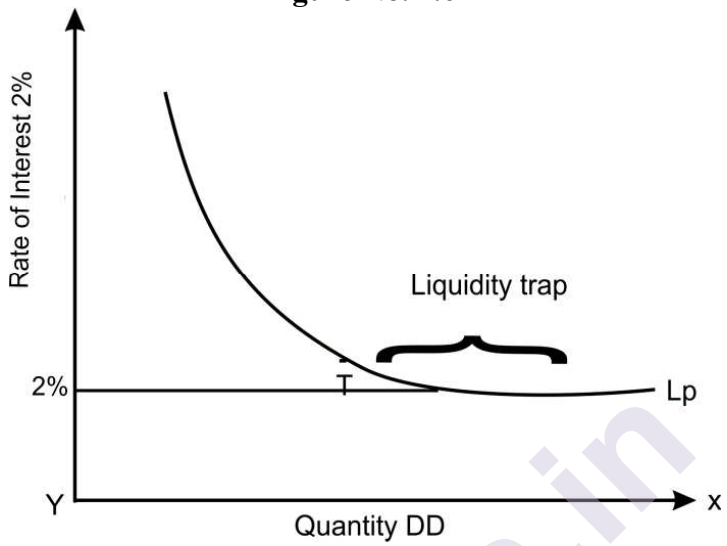
In the left panel, an increase in the money supply shifts the LM curve, to the right; this raise GDP and lower interest rate. In the Right hand panel an increase in government spending shift the IS curve the right; this raises GDP and raises the interest rate. There is fundamental difference between expansionary monetary policy lowers rate of interest and expansionary fiscal policy raises interest rates.

4.7.3 The Liquidity trap :

A situation in which the public is prepared at a given interest rate; to hold whatever amount of money is supplied. The LM curve become horizontal to x-axis. At lowest rate of interest the entire cash is trapped by people. In the liquidity trap, monetary policy is powerless to affect the interest rate.

Thus from given figures on x-axis quantity demand on y-axis Rate of Interest at lowest rate of interest say at 2% people hold money with them self leading to liquidity trap.

Figure No. 4.6



4.7.4 Fiscal policy and crowding out :

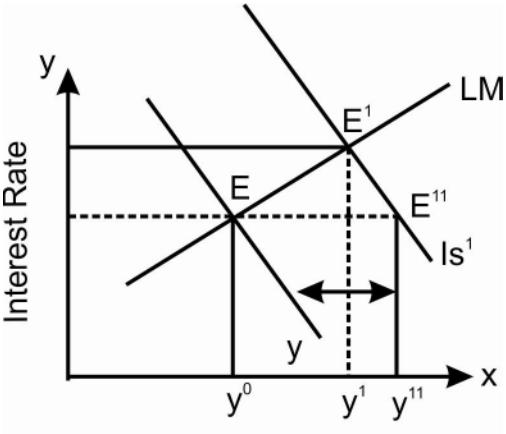
As we known from our analysis of study towards IS curve. It is goods market model. It get influence due to government policy changes the impact of it leads to shift in IS curve either right to original IS curve or left hand side of original IS curve. Thus we can say that any government (fiscal) policy programme related to taxation or expenditure affect IS curve accordingly.

The equation of IS curve $Y = \alpha\, G\left(\overline{A} - bi\right)$

Increasing in Government spending :

Fiscal expansion increases equilibrium level of income and interest rate which raises Aggregate Demand. Increased Aggregate demand raises output and shifting IS curve towards right hand side from the original IS curve can be illustrates in diagram. In Figure 4.7 we have illustrated the effect of a shift in the Is schedule. At each level of interest rate equilibrium income must increase multiplier time. Initially economy is Equilibrium at E and government expenditure increase will shift IS curve at E^{11} if rate of interest remains same. At E^{11} the goods market is in equilibrium in that planned spending equals output. But the money market will not be at equilibrium. Due to increase in income demand for money increases. Thus excess demand for real balances, the interest rate rises. Firms planned investment spending declines at higher interest rates and aggregate demand falls.

Figure No. 4.7



Income / Output

Increased Government spending increases aggregate demand shifting the IS curve to the risk

Hence full adjustment take place by expansionary effect of higher government spending and the dampening effect of the higher interest rate reduces private spending. Figure 4.7 shows that only at point E^1 both the goods market and money market will be at equilibrium. Thus point E^1 is new equilibrium point where quantity of real balances demanded equal to given real money stock.

4.7.5 Crowding Out :

In fig. 4.7 we see that increased government spending raises both income and interest rate to achieve equilibrium. But comparison can be done between E and E^{11} the equilibrium in the goods market at unchanged interest rate point E^{11} is at equilibrium when we neglect impact of interest rate on the economy. In comparing E^{11} with E in (fig. 4.7) it is clear that adjustment of interest rate and its effect on aggregate demand dampen the expansionary effect of increased government spending, income, instead of increasing level y^{11}, rises only to y^1.

The factor responsible beyond income increase only to y^1 rather y^{11} is that the increase in interest rate from I_0 to I_1 reduces the level of investment spending. Thus increase in government expenditure crowd out investment spending.

Crowding out occurs when expansionary fiscal policy causes interest rate to rise, thereby reducing private spending, particularly investment.

Determination of level of crowd out i.e. level of adjustment of equilibrium level due to dampen of output expansion induced by increased government spending and higher rate of interest.

1) If income increases more and interest rate increases less flatter the LM schedule
2) Income increases less and interest rate increases less. The flatter the IS curve.
3) Income and interest rate increase more the larger the multiplies, and thus the horizontal shift of the IS schedule.

In each situation the extent of crowding out is greater the more the interest rate increases when government spending rises.

4.8 QUESTIONS

1. How to Derive IS Curve?
2. What factors are responsible for downward slope of IS curve?
3. Explain derivation of LM curve.
4. Explain Shift of LM Curve.
5. Explain the concept of Liquidity Trap.
6. How Fiscal Policy influences IS Curve?
7. Explain the concept of crowding out.

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Unit - 5

AS AND AD MODEL AND INFLATION AND UNEMPLOYMENT

Unit Structure :

5.1 Objectives

1. To understand the concept of Aggregate demand and aggregate supply
2. To know factors affecting Aggregate demand
3. To Understand the factors responsible for long run aggregate supply curve
4. To understand the level of equilibrium of aggregate demand and aggregate supply
5. To know trade off of unemployment and inflation
6. To understand short run Phillips Curve
7. To understand difference between short run and long run Phillips Curve
8. To Know the concept of long run and rational expectation concept

5.2 INTRODUCTION :

The model of Aggregate Supply and Aggregate Demand :-

In classical macroeconomic theory the amount of output depends on the economy's ability to suppy goods and services, which in turn depends on the supplies of capital and labour and on the available production technology. Flexible prices are a crucial assumptions of classical theory. This theory implies that price adjust to ensure the quantity of output demanded equals the quantity supplied. The economy work on different way when prices are sticky. Monetary and Fiscal Policy can influence the output over time period when prices are sticky price stickiness provides a rational for why these policies may be effective in stabilizing economy in short run.

5.2.1. The AD-AS model are used to explain variability in output, price level and level of inflation in the Economy.

Aggregate Demand curve depicts the total output of goods and services which holds firms, households Government are willing to buy at various price levels.

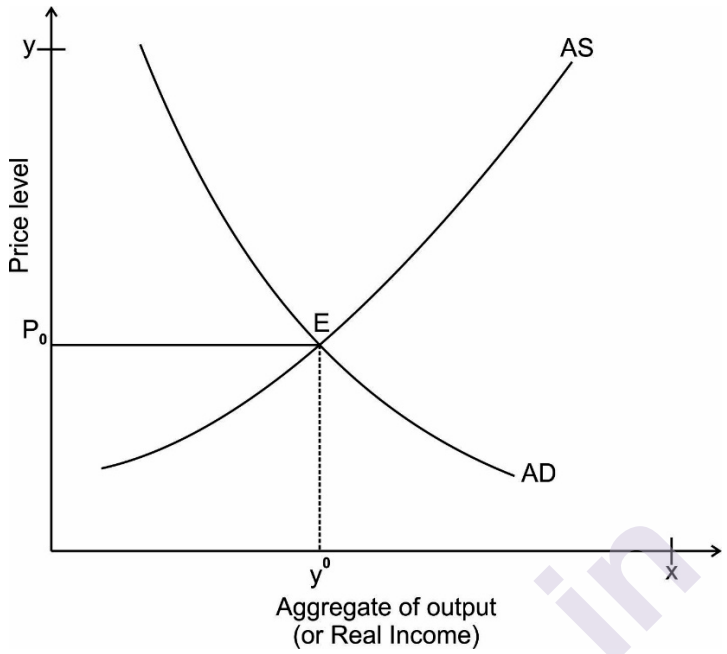
5.2.2. Aggregate Demand curve shows those combination of price level and aggregate output at which goods market and money market are in equilibrium.

$\Rightarrow$ Aggregate supply curve shows the quantity of aggregate output of goods and services that firms of the economy produce and supply at each given price level.

5.2.3. Determination of output and price level through Aggregate Demand and Supply.

In the given figure 5.1. On x-axis Aggregate Output is represents on y-axis price level. The intersection of AD and AS at equilibrium point. E determine equilibrium price level P_o and equilibrium output Y_o changes in any of these will affect price level and output.

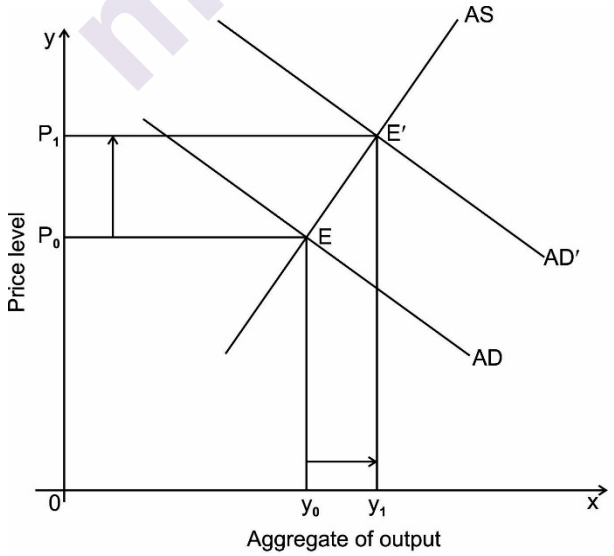
Figure No. 5.1



5.2.4. ⇒Change in Aggregate Demand and its impact on price level and output.

If Government expenditure increases AD curve shift to the Right keeping As curve unchanged in fig. 5.2 as we can see due to increase in government expenditure. AD curve shift upward towards Right hand side. Leading to increase in output from Y_o to Y_1 and increase in price level from P_o to P_1.

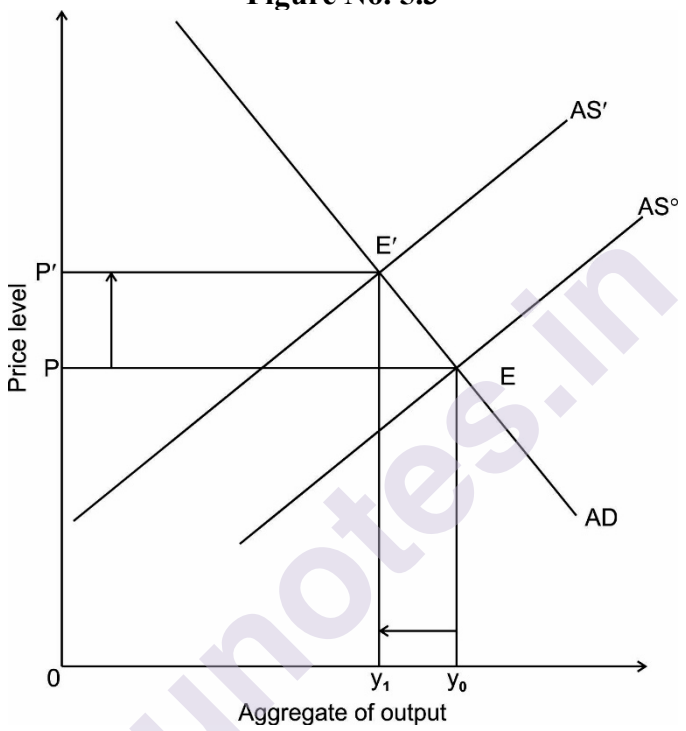
Figure No. 5.2



5.2.5.Impact of decrease in Aggregate Supply on price level and output

If price of input such as wages of labour, prices of raw materials fuels etc. rise ; leading to leftward shift in as curve in given figure 3 due to increase in input cost as curve shift leftward front the original as curve due to which we can see that price level rises from P_o to P_1 and output decline from Y_o to Y_1.

Figure No. 5.3



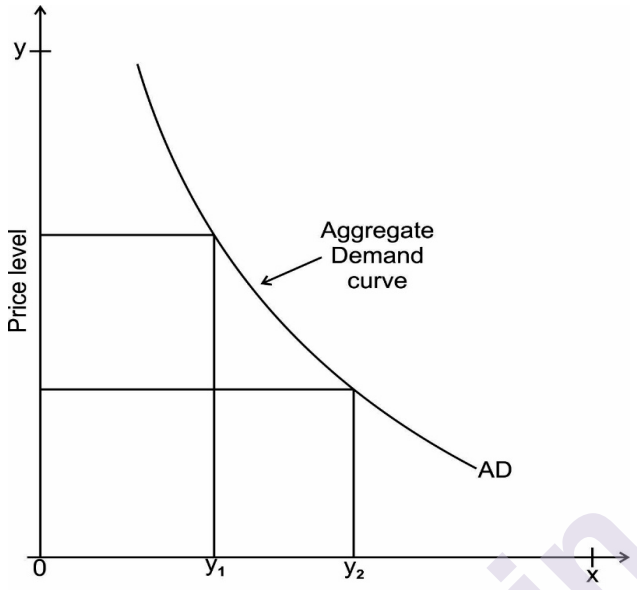
5.3. AGGREGATE DEMAND (AD) :

Aggregate Demand is the relationship between the quantity of output demanded and the aggregate price level.

5.3.1. ⇒Aggregate Demand Curve : The AD slopes downward the higher the price level the lower the level of real balances and therefore the lower the quantity of goods and services demands Y.

In the given fig.5.4 On x-axis represents aggregate output and on y-axis price level. Here we can illustrate why AD curve is downward sloping. Factors responsible for downward slopeof AD curve -

Figure No. 5.4



Aggregate of output
Aggregate Demand Curve with varying price level.

(i) Real Balance effect :

The changes in price level affect the real value (purchasing power of money balance) and monetary assets with fixed nominal values held by the people with the rise in the general price level the real value of these monetary assets will fall making people feel poorer than before. Due to which consumption will decline and demand will reduce. And just inverse to that if the price level falls the real value of their monetary assets increases inducing them to buy more. This is called real balance effect of the change in the price level.

(ii) Rate of Interest :

At a higher price level, the people will require more money for conducting a given amount of transaction. Due to which Demand for money shoot up for making transactions. Keeping money supply constant if demand for money increases as we have seen in IS-LM model. In case of LM model it leads to increase in rate of interest. As a result of which, with higher rate of interest investment in capital formation will reduce. On the contrary, Given the money supply, constant if price level falls, it leads to decrease in demand for money. Because they require less money for transaction. Due to effect of which the rate of interest falls. To conclude, the investment demand and the general price level are inversely related.

(iii) Foreign Trade Effect :

It can also consider as Balance of payment effect if a general price level in India falls, exports will become cheaper leading to their increase. Thus fall in price level in India will lead to more exports and lesser

imports causing expansion in aggregate demand for Indian goods. On the contrary rise in price level in India causes decline in exports and increase in its import.

Thus during inflation rise price level leading to decline in net exports.

Hence, to sum up, the quantity of Aggregate demand for consumption, investment and net export increases with a fall in price level and decline with a rise in price level.

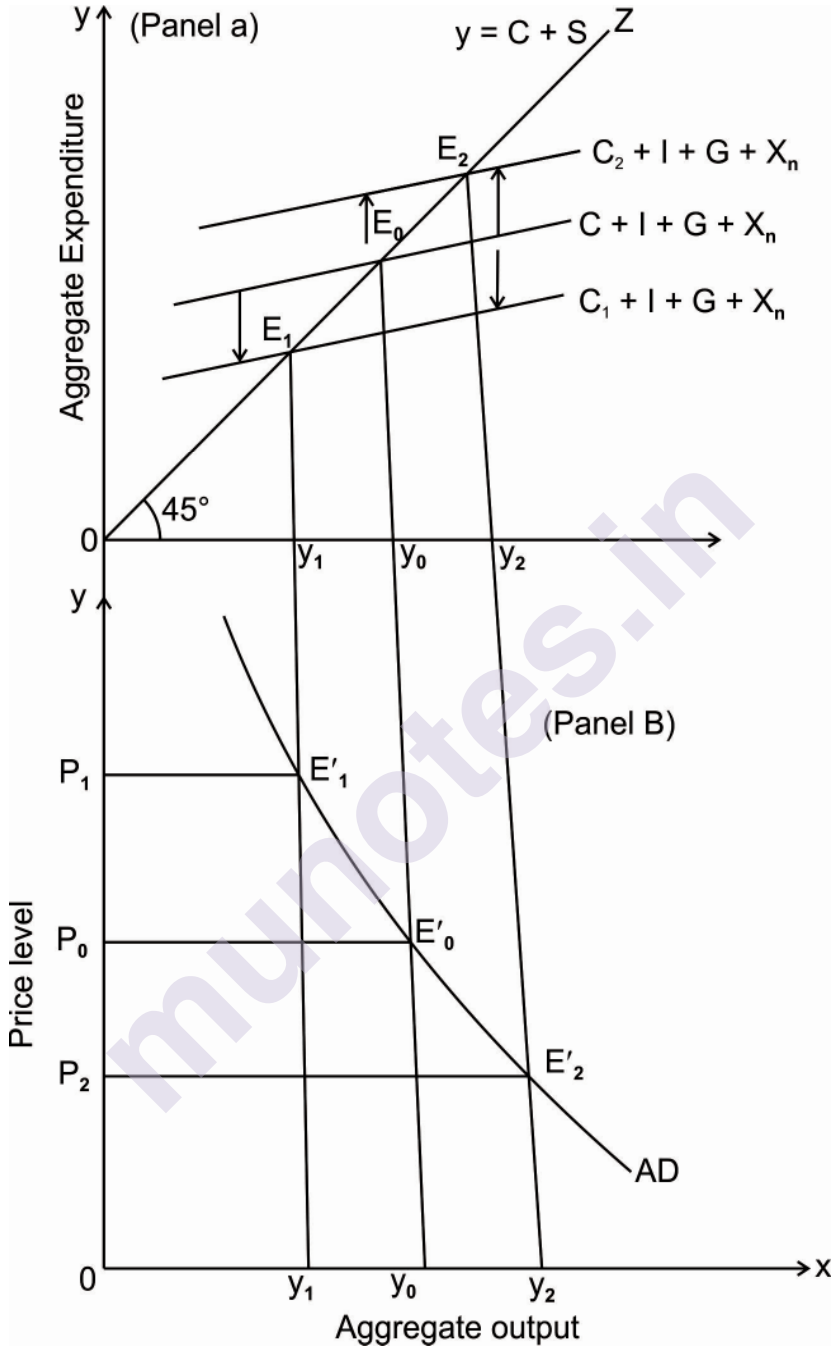
Thus we can conclude that through figure – 4 Aggregate Demand Curve showing relationship between Aggregate output demanded and the general price level slopes downward to the right.

5.4. DERIVATION OF AD CURVE :

Aggregate Demand determinants are (C + I + G + (x – M)) shows equilibrium aggregate expenditure at various levels with lower price level real purchasing power of the money balance or financial asses with fixed nominal values held by he people will increase. Due to lower price level people will consume more at each level of national Income. Hence consumption function curve will shift upward due to which Aggregate expenditure (C + I + G + x - M) curve shift above.

Illustration of diagram. Initially at price level P_o the Aggregate Expenditure function curve. $(C + I + G + x_n)$ intersect the 45^oline at point E_o according to which Y_o is the equilibrium quantity of real GNP or aggregate output demanded. Thus initial price level P_o the equilibrium quantity of aggregate output demanded is Y_o. Therefore, in the panel (b) at the bottom aggregate output Y_o directly against price level P_o.

Figure No. 5.5
Derivation of Aggregate Demand Curve



Let take another condition. Suppose the price level falls from P_o to P_2due to decrease in price level the purchasing power of people will increase and leading to upward shift in consumption function curve (C_2 + I + G + x_n). Thus at lower price P_2 in panel (b) equilibrium output (E_2) aggregate demand at higher level of output Y_2.

Now, if situation get inverse say price rises from P_o to P_1. People feel that they become poor due to fall in their purchasing power. Due to its negative effect they will consume less and consumption function curve ($C_1 + I + G + x_n$) will shift downward. Consumption function curve intersect 45^o line at point E_1 in panel (a). Lower equilibrium level. Thus E_1 determine Y_1 Aggregate Demand at price P_1 in lower panel (b).

Thus by joining equilibrium position at different price level i.e. E_1^1, E_0^1, E_2^1 we will derive Aggregate Demand curve.

Similarly due to rise in price demand for money increases money supply remains same. This is leading to higher interest rate due to which investment in the market will reduce. And thus Aggregate expenditure curve shift downward and thus lower aggregate output demanded.

Just inversely to it at lower price demand for money will fall keeping supply of money unchange. Due to which rate of interest falls. So more investment will take place. And Aggregate expenditure curve shift upward. Hence their will be increase in Aggregate Output Demanded.

Similarly, change in price level also affect exports (x) and imports (M) and therefore cause change in net exports (X_n). When price falls export increases and import falls. On the contrary, due to rise in price export falls and import increases. And according Aggregate Output increase and decrease.

5.4.1. Shift in Aggregate Demand Curve and multiplier effect :

In our above analysis we can see that due to change in price level Aggregate expenditure upward and downward. We kept Government taxation (G), Investment I, and money supply (M), Constant as we consider it as autonomous of changes in price level (and induced changes in the rate of interest).

Now when these non price factors change, aggregate demand curve will shift.

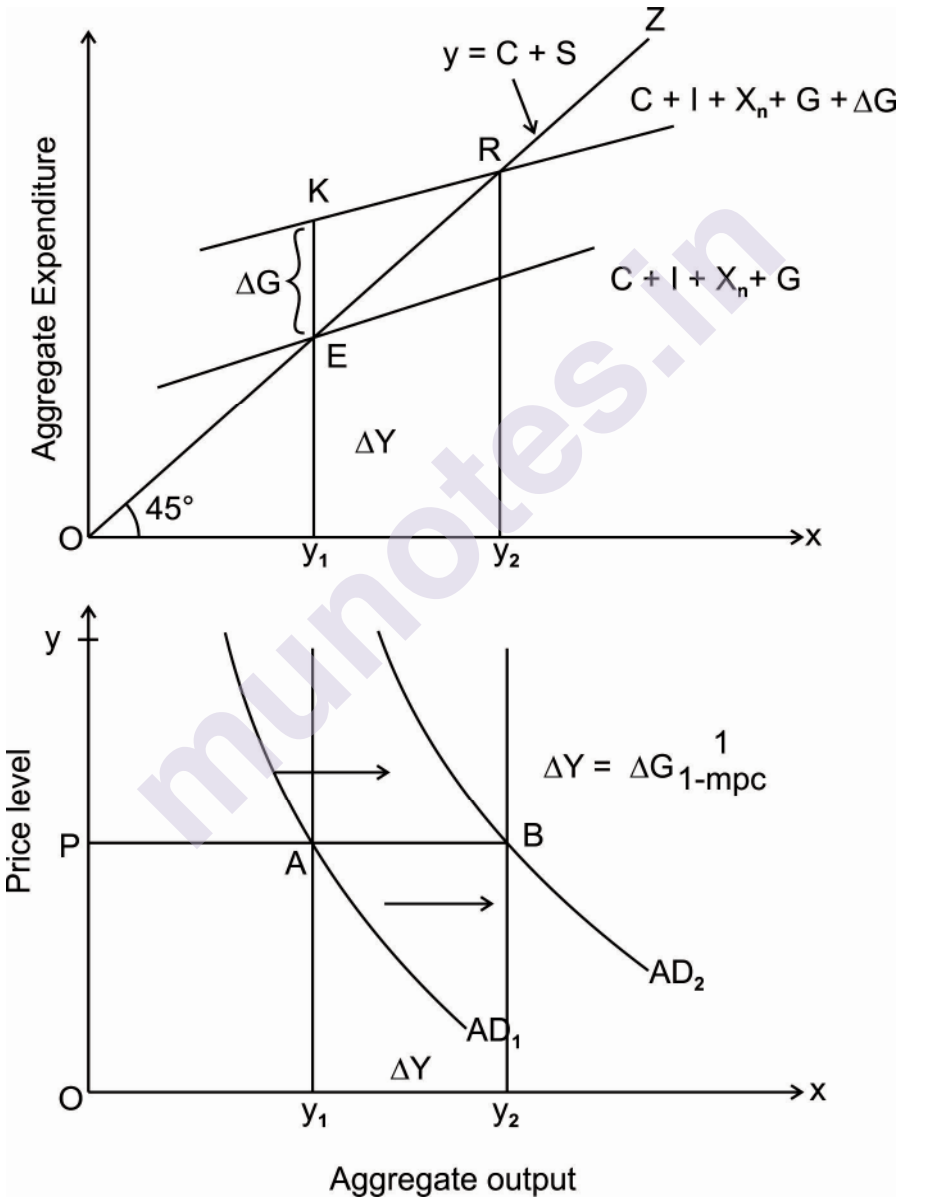
1) Suppose, Government expenditure increases by AG, this will raise expenditure curve upward. Resulting in equilibrium level of aggregate output will increase at the given price level. This means shift in aggregate demand curve at the given price.

In the upper panel of fig. 6 the Aggregate expenditure at given price level P, is $C + I + x_n + G$ which is intersecting at 45^o line at point E yielding equilibrium level of National Income or output equal to Y_1.

Assume that Government expenditure increases ΔG, leads to upward shift of aggregate expenditure curve say $C + I + x_n + G + \Delta G$

which intersects at higher equilibrium level at $P_1$to 45^o line and yield more income Y_2 at given price level in lower panel. This process of increase in Aggregate expenditure due to increase in Government expenditure. Keeping price constant leads to more Aggregate output shifts to Aggregate demand curve towards right hand side as it is shown in the lower panel of fig. 5.6.

Figure No. 5.6
Shift in Aggregate Demand Curve



5.4.2. Multiplier effect :

Government expansion policy refers to decrease in taxation and increase in government expenditure. If government expenditure or investment increases it has multiplier effect. Thus aggregate output demanded depending on the size of multiplier.

$$\Delta Y = Y_1 Y_2 = AB = \Delta G \frac{1}{1\text{-}MPC}$$

$\Delta Y \Rightarrow$Change in income denoted by AB from Y_1 to Y_2 in figure 5.6

ΔG = Increase in government expenditure.
MPC =Marginal Propensity to Consume and 1/1-MPC is then value of multiplier.

The above equation is derived from figure 5.6 and it represent that increase in government expenditure can bring about multiplier time increase in aggregate output RT in the increase level due to multiplier effect.

Similarly deduction of tax rate by government can also influence the Aggregate Output and shift AD curve right hand side.

5.4.3. $\Rightarrow$Shifting of Aggregate Demand is also taking place due to money supply.

- **Increase in money supply :** Increase in money supply keeping same price level rate of interest will fall which leads to more investment in economy. Aggregate Output demanded will be greater at the given level of price level. Hence expansion in money supply shift, aggregate demand curve to the right.

- **Decrease in money supply :**On the contrary to above analysis, if money supply decreases at given price level. Due to its effect interest rate increases and investment falls which causes aggregate demand to fall. Hence AD curve shift leftward from original curve.

$\Rightarrow$ **Conclusion :**

Thus we can concluded from above analysis of aggregate demand. Fiscal and Monetary Policy can affect AD curve position. Expansionary Monetary and Fiscal policy shift AD curve rightward and output increase.

On the contrary to it contractionary monetary and fiscal policy shift AD curve leftward and output declines.

5.5. AGGREGATE SUPPLY :

Aggregate supply is also known as total output, it is the total supply of goods and services produced within an economy at a given overall price in a given period.

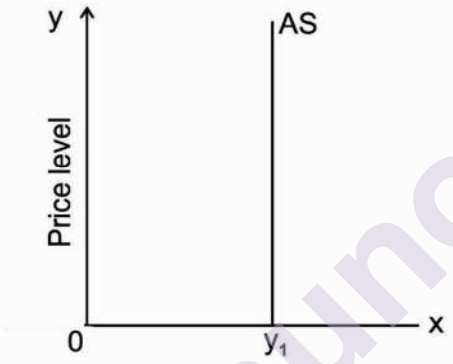
Example of events that would increase aggregate supply include an increase in population, increase in physical capital stock and technology progress.

Aggregate supply can be explained with the help of diagram in different time period.

5.5.1. Short Run Aggregate Supply Curve (With variable price level) :

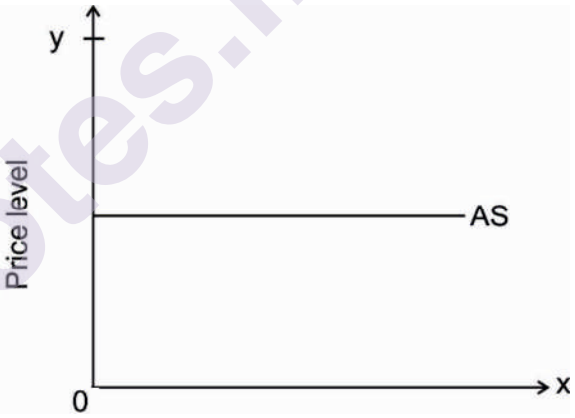
5.5.1.1. ⇒Classical Economist are assumed that full employment prevail in the economy. Thus aggregate supply curve is perfectly inelastic (vertical parallel to Y–axis).

Figur 5.7
Aggregate Supply Curve
Classical view



Aggregate output

Figur 5.8
Aggregate Supply Curve
Keynesian view



Aggregate output

Figure 7 shows Classical approach of Aggregate supply curve with given price level and employment.

5.5.1.2. ⇒ Keynesian :-Keynesian Aggregate Supply Curve shows relationship between price level and the aggregate production (Supply) during the period of depression and involuntary unemployment when there is excess capacity in the economy. As shown in figure 8 Aggregate Supply is horizontal straight line perfectly elastic showing that in response to increase in Aggregate Demand more is produced and supplied at the same price level OP.

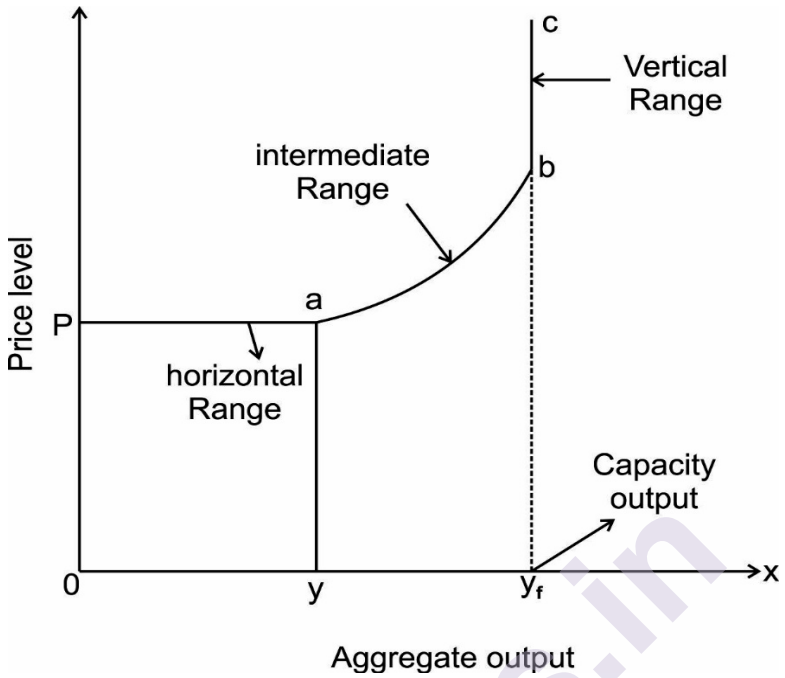
Three Ranges of Short Run Aggregate Supply Curve:

Short Run Aggregate Supply Curve consist of three ranges

i.e. (a) Horizontal Range
(b) Intermediate (upward sloping range) and
(c) Vertical Range.

Figure No. 5.9

Short run aggregate supply curve with three ranges



(a) Horizontal Range :- (P.a.)

Keynesian and his followers assumes that Aggregate Supply Curve was horizontal from P to a in fig. 9 is consider as Keynesian Range. Economy reaches its optimal level at full employment Y_p in fig. 9. As we can see from above diagram that Keynesian range comprises levels of output that are substantially less than full capacity production Y_f. The gap between Y and Y_f implies that production can be expanded without facing rise in unit cost of production. This gap shows grip of severe recession or depression with a lot of idle capacity in the form of unemployed labour, unutilised machinery and other capital equipment.

(b) Intermediate Range:- (a.b)

In figure 5.9 range between ab is intermediate range where as curve is upward sloping increase in output from Y to Y_f brings about rise in price level.

Causes of upward sloping Aggregate Supply Curve. First, the gap between the resource available for utilisation and full employment.

Example nation production expands in this range some industries say electronics and computer hardware may experience shortage of skilled engineers engaged in these industries while some industries. Such as textile industries may be still facing quite large unemployment. Due to such factors bottlenecks in production arise which will increase the cost of production where as economy is operating below full employment level.

Secondly, due to more demand for raw material for expanded form of production will increase the cost of production.

Thirdly, constant wage and diminishing marginal productivity of labour causes increase in cost of production.

Thus due to all above reasons, unit cost of production increases even before full employment. Thus product price must rise it firms have to recover the rising cost.

(c) Vertical Range : (b – c)

Classical Range in figure 9 is vertical i.e. perfectly inelastic. Classical believe that economy is at full employment level Y_f.

The vertical shape of AS curve represent that any further rise in the price level will fail to cause any increase in aggregate output because economy is at optimum utilisation of resources.

5.6 LONG RUN AGGREGATE SUPPLY CURVE : (LRAS)

Determinants of LRAS are labour, capital and technology.
Y = F (L, K, T)

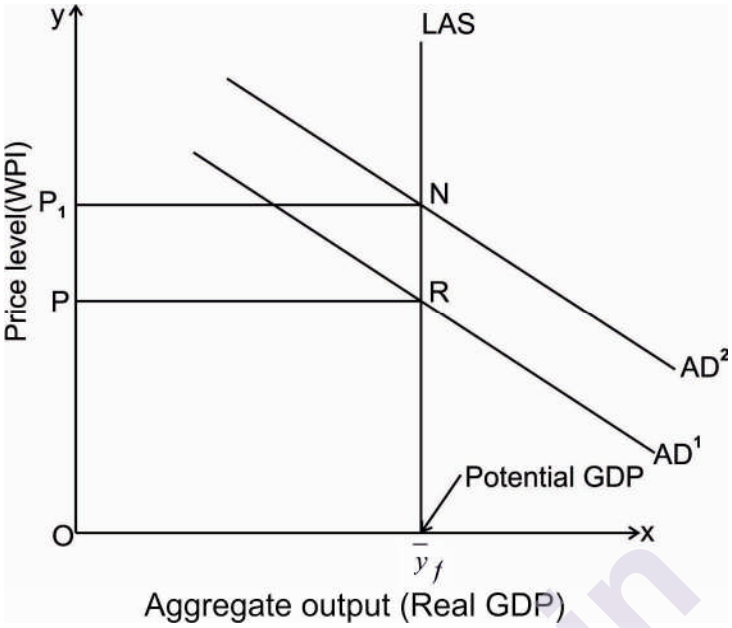
The Long Run Aggregate Supply Curve is vertical which reflects economists beliefs that changes in the aggregate demand only temporarily change the economy's total output.

From above given determinants labour is most variable factor and they are ready to supply their labour at equilibrium wage rate at which full employment will exist. Even at full employment level some workers are in search of new and better job.

Thus frictional and structural type unemployment type of unemployment exist even at full employment level of Aggregate Output. Such type of unemployment is called natural rate of unemployment. So around 4% to 5% of unemployment exist in economy is consider to be full employment. At quantity of real GDP produced and supplied at natural rate of unemployment.

$\Rightarrow$The Long Run Aggregate Supply describes the relationship between the quantity of Real GDP and the price level in the long run where real GDP equals potential GDP.

Figure No. 5.10 Long Run Aggregate Supply



As we can see in fig. 5.10 long run Aggregate supply curve is vertical because potential GDP does not vary with price level.

To show this we can illustrate with help of diagram (fig. 10) where Aggregate Demand curve shift upward to AD^2 price level rises to P^1 but Aggregate output is much percentage of change in price bring about equal percentage change in real wage as well thus Aggregate Supply curve in long run is unchanged i.e. vertical.

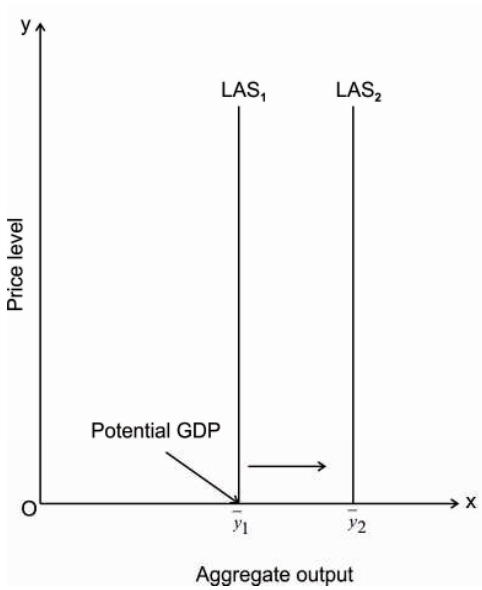
5.6.1 Changes in Aggregate supply curve :

It is changes in potential GDP which shifts the Aggregate supply curve the factors responsible for change in Aggregate supply curve in Long Run (i) change in the full employment quantity of labour. (ii) change in the stock of capital (iii) progress in technology.

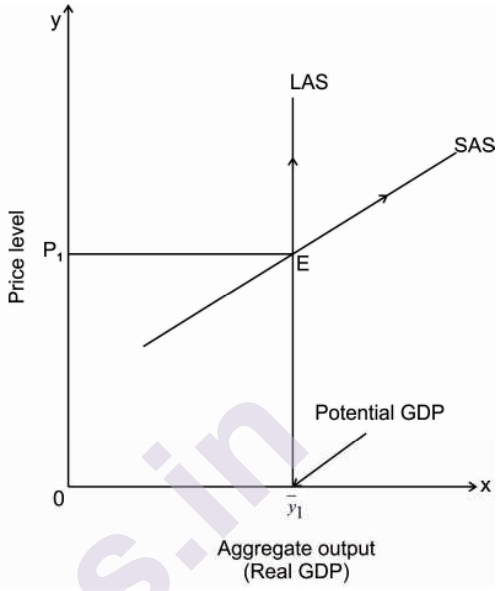
Figure No. 5.11
Increase in labour force,

Figure No. 5.12
Short run Aggregate

Capital stoc and progress
In technology increase
Potential GDP and Shifts
LAS curve



Figur 5.11



Figur 5.12

Thus from above fig. 11 we can analyse that if we have efficient trained, skilled, educated labour force with aboundant capital availability and Advance technique of production leads to Righ ward shift in Aggregate supply (LRAS) and increases real GDP from $\overline{Y}_1$ to $\overline{Y}_2$.

In short run Fig. 12 only labour is variable factor, capital and technology remains constant. Nominal wages are sticky in the short run. When actual price level rises in the short run, more quantity of real GDP produced and supplied. Though wage rate is sticky as it is determined on the basis of long run contract. But due to increase in actual price level the real wage falls. The lower real wage induces firm to employ more labour. The increase in employment of labour will lead to the increase in aggregate output. Due to which the Aggregate supply curve in short run is upward sloping.

Short Run Production Function :

$$Y = F\left(L, \overline{K}, \overline{T}\right)$$

Y = Aggregate output
L = Labour is variable
$\overline{K}$ = Constant capital in short run
$\overline{T}$ = Technology also is constant in short run

5.7 MACRO ECONOMIC EQUILIBRIUM :

AS - AD model

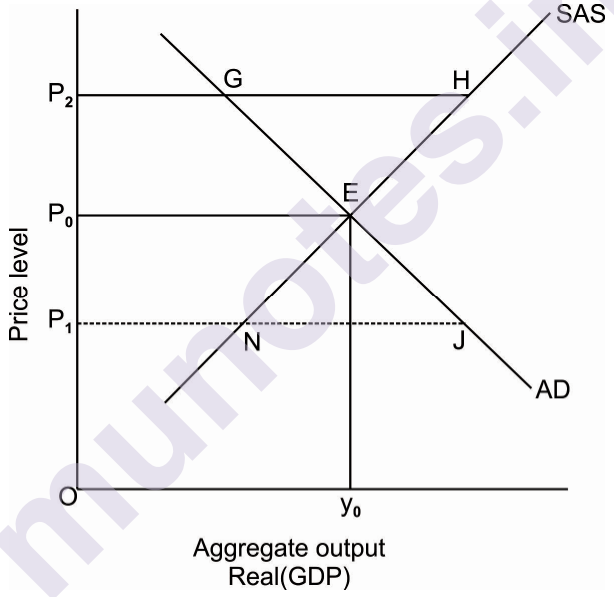
The level of equilibrium where both AD - AS intersect is also know as effective Demand or macro economic variable. According to J.M. Keynes, the level of income and output in an economy is determined by the level of employment and the level of employment is determined by the level of effective demand. Greater the level of effective demands, greater would be the level of employment.

Macro Economic equilibrium explained below at both short run and long run situation.

5.7.1. Short - Run Macroeconomic Equilibrium :

Short Run Macroeconomic Equilibrium take place when AD = AS.

Figure No. 5.13
Short run Macroeconomic variable



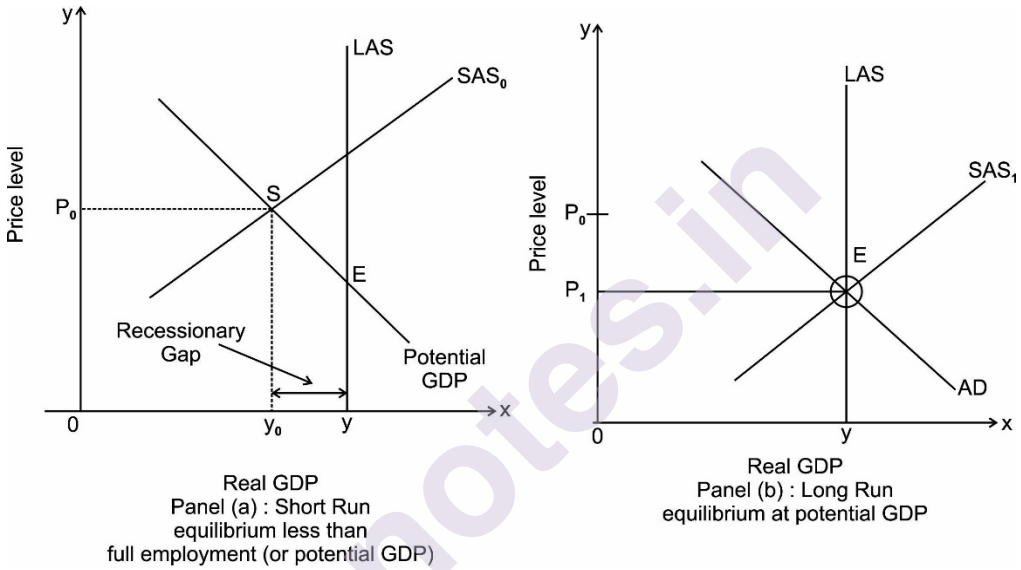
As it is shown in Fig.13 at point E_1. Any deviation from this level will bring disequilibrium. Suppose price level rises from P_1 to P_2.Aggregate demand will be at G < than H quantity supplied at P_2price. Due to which unintended inventories will fill up and firm will at both production and the prices. And thus will reach to equilibrium at P_1 price level. On the contrary, when price level is P_1aggregate demand is at J > than aggregate supply at N. Which in…… firm to increase production and raise prices. Thuswe can conclude that changed in factors at AD and AS fluctuate level of equilibrium

5.7.2. Long - Run Macroeconomic Equilibrium :

Long Run equilibrium occurs when real GDP equals potential GDP. Long run equilibrium of price level and real GDP is reached when money wage rate adjusts so that the short-run aggregate supply curve shifts to intersect the long run Aggregate Supply Curve (LRAS) at the point at which aggregate demand curve intersects the latter.

Figure No. 5.14

Panel (a) : Short run equilibrium less than full employment (or potential GDP) **Panel (b) : Long run equilibrium at potential GDP**



As we can see in Fig.5.14 Panel (a) Short run aggregate supply curve intersects short run aggregate demand curve at point S at $Y^0$is Real GDP level at price $P_o$which is less than potential GDP $\overline{Y}$. Thegap between $Y_o\overline{Y}$ is due to recession this situation exists because the production is less than potential GDP. Cyclical unemployment occur due to which unemployment rate exceed the natural rate of unemployment.

If money wage rate is flexible at classical economist think they are then in the short run equilibrium at point S at more than natural rate of unemployment, money wage rate will fall. As a result, short run aggregate Supply Curve (SAS) will shift rightward. This shifting will be continue until it intersects the Long Run Aggregate Supply Curve at point E in panel (b). This new equilibrium price level falls to$P_1$and aggregate demand increase to potential GDP.

On the contrary if short run equilibrium is at more than potential level of output. Then is leads to inflationary gap in the economy.

Thus the optimum level is the position where Aggregate Demand Curve intersects Long Run Aggregate Supply Curve at potential real GDP at full employment $\overline{Y}$.

5.8 INFLATION AND UNEMPLOYMENT

5.8.1 Introduction :

Inflation : In a broad sense the term, inflation means a considerable and persistent rise in the general level of prices over a long period of time.

⇒ According to pigou, "Inflation exists when money income is expanding more than in proportion to increase in earning activity."
⇒ According to Ackley, "Inflation is a persistent and appreciable rise in the general level or average of prices."
⇒ According to Samuelson, "Inflation denotes a rise in general level of prices."

5.8.2 Measure of Inflation :

There are two measure of inflation

i) Percentage change in price index number (PIN).
ii) Change in GNP Deflator

$$\text{Rate of Inflation} = \frac{PIN_t - PIN_{t-1}}{(PIN_t)} \times 100$$

$$\text{GNP deflator} = \frac{\text{Nominal GNP}}{\text{Roal GNP}}$$

5.8.3 Types of Inflation :

1) Moderate Inflation : Single digit rate of annual inflation is collect moderate inflation or 'creeping inflation'.

2) Galloping Inflation :

According to Baumal and Blinder, "Galloping inflation refers to an inflation that proceeds at an exceptionally high rate."

According to Samuelson and Nordhaus, "Inflation in the double - or triple digit range of 20,100 or 200 percent a year is labeled galloping inflation.

3) Hyper Inflation : A price rise at more than three digit rate per annum is called hyper inflation. Inflation that exceeds 50% month. During the period of hyper inflation paper currency becomes worthless and demand for money decreases drastically.

5.8.4 Unemployment :

Unemployment is a situation in which those who are willing to work at the prevailing wage rate do not find job.

Unemployment - Labour force - number of employees

Labour force of a country consists of person belonging to the age group of 15 to 65 years.

Labour force = Number of Employed + Number of unemployed

$$\text{Unemployment rate} = \frac{\text{Labour force - employment}}{\text{Labour force}} \times 100$$

$$\text{Unemployment rate} = \frac{\text{Number of employed}}{\text{Labour force}} \times 100$$

5.8.5 Concept of unemployment :

i) Usual status of unemployment
ii) Current weekly status unemployment
iii) Daily status unemployment

5.8.6 Kinds of unemployment :

i) Frictional unemployment
ii) Structural unemployment
iii) Natural unemployment
iv) Cyclical unemployment

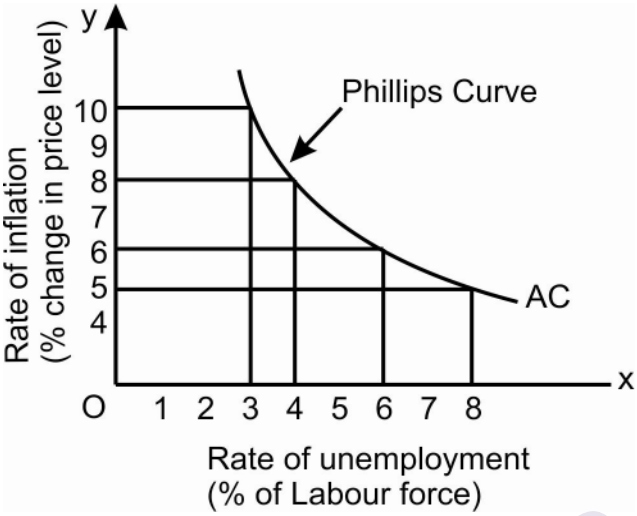
5.9 INFLATION AND THE RATE OF UNEMPLOYMENT

The neoclassical economist held the view that inflation does not affect the level of employment. However in 1958, A.W. Phillips, a British Economist and a professor at London School of Economics, brought out a study of the relationship between unemployment and the change in money wage rates in the British economy (1862-1957). Phillips found on inverse relationship between the rate of changes in the money wage rate and the rate of unemployment. This inverse relation implies a trade-off. To reduce unemployment inflation need to increase i.e. increase in price level.

5.10 THE PHILLIPS CURVE

Phillips revealed in his study that there exists an inverse relationship between the change in money wage rate and the rate of unemployment in the form of a curve called Phillips curve.

Figure No. 5.15



The Philips curve is presented in Fig. 5.15 on x axis Rate of unemployment and on y axis. Rate of inflation is presented. PC curve is Philips curve. It is downward sloping showing inverse relation between unemployment and rate of inflation. At high inflation rate say 10% the level of unemployment is 3% whereas at low rate of inflation at 5% the unemployment rate increased to 8%.

This trade off presents a dilemma for the policy makers; should they choose a higher rate of inflation with lower unemployment or a higher rate of unemployment with a low inflation rate.

Explanation of Philip Curve :

Keynesian approach for Philips curve Aggregate supply is upward sloping at intermediate range. It is near to full employment level.

According to Keynes there are two reason for upward slope in Aggregate supply curve are those are

1) AS output increased by the firms in the economy, diminishing returns to variable factors, especially to labour, resulting in fall in marginal physical product $\left(MPP_L\right)$ of labour with given constant money wage fall in MPP_L causes rise in marginal cost (MC) of production. $\left(MC = \frac{w}{MPP_L}\right)$

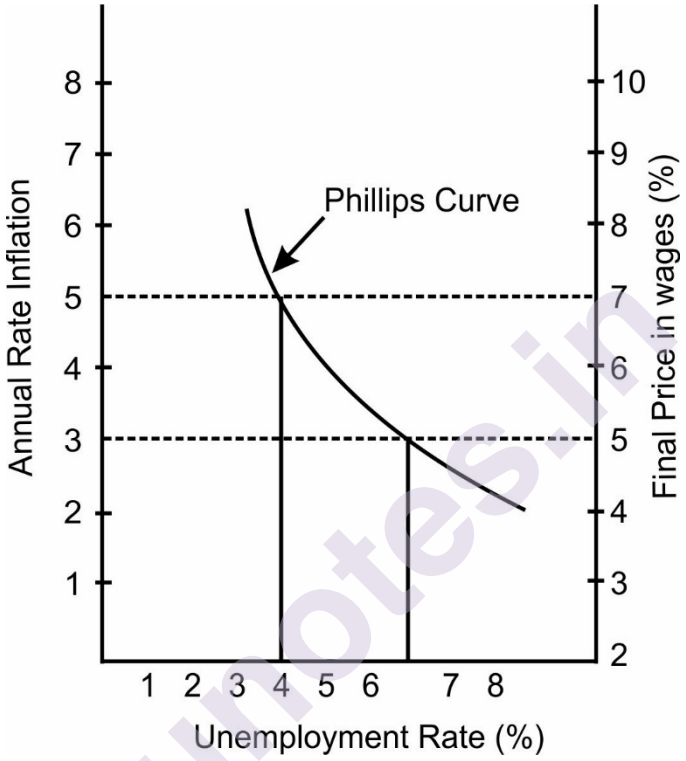
2) As employment and output increase, increase in Aggregate demand as we have seen in fig. 14, demand for labour increases. And thus increases wage rate leading to upward sloping Aggregate supply curve.

Philips curve while describing the relationship between inflation and unemployment, consider the relationship between rate of increase in wage on one hand and unemployment one other hand.

Trade offbetween Unemployment and Wage - Price Rise :

Phillips curve not only explain the relationship and wage rates and unemployment rates but also explain the relationship between rice level and unemployment rate.

Figure No. 5.16
Theoretical Phillips curve inflation and unemployment



Trade off means that a certain rate of inflation can be traded for same rate of unemployment. In fig. 5.16 the vertical axis on the left measures the annual rate of inflation and the horizontal axis measures the rate of unemployment. The vertical axis on the Right measured the annual percentage rise in the wage rate.

Inflation rate equals rate of increase in curves cost annual rate of increase in labour productivity wage rate will be 2% greater than inflation rate. e.g. if wages increases by 5 percent and labour productivity increases by two percent, then the rate of inflation is only 3% (average push inflation).

Given the Phillips curve in fig. 5.16 the trade off between the unemployment and the inflation rate can be easily found.

Example : In fig. 16, a 2.5% (6.5% - 4%) unemployment can be traded for a 2 percent (=5% - 3%) inflation. This shows that if policy maker tries to reduce unemployment by 2.5% that from 6.5% to 4%, they have to increase inflation from 3% to 5%. And on the contrary if target is to

reduce inflation by 3% from 5% then we have to accept increase in unemployment from 4% to 6.5%.

A similar conclusion can be drawn by unking unemployment rate to wage - inflation rate given on the vertical axis on the right hand side.

Phillips curve is short run phenomenon in the long run Phillips curve keeps shifting. The Phillips curve found relevant only for the period (1961-69). In 1970 in its economy their was cut adverse ??? economy was suffering from high level of unemployment as well as high inflation. Due to which the growth of economy was very low. Such situation with high unemployment + high inflation and low economic growth is termed as stagflation.

It is therefore concluded that there exists either no or a weak relationship between inflation and unemployment in the long run.

5.11 THE LONG RUN PHILLIPS CURVE

Prideman's theory of Natural Rate of unemployment.

Milton Friedman integrated the logic of the short-run Phillips curve into the macro economic theory and explained the spiraling. Phillips curve. In the process he formed (constructed) Long run Phillips curve. According his studies he believes that in the Long run there is only one rate of unemployment whatever is the rate of inflation. This rate of unemployment is called "Natural rate of unemployment". It is also termes as "Non-accelerating inflation rate of unemployment" (NAIRU).

NAIRU is that it exist even when labour market is cleared and is consistent with the potential level of output. Friedman argues that NAIRU cannot be eliminated permanently by means of expansionary monetary and fiscal policies of the government. The expansionary policy may only accelerate the rate of inflation and cause an upward shift in the Phillips curve showing higher levels of unemployment and inflation rates. It is thus ultimately the Phillips curve becomes a vertical line.

Figure No. 5.17

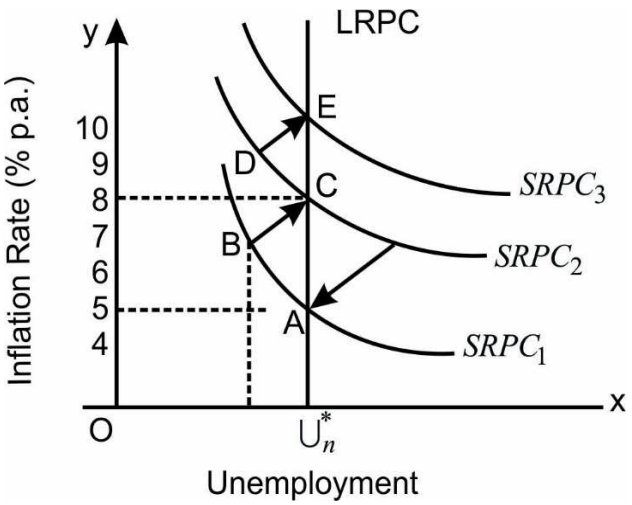


Fig. 5.17 Friedman's Longrun Phillips curve on x axis unemployment Rate % is meationed. On y axis inflation rate % is measured $SRPC_1, SRPC_2, SRPC_3$ are short run Phillips curves at different level of unemployment and inflation rates. Now suppose that at some point of time the economy is at point A with unemployment U_n^* and inflation rate of π and that these rates are consistent with the potential level of output. If policy maker decides to reduce unemployment to do so they will apply expansionary policy. As economy is at potential level as we can see in fig. 17 at U_n^* expansionary policy will push up the price level. Due to increase in price real wage of workers go down. As a result employee increase their demand for labour, employment increases and unemployment decreases. Thus with rising prices and decreasing unemployment Trade off at point A moves towards point B along the short run Phillips curve $SRPC_1$ the range area from A - B i.e. unemployment reduce from U_n^* to U. However the decrease in the unemployment rate below its natural rate could be possible only if real wage declines and there is a time lag between the money wage catching up with the price rise. This time lag is due to lack of realization of pinch of increase in inflation rate.

But latter on they started realizing the pinch of higher inflation rate ?????

Thus they begin to incorporate their expectations into their demand for higher money wages maturing with the expected price rise.

Labour's will negotiate for higher wage rate. Wage bargaining will take place as a result the real wage begin to increase. The rise in Real wage causes decline in demand both labour. Due to which the labour market begin to move towards higher level of equilibrium point at C.

movement from B to C indicate increase in both inflation and unemployment. Thus this will shift $SRPC_1$ to $SRPC_2$. As a result, the rate of unemployment rises back to its natural level, U_n^*. The rate of inflation rises from π to π_2. Any further step taken towards reduction in unemployment again same movement will takes place further from C to D and they ultimately from D to E as is happen earlier. An attempt to reduce the natural rate of unemployment through expansionary policies results only into an upward shift in the Phillips curve without reducing the natural rate of unemployment permanently. When we consider long run view of the Phillips curve and its upward shift. We will get equilibrium point shifting upward from A to C and then to E all conforming to the short run Phillips curve. When we join all these equilibrium points A, C, E we get a straight vertical line which is called friedman's Long Run Phillips curve (LRPC).

5.12 LONG RUN PHILLIPS CURVE AND RATIOANL EXPECTATIONS

Rational Expectation theory which is popularly known as new classical macro economics. According to Rational expectation theory there is no lag in adjustment of nominal wages consequently to the rise in price level. Rational expectation theory rest on two basic elements.

1) According to it, workers and producers being quite rational have a correct understanding of the economy and therefore correctly anticipate the effects of the governments economic policies using all the available relevant information.

2) Wages and product prices are highly flexible and therefore can quickly change upward and downward. New information is quickly assimilated in the demand and supply curve of the market. Thus new equilibrium prices adjust to the new economic events and policies. The increase in Aggregate demand or expenditure as a consequence of easy monetary policy of the Government will fail to reduce unemployment and only inflatin will be increasing. According to rational expeditions the off long-run aggregate supply curve is a vertical straight line at potential GDP level such as LRPC in fig. 17.

5.13 CONCLUSION

The logical conclusion that follows is that attempt should be to keep the unemployment rate close to its natural rate. but some economist criticize and recommended that Natural rate of unemployment itself is fuzzy concept. Even optimum level that potential level of economy itself is also fuzzy concept it's better to start or to learn to line with inflation.

5.14QUESTION

1) Explain the concept of Aggregate Demand.
2) How to derive aggregate demand curve.
3) Why Aggregate Demand Curve slope downward?
4) Explain short run supply curve.
5) Illustrate with suitable diagram Long Run Aggregate supply curve.
6) Explain macro economic equilibrium AD-AS model.
7) Explain Short Run Phillips curve.
8) Explain Long Run Phillips curve.
9) Explain Long Run and Rational Expectations.

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Module 3

Unit-6

THE OPEN ECONOMY: DEFINITIONS AND CONCEPTS

Unit Structure:

6.0 OBJECTIVES:

After going to this unit you will able to:

1. Understand the concept of balance of payment (BoP).
2. Understand the concept of trade balance.
3. Understand the concepts of capital mobility and automatic adjustment.

6.1 INTRODUCTION:

Macro open economy model mostly includes international trade of the nation where balance of payment, trade balance, capital mobility, exchange rate regimes, what is automatic adjustment? etc. These are the key concepts to understand open macro economy models and policy framework. So, in this chapter, we discuss above important concepts in detail.

6.2. TRADE BALANCE:

Trade balance is also known as the balance of trade (BoT) which indicates the distinction between the monetary value of a country's imports and exports in a given time period.

Balance of trade (BoT) or trade balance is the visible current account of balance of payment (BoP).

Formula,
Trade balance calculates by below formula.

Trade Balance = Value of Exports of Goods – Value of Imports of Goods

In the case of trade balance there are two possibilities as below-
1. Positive trade balance/ Trade Surplus
2. Negative trade balance/ Trade Deficit

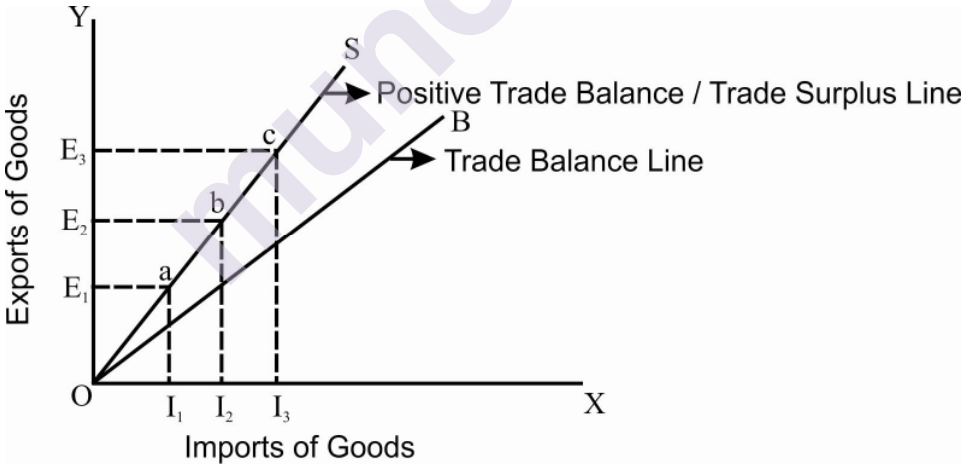
6.2.1 Positive Trade Balance / Trade surplus:

When the value of trade balance comes positive, it means export value is greater than import value, it is called as trade surplus.

Trade surplus = value of export > value of import

The positive trade balance or trade surplus has been explained in detail by below diagram-

Figure No. 6.1
Trade Surplus



Above figure shows the trade surplus. In this figure, on the X axis imports of goods have been shown and Y axis, exports of goods. OS curve is a trade surplus curve and OB is a trade balance curve. OS curve is a right of OB curve which shows positive trade balance on which every point (a, b & c) shows that exports of goods is greater than imports of goods.

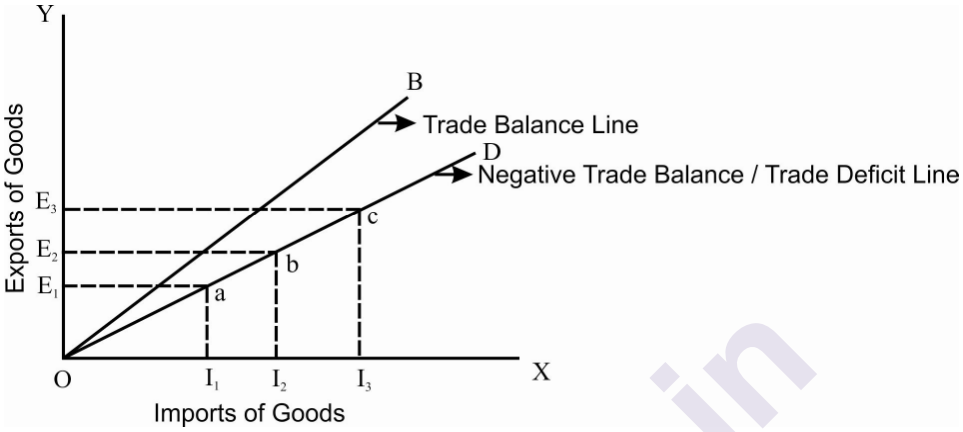
6.2.2 Negative Trade Balance/ Trade Deficit:

When the value of trade balance comes negative means export value is less than import value, it is called as trade deficit.

Trade deficit = value of export < value of import

The negative trade balance or trade deficit has been shown in detail by below figure.

Figure No. 6.2
Trade Deficit

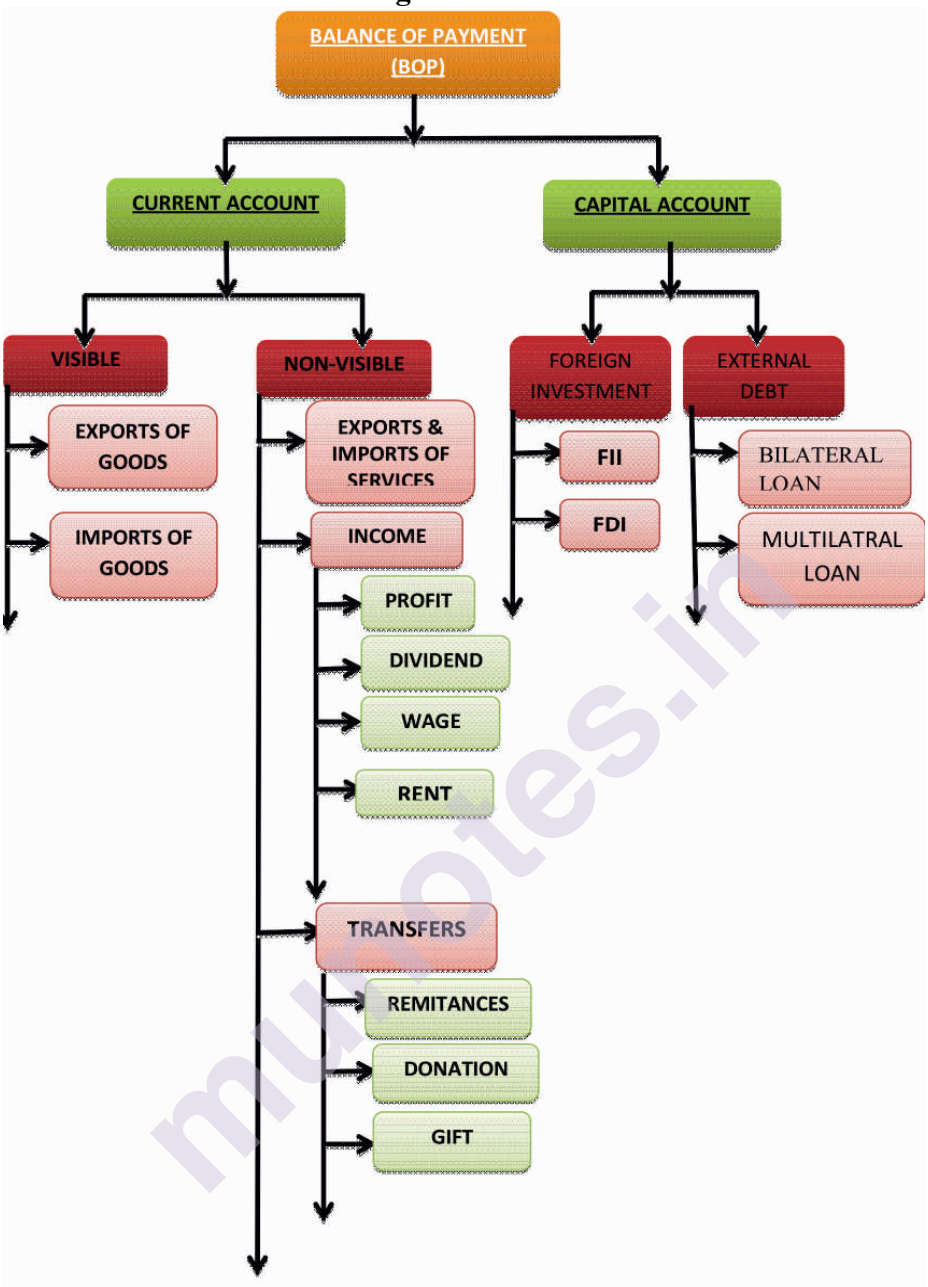


Above figure indicates that the trade deficit. In this figure, on the X axis imports of goods have been shown and Y axis; exports of goods have been mentioned. OD curve is a trade deficit curve and OB is a trade balance curve. OD curve is a left of OB curve which shows negative trade balance on which every point (a, b & c) indicates that import of goods is greater than export of goods (export of goods is less than import of goods).

6.3 BALANCE OF PAYMENT (BOP)

The balance of payment (BOP) of a country is the record of all economic transactions between the residents of the country and the rest of the world in a particular period of time (one year). In the balance of payment, there are two sub-accounts which are current account and capital account. The balance of payment account structure is as follows.

Figure No. 6.3



Balance of payment (BoP) is a record book of international transactions which is called as double entry account. The structure of BoP account is slightly complex, because in this single account, there are multiple subaccounts which have been explained with the help of above diagram. In this diagram, there are mainly two accounts, first is current account and second is capital account. In the case of current account, there are two subaccounts these are visible account and invisible account. Visible account refers to only export of goods and import of goods which also known as balance of trade (BoT) or trade account, invisible account which refers export and import of services, income (wage, profit, rent and dividend) and transfers (remittances, donation and gift).

Capital account refers to international investment flow in which FDI, FII and debt services are explicitly shown. Balance of payment (BoP) has another important three accounts. These are also known as adjustment accounts. These are overall balance, error and omission and reserve account.

The actual balance of payment (BoP) sheet of Government of India has been given for the financial year 2018-19 which has been taken from economic survey of India, 2019-20.

Table No. 6.1
Balance of Payment Sheet of India, 2018-19

Sr. No.	Item	2018-19
I	**Current Account**	
1.	Exports	3,37,237
2.	Imports	5,17,519
3.	Trade Balance (1-2)	-1,80,283
4.	Invisibles (net)	1,23,026
	A. Services	81,941
	B. Income	-28,861
	C. Transfers	69,946
5.	Goods and Services Balance	-98,342
6.	**Current Account Balance (3+4)**	**-57,256**
II	**Capital Account**	
	Capital Account Balance	**54,403**
	i. External Assistance (net)	3,413
	ii. External Commercial Borrowings (net)	10,416
	iii. Short-term credit	2,021
	iv. Banking Capital (net) of which:	7,433
	Non-Resident Deposits (net)	10,387
	v. Foreign Investment (net) of which:	30,094
	FDI (net)	30,712
	Portfolio (net)	-618
	vi. Other Flows (net)	1,026
III	**Errors & Omission**	**-486**
IV	**Overall balance**	**-3,339**
V	**Reserve Changes [increase (-)/ decrease (+)]**	3,339

(Source: Economic Survey of India, 2020-21)

Above table provides practical and more appropriate example to understand what is the exact composition and structure of balance of payment (BoP).

6.4 CAPITAL MOBILITY

Capital mobility is become inevitable in globalized economy; because, economic integration is increasing in 21st century. Therefore, financial market and capital market in which bonds and stocks are traded. In the industrial countries, there are no restrictions on asset holding in abroad. There are two main versions of capital mobility. One among them is very popular in developed countries and second one is popular in developing countries like India, Shrilanka and most Asian countries etc.

These two versions of capital mobility are as follows-

1) Perfect capital mobility.
2) Imperfect capital mobility.

Perfect capital mobility is the version adopted by developed countries where economic integration became necessary. So, there is no issue of capital mobility. Capital mobility means capital is perfectly mobile internationally when investors can purchase assets in any country by their interest, this transaction happens at very low cost and unlimited amount. When capital is perfectly mobile, investors or asset holders are willing and able to move a large amount of funds across borders in a search of highest profit on assets. So, profit or returns on capital is main driven source behind capital mobility. Perfect capital mobility is suitable and favourable to most developed countries.

The second version of capital mobility is called imperfect capital mobility where capital is not perfectly mobile, but with the permissions of government of nation, there are some companies, government sectors, investors which can invest in abroad. This type of system is called imperfect capital mobility where investors faces restrictions on investment in abroad and vice-versa. This type of system mainly found in the developing countries like India and most Asian countries.

6.5 AUTOMATIC ADJUSTMENT

Automatic adjustment is the concept related to the balance of payment (BoP) of the country. How automatic adjustment happens in balance of payment? The automatic adjustment in balance of payment is a complex phenomenon and difficult to understand. Automatic adjustment in the nation's balance of payment is very important issue for economist and policy makers. The economists have suggested various methods and approaches to correct the balance of payment disequilibrium. One among them is the classical approach of automatic adjustment which is automatic

adjustment in balance of payment under fixed exchange rate and automatic adjustment in balance of payment under flexible exchange rate.

6.6 SUMMARY

This unit is delivered the knowledge about trade balance (positive trade balance and negative trade balance) the structure of balance of payments (BOP), capital mobility and automatic adjustment which are very important concepts in the study of open economic models in macro economics. The actual structure of balance of payment (BOP) of India is easy to understand with the help of balance of payment sheet which has been given for 2020-21 in this unit.

6.7 QUESTIONS

1) Explain the concept of trade balance with the help of diagrams.
2) Explain structure of Balance of Payment (BOP).
3) Explain the concepts of capital mobility and automatic adjustment in short.

6.8 REFERENCES

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Unit -7

IS-LM-BP Model

Unit Structure :

7.0 OBJECTIVES

After going to this unit you will able to :

1. Understand the IS curve
2. Understand the LM curve
3. Understand the BP curve
4. Understand IS-LM-BP model under flexible and fixed exchange rates.

7.1 INTRODUCTION

The IS-LM-BP model is known as IS-LM-BoP model or Mundell-Fleming model or open economy IS-LM model. IS-LM model is used in autarchy. IS-LM model is formulated by Robert Mundell and Marcus Fleming. Mundell explained this model in his research paper entitled 'Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rate' in 1963 and Fleming depicted in his article 'Domestic

Financial Policies under Fixed and under Floating Exchange Rates' in 1962. This model is more realistic in nature, because it assumed imperfect capital mobility and thus made this IS-LM-BP model more rigorous and comprehensive model.

For more understanding this IS-LM-BP model and how it works? We will see first what the IS curve represent, secondly we will see LM curve phenomena and thirdly we will see BP curve. Finally we will see how IS-LM-BP model works in both version under fixed exchange rate and flexible exchange rate.

7.2 IS CURVE (GOODS MARKET EQUILIBRIUM)

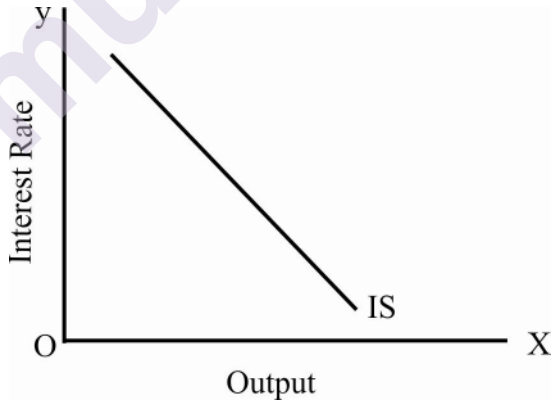
IS curve represents the relationship between output and interest rate. Output is the sum of consumption, investment, public spending and net export.

Mathematically,

$$\mathbf{Y = C\,(Y - T) + I + G + NX}$$

In the above equation, investment is not constant which is mainly depends on interest rate. So, in other words, IS curve indicates relationship between production or output and interest rate which shows equilibrium in the goods market. IS curve has been explained with the help of diagram as below-

Figure No. 7.1
IS Curve



In the above figure, on the x-axis output has been mentioned and on the y-axis interest rate has been given. IS curve shows the relationship between output and interest rate. IS curve has a negative slope, because there is inverse relation between output and interest rate.

If, Interest rate decreases, output increases and interest rate increases, output decreases.

Interest Rate ↓ output ↑

Interest Rate ↑ output ↓

There is good market equilibrium exists at any point of IS curve.

7.3 LM Curve (MONEY MARKET EQUILIBRIUM):

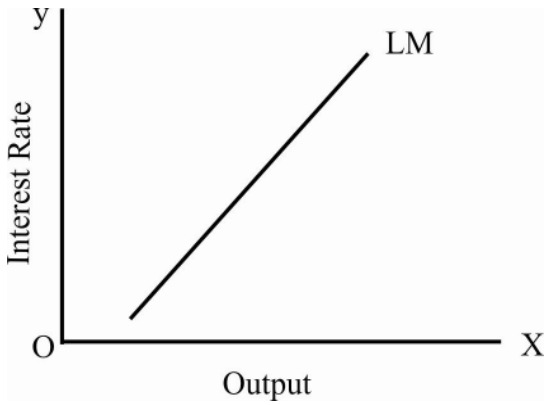
The LM curve represents money market equilibrium. The LM curve shows the relationship between liquidity and money. In the globalized economy or open economy, the interest rate is determined by the equilibrium of supply and demand for money.

$$M/P = L(i, Y)$$

Where,
M = Amount of money offered
Y = Real income
i = Real interest
L = Demand for money which is function of i and Y

Exchange rate of currency affects LM curve in some way. The equilibrium of money market indicates or implies that given amount of money, the interest rate is an increasing function of national output level when the national income (Y) or output increases; the demand for money also increases. But if the money supply is given, therefore the interest rate should rise until the opposite effects acting on the demand for money are cancelled, people of the country will demand more money because of higher income and will reduce demand for money due to higher interest rate. This relation between the output and interest rate is positive. That is why the shape of LM curve is upward sloping as depicted in the below figure.

Figure No. 7.2
LM Curve



In the above figure, LM curve represents money market equilibrium where interest rate and output of the country are in

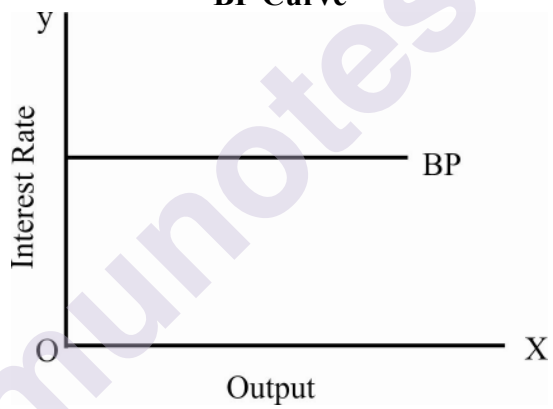
equilibrium. In the figure, output is given on X axis and interest rate is given on Y axis. The LM curve shows positive relation between output and interest rate means when output of the country increases, interest rate also increases due to raise in income and vice-versa.

Interest ↑ output ↑
Interest ↓ output ↓

7.4 BP CURVE (BALANCE OF PAYMENT CURVE)

The BP curve indicates or shows that at which points the nation's balance of payment is in equilibrium. The slope of BP curve is usually upward sloping. The higher production in the country, the higher imports which creates disequilibrium in balance of payment and the balance of payment adjusts by interest rate which affects international capital flow which makes balance of payment is balanced. Below figure depicts balance of payment curve and its relationship.

Figure No. 7.3
BP Curve



In the above figure, BP curve represents balance of payment curve which represents the relationship between interest rate and output. Normally, it has positive relationship between these two economic variables. The slope of BP curve is mainly depends on the degree of capital mobility. It means greater the capital mobility, flatter the BP curve. When we draw horizontal BP curve like as above diagram which represents perfect capital mobility in which small changes in interest rate, capital mobility comes in action.

7.5 IS-LM-BP MODEL/ MUNDELL-FLEMING MODEL

The IS-LM-BP model is also known as IS-LM-BoP model or Mundell-Fleming model. The IS-LM-BP model or Mundell-Fleming model is an open economy version of the IS-LM model which is closed economy model.

IS-LM model consists the following two equations which represents money market equilibrium and goods market equilibrium.

$$M = L(Y, r) \quad \text{- (1)}$$

$$S(Y) + T = I(r) + G \quad \text{- (2)}$$

Equation (1) shows the money market equilibrium which always exists on LM curve and equation (2) shows that the goods market equilibrium which always exists on IS curve. The IS-LM model determines the nominal interest rate (r) and level of real income where the aggregate price level held constant.

In the case of an open economy, the LM schedule will not be changed. But IS schedule will change. Equation (2) is derived from the goods market equilibrium condition for a closed economy as below.

$$C + S + T = Y = C + I + G \quad \text{- (3)}$$

If, we subtracted the above equation by C, we will get below equation.

$$S + T = I + G \quad \text{- (4)}$$

If we add the imports (Z) and exports (X) to the equation (3), then equation (3) is replaced by,

$$C + S + T = Y = C + I + G + X - Z \quad \text{- (5)}$$

It means, the IS equation becomes,

$$S + T = I + G + X - Z \quad \text{- (6)}$$

In the above equation, (X-Z) is the net exports which is the foreign sector's contribution to aggregate demand. If, we bring imports over to the left-hand side and indicate the variables on which each element in the equation depends, the open economy IS equation can be written as below-

IS equation in Open Economy:

$$S(Y) + T + Z(Y, \pi) = I(r) + G + X(Y^f, \pi) \quad \text{- (7)}$$

LM equation in open economy same as closed economy-

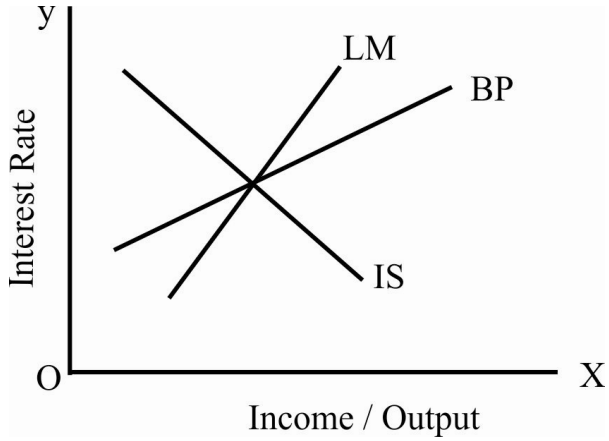
$$M = L(Y, r) \quad \text{- (8)}$$

BP equation in open economy-

$$X(Y^f, \pi) - Z(Y, \pi) + F(r - r^f) = 0 \quad \text{- (9)}$$

In the equation (9), first two terms indicates net exports (trade surplus) and third term shows net capital inflow (trade deficit).

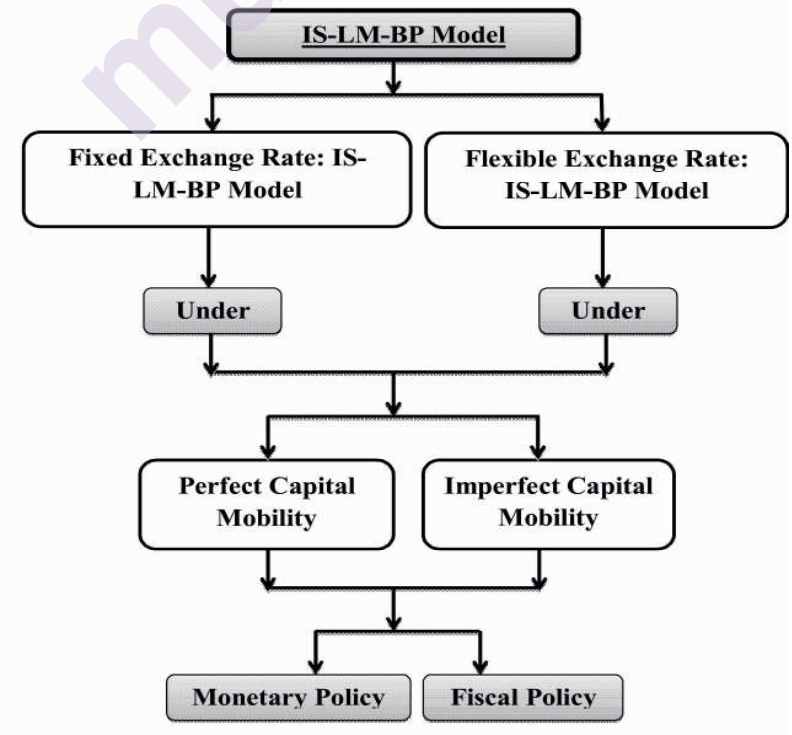
Figure No. 7.4
IS-LM - BP Model



The BP schedule is positively sloped as depicted in above figure. As income rises, demand for import increases whereas export does not. In this condition to keep balance of payment in equilibrium for that capital inflow must increase and for the increment in capital inflow interest rates should be higher, then balance of payment will be in equilibrium. In above diagram, there is need to understand slope of BP curve which is upward sloping it means capital mobility in international financial market is imperfect. Horizontal BP curve shows perfect capital mobility. In the context of perfect capital mobility, $r = r^f$, means domestic interest rate = foreign interest rate. If, $r \neq r^f$, it shows imperfect capital mobility in international financial market.

7.5.1 Fixed Exchange Rate: IS-LM-BP Model

Figure 7.5

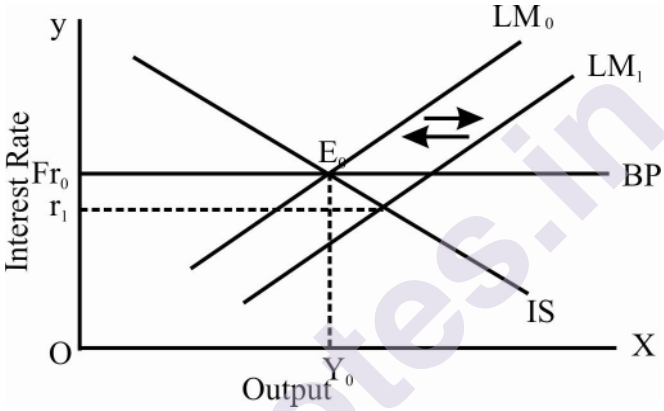


7.5.1.1 Fixed Exchange Rate: IS-LM-BP Model under Perfect Capital Mobility:

- **Monetary Policy:**

When the perfect capital mobility is in international financial market, we see monetary policy is completely ineffective when exchange rates are fixed. How it happens? We need to understand with the help of IS-LM-BP schedule with intervention policies.

Figure No. 7.6
IS-LM-BP Model in Monetary Policy with fixed Exchange rate and Perfect Capital Mobility

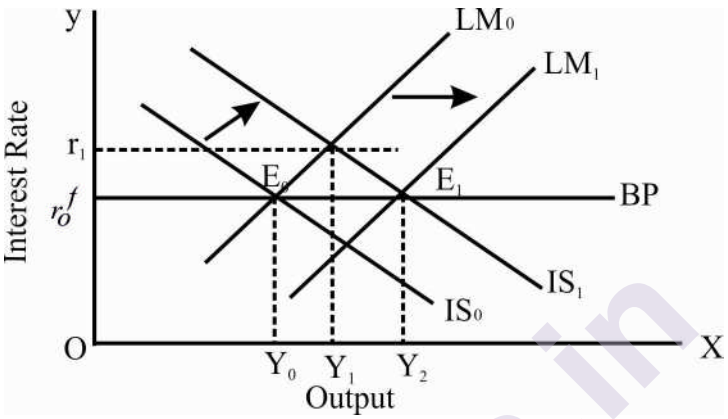


We will explain above Figure by taking a hypothetical example. With perfect capital mobility and effect of expansionary monetary policy, we will take an example of India. In India, increase in money supply from M0 to M1 as illustrated in above diagram, increasing money supply shifts to the LM schedule to the right from LM0 to LM1. The India's interest rate temporary falls from r0 to r1, this interest rate is below than foreign interest rate. This situation leads to high capital inflow from India. In the case of perfect capital mobility, investors will be selling India's asset, therefore indirectly India's currency will be selling. In this case, Indian Central Bank (RBI) can not restore equilibrium through sterilized intervention in the foreign exchange market. The massive capital outflow will be continued as long as the India's interest rate remains below the foreign interest rate. India's sterilized intervention policy will be just mean that exhausting foreign assets holding. It implies that monetary policy action is completely ineffective in nature. There is need to reduce the monetary supply in money market. Then, initial point will be achieved. It means, there is no gain from monetary action in the case of perfect capital mobility under fixed exchange rate system.

- **Fiscal Policy:-**

In the case of perfect capital mobility and fixed exchange rate, there is quite different results found in fiscal policy as compare to the monetary policy when perfect capital mobility in international financial market and fixed exchange rate prevails, fiscal policy became effective which discussed as in the below figure-

Figure No. 7.7



IS-LM-BP Model in Fiscal Policy with Fixed Exchange Rate and Perfect Capital Mobility

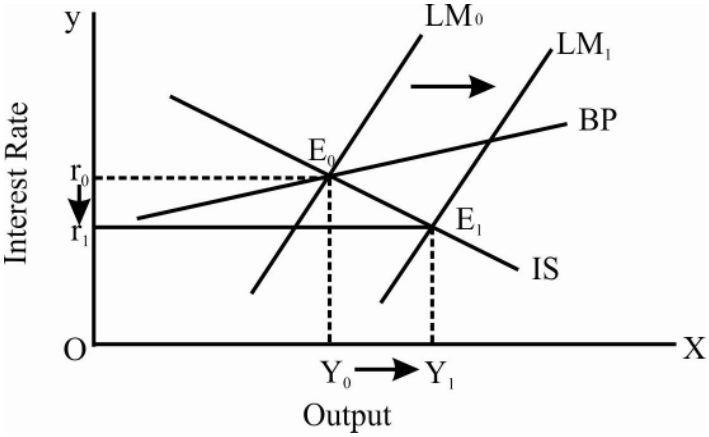
In the above figure, when government spending increased in the case of perfect capital mobility, it will affect IS curve. IS curve will shift from IS0 to IS1, the domestic interest rate is reached at r, which is more than international interest rate. This results more capital inflow in domestic country. The central bank of country will intervene to maintain fixed exchange rate, it leads to increase in money supply. Now LM schedule will shift from LM0 to LM1 and new equilibrium point E achieved where $r = r^f$ and all market is in equilibrium. So, this fiscal policy effect is from E0 to E1. It means that national income increased from Y0 to Y1. It indicates that under the perfect capital mobility and fixed exchange rate system, expansionary fiscal policy is very effective in nature.

7.5.1.2 Fixed Exchange Rate: IS-LM-BP Model under Imperfect Capital Mobility:-

- **Monetary Policy:**

When the imperfect capital mobility with fixed exchange rate system, what is effect of expansionary monetary policy? Discussed in below diagram-

Figure No. 7.8
IS-LM-BP Model in Monetary Policy with fixed Exchange Rate and Imperfect Capital Mobility

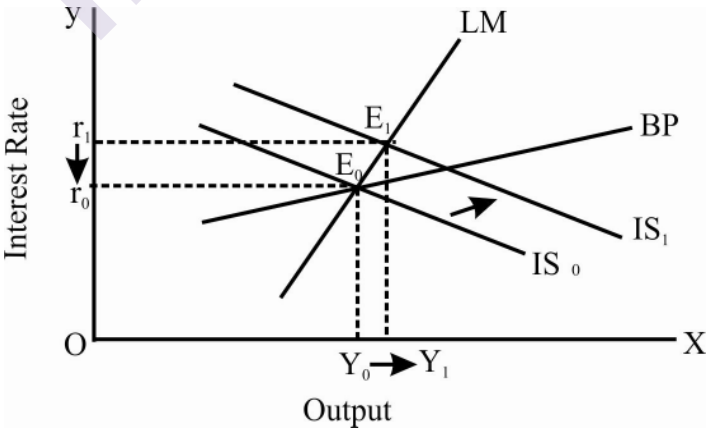


Suppose, money supply increased from M0 to M1, this leads to shift in LM schedule from LM0 to LM1. The equilibrium point shifts from E0 to E1. It leads to fall in interest rate in domestic country and increase in income from Y0 to Y1, but new equilibrium point E1 shows that balance of payment deficit, because this E1 point is below the BP curve. So, it is indicating deficit in balance of payment.

- **Fiscal Policy:-**

When imperfect capital mobility under fixed exchange rate system how fiscal policy of the nation works? Discussed in detail in the below figure-

Figure No. 7.9
IS-LM-BP Model in Fiscal Policy with fixed Exchange Rate and Imperfect Capital Mobility



In the case of expansionary fiscal policy, suppose government increase spending in the economy, it will shifts IS schedule which shifts from IS0 to IS1 and equilibrium point E0 to E1. It will lead to increase in interest rate from r0 to r1 and income Y0 to Y1. The new equilibrium

point E1 is above the BP curve which indicates that surplus in balance of payment. So, expansionary fiscal policy will lead to create balance of payment (BoP) surplus.

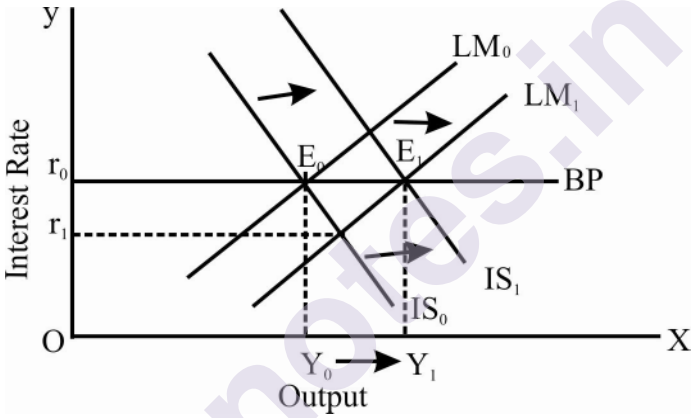
7.5.2 Flexible Exchange Rate: IS-LM-BP Model

7.5.2.1 Flexible Exchange Rate: IS-LM-BP Model under Perfect Capital Mobility:-

- **Monetary Policy:**

The perfect capital mobility with flexible exchange rates prevails in international market, the effect of expansionary monetary policy is discussed in below figure-

Figure No. 7.10
IS-LM-BP Model in monetary Policy with Flexible Exchange Rate and Perfect Capital Mobility

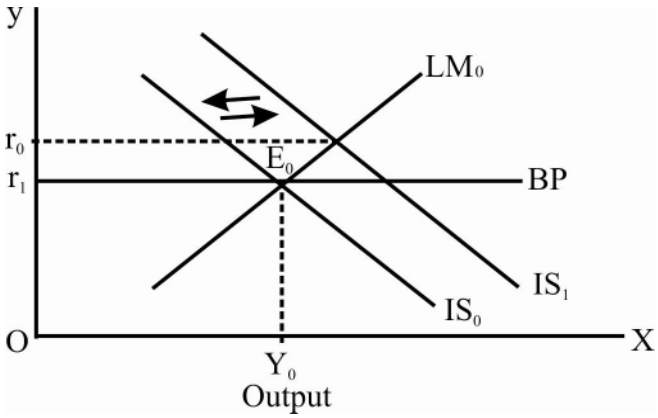


Suppose, an increase in money supply by central authority affects LM schedule to shift from LM0 to LM1, it leads to fall in domestic interest rate. This situation leads to massive outflow of capital from domestic country, because $r < r^f$. The capital outflow causes the exchange rate rise, this will shift in IS curve from IS0 to IS1, the domestic interest rate is brought back. This policy is very effective in nature, because income is increased from Y0 to Y1. So, in the case of perfect capital mobility under flexible exchange rate system, the expansionary monetary policy is very effective in nature.

- **Fiscal Policy:**

When flexible exchange rate with perfect capital mobility prevails in international financial market, expansionary fiscal policy is completely ineffective in nature which briefly discussed in the below figure-

Figure No. 7.11
IS-LM-BP model in Fiscal Policy with Flexible Exchange Rate and Perfect Capital mobility



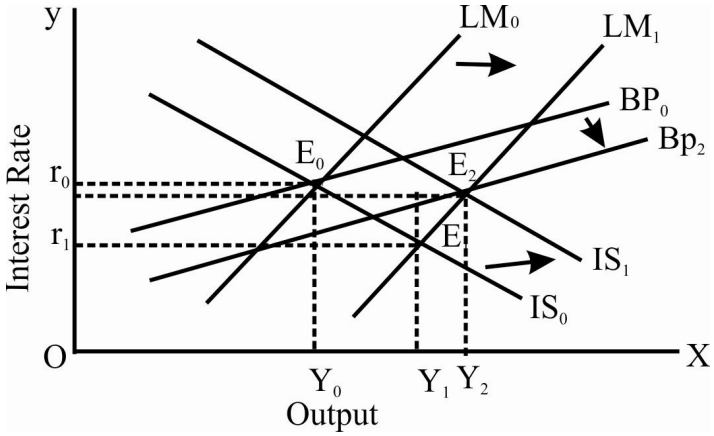
In the case of expansionary fiscal policy, suppose government increases spending which leads to shift in IS schedule from IS0 to IS1; it leads to increase in domestic interest rate above that foreign interest rate. This result will increase capital inflow in domestic country. Again policy effect will lead to fall in exchange rate. The fall in exchange rate will affect IS schedule which shifts from IS1 to IS0 as beginning point which indicates that the expansionary fiscal policy is completely ineffective in the case of flexible exchange rate with perfect capital mobility.

7.5.2.2 Flexible Exchange Rate: IS-LM-BP Model under Imperfect Capital Mobility:-

- **Monetary Policy:**

In completely flexible exchange rate regime, central bank does not intervene or not able to intervene. The exchange rate of the currency will adjust automatically by demand and supply forces in international financial market. Therefore, there is need to understand the expansionary monetary policy effect on IS-LM-BP model which discussed with the help of below figure-

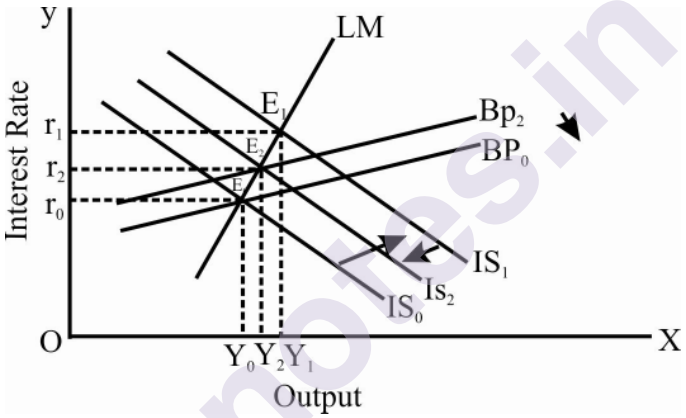
Figure No. 7.12
IS-LM-BP Model in Monetary Policy with Flexible Exchange Rate and Imperfect Capital Mobility



Suppose, money supply increase in the economy, it affects economy and equilibrium E0 to E1 point. This will lead to fall in interest rate from r0 to r1, income of the country increases from Y0 to Y1. We move to the point below the BP curve which indicates deficit in balance of payment (BoP). In the case of flexible exchange rate, exchange rate of currency will be rised. The changes in the exchange rate will shift the BP schedule from BP0 to BP1 and IS schedule will shift from IS0 to IS1. The final equilibrium point will be E2 where income is Y2 and interest rate will be r2.

- **Fiscal Policy:-**

Figure No. 7.13
IS-LM-BP model in Fiscal Policy with Flexible Exchange Rate and Imperfect Capital Mobility



Government applies expansionary fiscal policy which increases government expenditure. Increase in the government expenditure shifts the IS schedule from IS0 to IS1. It leads to shift equilibrium point from E0 to E1. The above diagram indicates that BP curve is more flat than LM curve. E1 point is the above of BP curve which indicates balance of payment (BoP) surplus. This will lead to fall in exchange rate and this policy affect IS schedule again. The new equilibrium will reach at E2 point where income level is Y2 which is below than initial income level.

7.6 SUMMARY

The IS-LM-BP model explained various effects of policy change where under the perfect capital mobility and fixed exchange rate, fiscal policy is more appropriate measure to economic development and here monetary policy is slightly ineffective in nature. And in another case of flexible exchange rate, monetary policy found more efficient.

7.7 QUESTIONS

1) Give Notes on :
   a) IS curve
   b) LM curve
   c) BP curve
2) Explain the IS-LM-BP curve in the case of fixed exchange rate & Perfect capital mobility.
3) Explain the IS-LM-BP curve in the case of fixed exchange rate & Imperfect capital mobility.

7.8 REFERENCES:

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MODULE – 4

Unit- 8

CONSUMPTION AND INVESTMENT

Unit Structure:

8.0 OBJECTIVES

After going to this unit you will able to:

- Understand the concept of consumption and consumption smoothing.
- Understand the concept of investment and irreversibility.
- Understand the concepts of seigniorage.
- Understand the concepts of money, bond and private wealth.

8.1 INTRODUCTION

In the study of macroeconomics, the investment and the consumption these are two important key concept to understand how determine the national income, level of employment and demand variation in the economy. Second important thing is the concept of demand for money. Why people of the country holding cash? What are the motives of demand for money? These are important concepts we will discuss in this unit.

8.2 CONSUMPTION

The consumption is the key macroeconomic concept which decides or affects whole economy like as national income, employment, full employment level and many more. That is why, there is need to understand the concept of consumption in the study of macroeconomics.

What is Consumption?

Consumption is the utility driven phenomena where consumption happened of goods and services, definitely utility is acquired from it. That is why, we stated above consumption is the utility driven act. The various macro economists define the consumption in the economy. Most important among them is given by Prof. J. M. Keynes who defined short term consumption function in his famous psychological consumption theory.

Relationship between Consumption and Income:

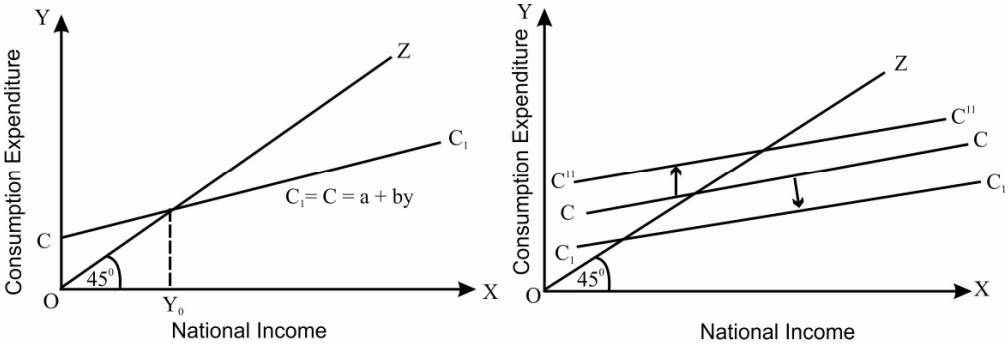
When income increases, consumption also increases; but it is not as much as income. This important fact of consumption was focused by Keynes who first of all evolved the concept of consumption function. Why it happens, because whatever income increases which is not consumed all, some were saved. So, that is the main reason behind it.

Keynesian linear consumption function is as follow:

$$\boxed{C = a + bY}$$

Where,
C = consumption
a = autonomous consumption
b = intercept term/ slope (coefficient of disposable income/ marginal propensity to consume (MPC)
Y = disposable income.
Above Keynesian consumption function is explained by following figure-

Figure No. 8.1
Keynesian Consumption Function



In above figure consumption function is depicted, where consumption function curve 'cc' deviates from the 45^0 line that is OZ line.

Initially low income consumption curve is above than OZ curve which suggest consumption is more than income, at the point of Y0, CC' curve merge with OZ line where consumption = income, then after with increasing income consumption is decreasing and the gap between income and consumption increases, this gap between consumption and income is called saving gap.

Therefore, the consumption function figure implies that, with the increasing income, consumption increases and it leads to increase the saving gap, it has a significant implication in macro economics.

Income ↑ - Consumption ↑ - Saving Gap

The concepts of Average Propensity to Consume (APC) and Marginal Propensity to Consume (MPC):-

There are two very important concepts in consumption function and these are average propensity to consume and marginal propensity to consume. There is need to understand variation between these two concepts, because some where these are same, but somewhere it varies. With the help of following table we will be able to understand the linear consumption function.

Table No. 8.1
Linear Consumption Function

Income (Rs. in crores)	Consumption (Rs. in crores)	Average Propensity to Consume (C/Y)	Marginal Propensity to Consume (ΔC/ΔY)
1000	950	0.950	-
1100	1020	0.927	0.7
1200	1090	0.908	0.7
1300	1160	0.892	0.7
1400	1230	0.878	0.7
1500	1300	0.867	0.7
1600	1370	0.856	0.7

The Keynesian consumption function is given in the above table where MPC (ΔC/ΔY) remains constant 0.70 and APC (C/Y) is falling with increase in income. Marginal propensity to consume (MPC) (ΔC/ΔY) indicates slope of consumption function which shows the linear consumption function; because MPC is constant. In the Keynesian consumption function, marginal propensity to consume is less than average propensity to consume (MPC < APC).

The consumption demand depends on income (Y) and propensity to consume. But propensity to consume is depends on various factors such like general price level, interest rate, stock of wealth and several subjective factors. J. M. Keynes is related with short run or short term consumption function. Therefore, Keynes assumed that price level, interest rate and stock of wealth etc. are constant in the short run. It means that Keynesian theory assumed the short run where other factors being constant.

Thus,

$$\boxed{C = f(Y)}$$

Where,
C = consumption
Y = Income
F = function

It means that consumption is the function of income. The specific Keynesian or linear consumption function can be as follows-

$$\boxed{C = a + bY}$$

Keynesian Theory of Consumption:

J. M. Keynes published his book in 1936 entitled "The General Theory of Employment, Interest and Money" the foundation of modern macro economics. The concept of consumption or consumption function plays an important role in the Keynesian theory of income and employment. J. M. Keynes mentioned various factors which determines the consumption of society in his book. Keynesian economic thoughts were mainly based on short run. So, he explained short run consumption function. Keynes laid stress on the current income as a consumption determinant. That is why; his consumption theory is also known as absolute income theory of consumption while Keynes studied many subjective and objective factors including interest rate and wealth which influences consumption level. He stated that individual and the society mainly depends on current level of income for consumption.

Keynesian Psychological Law of Consumption:

According to the Keynesian psychological law of consumption, "As income increases, consumption increases; but not as much as increase in income." In other words, in the Keynesian psychological consumption law, marginal propensity to consume is not zero but less that 1.

$$\boxed{1 > \Delta C/\Delta Y > 1}$$

Above equation implies that here is saving gap in consumption function means whatever not consumed will be saved. There are three important features of Keynesian consumption theory as follows-

- Consumption expenditure depends on absolute income of current period.
- Marginal propensity to consume (MPC) is greater than 0, but less than 1.
- There is no proportional relationship between income and consumption. It means average propensity to consume (APC) falls with increase in income.

8.3 CONSUMPTION SMOOTHING

In the modern macro economics, consumption smoothing approach is the standard tool. Consumption smoothing theory is not just a behavioral theory, but a preference maximization theory where individuals are forward looking or the consumption smoothing is the practice of increasing or optimizing people's standard of living by making a proper balance between expenditure on consumption and saving during the various phases of our lives. It simply implies that the balance between consumption expenditure and income.

Suppose, a person saved more from his income in the current period, definitely he will enjoy his saving in the future; but if he saved less and consumed more in the current period, definitely he will suffer in future.

8.4 TEMPORARY AND PERMANENT SHOCKS

Consumption shocks refer to the disturbances that change the value of consumption or variable by random amount. In the consumption theory, we have treated future income which is well-known economic variable. In fact, in the consumption theories in particular Ando Modigliani demonstrated that in average future income is proportional to the current income, we expect smooth consumption in future or in the whole life. But it is realistic, because the effect of consumption and saving shocks of income discussed here.

The temporary and permanent shocks of consumption are the most important determinants of household's consumption. According to Friedman's permanent income hypothesis, household consumption always responds to permanent income shock more than temporary income shocks.

Effect of Permanent and Temporary Income Shocks of Consumption on Saving:

Effects of permanent and temporary income shocks of consumption have been explained in the below table.

Table No. 8.2
Effects of Shocks

Sr. No.	Types of Income Shocks of Consumption	Effect on Saving	Effect on Consumption
1.	Temporary Current Negative Shock	**Saving** ↓	**Consumption** ↑
	Temporary Current Positive Shock	**Saving** ↑	**Consumption** ↓
2.	Anticipated Future Negative Shock	**Saving** ↑	**Consumption** ↓
	Anticipated Future Negative Shock	**Saving** ↓	**Consumption** ↑

1. Temporary Income Shocks of Consumption:

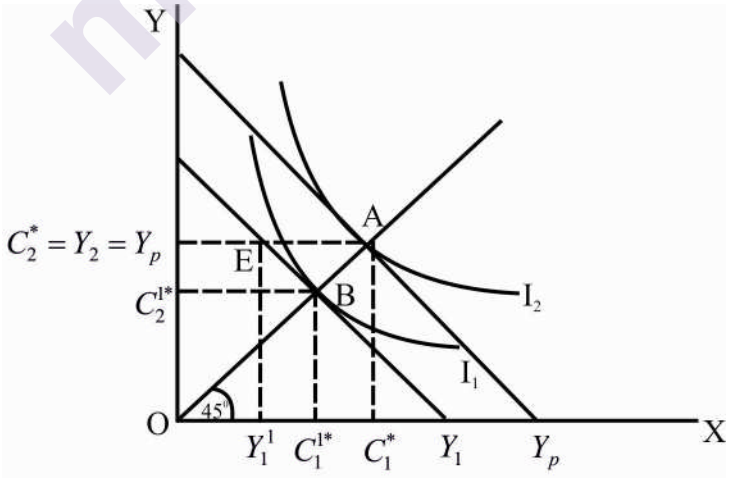
There are mainly following two temporary income shocks of consumption which discussed as below-

- Temporary Current Negative Shock of Consumption
- Temporary Current Positive Shock of Consumption

Temporary Current Negative Shock of Consumption:

In the temporary current negative shocks of consumption, individual adjust a temporary current negative shocks which decreases his income with decreases his income with dissaving and maintaining the smoothness of consumption.

Figure No. 8.2
Temporary Carmet Negative Shock



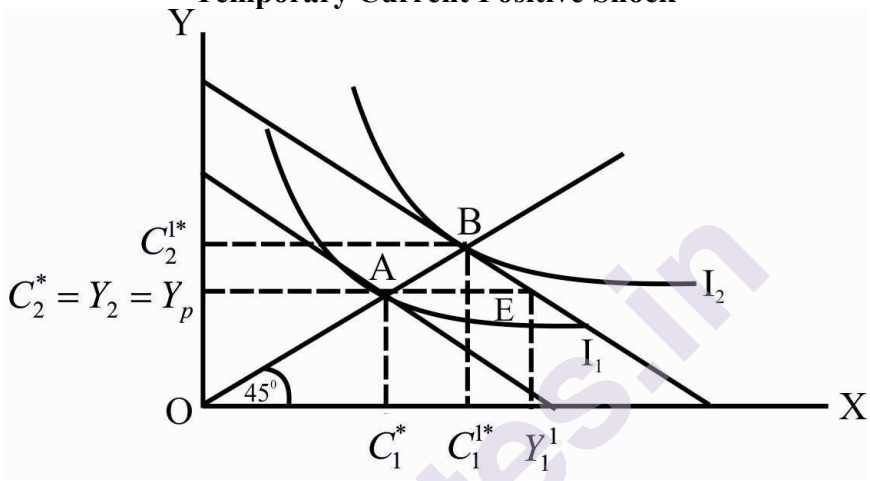
Above figure indicates the temporary current negative shocks of consumption which results to the decline in current income which is accompanied by decrease in savings.

Temporary Current Positive Shock of Consumption:

In the temporary current positive shock of consumption, income increases of individual, he increases the saving while smoothing consumption.

The temporary current positive shock of consumption has been explained with the help of below diagram.

Figure No. 8.3
Temporary Current Positive Shock



In the above diagram temporary current positive shock has been depicted which shows that lifetime income is given at point E rather than point A. It results, an increase in current savings to $Y_1' - C_1'$ and an increase in current consumption to $C_1'^*$ with the temporary current shocks. It means that increases in consumption and saving absorb the impact of the shock.

2. Permanent Income Shocks of Consumption:

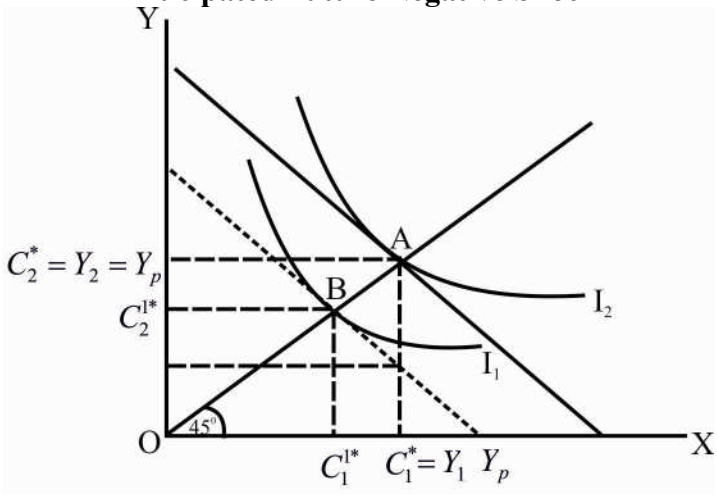
There are mainly two permanent income shocks of consumption which are given as follows.

- Anticipated Future Negative Shock of Consumption.
- Anticipated Future Positive Shock of Consumption.

Anticipated Future Negative Shock of Consumption:

If individual's future income decreases, an individual increase today's saving, it is known as anticipated future negative shock of consumption which has been explained with the help of below diagram.

Figure No. 8.4
Anticipated Future Negative Shock

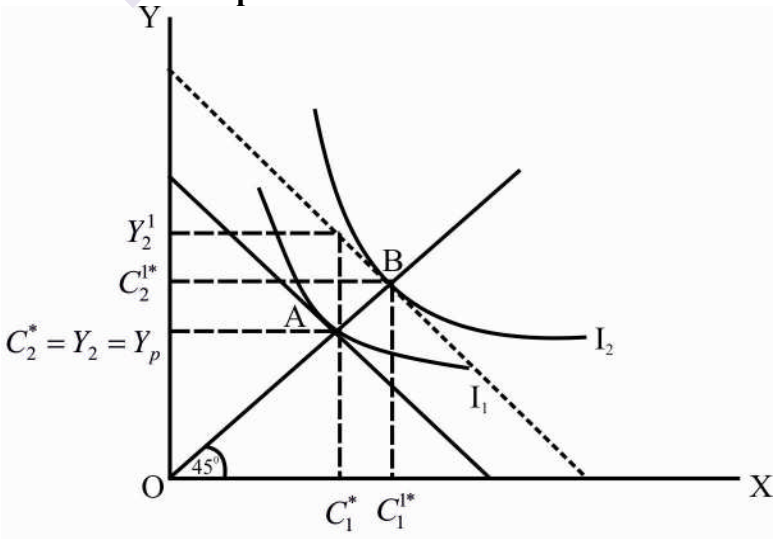


Above diagram indicates that anticipated future positive shock of consumption. In this case, current income is not changed at Y1, but in future there is expectation to decline in income to Y2'. And the consumption path moves from point A to point B with consumption smoothing and current consumption declines to C1'* despite no change in current income Y1. If current consumption declines, saving must rise anticipating a decline in future income and individual is transferring to current income to future income by saving. Therefore, saving increases in response to decline in an anticipated future income.

Anticipated Future Positive Shock of Consumption:

In the anticipated future positive shock, anticipated future income increases, individual decreases his today's saving and increases present consumption as with improved future income there is no need to save as much as before.

Figure No. 8.5
Anticipated Future Positive Shock



Above figure indicates anticipated future positive shock of consumption in which individual borrows the income for consumption in the present and because of rise in current consumption.

8.5 INVESTMENT

Investment is the important concept in macro economics which implies the situation of national income, employment and capital formation in country. It means, investment is the key economic variable in the development of country.

Definition of Investment:

The investment means to addition in the stock of capital or creation of new capital such as plant, machine, and transportation vehicle, new factories and so on which creates employment and income in the economy. Just holding financial asset is not real investment like holding shares, holding bonds etc. This type of investment is merely called financial investment. It may or may not create income and employment. Therefore, creation of physical capital in the economy, it is called real investment.

Types of Investment:

There are mainly two types of investment which discussed as below-

1. Autonomous Investment
2. Induced Investment

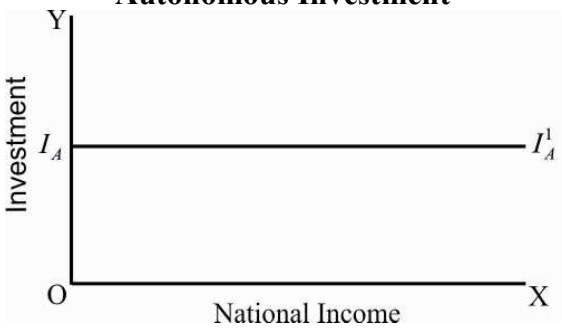
1. Autonomous Investment:

After the Keynesian analysis two types of investment distinguished, these are autonomous investment and induced investment. The autonomous investment is the investment which does not change with the change in income level. It means, the autonomous investment is independent from income.

J. M. Keynes explained that the level of investment is depends upon marginal efficiency of capital (MEC) and rate of interest. He states that change in income level will not affects investment. Therefore, the concept of autonomous investment of Keynes is mainly based on short term analysis or short run problems. He said, income effects investment in the long run.

The autonomous investment explained with the help of below figure.

Figure No. 8.6
Autonomous Investment



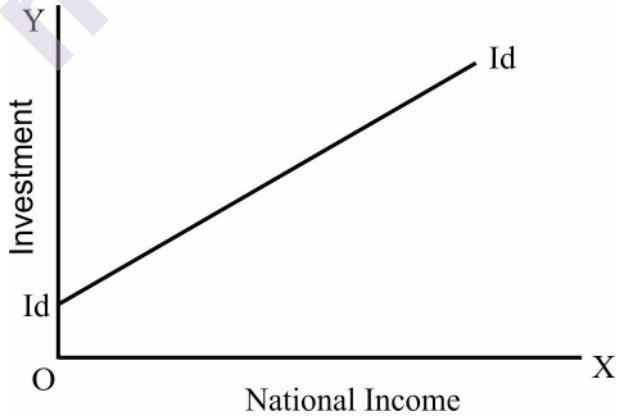
In the above figure, X axis represents national income and Y axis represents investment I_AI_A' indicated autonomous investment. The autonomous investment takes place houses, road constructions, public undertakings and other types of public infrastructure development which are necessities, not depends on income. That is why, the autonomous investment curve is horizontal to X axis. It implies with the increase in income or change in income; autonomous investment does not change.

2. Induced Investment:

The induced investment is the investment which changes with changes in the level of income. The high level of income, the higher the consumption level, consumption will lead to increase in demand and increase in demand will promote to industry to produce more which will increase the investment level in economy due to increase in profit expectations of investors.

The induced investment we can explain with the help of diagram which discussed in the below diagram-

Figure No. 8.7
Induced Investment



In the above figure 8.7, Y axis represents investment and X axis represents national income. IdId represents induced investment curve which is upward sloping. It implies that with increase in income, investment also increases. It means that there is positive relation between national income and investment.

8.6 KEYNES THEORY OF INVESTMENT

J. M. Keynes explained his investment theory in his famous book entitled "The General Theory of Employment, Interest and Money" in 1936. In this book, he states that investment demand is depends on two factors, these are expected rate of profit (Keynes called it marginal efficiency of capital – MEC) and rate of interest. The people of the country have two choices of investment, either invest in physical capital to earn profit or lend money to earn certain rate of interest. It implies investment is mainly depends on rate of interest and marginal efficiency of capital (MEC). In other words, the greater the rate of profit or MEC as compared to interest rate, the greater the chance to increase in investment.

For example, marginal efficiency of capital is 25% and current rate of interest is 10%. So, 25 - 10 = 15, which is net MEC. In this situation, investor will try to more invest, because MEC is greater than rate of interest.

Therefore, the equilibrium will happen in financial market where, marginal efficiency of capital equals the rate of interest. According to Keynes, rate of interest is not important in the short run; because in the short run there is less chances to variation in the rate of interest. Therefore, Keynes focused mainly on the rate of profit or marginal efficiency of capital (MEC) in the short run.

According to Keynes interest rate is determines by supply of money and the liquidity preferences. Greater the money supply, lower the interest rate and vice versa. There are two important factors of investment discussed as below-

1. Marginal Efficiency of Capital (MEC)
2. Rate of Interest.

1. Marginal Efficiency of Capital (MEC):

The concept of marginal efficiency of capital explained by J. M. Keynes refers to the rate of expected profit to be make from investment in certain capital assets. The rate of expected profit from an extra unit of capital asset is known as marginal efficiency of capital.

According to Keynes, marginal efficiency of capital is the rate of discount which renders the prospective yields from a capital asset over its whole life period equal to the supply price of that asset. So, the marginal efficiency of capital is obtained by following equation-

Supply Price = Discounted Prospective Yields

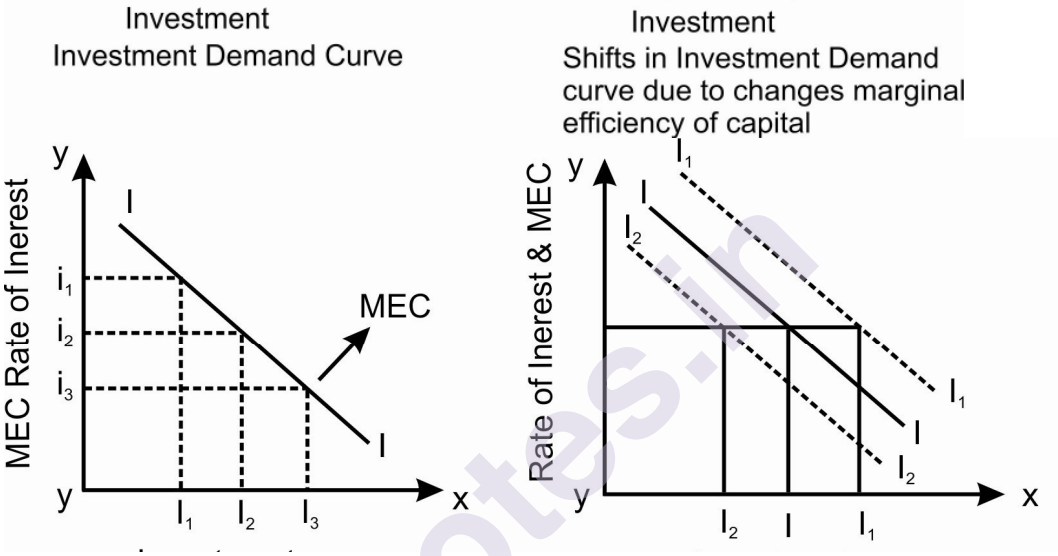
$$C = \frac{R1}{1+r} + \frac{R2}{(1+r)^2} + \frac{R3}{(1+r)^3} + \text{-------} + \frac{Rn}{(1+r)^n}$$

Where,
C = supply price or replacement cost
R1….R3 = annual prospective yields from the capital asset.
r = expected rate of profit or marginal efficiency of capital.

2. Rate of Interest and Investment Demand:

The rate of interest and investment demand curves discussed with the help of following figure.

Figure No. 8.8



In the above figure, Y axis represents interest rate and MEC and X axis represents investment. Above figure indicates the relationship between investment demand, interest rate and MEC. The MEC curve represents, when interest rate falls, investment increase due to increase in MEC and vice versa.

Interest Rate ↓ - MEC ↑ - investment ↑
interest Rate ↑ - MEC ↓ - investment ↓

8.7 DETERMINANTS OF INVESTMENT

Determinants of investment mean the factors or economic variables which affects the level of investment. The determinants of investment are as follows : -

- Marginal Efficiency of Capital
- Expected Demand for Product
- Cost of Capital
- Transfer of value
- Transfer of value
- Technology
- Innovation
- Availability of Credit
- Fiscal Policy

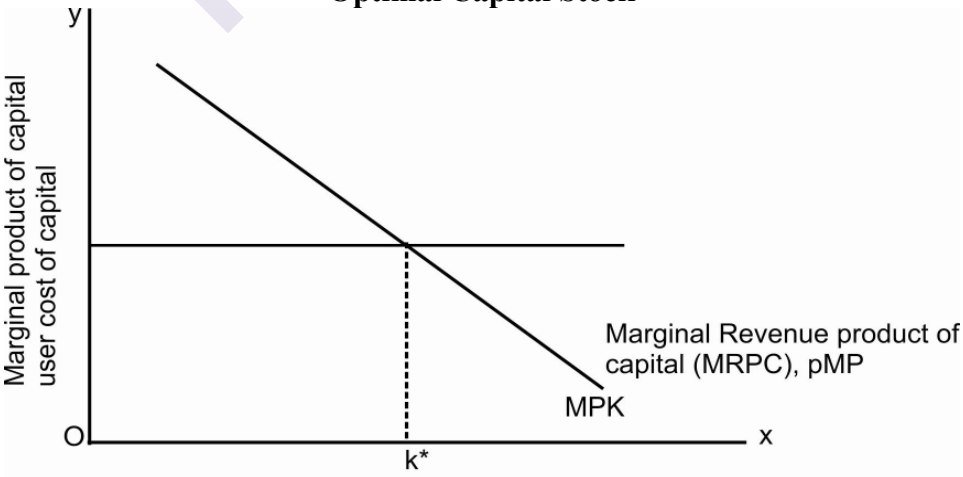
Above seven factors which are very important to determine the level of investment in the economy.

8.8 THE OPTIMAL CAPITAL STOCK

The concept of the optimal capital stock is concerned with the principle of profit maximization. Optimal capital stock means the additional profit from employing one additional unit of capital is the marginal revenue product of capital (MRPC). The additional cost or sacrifice of employing an additional unit of capital is the user cost of capital. The benefit or profit is maximized by employing unit of capital (k*), where marginal revenue of product (MRP) equals to the user cost.

The optimal stock of capital where a firm which maximize profit should employ is illustrated in the below figure-

Figure No. 8.9
Optimal Capital Stock



Stock of Capital

The above diagram represents marginal product of capital, user cost of capital on Y axis and on X axis, stock of capital has been shown.

The marginal product of capital (MRK) decreases with the increase in a stock of capital and the output price is given (pMPk) or the extra revenue generated from employing extra unit of capital decreases as the capital stock increased. This phenomenon is depicted by the downward sloping curve or the marginal revenue product of capital (MRPC) curve.

The optimal stock of capital is depicted by K*. Any firm who is profit maximizer will try to operate at K* where profit is maximized or capital stock is optimum.

8.9 IRREVERSIBILITY AND INVESTMENT

Irreversibility and investment is the modern concept in macro economics and more recent approach to investment. The alternative theory of investment is the theory of irreversible investment. The concept of irreversibility refers to the important fact that many firms may not able to sell the stock of capital. A firm or industry faces complete irreversibility when resale market is completely absent which means resale price of capital stock is equals to zero.

8.10 SUMMARY

Consumption and investment are the key concepts in macro economics and consumption is function of income there is positive relationship between consumption and income, marginal propensity to consume (MPC) and average propensity to consume (APC) are the two important concepts in consumption function. In this unit we studied concepts and theories of consumption as well investment. Like concept of consumption smoothing, temporary and permanent shocks of consumption, induced and autonomous investment, Keynesian theory of consumption as well as investment, investment and irreversibility etc. Which are important for the study of consumption.

8.11 QUESTION

1) What is consumption? Explain the relationship between Consumption and Income.
2) What are temporary and permanent shocks?
3) What is the meaning of investment? Explain types of investment with the help of figure.
4) Explain Keynesian theory of investment.

8.12 REFERENCE

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Unit- 9

THE DEMAND FOR MONEY

Unit Structure :

9.0 OBJECTIVES

After going to this unit you will able to :

1) Understand Fisher's and Keynesian approaches of demand of money
2) Understand functions of money
3) Understand the concept and types of bond
4) Understand the optimal level of Seigniorage

9.1 INTRODUCTION:

Demand for money is highly important in micro economics, because demand for money is not only determined the interest rate but also national income and country's price level. According to classical economists, money is only as a medium of exchange. Therefore, they used merely money as a medium of purchase of goods and selling of goods. It means, they just want money (demand for money) only for transaction purpose. But J.M. Keynes focuses on another important function of money and that is store of value.

According to J. M. Keynes, people hold money as an asset to take advantage of price variation. So, again Keynes said one another important

motive of demand for money which is speculative demand for money. Here is important to note that what people demand for money which is not just nominal money holding, but real balances. It means people are interested in the purchasing power of money holding. If, people of the country merely concern with nominal income (just holding currency notes irrespective with price level), the people will definitely suffer money illusion. In the macro economics, there is always lively debate on demand for money among the economist, because just we said above that money is not just merely matter of exchange; but it affects economy as a whole.

There are main two approaches of demand for money.

1. Fisher's Transaction Approach
2. Keynesian Approach

9.2 FISHER'S TRANSACTION APPROACH

The classical economists focus or use money only as a medium of exchange. It implies that money does not matter in economy. Money uses as a medium of buying and selling of commodity. So, the relation between money and commodity is explained by Fisher in below equation.

$$MV = PT$$

Where,
M = The quantity of money in circulation.
Y = Transaction velocity of circulation
P = Average Price.
T = The total number of transactions

According to Fisher, in any period the value of all goods and services or assets sold must equal to the number of transactions (T) multiplied by price level (P). It means, total value of transaction equals to PT. The value of money flow or money supply (M) is multiplied by average number of transactions or money circulation in economy (v) which denotes velocity of money in the economy.

In short, Fisher's equation MV = PT explains just role of exchange for money in the economy. Money plays only the role of medium of exchange.

9.3 KEYNESIAN APPROACH OF DEMAND FOR MONEY

Prof. J. M. Keynes explained another view of demand for money. Why people demand for money? He explained various motives of demand for money which were not discussed in the classical theory. Keynes states that money is not just merely medium of exchange, it has another functions also like as store of value which makes money as an important

variable in economy which affects national income, general price level. It means that money matters.

According to Keynes, liquidity preference means the demand for money to hold or the desire of people of the nation to hold cash. This desire of people to hold cash (liquidity) arises due to 3 motives which discusses as below-

1. The Transaction Motive
2. The Precautionary Motive
3. The Speculative Motive

1. The Transaction Motive of Demand for Money:-

The transaction motive of demand for money is explained by classical economists also. It is common motive between classical and J. M. Keynes of demand for money. Under this motive people hold cash for their daily needs of goods and services to sell and buy it. In other words, people keep some cash in their pockets for daily transactions. This is the motive of transaction.

According to Keynes, this transaction motive is depends on the level of income (Y).

$$M1 = L1 (Y)$$

Where,
M1 = transaction demand for money
L1 = demand function
Y = Income.

2. The Precautionary Motive of Demand for Money:

Precaution is the part of human life. People make the strategies by the precautionary motive also. So, J. M. Keynes emphasize on this precautionary motive; it means people of the country keeping some cash in their pockets for unforeseen or unexpected emergencies as a precaution, it is called precautionary demand for money is also depends on income like transaction demand for money.

3. The Speculative Motive of Demand for Money:

J. M. Keynes emphasizes more on this motive of demand for money. Keynes explained the important function of demand for money which has store of value which creates new motive of demand for money and that is speculative demand for money where people of the nation are holding some cash to take the advantage of price change or variation in prices of assets and bonds. So, this motive of demand for money is called speculative motive.

$$M2 = L2 (r)$$

It means, above equation indicates that speculative demand for money (M2) is depends on rate of interest (r) instead of income.

9.4 MONEY

Money is the medium of exchange as we discussed in the Fisher's equation; but here is need to understand the concept of money? What money does? What are the functions of money? So, these are the important facts of money, we are going to discuss in this topic.

9.4.1 Definition of Money:

There is no unique definition of money. Various economist or monetarists try to define what is money? Among these various definitions more acceptable and comprehensive definitions discussed as below.

According to Crowther, "Money can be defined as anything that is generally acceptable as a means of exchange and at the same time it acts as a measure and a store of value."

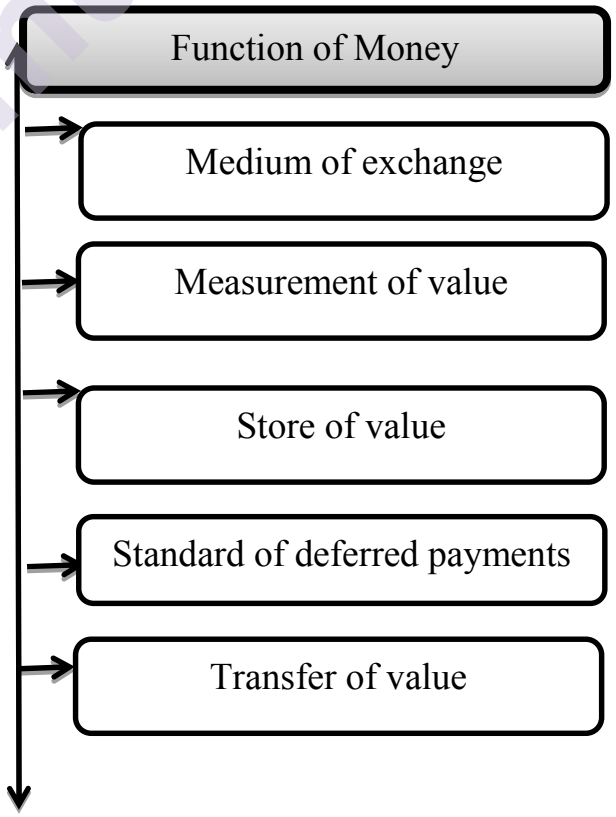
According to Prof. D. H. Robertson, "Money means anything which is widely accepted in payment for goods or in discharge of other kinds of business obligations."

Some economists defined, money is that what money does.

Therefore, above definitions implies the performance of money and functions of money. In these all definitions, which has been explained above, there are some key value, measure (unit of account) etc. these are the main functions of money with other functions.

9.4.2 Functions of Money:

There are five important functions of money (currency) as bellow:



- **Medium of Exchange:**

Money is very important for buying or selling of goods and services. With the help of money, people get any goods and services without disturbances and sell any goods and service.

- **Measurement of Value:**

Value of goods and services measured in the form of money. Money is generally used to determine and show the price of commodity. For example, suppose the price of 1 kg. of Tomato is Rs.50. It means 1kg. Tomato= Rs.50.

- **Store of Value:**

Wealth would be stored in the term of money. It means, money has a store value. It can be stored for very long time. Before existence of money, wealth could not store in the same value. Today, it is possible only because of money.

- **Standard of Deferred Payments:**

Money is also useful for the deferred payments. If a person borrows today, then he can pay back their loan in the future with the help of money.

- **Transfer of Value:**

Money is also useful to transfer of value. Today within few minutes, money transferred from one bank to another bank, one asset to another asset, one person to another person with the help of internet and financial instruments. Even though, the value of transfer remains constant.

9.5 BONDS:

Bond is the financial instrument or tool in financial market which is one of the important financial asset for investor, so bonds have its own value in financial market. There are various types of bonds depends on various facts like as maturity date.

Definition:

Bond is a legal promise to repay a debt. It is an investment tool where investor getting some amount of interest at fixed rate on fixed date. So, it implies that bond is the income earning source of investors. Bond prices vary inversely with interest rate.

9.6 PRIVATE WEALTH

As we discussed above, what is money? What is bond? Apart of this households and firms in the private sector apparently holds no other assets and liabilities like as mutual funds, share, equity and common stock. So, what is net private wealth? Net private wealth or net private sector wealth is sum of its assets minus the sum of its liabilities common stock

representing possession (ownership) in a firm are the assets of households and corresponding liabilities of the firm that issue them.

Thus, the net private wealth consists of its net claims on outside that sector. There is important to note that only the outside financial wealth that we are concerned with, these are two types of sources of wealth. One is government liabilities on bond and second is central bank liabilities on money. This relation we can explain by follows formula.

$$\mathbf{Wt = Mt + Bt/ It}$$

Where,
Wt = nominal wealth of the private sector
Mt = Stock of money held by the private sector at the time of t.
Bt = stock of bonds held at the time of t.
It =interest rate at the time of t.

So, it implies that interest rate affects bond holding and money holding in the financial market.

9.7 FINANCIAL ASSETS

The financial assets in financial market are non-physical assets. The value of assets is depends on contractual claim such like bank deposit, bonds and stocks. The financial asset is more preferable, because it has high liquidity as compare to other assets like commodity or real estate. Financial assets are very easy to sell and buy. There are various types of financial assets according to the international financial reporting standards (IFRS). Afinancial asset can be equity, cash or cash equivalent, contractual rights and many more.

Financial assets are the measure way for investors to earn profit in financial market.

9.8 SEIGNIORAGE: THE OPTIMAL LEVEL OF SEIGNIORAGE

There is basic idea behind seigniorage which is the net revenue producing from money. It simply implies that government generates revenue through printing of money. In other words, the difference between the exchange values of produced money and the cost of producing money and maintain it in circulation, it is called as seigniorage in macro economics.

The concept of seigniorage is so old which studies since gold standard. In the gold standard system, when every citizen hold gold as a money in the form of gold coins, a duty payable on this service was known as seigniorage. If the coins in this system were produced in mint, then the mint operations were following account identity.

$$M = PQ + C + S$$

Where,
M = the nominal value assigned to the batch of coins (e.g. 100 INR)
P = nominal price paid by mint per gram of precious metal.
Q = the number of grams of precious metal embodied in the batch of coins.
C = the remaining average cost of operating the mint (called 'brassage')
S = the nominal seigniorage.

Here, the S is written as seignioage profit available for spending by the king. Total seigniorage revenue depends on how many batches of coins are produced per annum.

In the world of 21st century, there is fiat money standard. In this system the content of the bullions in the money is zero. Therefore, production cost is almost zero. In this system, the government's nominal seigniorage is just the change in the stock of base money per year.

$$S = \Delta M0$$

Where,M0 = stock of base money and real seigniorage (RS) is
RS = ΔM0/P

Seignorage has a revenue implication in that rate of monetary expansion or the expansionary monetary policy is not infinite. So, this is the equals to the profit maximization for a monopolist who has to take into account the decrease in the sales as he raises the price.

The Optimal Level of Seigniorage:

The optimal seigniorage is the concept refers to increase in the growth rate of nominal money supply, increase in the rate of inflation and results in a reduction in the demand for real balances or real money balances.

Seigniorage can be written as follow-

$$S = \frac{\Delta M_0}{P} = \frac{\Delta M_0}{M_0}\frac{M_0}{P}$$

Where,

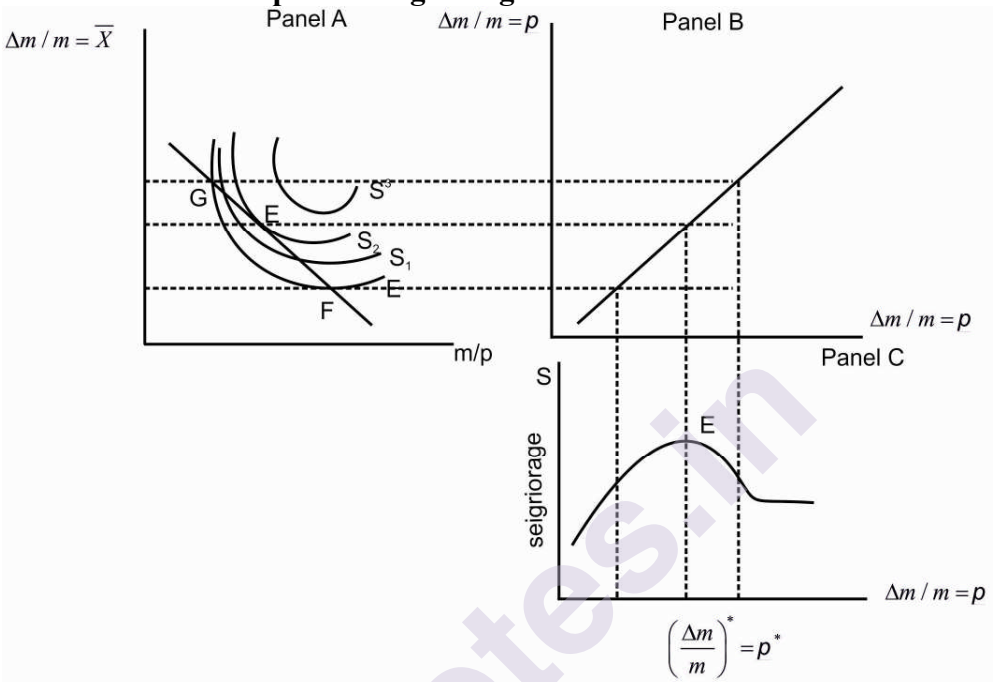
$\frac{\Delta M_0}{M_0}$ **=the growth rate of base money**

$\frac{M_0}{P}$ **=tax base**

S = Seigniorage

The optimum level of seigniorage is explained with the help of following diagram of optimum seigniorage and inflation where panel A, Panel B and Panel C are plotted.

Figure No. 9.1
Optimal Seigniorage and Inflation



In the above diagram, S0, S1, S2 and S3 these are various levels of seigniorage in Panel A and DD curve depicted real money demand function. Point E shows that the equilibrium or maximum point of seigniorage in panel A and Panel C. Panel C indicates the phenomenon of seigniorage where Y axis shows seigniorage and X axis indicates ΔM/M. Point E indicates optimal seigniorage.

9.9 SUMMARY

This unit delivered the most important concepts which are investment, consumption, consumption smoothing, temporary and permanent shocks of consumption, seigniorage, financial assets and demand for money etc. These concepts affect the economy. Changes in these economic variables will make change in the level of employment, level of income, general price level, level of full employment and many more.

9.10 QUESTION

1) Explain Keynesian approach of demand for money.
2) Give the definition of money and explain the various functions of money.
3) Explain the capital level of Seigniorage with the help of diagram.

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- Carlin, Wendy and David Soskice (2007), Macroeconomics, Oxford University Press.
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