

**B.Com./B.A.(Programme)      Semester-VI      GE - Economics**

**GENERIC ELECTIVE (GE)**  
**Principles of Macroeconomics**  
**Study Material : Unit 1-5**



**SCHOOL OF OPEN LEARNING**  
**University of Delhi**

**Department of Economics**

**Graduate Course**

**PAPER XVII : Macroeconomics**

**Unit : 1**

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LESSON : 1.

# INTRODUCTION TO MACROECONOMICS

## 1.1 INTRODUCTION

### 1.1.1 What is Economics

The science of economics was born with the publication of Adam Smith's "*An Inquiry into the Nature & Causes of Wealth of Nations*" in the year 1776. Before Adam Smith, there were other writers who expressed significant economic ideas. But economics as a separate branch of knowledge started with Adam Smith's book. The word 'ECONOMICS' has been derived from two greek word oikos (meaning a house) and nemein (meaning to manage). Hence economics meant managing a household in an economical manner.

Economics is concerned with the allocative decisions of individuals, households, business and other economic agents operating in the society and how the society itself (as a whole) allocates its resources. Alternatively, it is the study of how a society chooses to use its limited resources to produce, exchange and consume goods and services.

Economics has been variously defined. For example Prof. Alfred Marshall defined it as "a study of mankind in the ordinary business of life; it examines that part of individual and social action which is more closely connected with the attainment and use of material requisites of well-being". It is thus "on one side the study of wealth, and on the other and more important side, the study of man".

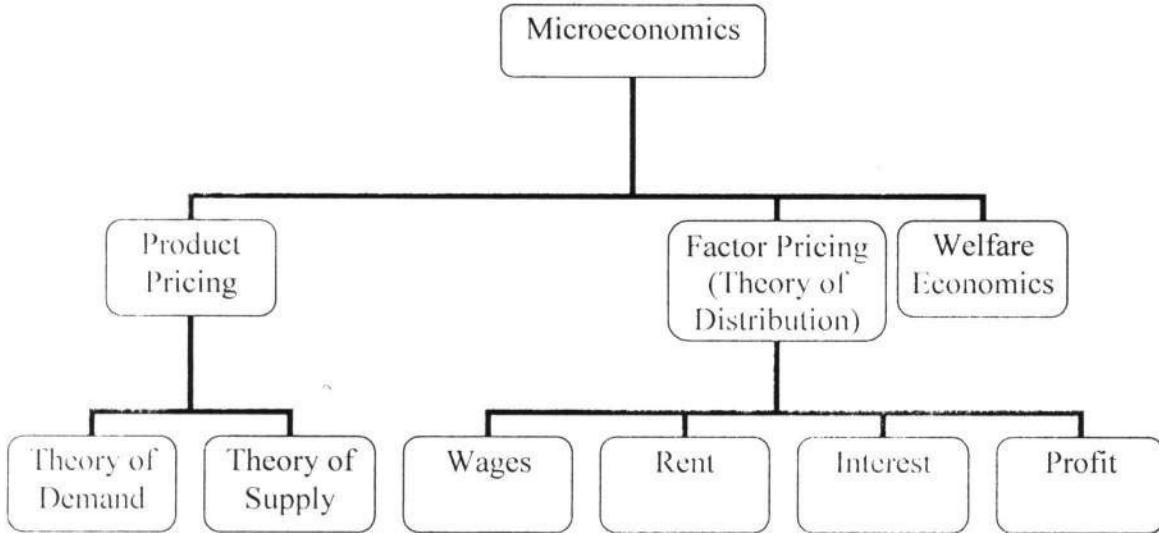
### 1.1.2 Scope of Economics: Micro and Macro Economics

Modern economics has two major branches – Microeconomics and Macroeconomics. Before 1930's, most economists concentrated their attention almost exclusively on microeconomics. Macroeconomics was the junior partner. But after 1936, the year John Maynard Keynes published "The General theory of Employment, Interest & Money", a new interest in macroeconomics arose. Some chose to call it the "Keynesian Revolution". (Late 1930's - mid 1960's). Under the influence of Keynes a whole new branch of economic theory has been developed called macroeconomics.

In fact, both the branches study economic phenomenon, investigate economic issues and provide a logical solution to economic problems at two different levels.

Microeconomics analysis the behaviour of individual decision making units, such as consumers, resource owners and firms. It studies economic problems such as what, how and for whom to produce at individual level. The unit of study is the part rather than the whole.

The Scope of microeconomics is vast and includes the following topics as shown in Fig. 1.1.



**Fig. 1.1 Scope of Microeconomics**

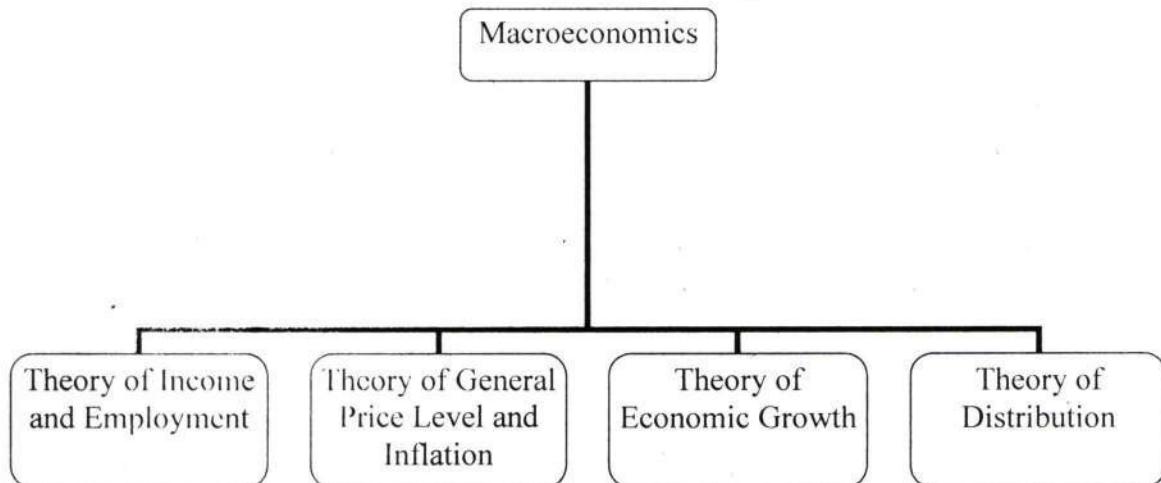
However, microeconomics fails to explain the functioning of an economy as a whole. It cannot explain unemployment, poverty, illiteracy and other problems prevailing at the country level.

The word Macroeconomics was coined by Ragnar Frisch in 1933. It deals with the functioning of the economy as a whole. It is concerned with the behaviour and performance of the aggregates or the “wholes” – such as aggregate output, general price level, size of national income, level of total employment, aggregate savings, aggregate investment, economic growth etc. Macroeconomics studies not only the nature and behaviour of the above variables but also the inter-relationships that exist between the above variables. It is also known as Theory of Income and Employment since its major subject matter deals with the determination of income and employment. The scope of macroeconomics in the words of Dornbusch & Fischer: “Macroeconomics is concerned with the behaviour of the economy as a whole – with booms and recessions, the economy’s total output of goods and services and the growth of output, the rates of inflation and employment, the balance of payments, and exchange rates.”

To conclude we can say: Macroeconomics focus on “big picture” view of the economy. It attempts to deal with the ‘big issues’ of economic life at aggregate level, such as:

- why growth rate is less than expected growth rate?
- why are jobs plentiful in some years and not in others?
- why do prices go up rapidly at some times?
- why high rate of inflation persist so long?
- why India’s BOP always in deficit?
- why fiscal and monetary policies of India failed to achieve their goals?

The scope of macroeconomics includes the following topics as shown in Fig. 1.2.



**Fig. 1.2 Scope of Macroeconomics**

Macroeconomics has emerged as the most challenging branch of economics. It has both theoretical and policy orientations.

1. Macroeconomics theories use macroeconomic models to explain the behaviour of macroeconomic variable and specify the nature of the relationship between them.
2. Study of the inter-relationships between aggregate economic variables assists the economic policy makers (the Government) to devise appropriate economic policies.
3. Macroeconomics analyses the working and effects of government policies (especially monetary and fiscal policy) on the economy.
4. It explores the consequences of government policies intended to reduce unemployment, smooth output fluctuations and maintain stable prices.
5. Macroeconomics provides a framework for controlling and guiding the economy to achieve desired goals of growth and stability.
6. Macroeconomic policies formulated and implemented by the Government are directed towards improving the long-run competitiveness of the economy. The combinations of wages, prices and exchange rates and productivity are "in-line" so that firms can market their products profitably to the rest of the world.
7. The study of macroeconomics is used to solve many problems of an economy like monetary problems, economic fluctuations, general unemployment, inflation, disequilibrium in the balance of payments position, etc.
8. We use this tool to understand why the economy deviates from a path of smooth growth over time.
9. Macroeconomic policies bring balance in the economic relations with the rest of the world.

In conclusion, we may say that in a sense, Microeconomic theory has a foundation in macroeconomics and Macroeconomic theory has a foundation in

microeconomics. Microeconomic point of view is – optimum allocation of its resources and macroeconomics point of view is full utilization of its resources.

## 1.2 CONCEPTS

### 1.2.1 Stocks and Flows

Macroeconomics uses certain economic aggregates called macro-economic variables, to assess the performance and to analyze the behaviour of an economy. Macroeconomic variables that figure in macroeconomic studies are generally grouped under this categories stock variables and flow variables. The twin concepts of stocks and flows are not difficult to understand but they can cause great difficulty if misunderstood or misused. To begin with, both are variables, quantities that may increase or decrease over time and are often related though measured in different units.

A stock is a quantity measured at a given point in time i.e. as on date, whereas a flow is a quantity measured per unit of time i.e. per hour, per week, etc.

For example, the amount of water in a tub is a stock because it is a quantity measured at a given moment in time and the amount of water coming out of tap is a flow as it is a quantity measured per unit of time. GDP is probably the most important flow variable in economics which tells us about the rupees flowing in an economy's circular flow per unit of time.

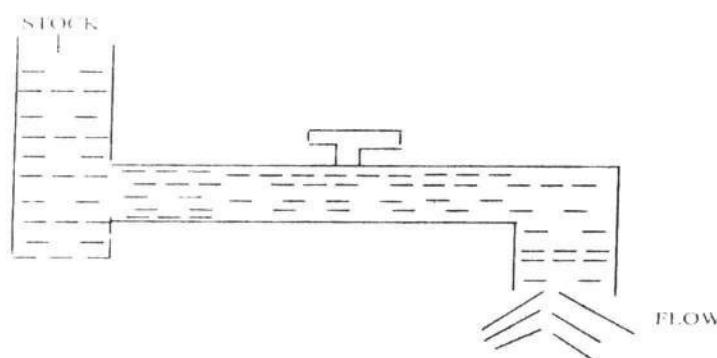


Fig 1.3 STOCK AND FLOW

Some examples:

Stock Variables	Flow Variables
Person's wealth	Person's income and expenditure
Balance sheet of a firm	Profit and loss account
Supply of money	Spending of money
Fixed deposit in a bank	Interest earned on the deposit
Inventories	Change in inventories
Accumulated savings	Savings
Total stock of capital	Investments
Foreign exchange reserve	Balance of payment
Total employment	Addition to employment Government tax revenues Government expenditures Exports and imports Wages and salaries

**Hint:** Any component with which change is associated becomes a flow concept.

- Some flow variables have direct counter part stock variables, e.g. 'investment' is a flow variable having counterpart of stock of capital.
- But some variables are only flows and have no direct stock counterpart e.g. imports and exports, wages and salaries, etc. These flow variables indirectly affect the size of other stocks.
- A stock can change only as a result of flow. For those flow variables which have a stock variable, a change in the magnitude of the stock variable between two specified points in time will depend on the magnitude of the flow variables themselves may be determined in part by changes in the stock.

The best example of this is the relationship between the stock of capital and the flow of investment (both of these two depend on each other). The stock of capital can increase only as a result of an excess of the flow of investment or of new capital goods produced. However, the flow of investment itself depends on other things on the size of the capital stock.

- With respect to this relationship between the flow of investment and the stock of capital, we may define the short-run period and the long-run period.

Short-run period - as one in which changes in the stock of capital are too small to influence the flow of investment (stock may be assumed to be constant in that period).

Long-run period - is one in which such changes are large enough to influence the flow of investment.

So, we can conclude:

Although flows may be influenced by changes in stocks, they will not be so influenced by changes in stocks in the short-run. Stocks can exert an influence on flow only in the long-run.

In this sense, elementary macroeconomics theory is primarily short-run, it is essentially a study of relationships among flows in which size of each flow in any time period is determined slowly by the size of the other flows.

### 1.2.2 Equilibrium and Disequilibrium

**Equilibrium:** refer to a position in which forces working in opposite directions are in balance and there is no in-built tendency to deviate from this position. In other words, it is expressed as a state of no change over time.

This is not to say that economics equilibrium is a motion-less state in which no action takes place whether it is a state of action or repetitive nature.

**Disequilibrium:** is the state in which the opposite forces produce imbalance or simply it can be stated as the absence of a state of balance. The factor causing disequilibrium arise of the working process of the economy. The economic activities are undertaken by million of decision makers, consumers, producers, workers and others and their decision need not always coincide and the result is the disequilibrium.

### 1.2.3 Partial and General Equilibrium Analysis

Partial and general equilibrium analysis are two other concepts which are often used in macroeconomic analysis.

**Partial equilibrium:** The analysis of a part of an economy isolated and insulated through assumptions from the influence of the changes in the rest of the economy. In simple words, when a part of economic system or an economic phenomenon is analysed in isolation of the economic system, it is called partial equilibrium analysis.

- It is based on *ceteris peribus*, i.e. all other related variables are constant.
- It is widely used in microeconomics analysis, but in macroeconomics partial equilibrium analysis is applicable when macroeconomic analysis is confined either to the product sector or to the monetary sector.

**General equilibrium:** General equilibrium analysis is carried out when the objective is to analyse the economic system as a whole. It takes into account the inter-relationships and inter-dependence between the various elements of an economy.

- General equilibrium analysis takes a comprehensive and realistic view of the economic system and focuses on the simultaneous determination of equilibrium of all the markets.
- Macroeconomic analysis is largely of general equilibrium nature as it helps in formulation of macroeconomics policies and identifies and explain the causes and effects of economic disturbances.

### **1.3 METHODS OF MACROECONOMIC ANALYSIS**

Three methods/approaches are employed in construction and analysis of economic model in macroeconomics.

#### **1.3.1 Static Analysis**

When an economic phenomenon is studied under static conditions, it is called static analysis. In this method, it is assumed that macroeconomic variables like the size of the economy, national income, national consumption, savings, investments, employment, etc. all pertain to same period of time and remain unchanged over the reference period because static ignore the passage of time. It cannot explain the process of change in a model so the entire economic process in a static economy reproduced itself year after year at the same level of output and employment. Such an economy is said to be in a state of static equilibrium. In this method, our analysis is limited to a single position of equilibrium only.

**Importance:** This kind of approach to the study of an economic phenomenon is essentially a theoretical approach. The primary objective of constructing a static model is to make generalizations or theoretical prepositions regarding the relationship between the related variables under static conditions.

Static analysis can identify the equilibrium positions and describe in general terms how the system will move to this position. It can indicate the position of the model for a given period but cannot explain the actual process step-by-step or period-by-period, that the system follows over time to reach that equilibrium position and also cannot reveal exactly what the position will be in any other period.

#### **1.3.2 Dynamic Analysis**

When a macroeconomic phenomenon is analyzed under dynamic conditions, it is called dynamic analysis. Dynamic analysis is able to trace the changes in the value of macroeconomic variables as they moved through successive disequilibrium position towards the single equilibrium position over time. It takes into account the time lag involved in the process of adjustment. It studies the nature and the magnitude of change.

**Importance:** For a realistic study of economic movements and for policy recommendations, we require information regarding the whole path of progress, i.e. 'how' an economy moves from one position of equilibrium to the other. It unfolds the changes which occur during the course of movement of the economy from one position to another. Moreover, a dynamic economy raises certain issues which cannot be handled through static or comparative – static approaches.

#### **1.3.3 Comparative Statics Analysis**

As it is clear by its name itself, it is a comparative study of economic conditions at two equilibrium positions at two different points of time. In other words, it refers to the technique of analysis which economists employ for comparing positions of economic variables and their relationship under equilibrium conditions at different points of time.

The economic forces that determine the equilibrium position for a model may be expected to change over time so as to displace the original equilibrium and lead to the establishment of a new equilibrium. So, one can compare the two equilibrium positions

and explain the change between the two in terms of the changes in forces. The analysis of this kind of change from one equilibrium to another may be handled by the method of comparative statics.

**Importance:** It assumes great significance where the object is to predict the future course of an economy on the basis of the past experience. Through method of comparative statics, we can show the direction and magnitude of the change in equilibrium price and quantity, that follows from changes in the underlying forces that causes the shifts in the supply and demand curve.

**CONCLUSION:** Comparative statics bridges the gap between equilibrium positions in one instantaneous jump, but it reveals nothing about how we got from one position of equilibrium to the other. In reality, we are more interested in the path followed between positions of equilibrium than in the positions themselves and only dynamic analysis can handle this task.

Hence, in short we can conclude that change from one equilibrium position to the next can be analyzed by method of comparative statics, but actual path followed between equilibrium positions can be explained only by macro dynamic analysis.

### Key Points

- The origin of economics can be traced to Adam Smith's book "*An Inquiry into the Nature & Causes of Wealth of Nations*" published in the year 1776.
- Microeconomics deals with behaviour of individual decision making units such as consumers, resource owners, etc.
- Macroeconomics deals with aggregates such as national income, aggregate consumption, etc.
- A stock is a quantity measured at a given point in time.
- A flow is a quantity measured per unit of time.
- Equilibrium refers to a position in which forces working in opposite direction are in balance.
- Disequilibrium is a state in which opposite forces produce imbalance.
- When a part of an economy is studied in isolation is called partial equilibrium analysis.
- A comprehensive study of an economic system is referred as General Equilibrium Analysis.
- Static, Dynamic and Comparative-Static Analysis are three methods of Macroeconomic Analysis.

### ***References***

Mankiw N. Gregory. Macroeconomics. 5<sup>th</sup> edition , Worth Publishers, 2003

### ***Questions For Review***

1. What is macroeconomics? Distinguish it from microeconomics.
2. Explain the difference between stock and flow.
3. What methods are employed by economists for analytical purposes in macroeconomic theory?

## NATIONAL INCOME ACCOUNTING

Economists want to figure out what's going on in the world around them. To do this, they rely on both theory and observation. Casual observation is one source of information about what's happening in the economy. They build theories in an attempt to make sense of what they see happening. Then they turn to use statistics to study the economy. Study of national income and related concepts like Gross Domestic Product (GDP), Gross National Product (GNP), Net National Product (MNP), Net Domestic Product (NDP), etc. enables the government to judge whether the economy is contracting or expanding, whether it needs a boost or should be controlled or rained in a bit, or whether severe inflationary or deflationary pressure are round the corner.

The data from National income accounts serve like 'beacons' to help economic policy makers in achieving their objectives. Poul. A. Somuelson and William D. Nordhaus have succinctly remarked, "Without measures of national economic aggregates like GDP, Policy Makers would be adrift in a sea of unorganized data". The three statistics that economists and the policy makers use most often to quantify the performance of the economy are:-

1. **Gross Domestic Product (GDP):-** It tells us the nation's total income and total expenditure on its outputs of goods and services.
2. **Consumer Price Index (CPI):** It measures the level of prices.
3. **Unemployment Rate:** It tells us the fraction of workers who are unemployed.

### 2.1 GROSS DOMESTIC PRODUCT (GDP)

GDP is often considered the best measure of how well the economy is performing. The value of income or product originating in a country in a particular year is one of the most important means of evaluating how the economy has performed in that year. This statistic is computed every three months by the Bureau of Economic Analysis from a large number of Primary data sources. The goal of GDP is to summarize in a single number the rupee value of economic activity in a given period of time.

GDP is the sum total of market value of all the final goods and services produced on the geographical or domestic territory of an economy in a given period of time.

GDP = Market value of goods and services produced by the residents in the country.

Plus              Income earned in the country by foreigners.

Minus              Income received by residents of the country from abroad.

This is a geographical territorial concept of Product. What we are concerned is the increased production, no matter who produces it i.e. whether production is being done by the residents of a nation or by foreign nationals. Thus, GDP does not make any provision for net factor income from abroad, it only includes what has been

produced on the domestic territory of the country. Thus, in the context of development, GDP is considered as a more appropriate measure.

There are two ways to view GDP:

- (a) It is the sum total of everyone's income in an economy.
- (b) It is the total expenditure on the economy's output of goods and services.

How, GDP measures both the economy's income and expenditure on its output. The reason is that these two quantities are actually the same; for the economy as a whole, income must equal expenditure. The fact follows from; because expenditure by one person becomes the income of the other. In other words, every transaction has both a buyer and a seller. For example, John buys bread of Rs. 10 from Johny, which is an income of Johny & expenditure by John.

### **2.1.1 Rules for Computing GDP**

1. To compute the total value of different goods & services we make use of the market prices of these final goods and services. The market price reflects how much the consumers are willing to pay for the goods and services.
2. Used goods GDP measures the value of currently produced goods and services. Thus, the sale of used goods is not included as part of GDP. Used goods were produced in an earlier period and their value was counted in that period.
3. Regarding the Inventories – Production for inventory increases the GDP, but the sale out of inventory does not affect GDP. It will be treated like the sale of used goods. This treatment of inventories ensures that GDP reflects the economy's current production of goods and services.
4. Intermediate goods and value added – GDP includes only the value of final goods. The reason is that the value of intermediate goods is already included as part of the market price of the final goods in which they are used. Adding Value of intermediate goods will lead to double counting.

One way to compute the value of all final goods and services is to sum the value added at each stage of production.

The value added of a firm = value of the firm's output. Less value of the intermediate goods that the firm purchases.

For the economy as a whole, the sum of all value added must equal the value of all final goods and services. Hence, GDP is also the total value added of all firms in the economy.

5. Housing service and other imputations – Although most goods and services are valued at their market prices when computing GDP, some are not sold in the market place (e.g. self-owned house, Government service etc.), and therefore do not have market prices. To include the value of these goods and services in the figure of GDP, we estimate their imputed value.

### **2.1.2 Real GDP Versus Nominal GDP**

GDP is useful for comparing economic activity, from year to year. GDP measured at current year prices (i.e. Nominal GDP) does not measure accurately the economy's Performance. It will produce a misleading picture of economy's performance because if the prices doubled without change in quantities, GDP also double which reflects economy's ability to satisfy demands has doubled whereas, in actual the quantity of every good produced remain the same. Therefore, to measure the actual economic performance, value of good and services should be measured using a constant of Prices, called real GDP. Hence real GDP is a better measure of economic well-being, which is not influenced by changes in Prices. It shows what would have happened to expenditure on output if quantities had changed but prices had not.

Nominal GDP = Value of goods and services measured at current prices.

Real GDP = Value of goods and services measured using a constant set of Prices of the base year.

### **2.1.3 The GDP Deflator**

It is also called the implicit price deflator of GDP. It reflects what's happening to the overall level of Prices in the economy.

GDP is defined as the ratio of nominal GDP to real GDP:

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

It is used to deflate (that is, take inflation out of) nominal GDP to yield real GDP.

We can also write the equation as:

$$\text{Nominal GDP} = \text{Real GDP} \times \text{GDP deflator}$$

OR

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

where,

Nominal GDP - measures the current rupee value of the output of the economy.

Real GDP - measures output value at constant prices.

GDP deflator - measures the price of output relative to its price in the base year.

**Note:-** The Bureau of Economic Analysis has decided to update periodically the prices used to compute real GDP. About every five years, a new base year was chosen. The prices were then held fixed and used to measure year-to-year changes in the production of goods and services until the base year was updated once again.

## **2.2. Other Measures of Income**

The national income accounts include other measures of income that differ slightly in definition from GDP. They all are also important to study as they also are often referred by economists.

### **2.2.1 Gross National Product (GNP)**

It is the most comprehensive machine of the nations productive activities. It measures the total income earned by nationals (residents of a nation).

GNP is the sum total of market value of all the final goods and services produced by the residents of a country in a given period of time.

GNP = market value of goods and services produced by the resident in the country.

Plus Income earned abroad by nationals.

Minus Incomes earned locally by the foreigners.

In other words, to obtain Gross national product (GNP), we add receipts of factors income (wages, profit and rent) from the rest of the world and subtract payments of factor income to the rest of the world.

$$\text{GNP} = \text{GNP} + \text{Factor payments from Abroad} - \text{factor Payments to Abroad}.$$

### **2.2.2 Net National Product (NNP)**

It is another concept of National income. The concept of NNP is closely related to the concept of GNP. The concept of GNP includes the output of both final consumer and capital goods. However, a part of capital goods is used up or consumed in the process of production of these goods. That is called depreciation or capital consumption (the amount of the economy's stock of plants, equipment and residential structure that wears out during the year). So GNP is gross of depreciation and NNP is net of depreciation.

$$\text{NNP} = \text{GNP} - \text{Depreciation}$$

### **2.2.3 National Income (NI)**

The next adjustment in the national income accounts is for indirect business taxes such as sales taxes. As firms never receive these taxes, it is not a part of their income. Once, we subtract indirect business taxes from NNP, we obtain a measure called national income.

$$\text{National Income (NI)} = \text{NNP} - \text{Indirect Business Taxes}$$

### **2.2.4 Personal Income (PI)**

It is the sum total of all kinds of incomes received by the individuals (including transfer earnings) from all sources income within and outside the country during an accounting year.

It includes wages and salaries, fees & commissions, bonus fringe benefits, dividends, interest earnings and also includes transfer incomes like pension, allowances, old age security benefits etc.

$$\begin{aligned} \text{Personal Income} = & \quad \text{National Income} + \text{Dividend+Government} \\ & \quad \text{Transfers to Individuals+Personal Interest} \\ & \quad \text{Income-Corporate Profits-Social Insurance} \\ & \quad \text{Contributions-Net Interest} \end{aligned}$$

### **2.2.5 Personal Disposable Income (DI)**

It is the amount households and non corporate businesses have available to spend after satisfying their tax obligations to the government.

It is the amount households and non corporate businesses have available to spend after satisfying their tax obligations to the government.

Personal Disposable Income = Personal Income – Personal Tax and non-tax Payments

### **2.3. The Components Of Expenditure (GDP)**

Economists and policy makers care not only about the economy's total output of goods and services but also about the allocation of this output among alternative uses.

The national income accounts divide GDP into four broad categories of spending, according to the identity of the purchaser:-

- \* Consumption (C)
- \* Investment (I)
- \* Government Purchases (G)
- \* Net Exports (NX)

Mathematically, their relation could represented as

$$Y = C + I + G + NX$$

Where, Y stands for GDP

GDP is the sum of consumption, investment, government purchases and net exports. Each rupee of GDP falls into one of these categories. This equation is the national income accounts identity.

In closed Economy:

$$\text{2 Sector model} \quad Y = C + I$$

$$\text{3 Sector model} \quad Y = C + I + G$$

In open Economy:

$$\text{4 Sector model} \quad Y = C + I + G + NX$$

Let us now discuss each of the component of GDP in a detailed manner.

#### **2.3.1 Consumption (C )**

Consumption is expenditure on final goods and services with a view to derive satisfaction. It is the most important function used in macro economic theory because all forms of consumption together make up two-thirds of GDP.

Consumption depends on number of factors e.g. income wealth, life style, sex etc. but assumption is aggregate amount of real consumer spending is determined exclusively by the real disposable income of consumers. The relationship between consumption and income is described by consumption function. Thus,

The consumption function is the assumed direct relationship between the disposable income level and the planned or desired consumption expenditures.

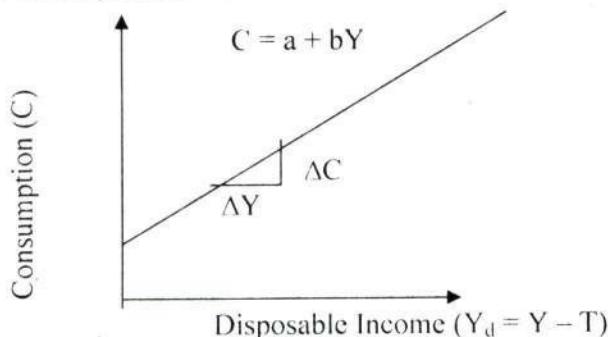
Algebraically, the basic relationship between country's consumption spending and disposable income is shown as:

$$C = F(Y_d) \quad \dots \dots \dots \text{consumption function}$$

in which,

C Stands for the consumption spending, and

Y Stands for the disposable income.



**Fig. 2.1: The Consumption function**

The consumption curve has a positive slope showing that when the income increases consumption also increases.

Consumption consists of the goods and services brought by households. It is divided into three subcategories;

- (1) *Durable goods*: Goods that last a long time, such as T.V. and cars etc.
- (2) *Non durable goods*: Goods that last only a short time, such as food and clothing.
- (3) *Service*: It includes the work done or services rendered for consumers by individuals, and firms such as consultation, doctor visits, hair cuts etc.

### 2.3.2 Investment (I)

Investment consists of goods bought for future use. In other words, it is expenditure on goods not for current consumption. Sometimes confusion arises because what looks like investment for an individual may not be investment for the economy as a whole. For an economy investment is something which adds or creates new capital. In other words, investment means additions to the physical stock of capital. Economy's investment does not include purchases that merely reallocate existing assets among different individuals.

Lets consider an example. Suppose we observe two events:-

- Mack buys for himself a 100 year old factory.
- Jones builds for himself a brand new factory.

What is total investment here? Two factories, one factory or zero?

A macro economist seeing two transactions counts only the Jones' factory as investment. Mack's transaction has not created new housing for the economy; it has merely reallocated existing housing. Mack's purchase is investment for Mack, but it is disinvestment for the person selling the factory. By contrast, Jones has added new factory to the economy, his new factory is counted as investment.

Investment is divided into three subcategories:

- (1) *Business fixed investment*: It is the purchase of new plant and equipment by firms.
- (2) *Residential fixed investment*: It is the purchase of new housing by households and landlords.
- (3) *Inventory Investment*: It is the increase in firms' inventories of goods. The investment in inventory can be positive or negative depending on the fact whether investments rise or are depleted.

Investment ( $I$ ) depends on the rate of interest ( $r$ ) Investment function is

$$I = f(r)$$

Investment is the cost of borrowing and so when interest rate increases, cost of borrowing (funds) increases. Thus, investment curve has a negative slope.

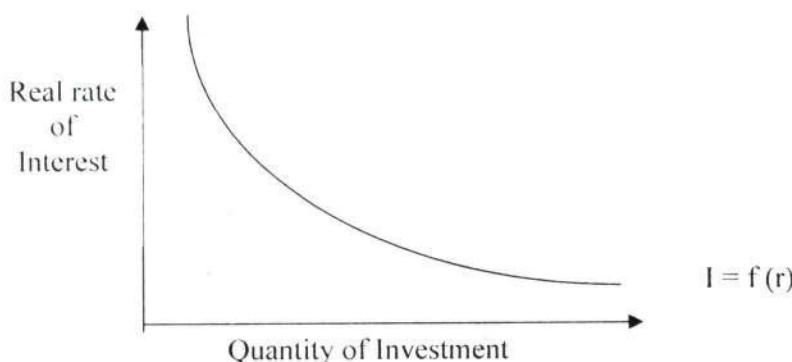


Fig. 2.2: The Investment function.

### 2.3.3 Government Purchases (G)

By Government Purchases we refer to the Government spending on goods and services as purchase of goods and services by federal, state and local governments. This category includes such items as military equipment, high ways, and the services that government workers provide. In addition, the Government makes transfer payments, payments that are made to people without their providing a current service in exchange. Typical transfer payments are social security benefits and unemployment benefits. Transfer payments are not counted as part of GDP, because transfer payment reallocates existing income and are not made in exchange for some of the economy's output of goods and services; they are not part of current production.

$$\text{Govt. purchases} = \text{Government Expenditure} - \text{Transfer payments}$$

### 2.3.4 Net Exports (NX)

The final component of GDP is net exports. It takes into account trade with other countries.

Net export is the difference between the value of goods and services exported by domestic country to other countries and the value of goods & services that other countries provide to the domestic economy.

In other words Net exports represent the net expenditure from abroad on our goods and services which provides income for domestic products.

NX = Value of goods and services exported (EX)

minus Value of goods and services imported (IM)

$$\boxed{NX = EX - IM}$$

The difference between exports and imports, called net exports, is a component of total demand for our goods.

The GDP is expressed as the sum of expenditure on domestically produced final goods and services. The four types of expenditure that are included in GDP and the economic group who makes those expenditures and some examples of each type of expenditure are summarized in the following table:

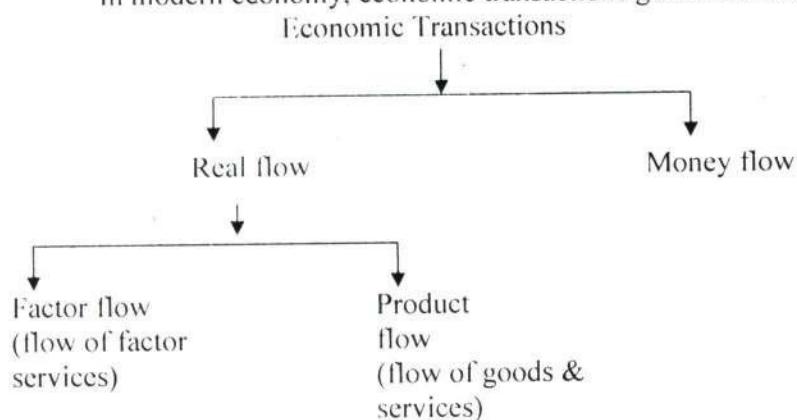
Type of Expenditure	Economic group that makes the expenditure	Examples
Consumption	Individuals, households	Food, clothing, shelter
Investment	Business firms	New plant and machinery equipment, new houses, increase in inventory.
Government purchases	Central, state and local governments.	New defence equipment, salaries of government officials, new government schools etc.
Net Exports	Foreign Sector	Export of manufactured items, services provided to foreigners by domestic residents.

Table 1.1

#### 2.4 Income Expenditure And The Circular Flow

As macroeconomics is the study of the economy as a whole. An economy can be defined as an integrated system of production, exchange and consumption. The three economic activities are inter-related. Changes in one lead to changes in the other. In carrying out these economic activities, people are involved in making transactions – they buy and sell goods and services. The transactions take place between different sectors of the economy due to which income and expenditure moves in a circular form called circular flow of income and expenditure.

In modern economy, economic transactions generates two kinds of flows:



**Fig. 2.3**

*Real flow:* It is the flow of goods and services from the firm to the households and flow of factor services from the household to the firm.

*Money flow:* It is the flow of money from the household to the firms in the form of Payment for goods and services and from the firm to the households, the flow of factor payments.

**Note:** Both Real flow and money flow go in opposite direction in a circular fashion.

In our economy, both commodities and factors of production are constantly being exchanged for money. The money flows hand to hand in much the same way as water flows through pipe or electricity through a circuit. Therefore, the entire economic system can be viewed as circular flows of income and expenditure. The magnitude of these flows, in fact determines the size of national income.

The mechanism of Income/Expenditure flows is extremely complex in reality. Therefore, to present this, the economy is divided into four sectors:

- (1) Households
- (2) Business firms
- (3) Government sector
- (4) Foreign sector

#### 2.4.1 The Circular Flow In 2-Sector Model

A two sector model is obviously an unrealistic model consisting of household and business firm which represents a private closed economy but provides a convenient starting point to analyze the circular flow.

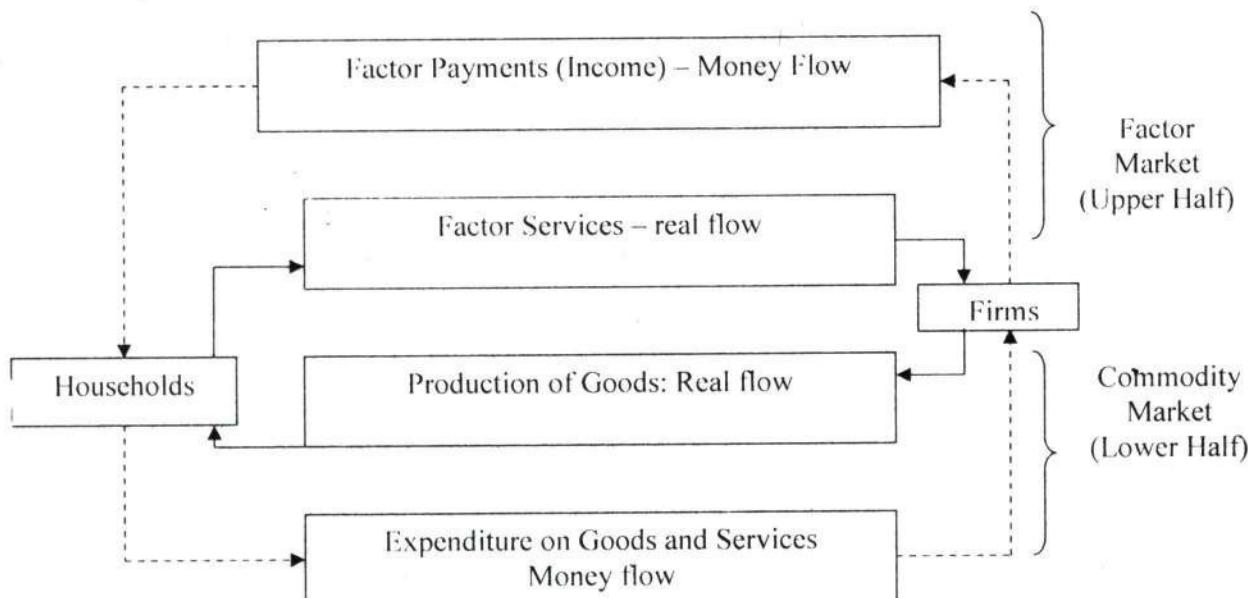
Features of households:

- (1) Households are the owners of all factors of production.
- (2) They are the consumers.
- (3) Their total income consists of wages, rent, interest and profits.

- (4) Whole of their income is spent on the consumption expenditure and therefore, savings = 0

Features of Business firms:

- (1) They own no resources of their own.
- (2) They hire and use the factors of production from households
- (3) They produce and sell goods and services to the households.
- (4) There are no corporate savings.



**Fig. 2.4 The circular flow of Income and Expenditure in a two-sector model.**

In the factor market (Upper Half)

- (1) Firm purchases the factors of Production (Land, labour capital and entrepreneurship) from the households who own them. This makes real flow shown by a continuous arrow.
- (2) In return to the services, provided, the households receive income in the form of wages, rent, interest and profits (factors income) – shown by dotted arrow. In reverse direction from firms to households.

Therefore, real or factor flow causes another and a reverse money flow.

In the product market (Lower half)

- (1) Firm produces goods and services with use of factors of production (purchased from households) and sell the same to the households. This is shown by continuous inner loop of real flow but in opposite direction from firms to households.
- (2) The households spent their earned income and make payments to firms for goods and services & creates money flow but this too, in opposite direction shown by dotted arrow.

Now, when we continue the goods and money flows in factor and product market and look at the flows in continuity we find circularity in flows.

- The circular flow in a simple economy is thus complete wherein:
- Firm purchases factors of production from households and then use these factors to produce commodities that are bought by households – circular flow of goods.
  - Money paid for factor services become income for households, which they spent to purchase goods and services so produced become income of the firms. Money flows around the circuit, passing from firm to household and back again – circular flow of income.

#### **2.4.2 Computation Of GDP From The Circular Flow**

GDP measures the flow of rupees in an economy. Since the circular flow shows that the GDP is both the total expenditure on the goods and services and the total income from the production of the goods and services, so to compute GDP we can look at either the flow of rupees from firms to households or the flow of rupees from households to the firms.

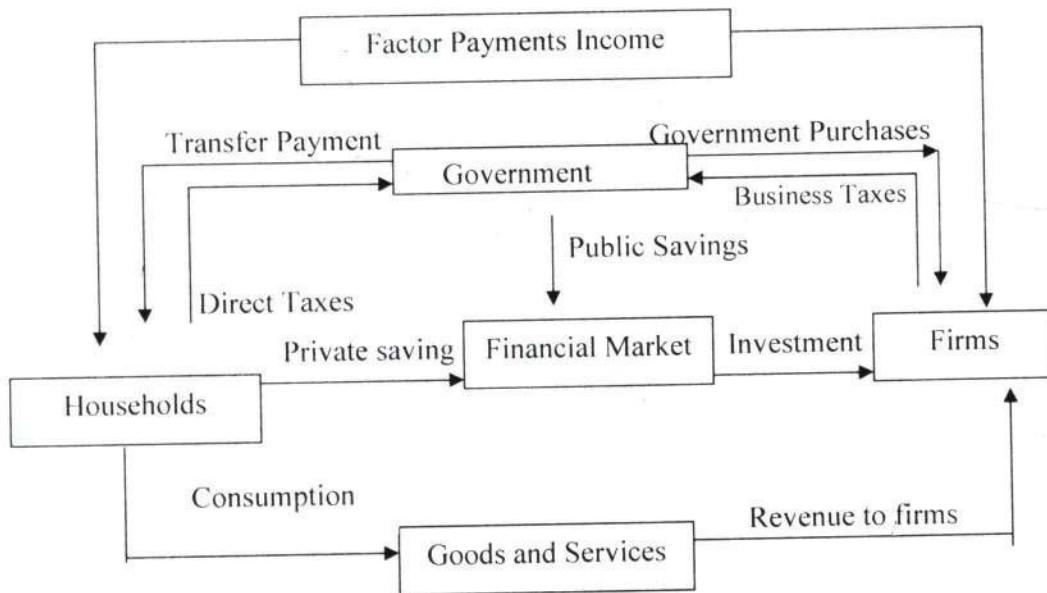
These two alternative ways of computing GDP must be equal because the expenditure of buyers on products is, by the rules of accounting, income to the sellers of those products. In other words,

$$\text{Expenditure by the buyers} = \text{Income of the sellers.}$$

#### **2.4.3 The Circular Flow in a Three-Sector Model**

A three-sector model depicts a more realistic economy. It reflects more accurately how real economies function. It includes government, the central authority, which plays an important role in the economy. In other words, it shows the linkages among the economic factors – households firms and the government – and how rupees flow among them through the various markets in the economy.  
Features:

- The economy is a closed economy and does not trade with rest of the world. The economy consists of three sectors:
  - Households
  - Firms
  - The Government
- Three fiscal variables are included in the circular flow:
  - Direct taxes
  - Government expenditure on goods and services
  - Transfer payments
- The three markets under study are:
  - the factor market
  - the product market, and
  - the financial market
- The Central authority (Government) affects the circular flow both by withdrawing income from it through taxes and by injecting income into it through their spending.



**Fig. 2.5 Circular flow of Income and Expenditure in a three-sector model  
(showing only money flow)**

- (1) The household receive factor income by supplying factor services to the firms, they use the factor income to consume goods and services, to pay taxes to the government and to save through the financial markets.
- (2) Firms receive revenue from the sale of goods and services and use it to pay for the factors of production, and to pay business taxes to the government.
- (3) Both households and firms borrow in financial markets to buy investment goods, such as houses and factories.
- (4) The government receives revenue from taxes and uses it to pay for government purchases and transfer payments.
- (5) In case, the tax revenue of the government is greater than government purchases, the government will have a budget surplus and is termed as public savings. However, if tax revenue is less than government purchases the government will have a budget deficit (and negative public savings).

Thus, the circular flow of income and expenditure takes place as long as the leakages = injection. The circular flow binds the various segments and its different units together and keeps the system moving without any interference or regulation.

#### KEY POINTS

- The GDP is the country's total income or the total expenditure on its output of goods and services.
- In the computation of the GDP only the value of the currently produced goods and services is included where the goods are valued at market prices.
- The real GDP is a better measure of economic well-being than the nominal GDP.
- GNP is the total value of final goods and services produced in the economy during a year plus net income from abroad.
- NNP is GNP – Depreciation

- Personal income is total income received by individuals in a year.
- Personal disposable income amounts to personal income minus direct taxes, fines, fees, etc. paid to the government.
- All economic transactions in an economy generates two kinds of flows – real flow and money flow.
- Real flow and money flow moves in circularity but in opposite direction.
- The magnitude of real flows and money flows determines the size of National Income in an economy.

*Reference*

Mankiw N. Gregory. Macroeconomics. 5<sup>th</sup> edition, Worth Publishers , 2003

*Questions for Review*

1. What is the GDP? How can GDP measures two things at once?
2. How is the Gross Domestic Product computed? What is the treatment given to inventories, intermediate goods and housing services in the computation of the GDP?
3. Distinguish between real and nominal GDP? Nominal GDP is a better measure of economic well-being. Do you agree?
4. Write a short notes on the following:
  - (a) Gross National Product (GNP)
  - (b) Net National Product (NNP)
  - (c) Disposable Income (DI)
  - (d) GDP Deflator
5. What are the different components of Expenditure? What is the significance of these components in national income accounts?
6. What are the adjustments required to be made to the national income to arrive at the personal income? Discuss.
7. Explain the circular flow of income in a two sector economy.
8. Explain are the circular flow of income in a three sector economy.

## Lesson-1

# Consumption and Saving Function

## APC, MPC, APS and MPS

Corresponding to a certain level of output, an equal amount of income is created which is distributed among the factors of production as their remuneration in the form of wages, profits, interest and rent. But this fact does not guarantee an equal amount of spending. Expenditure may be greater or less than the amount of income generated in the system. The amount of spending on consumption will depend upon the relationship that might exist between income and consumption. Such a relationship which indicates as to how consumption varies in response to changes in income is called the 'consumption function'.

Normally, consumption expenditure increases with income. As the community grows richer, it tends to consume more. The ratio between total consumption expenditure and the total income is called the average propensity to consume (APC). For, example if out of a total income of 100, 80 is consumed, then the APC would be  $80/100 = 0.8$ . Correspondingly, we can define the average propensity to save, (APS) as the ratio between the total savings and the total income ( $=20/100=0.2$ ).

Another set of important concepts is given by the marginal propensity to consume (MPC) and the marginal propensity to save (MPS). While the APC and the APS relate the total consumption and saving with the total income, the MPC and MPS relate the changes in consumption and saving with the changes in income. If an increase in income from 100 to 200 induces an increase in consumption from 80 to 150 and an increase in saving from 20 to 50 then the MPC will equal  $70/100$  [ $=\text{change in consumption } (150-80) / \text{change in income } (200-100)$ ] and the MPS will be equal to  $30/100$  [ $=\text{change in saving } (50-20) / \text{change in income } (200-100)$ ]. These two concepts tell us the proportion of any change in income which will be consumed or saved. If we write Y for income, C for consumption and S for savings, then the APC and APS can be written as  $C/Y$  and  $S/Y$ . If for changes in income, consumption and saving, we write  $\Delta Y$ ,  $\Delta C$  and  $\Delta S$ , then MPC and MPS can be written as  $\Delta C/\Delta Y$  and  $\Delta S/\Delta Y$  respectively. Consumption during any time-period depends not only on current income, but also on a host of other subjective and objective factors. We shall consider these factors in detail in a later section. For the present, we start our analysis on the assumption that current income is the principal variable upon which aggregate consumption depends. With a view to simplifying the exposition of the basic mechanics of income determination, we start with a simple consumption function based on Keynes' 'fundamental psychological rule' which incorporates the following elements :

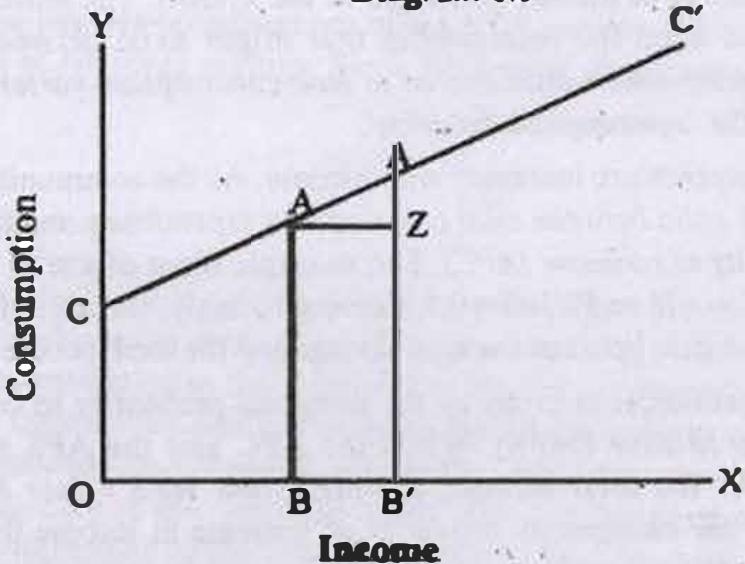
1. Real consumption varies directly with real income (if price-level is assumed to be constant, then real and monetary income are the same). In other words, consumption rises and falls with rise and fall in income.

2. As income increases, consumption also increases, but by less than the increase in income, part of the additional income being saved. This means that  $\Delta Y = \Delta C + \Delta S$  (where  $Y$  denotes income,  $C$  consumption,  $S$  saving and  $\Delta$  denotes change) and  $\frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y} = 1$ . It is clear that  $C/\Delta Y$  (MPC) is positive, but less than 1.

3. Consumption cannot fall below a certain minimum level even if income falls to zero. This is the bare subsistence level of consumption. This part of consumption is autonomous or independent of the level of income. The equation  $C = Ca + c.Y$  summarises such a consumption function. In this equation,  $C$  stands for aggregate consumption,  $Ca$  stands for autonomous part of consumption and  $c$  is the increase in income which is consumed or marginal propensity to consume  $\Delta C/\Delta Y$ .

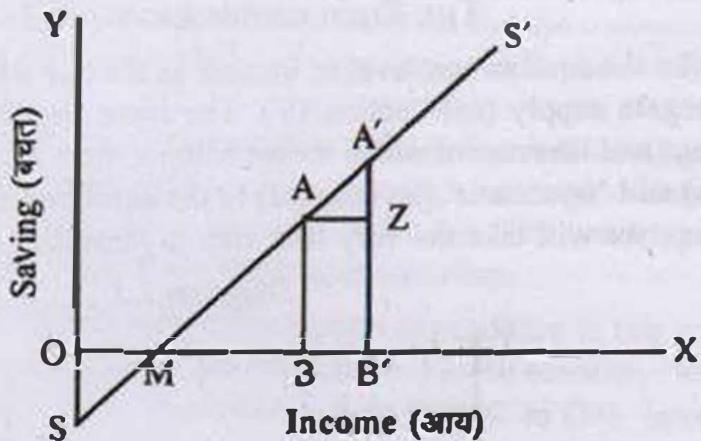
In the diagram below, curve  $CC'$  depicts the consumption function stated in the above equation i.e.  $C = Ca + c.Y$ . The related concepts APC, APS, MPC and MPS are explained graphically below :

Diagram 1.1



In the above diagram,  $OC$  is the level of autonomous consumption ( $Ca$  in the above equation). Consumption does not fall below this level even if income falls to zero. When income is  $OB$ , the corresponding consumption level would be  $AB$ ; when it rises to  $OB'$ , the consumption level rises to  $A'B'$ . The line  $CC'$  cuts the  $Y$ -axis at  $C$ , indicating that consumption is  $OC$  even when the income falls to zero. Once we define a relationship like  $CC'$ , it becomes easy for us to derive APC and MPC. APC in the above diagram would be  $AB/OB$  for income  $OB$  and  $A'B'/OB'$  for the income level  $OB'$ . The MPC will be equal to  $A'Z/AZ$ . The ratio  $A'Z/AZ$  indicates the slope of the consumption function. It shows as to how steep the consumption line is.

*Diagram 1.2*



An exactly similar analysis can be carried out with respect to the savings curve relating savings with income. In diagram 1.2 above, the curve  $SS'$  cuts the Y axis at  $S$  below point  $O$  indicating that at zero income level the savings are negative and the amount of negative savings is  $OS$ . Upto point  $M$ , the  $SS'$  curve remains below the X-axis indicating that upto the income level  $OM$ , the savings remain negative and they become zero only at point  $M$ . After the point  $M$ , however, the relationship between savings and income becomes positive and we can proceed to derive the average and marginal propensity to save in exactly the same way as we did in the case of the consumption curve. The values of the APS and the MPS according to the above diagram are :  $AB/OB$  or  $A'B'/OB'$  (for APS) and  $A'Z/AZ$  (for MPS).

About the behaviour of the MPS and the MPC, it is said that their values are almost always less than one because not whole of a change in income is either consumed or saved. Usually it is only a portion of the total change in income which is consumed and the rest saved. Further, it is maintained that at high levels of income, the additional consumption out of the additional income tends to decline and the proportion of it that is saved tends to increase. In other words, the MPC tends to decline while the MPS tends to increase with a rise in incomes. This is reasonable to assume since at higher levels of income, most of the essential consumption needs are satisfied which reduce the urge for additional consumption out of an addition to income. When consumption out of additional income falls, savings will naturally increase, thus increasing the value of the MPS.

#### **SELF-CHECK EXERCISE**

Define the following concepts on the basis of our discussion of the preceding sub-section

- The consumption function.
- Average propensities to consume and save.
- Marginal propensities to consume and save.
- Draw a diagram to identify the four concepts.

## LESSON 2

### DETERMINANT OF CONSUMPTION

As already stated, income creation at any stage is determined by the level of expenditure, and hence aggregate demand, in the earlier period. The two main expenditure items are consumption and investment. *For the time being, we take investment to be autonomous, meaning thereby that it is independent of all the factors within the economic system and is determined outside the system.* It is, so to say, a given quantity which does not change with change in income, consumption etc. With this, we leave investment here and proceed to discuss the other item of aggregate demand, namely, consumption.

The most important determinant of consumption is the level of income. This is as much true for an individual as it is for the society as a whole. However, there are different hypotheses regarding the ways in which income influences consumption. These are : Absolute income hypothesis, Relative income hypothesis, Permanent income hypothesis and the Life-cycle hypothesis. Each of these hypotheses assigns a different role to income in the determination of consumption.

#### **The absolute Income Hypothesis**

This hypothesis is associated with Keynes's theory of consumption and is based on his Fundamental Psychological law. According to this law :

- (1) Level of consumption is determined by the absolute level of income. Higher the level of income, higher will tend to be the level of consumption.
- (2) At very low levels of income, consumption exceeds income and saving is negative. Consumption is financed either by dissaving or borrowing.
- (3) At a certain level of income, consumption equals income and saving becomes zero. This may be called the break even point.
- (4) Beyond this point, as income rises, consumption also rises, but by less than the increase in income. This means that change in income  $\Delta Y$  is equal to  $\Delta C + \Delta S$  (i.e., change in consumption and change in savings). Evidently  $\Delta C/\Delta Y$  is less than 1, and  $\Delta C/\Delta Y$  (i.e. MPC) +  $\Delta S/\Delta Y$  (i.e. MPS) = 1
- (5) Further  $\Delta C/\Delta Y$  i.e., the marginal propensity to consume (MPC) declines with increasing levels of income.

#### **The Relative Income Hypothesis**

Duesenberry was the author of this hypothesis according to which a family's consumption depends on the level of its income relative to the incomes of other families with which it identifies, rather than on the absolute level of its own income. An example amply clarifies this hypothesis. Suppose your neighbours grow richer while your income remains unchanged. Your consumption will increase simply because your relative income position has deteriorated vis-a-vis your neighbours whom you tend to imitate. As you must have observed, low income people typically imitate the superior consumption patterns of the people in higher income groups. Duesenberry

has described this phenomenon as 'the demonstration effect'. According to this hypothesis, if incomes of all families in the society rise in the same proportion as the aggregate income (i.e., there is no change in the relative income position of different families), APC of each family will remain the same, as it was earlier before the change. In other words, changes in the level of aggregate income will not affect APC provided the distribution of income remains the same.

### **The Permanent Income Hypothesis**

This hypothesis was presented by the famous economist Friedman. According to this hypothesis, "permanent" consumption is proportional to "permanent" income. Actual income of any period consists of the sum of permanent and transitory components. Similarly, actual consumption during any period will consist of the basic permanent component and the random transitory component. A family's actual yearly income may be greater than or less than its permanent income depending upon positive and negative transitory components such as sudden accrual of a bonus or sudden loss of wages due to breakdown of a plant. These unforeseen additions to or subtractions from a family's income cancel out over a long period but are present in the short period. Permanent income according to this hypothesis is the expected or anticipated average (or mean) income which a "family" expects to receive over a number of future years. Permanent income of a family depends upon how much it has invested in human capital by way of education, training etc. of its members and how much non-human capital it has accumulated in the form of real estate, financial assets etc. On the basis of these two sources of earned and unearned income, each family tries to estimate its average flow of income over future years. Permanent consumption is a constant proportion of permanent income according to this hypothesis. Consumers tend to adjust their consumption habits to their long-term or permanent income prospects and they usually do not change their consumption levels on account of temporary fluctuations in income. A wage earner who suddenly becomes unemployed will normally not expect his income to remain at the same level and will, at least for a while, maintain consumption at its earlier level. In other words, APC of families at all levels of income is the same when expressed as a ratio of permanent consumption to permanent income. This also implies that the rich and the poor, both alike, save the same proportion of their respective permanent incomes. Some economists criticise this hypothesis on the grounds that even though all families may attempt to even out their consumption over time, how can the poorer families save the same proportion of income as the comparative richer families ?

### **The Life-cycle Hypothesis**

This hypothesis is essentially similar to the permanent income hypothesis except for the fact that in the former, income relevant to consumption during any period is taken as the average of the income-flow over the whole life of the individual or family concerned.

## **Other Factors Affecting Consumption**

### **Rate of Interest**

According to the classical economists, higher the rate of interest, higher will be the rate of saving. This means a higher rate of interest will discourage consumption. However, this is not a balanced view. A rise in the rate of interest tends to produce a substitution effect towards more future and less present consumption (i.e., more saving). It also induces an income effect by increasing the individual's future income and thus reducing its marginal utility. *Therefore, the effect of a change in the rate of interest depends upon the relative strengths of the substitution effect (which encourages savings) and income-effect (which discourages savings).* In case of the richer sections of society who have already substantial amounts of assets, the income-effect will be more powerful than the substitution effect and a higher rate of interest may encourage them to consume more and save less. In case of lower-income groups, on the other hand, substitution effect may be stronger than the income effect and a higher rate of interest may encourage them to save more. Thus the net effect of changes in rate of interest on consumption may be negligible and empirical studies also support this.

### **Changes in The Price Level**

A rise in the general price level causes a fall in real incomes while a fall in the price level causes a rise in real income. Thus, other things remaining constant, a fall in real income will lead to a fall in consumption and vice versa. *However, if people suffer from money illusion and do not recognise the effect of a change in the price-level on their real income, they may act differently and in that case, the net effect may be anything.*

### **Price Expectation**

In a situation of continuing inflation which generates expectations of further rise in the price level, people are encouraged to purchase more at present with a view to avoiding purchases at higher prices in the future. Similarly a situation of falling prices may generate expectations of further fall in the price level and encourage people to postpone their purchases with a view to benefiting from the lower prices in the future. Thus expectations of a rise in the price level in future encourage present consumption and expectations of a fall in the price level discourage consumption at present.

### **Distribution of Income**

It is a well known fact that MPC (Marginal Propensity to Consume) is high at lower levels of income and low at higher levels of income. This is because at lower levels of income, the pressure of immediate consumption needs is much more than at higher levels of income. From this, it follows that a re-distribution of income from richer sections to the poorer ones will increase the level of aggregate consumption in the society, whereas an increase in the inequality of incomes will reduce aggregate consumption.

## **Ownership of Financial Assets**

Families with larger accumulation of financial assets feel richer and are inclined to spend more on consumption compared to the families who own less of financial assets. *This is true even when the disposable income in two cases is the same.* A similar kind of effect is produced by windfall gains and losses..

## **Consumer Credit**

Availability and easier terms of consumer credit stimulate consumer expenditure on durable goods. You must be aware of the various hire purchase schemes available these days.

Besides the above factors, changes in the size and composition of population, pent up demand on account of ir etc. and institutional changes popularising long-term savings may also affect the level of cumption and savings.

### ***SELF-CHECK EXERCISES***

- (1) Identify the emphasis that each hypothesis lays on the influence of changes in income on consumption.
- (2) Each of the influences—absolute income, relative income position, consideration for future income prospects—has a role in the determination of consumption.

## LESSON 3

# DETERMINANTS OF INVESTMENT

### Introduction

As you already know, according to Keynes, the level of income in a capitalist economy depends upon the level of aggregate demand. Aggregate demand originates from private consumption expenditure, business investment expenditure, government expenditure and export demand. You have also seen that a change in any of the above items of expenditure results in a much larger change in income through the multiplier effect. Out of these items of expenditure, we have so far assumed investment as an autonomous quantity, determined independently and outside the system. *But now we relax that assumption and see how level of investment is determined in the economic system.* In this context, we discuss basically two theories of investment, the first being the Keynesian concept of the Marginal Efficiency of Capital (MEC) and the second is the Acceleration Principle.

### Discounting Future Values

Before explaining the concept of MEC, we discuss first the principle of discounting in the context of capital goods. Capital goods are durable-use goods which aid production over a number of years. Returns from these capital goods are spread over the whole of their useful lives. Therefore, investment in capital goods necessitates estimation of their prospective yields. Prospective yield from a capital good is  $MPP \times MR$  minus all variable costs (except interest and depreciation), where MPP is marginal physical product and MR is marginal revenue. *While yields obtainable from the use of a capital good are future quantities, the cost of a capital asset is payable at present. So long as we have a positive rate of interest, amounts available in future are worth less at present. Therefore, we cannot compare future quantities (prospective yields) with present cost.* We have to calculate the present value of the series of prospective yields to make them comparable with the cost of the capital good in question. For example, if the present market rate of interest is 10% p.a., Rs. 1000 lent out today would grow to Rs. 1210 in 2 years  $[(1000 \times (110/100))^2]$  and to Rs. 1331 in 3 years  $[1000 \times (1.1)^3]$ . Thus at the current market rate of interest of 10%, the present value of Rs. 1331 obtainable after 3 years is Rs. 1000 [That is  $1331 \times (100/110)^3 = 1000$ ] and the present value of Rs. 1210 obtainable after 2 years is also Rs. 1000 [that is  $1210 \times (100/110)^2$ ]. We call this "discounting" the future values, the process through which a future quantity shrinks when converted into present value. This discounting process is simply the reverse of the process through which any present quantity grows at a compound rate when carried into future. We can similarly calculate the present value of a whole series of prospective yields available at different points of time in future.

The general formula for finding the present value of any future income-stream is :

$$C = \frac{R_1}{(1+i)^1} + \frac{R_2}{(1+i)^2} + \frac{R_3}{(1+i)^3} + \dots + \frac{R_n}{(1+i)^n}$$

In this equation, C is the present discounted value,  $R_1, R_2, \dots, R_n$  are prospective returns

expected to accrue in different years of the productive life of the capital good (say, a machine) and  $i$  is the rate of discount. Let us take a simple example to explain the process of finding the present value of the series of prospective yields of a machine expected to accrue during different time periods. Suppose that an entrepreneur expects that the use of a machine will generate Rs. 1000 per year for 5 years. The present values of the series of prospective yields (Rs. 1000 per year for 5 years) calculated at different rates of discount are presented in the table below :

**TABLE**

**Discount Values of Rs. 1000 at Different Discount Rates and for Different Time Periods :**

Rate of discount Time Period ↓	3%	4%	5%	6%	7%	8%	9%	10%
1 Year	970.87	961.54	952.38	943.40	934.58	925.93	917.43	909.09
2 Years	942.60	924.56	907.03	890.00	873.44	857.34	841.68	826.45
3 Years	915.14	889.00	863.84	839.62	816.30	793.83	772.18	751.31
4 Years	888.49	854.80	822.70	792.09	762.90	735.03	708.43	683.01
5 Years	862.59	821.93	783.53	747.26	712.99	680.58	649.93	620.92
Total Present Value	4579.7	4451.8	4329.5	4212.4	4100.2	39992.2	3889.6	3790.8

### Observation

1. The present value of the series varies inversely with the rate of discount given the time-period. Smaller the rate of discount, higher the present value and vice versa.
2. With a given rate of discount, the present value also varies inversely with the time-period of discount. Longer the period, smaller is the present value and vice-versa.

One method of estimating whether or not investment in a certain capital asset is a profitable proposition is simply to calculate the present value of the prospective yields by discounting them at the current market rate of interest and then to compare the present value so calculated with the current cost of the capital asset in question. If the current cost of the capital asset is less than the present value of the prospective yields (discounted at the market rate of interest), it is a profitable business proposition. In case, the current cost is greater than the present value thus calculated, it is not profitable to invest in the machine. If, however, the current cost and the present discounted value are just equal, it is a matter of indifference for the investor whether or not to invest. For example, in the table given above, when the series of prospective yields is discounted at the present market rate of interest of 5% p.a., the present value amounts to Rs. 4329.48. Evidently, if the current cost of the machine is less than this amount, it is a profitable proposition to invest in this machine and vice versa.

### Marginal Efficiency of Capital

Keynes has approached this problem in a different manner. Instead of comparing the present

value of prospective yields (discounted at the market rate of interest) with the current cost of the capital asset in question, he requires us to find out that rate of discount which makes the present value of the series equal to the current cost of the capital asset and then compare this rate of discount with the market rate of interest in order to judge whether investment in the machine is profitable or not. Keynes has defined 'marginal efficiency of capital' as that rate of discount which, when applied to the series of prospective yields obtainable from the use of a capital asset, will just reduce their sum to equal the cost of the asset under consideration. MEC (Marginal efficiency of Capital) is thus determined only by the prospective yields and the current cost of the capital asset. The rate of interest does not come into the picture in the determination of MEC.

By substituting C for V and inserting the values of  $R_1, R_2, \dots, R_n$  in the discounting formula

$$C = \frac{R_1}{(1+i)^1} + \frac{R_2}{(1+i)^2} + \frac{R_3}{(1+i)^3} + \dots + \frac{R_n}{(1+i)^n}$$

we can find that rate of discount which equates the discounted value of the series to C (the current cost of the capital asset). Thus, if  $C (=4100.2) = \frac{1000}{(1+i)^1} + \frac{1000}{(1+i)^2} + \frac{1000}{(1+i)^3} + \frac{1000}{(1+i)^4} + \frac{1000}{(1+i)^5}$ .

Solving it for  $i$  gives us 0.07 or 7%. This is the value of MEC given the prospective yield of 1000 per year for 5 years and given the current cost of the machine at Rs. 4100.21. Similarly by taking different values of C, we can find the value of corresponding MEC's given the same prospective yields. For example, when  $C = 3790.8$ ,

value of  $i$  in the equation  $C = \frac{1000}{(1+i)^1} + \frac{1000}{(1+i)^2} + \frac{1000}{(1+i)^3} + \frac{1000}{(1+i)^4} + \frac{1000}{(1+i)^5}$  comes

out to be 0.10 i.e. 10% which is the MEC. Thus given any series of prospective yields and the current cost of the capital asset, we can solve the equation for  $i$  i.e. MEC.

Rate of interest enters the picture only when a firm considers the alternatives of investing a certain sum of money in the purchase of a capital asset promising a certain MEC or lending the sum at the current market rate of interest. It is evident that investing the sum in the purchase of the machine would be preferable to lending it only if MEC is greater than the market rate of interest. On the other hand, lending the sum rather than investing it in the capital asset would be a better proposition if the market rate of interest is greater than MEC. It would be a matter of indifference for the firm if MEC is equal to the current rate of interest.

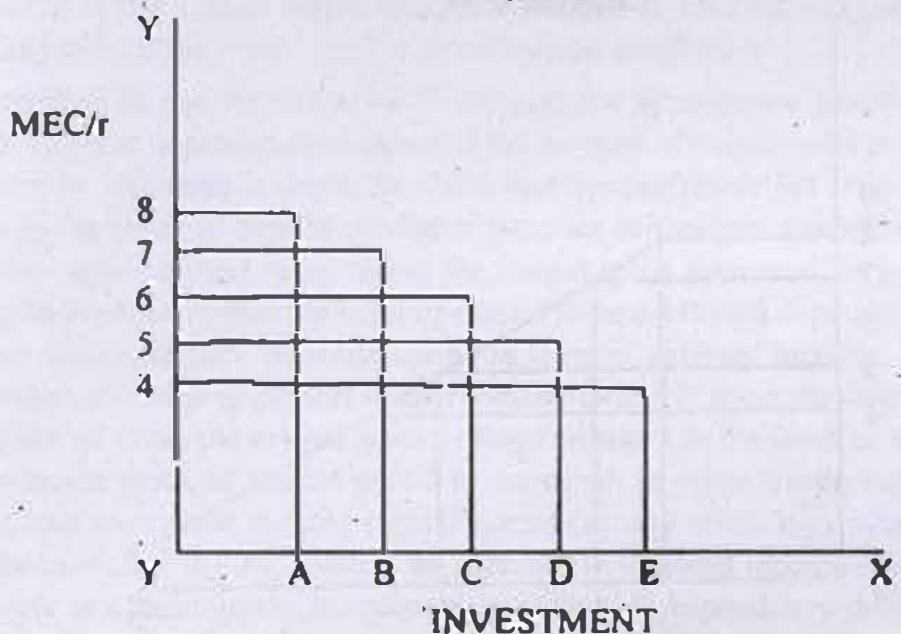
### **SELF-CHECK EXERCISES**

1. MEC is determined by the series of prospective yields ( $R_1, R_2, \dots, R_n$ ) and the current cost of the capital good in question (C).
2. MEC is equal to that rate of discount ( $i$ ) which equates the sum of the discounted values of the series with the current cost of the capital asset.
3. Given a series of prospective yields of capital asset, higher the current cost C, smaller is MEC and vice versa.
4. Rate of interest has no role in the determination of MEC.

## MEC Schedule of a Firm

*MEC of a capital asset depends upon its prospective yields (net of all costs except depreciation and interest) and current supply price of the asset.* For a single firm, the current supply cost of the capital assets can be assumed as given since acquisition of more machines by a single firm is not likely to exert much pressure on the capital good industry. *Prospective yields depend upon costs of production associated with the output and market price of the product.* When the firm acquires and uses in production more units of the same capital asset, costs of production per unit of output are likely to increase because of the U-shape of the cost curve. Secondly, when the firm supplies a larger output, market price is likely to fall. Therefore, prospective yields and hence MEC decline as more units of capital are used. Because of the operation of these two factors, the MEC of additional capital assets, diminishes as the firm increases its investment in machines. Therefore, MEC schedule of the firm will slope downwards with increase in investment in machines as shown in the diagram below :

Diagram 3.1



OX measures investment and OY measures MEC and rate of interest  $r$ . OA corresponds to that level of investment (at 8% rate of interest) which is just for replacement so that net investment is zero. Net investment is undertaken only when there is need to add to the actual capital stock. This means that the actual stock at this point of time is equal to the desired stock and no net investment is required. If the market rate of interest falls to 7%, one more project requiring AB investment becomes profitable. If rate of interest falls to 6%, second project (with  $MEC=7\%$ ) and third project (with  $MEC=6\%$ ) also become profitable. If rate of interest falls further to 5%, the fourth project (with  $MEC=5\%$ ) also becomes profitable. To sum up, net investment is zero when rate of interest is 8% and only replacement investment takes place. In other words, the actual capital stock is the optimum stock and no addition is required. But when rate of interest falls from 8% to 5%, size of the optimum stock becomes larger and the actual stock falls short of the optimum size which induces net investment in order to bring the actual stock to the optimum level.

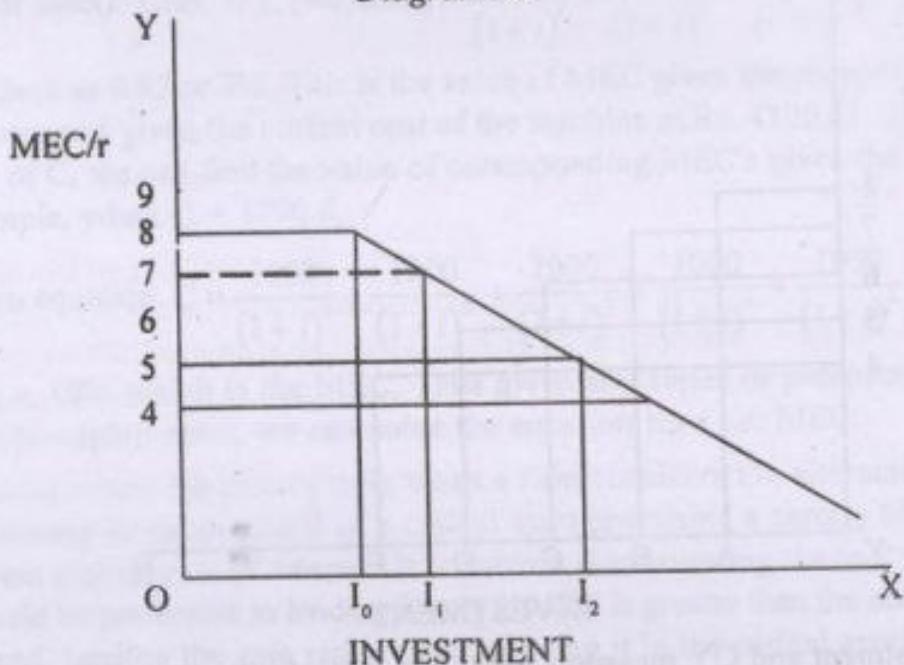
### **SELF-CHECK EXERCISES**

1. Note that MEC and rate of interest are different things.
2. Disinvestment in case of high rate of interest cannot be more than replacement investment.  
Why ?
3. Draw a diagram to show that at rate of interest higher than 8%, replacement will be zero and net investment will be negative.

### **The Aggregate MEC Schedule**

As usual, we can sum up the MEC schedules of all the firms laterally to obtain MEC schedule for the economy as a whole. In the process of summation, the kinks in the MEC schedules of individual firms (because of lumpiness of investment projects) even out and we get a smooth MEC curve sloping downward to the right with changes in the level of aggregate investment. The diagram below portrays an aggregate MEC curve for the economy as a whole.

Diagram 3.2



In the above diagram, investment is measured along the X-axis and MEC and rate of interest are measured along the Y-axis. It can be seen that when MEC and rate of interest are equal at 8%, actual capital stock is equal to the optimum stock and only replacement investment equal to  $OI_0$  takes place. This is equilibrium position when there is no net investment in the economy. When the market rate of interest falls from 8% to 7%, the size of desired capital stock becomes larger than the actual stock and net investment equal to  $I_0 I_1$ , becomes necessary in order to bring the actual stock to the desired level. When the market rate of interest falls to 5%, level of net investment rises from  $I_0 I_1$  to  $I_0 I_2$  (i.e., by  $I_1 I_2$ ). The important point to be noted here is whether this additional investment can be undertaken or not in a single year, depends upon the capacity of the capital goods industry. This is so because while considering the case of a single firm, we could assume that an increase in investment by this firm would not cause the current supply price

of capital goods to rise. The same assumption cannot be made in the case of the economy as a whole.

### The Acceleration Principle of Investment

In the context of the mechanics of income determination and the multiplier effect, we analysed how investment affects the level of income. But now we shall discuss how changes in the level of income affect investment. Whereas "autonomous investment" is a given quantity, determined independently of the economic system, investment that takes place in response to the changes in the level of income is known as "induced investment". *The theory which tells us how the level of investment is affected by changes in the level of income is known as the "acceleration principle". The basis of this principle is the notion that, given the state of technology and prices of the factors of production, there exists a certain normal ratio between the output to be produced and the stock of real capital needed to produce it. In other words, there is a technological relationship between output and the capital stock.* Suppose in an industry, plant and equipment worth Rs. 2000 are needed to produce an annual output worth Rs. 1000. In this case, the ratio of the value of capital to the value of the annual output is  $2000 : 1000 = 2$ . This ratio is known in economic literature as the 'capital-output ratio' or 'the acceleration coefficient'.

According to the Acceleration Principle, the appropriate stock of capital in an economy depends upon the capital-output ratio and the amount of output to be produced. Suppose the output of cloth to be produced is worth Rs. 2000 and the capital-output ratio in the textile industry is 3. Obviously the stock of capital needed to produce this output would be  $Rs. 2000 \times 3 = Rs. 6000$ . Given the capital-output ratio, larger the output to be produced, larger will be the capital stock required to produce it. But the level of output to be produced depends upon the expected demand (or sales) which, in turn, depends upon the level of national income. *Therefore, we can say that the appropriate stock of capital in an economy depends upon the level of national income.* Also, if at a point of time, the capital stock is fully adjusted to the level of national income, no further addition to the stock of capital would be required. In other words, only replacement investment would occur to replace the old capital goods (as and when they wear out) and net investment would be zero. But if now, there is an increase in national income due to any reason (say due to an increase in consumption, investment, government expenditure or exports), aggregate demand for output increases and the capital stock needed to produce this larger output is also proportionately larger. In order to bring the existing capital stock to the desired level, businessmen will undertake investment in addition to the normal replacement investment and thus net investment will be positive. The opposite will happen in the cases of a decline in the level of national income when aggregate demand for output will decrease and a smaller capital stock will be required to produce the smaller output. In this situation, a part of the existing capital stock will be rendered surplus and in order to bring it to the appropriate level, there will be disinvestment, meaning that businessmen will not replace the worn out capital goods.

As explained above, *the basic idea behind the acceleration principle is that the desired or optimum or appropriate stock of capital depends upon the level of final output to be produced i.e., the level of national income.* By the same logic, the change in the existing stock of capital (which is nothing but investment) depends on the change in the level of national income. If I

denotes investment,  $Y$  denotes income and  $V$  denotes the normal capital-output ratio, we can write the acceleration principle as :

$$I_t = V(Y_t - Y_{t-1})$$

This only means that the amount of net investment undertaken during a period ( $I_t$ ) is equal to the change in income since the previous period ( $Y_t - Y_{t-1}$ ) multiplied by the normal capital-output ratio  $V$ . The idea can be clarified with the help of a simple example.

Suppose that a machine costing Rs. 2000 produces annual output worth Rs. 1000 and lasts for 10 years. The capital output ratio is 2 ( $2000 \div 1000$ ). Suppose further that the sales of the commodity produced has remained constant at Rs. 10,000 per year. This means that the economy must be using 10 machines ( $10,000 \div 1000$ ). Also assume that every year one out of ten machines falls due for replacement. In such a situation investment will consist only of replacement purchases (i.e., one machine worth Rs. 2000 every year). In other words, as long as national income (which indicates aggregate demand and sales) remains constant, net investment would remain zero. If, however, in some particular year, national income rises to Rs. 12,000, the desired capital stock would rise to Rs. 24,000 (current national income multiplied by the capital-output ratio, i.e.,  $12000 \times 2$ ). This means net investment worth Rs. 4000 will have to be undertaken or 2 new machines will have to be purchased in addition to the one machine that is to be replaced. You should note that with a 20% increase in national income (from Rs. 1000 to Rs. 12000) there is 200% rise in gross investment (from Rs. 2000 to Rs. 6000). The economy will have capital stock worth Rs. 24000. Now if in the next year, national income falls to Rs. 11000, the desired capital stock will be 22000 and the businessmen will not even replace the machine that they used to replace, rather than buying more machines. The net investment in this situation will fall from Rs. 4000 to Rs. 2000. Thus a fall of approximately 8.5% in national income leads to a fall of 150% in net investment.

To sum up, we can say that :

1. Net investment, It is a function of the change in the level of national income ( $Y_t - Y_{t-1}$ ) and not of the level of national income as such ( $Y_t$ ). This implies that net investment occurs only so long as national income grows, it falls to zero when national income is constant and becomes negative when national income falls.
2. The nature of investment is very volatile. A given change in national income induces a much larger change in the level of investment.

If we critically examine the acceleration principle, we can say that first, capital output ratio may not be fixed and there is generally some flexibility in the amount of capital that may be used to produce a given output. Secondly, the central consideration affecting the inducement to invest is profitability of investment and not the technological relation between output and capital. Thirdly, the acceleration principle is based on the assumption that the current level of demand will be maintained in future, which may not be correct. The profitability of a capital asset depends upon the level of demand for its output during the whole of its economic life and not only on the current level of demand. For example, if a rise in the level of demand is expected to be temporary, then instead of installing new plant and equipment, the increased demand may be met by working the existing equipment more intensively.

However, the significance of the acceleration principle lies in the fact that it is not only investment which affects the level of income, but it is also changes in the level of income which affect investment, at least a part of investment called 'induced investment'. If the multiplier tells us about the effect of changes in investment on the level of national income, the acceleration principle tells us about the effect of changes in the level of income on investment. In other words, the multiplier and the accelerator together show us the two-way relationship between income and investment. The change in investment leads to multiple changes in the level of income and these, in turn, would induce further changes in the rate of investment (through changes in the desired stock of capital). Changes in investment will again affect the level of income and thus induce further changes in the rate of investment and so on. The final path of income-generation will depend on the interaction between the multiplier effect and the acceleration effect.

### **SELF-CHECK EXERCISES**

1. Can you go on increasing the level of output without increasing the capital stock? If so, how long?
2. Note that the need to undertake investment comes via changes in profitability.
3. Net investment is undertaken in the light of long-term prospects and not in response to short-run changes in demand.

## LESSON 3

# EQUILIBRIUM DETERMINATION AND MULTIPLIER

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### STRUCTURE

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- 3.1 Objective
- 3.2 Introduction
- 3.3 Equilibrium in Two and Three Sector Economy
- 3.4 Concept of Multiplier
- 3.5 Automatic Stabilizers
- 3.6 Summary
- 3.7 Self Assessment Questions
- 3.8 Suggested Readings

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### 3.1 OBJECTIVE

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After reading this lesson, you should be able to

- a) Explain different types of Economy – Open and Closed
- b) Understand the concept of Equilibrium using AD– AS and S– I Approach
- c) Differentiate between different types of multipliers.
- d) Analyze Automatic Stabilizers
- e) Explain and analyze the changes in Equilibrium

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### 3.2 INTRODUCTION

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Economics has two diverse fields – Micro and Macro. While Micro is concerned with analysis of a particular unit, macro economics is concerned with the aggregate or the total. In macro economics, the economies can be classified as Open and closed economy, a closed economy is one where there is no interaction with the external economies having no export and import. An open economy on the other hand is one where the economies are interlinked because of export and import of goods and services. Further there can be two sector, three sector or four sector economies. In two sector there are Households and Firms. In three sector along with the above two there is also Government. Four sector comprises of external sector too along with export and import in addition to above three sectors.

**Household:** A sector that makes the expenditure for own consumption. The entire expenditure by this sector can be clubbed under the consumption function which is explained as follows:

$$C = \hat{C} + cY \quad (\text{Linear Consumption function})$$

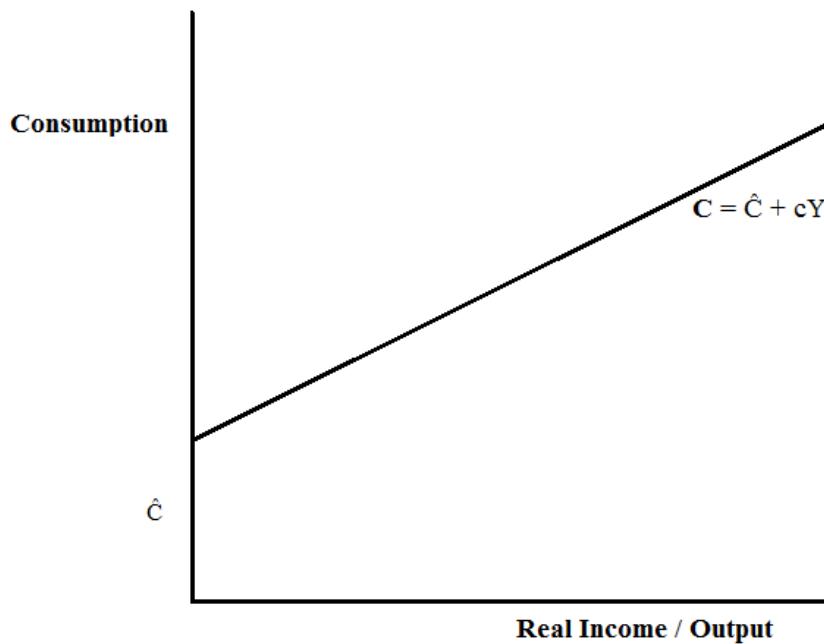
Where  $\hat{C}$  = Autonomous Consumption that is the level of consumption which is fixed irrespective of the level of income. It is there even at zero level of income. This is the

consumption that households derive out of past savings. It thus determines the intercept of consumption function.

$c$  = Slope of consumption function which shows change in consumption because of change in income. It is shown by MPC (marginal propensity to consume) =  $\Delta C / \Delta Y$ . In a linear consumption function MPC is constant that is the slope is same everywhere on the consumption curve. In non linear consumption function however the marginal propensity to consume decreases with increase in income. For simplicity we assume that the consumption function is linear with constant MPC.

$Y$  = Real Income or total output of the economy.

Linear consumption function can be plotted as:

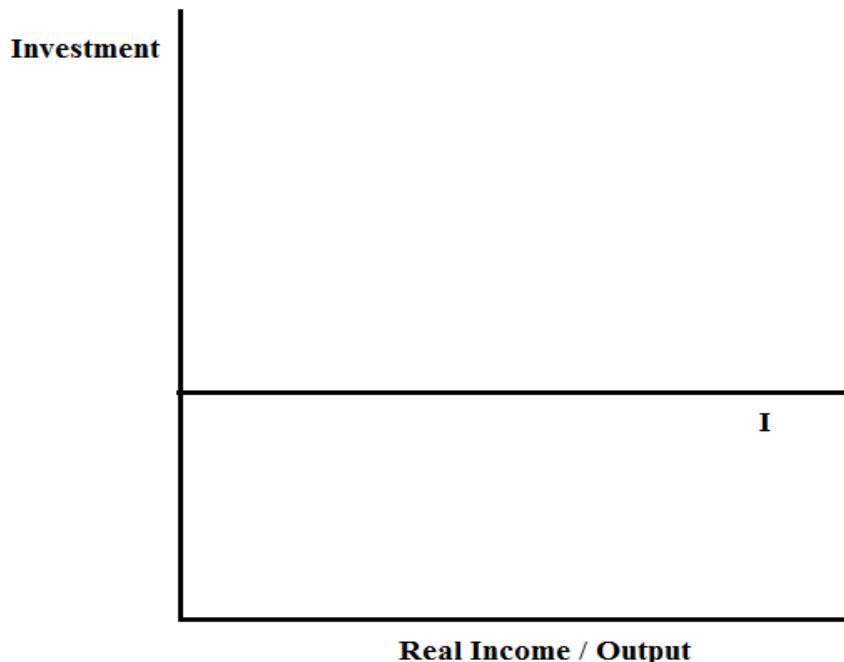


**Figure 1: Linear Consumption Curve**

Here consumption function is a straight line starting from an intercept shown by  $\hat{C}$  showing the level of consumption which is there even at zero level of income which is being supported by past savings. The slope is given by MPC (Marginal Propensity to consume).

**Firm:** This is the second component of macroeconomics. It shows all expenditure done by the private enterprises that spend so that goods or services can be manufactured and sold further. For simplicity it is assumed that it is constant or fixed. It is shown by

$I = \hat{I}$  that is autonomous investment or fixed investment



**Figure 2: Investment Curve**

Investment by private enterprises is fixed irrespective of the level of income or rate of interest in the economy. This assumption would however be relaxed later in the IS-LM model.

**Government:** This is the third component in macroeconomics. Government has mainly three functions – imposition of tax, granting of subsidy, and government expenditure also called government purchases.

**External Sector:** The last component of open economy that includes export and import of goods and services.

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### **3.3 EQUILIBRIUM IN TWO SECTOR AND THREE SECTOR ECONOMY**

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Equilibrium is a state of rest where there is no tendency to change. An economy is said to be in equilibrium when the total output (real disposable income) is equal to the total or aggregate demand as shown by:

$Y = AD$  where  $AD = C + I$  (in 2 sector economy) and  $C + I + G$  (in 3 sector economy).

If  $Y \neq AD$  there is disequilibrium and it leads to unplanned inventory which is calculated as:

$$IU = Y - AD$$

If  $Y > AD$ , there is accumulation of inventory as total output being produced is more than the total demand in the economy leading to increase in the unplanned stock and  $IU > 0$  whereas

If  $Y < AD$ , there is depletion of inventory as total output being produced in the economy is less than the total demand and hence the excess demand is met out of the stock that reduces the existing stock and  $IU < 0$ .

### **Equilibrium in Two Sector Economy**

A two sector economy is one where there is presence of households and private firms and there is neither government nor the external sector. It can also be called a closed economy as there is no interaction with the outside world in the form of exports and imports. A two sector economy would be in equilibrium when the total output is equal to aggregate demand by the households and firms as shown below:

$$Y = AD, Y = C + I, Y = \hat{C} + cY + \hat{I}, Y = \bar{A} + cY$$

Where  $\bar{A} = \hat{C} + \hat{I}$  its autonomous spending

$Y - cY = \bar{A}$ ,  $Y(1-c) = \bar{A}$ ,  $Y = \bar{A}/(1-c)$ . Thus the equilibrium condition is

$$Y = \bar{A} / (1-c)$$

Equilibrium is thus dependent on autonomous spending and marginal propensity to consume. If any or both of them changes there is change in the equilibrium level of output.

Equilibrium can also be attained using an alternative approach as shown below:

$Y = C + S$  (As households can either consume the income or save it). Thus total income is spent on either the consumption or saving.

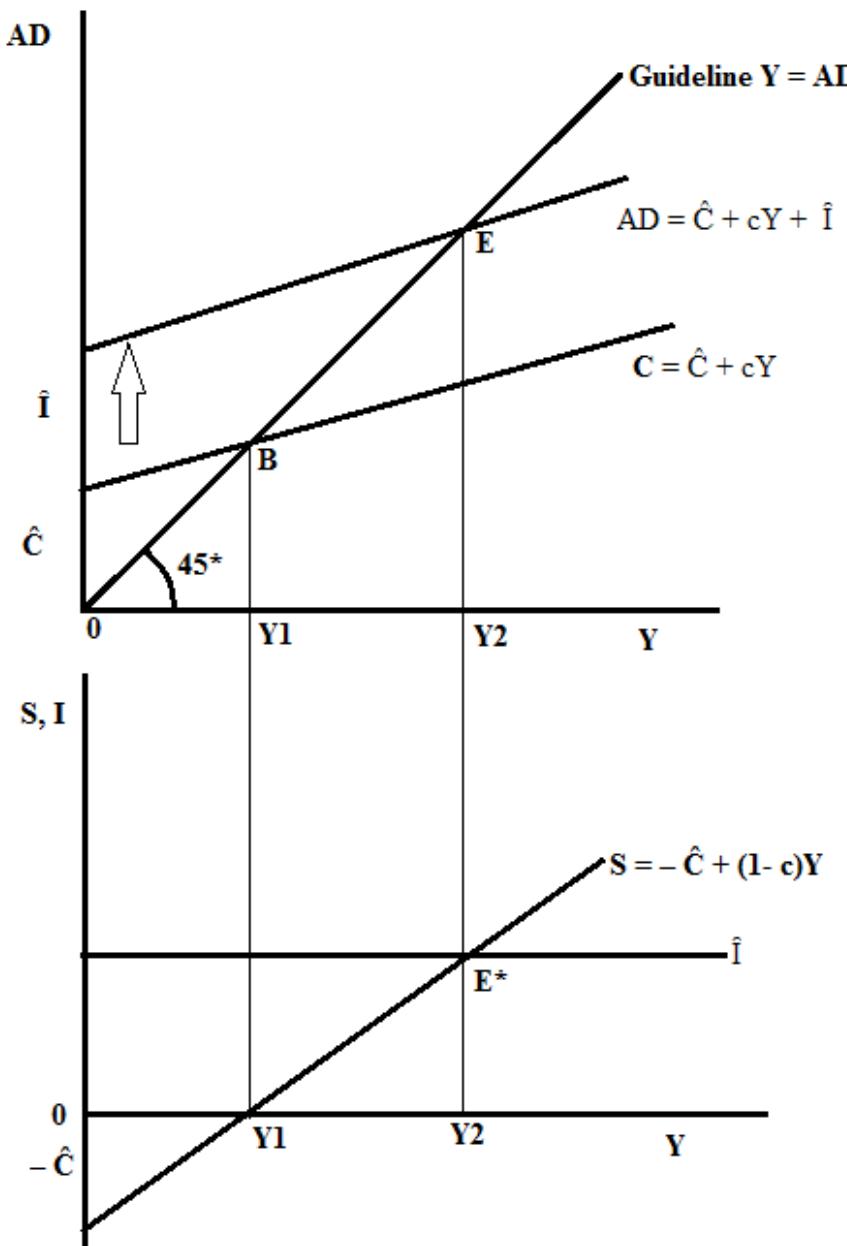
$$S = Y - C, S = Y - (\hat{C} + cY), S = -\hat{C} + (1-c)Y,$$

In equilibrium  $Y = AD (C + I)$ . So from above two equations we get

$$C + S = C + I, S = I.$$

Here savings are the leakages from the economy and investment is the injection in the economy. Thus according to this approach equilibrium is where leakages and injections are equal.

Both the above equilibriums can be presented in the following figure:



**Figure 3: Equilibrium in 2 sector economy**

Equilibrium in two sector economy can be achieved by using two approaches that is  $Y = AD$  approach also called Keynesian cross or Savings and Investment approach which is derived from the above approach only. In the figure above there is a 45 degree guideline that shows that any point on this guideline is the equilibrium as the values on X axis and Y axis are equidistant on the guideline. Thus equilibrium would always be on this line. Then there is consumption function that is shown by  $C$  which is the linear consumption function with slope ' $c$ ' and  $AD$  is the aggregate demand curve that is parallel to  $C$ . The point where guideline and consumption function intersect is the break even point where savings are zero and  $Y = C$ . It is shown by point  $E^*$ .

B at  $Y_1$  level of income. Equilibrium is where guideline and AD intersect which is at point E in the Keynesian cross and  $E^*$  in the panel below and equilibrium level of output is  $Y_2$ .

### Equilibrium in Three Sector Economy

A three sector economy is one where there is presence of government in addition to the households and firms. Households spend on consumption, Firms spend on Investment and Government performs three functions – Government expenditure called government purchases which is assumed to be autonomous, collect taxes (it can be fixed or proportionate tax) and provides transfer payments which is also assumed to be constant. The equilibrium thus can be attained in two ways:

When there are Fixed Taxes

Equilibrium condition is

$$Y = AD,$$

Now here aggregate demand comprises of consumption which is dependent on disposable income and not only income as was in two sector income as income and disposable income are different because of presence of taxes and transfer payments in case of three sector economy whereas in two sector economy the disposable income and income were one and the same.

$$Y = C + I + G, Y = \hat{C} + cY_d + \hat{I} + \bar{G}, Y = \hat{C} + c(Y - TA + TR) + \hat{I} + \bar{G}$$

Where TA and TR are assumed to be constant in addition to Investment and government

$$Y = \bar{A} + cY, Y = \bar{A} / 1-c \text{ (Equilibrium Condition)}$$

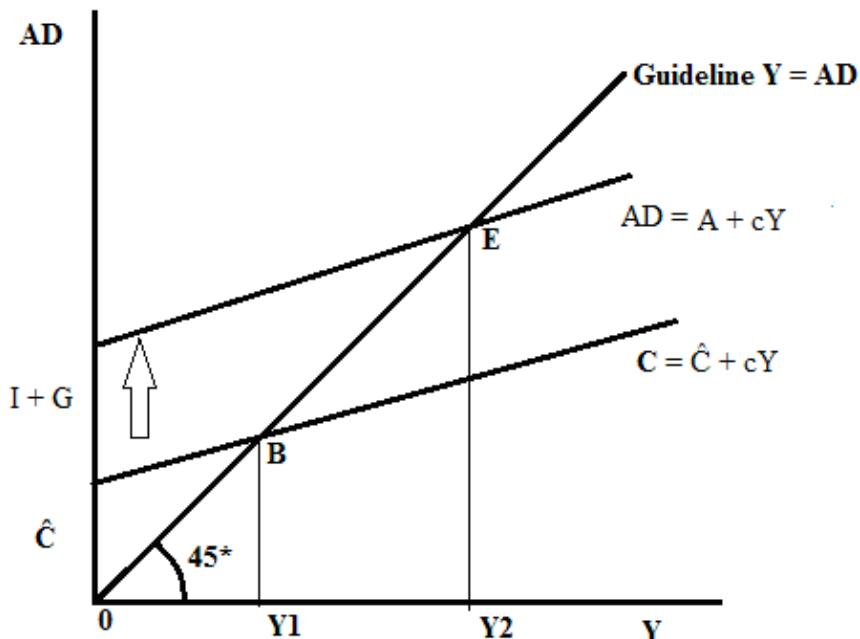


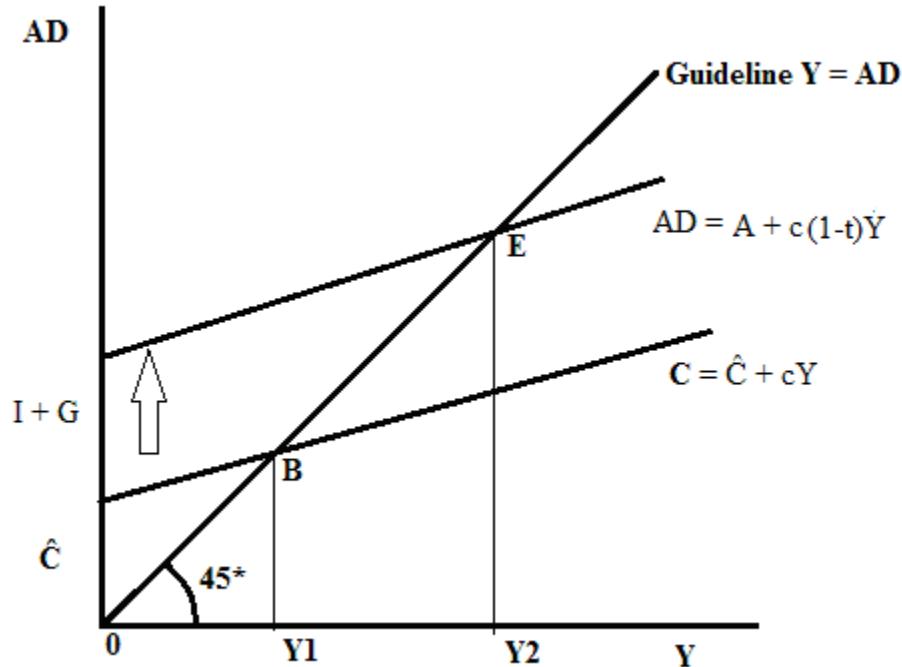
Figure 4: Equilibrium in 3 sector using Fixed Taxes

When there are proportionate taxes

$$Y = AD, Y = C + I + G, Y = \hat{C} + cY_d + \hat{I} + \bar{G}, Y = \hat{C} + c(Y - tY + TR) + \hat{I} + \bar{G}$$

Where TR is assumed to be constant in addition to Investment and government purchases and tax rate is fixed as a proportion of Y.

$$Y = \bar{A} + c(1-t)Y, Y = \bar{A}/1-c(1-t) \text{ (Equilibrium Condition)}$$



**Figure 5: Equilibrium in 3 sector using Proportionate Taxes**

Both the cases above consider  $Y_d$  as compared to  $Y$  used in two sector economy.  $Y_d$  is the disposable income that is the income available in the income after deduction of taxes and addition of transfer payments. In fixed tax the slope of aggregate demand function is given by MPC ( $c$ ) which is same as that of two sector economy as impact of taxes and transfer payments is considered in autonomous spending. On the other hand slope of aggregate demand function with proportionate taxes is  $c(1-t)$ . Thus aggregate demand curve becomes flatter as slope of AD reduces. The difference between the two equilibrium outputs would be shown under automatic stabilizers.

### **3.4 CONCEPT OF MULTIPLIER**

The change in equilibrium level of output because of change in autonomous spending by 1 Re is known as multiplier. As shown above the equilibrium output in a two sector economy is given by the following equation:

$Y = \bar{A} / (1 - c)$  where  $\bar{A}$  = Autonomous spending that includes fixed consumption by the households and autonomous investment by private firms.

$c$  = Marginal Propensity to consume (MPC).

From the above equation the value of multiplier can be obtained as:

$$\Delta Y = \Delta \bar{A} / (1 - c), \Delta Y = 1 / (1 - c) \cdot \Delta \bar{A}$$

Thus the change in equilibrium level of output is more than the change in autonomous spending because of presence of multiplier shown by the  $1 / (1 - c)$ .

**Example 1:** Let Autonomous spending increases by Re 1 and MPC is 0.8 then value of multiplier would be:  $1 / (1 - 0.8) = 5$  times that is change in equilibrium level of output is more than change in autonomous spending.

The value of multiplier depends on the value of ' $c$ ' and as ' $c$ ' varies from 0 to 1 so the value of multiplier also varies from 1 to infinity as shown below:

**Example 2:** Calculate value of multiplier in the following cases: a) MPC = 0 b) MPC = 1, c) MPC = 0.2 d) MPC = 0.8

Solution: a)  $1 / (1-0) = 1$  times so no multiplier effect.  $\Delta Y = \Delta \bar{A}$

b)  $1 / (1-1) = \text{Infinity}$

c)  $1 / (1-0.2) = 1.25$  times  $\Delta Y > \Delta \bar{A}$

d)  $1 / (1-0.8) = 5$  times,  $\Delta Y > \Delta \bar{A}$

Thus it shows that multiplier has a direct relation with MPC, the greater is MPC the higher is the value of multiplier.

### Graphical derivation of Multiplier

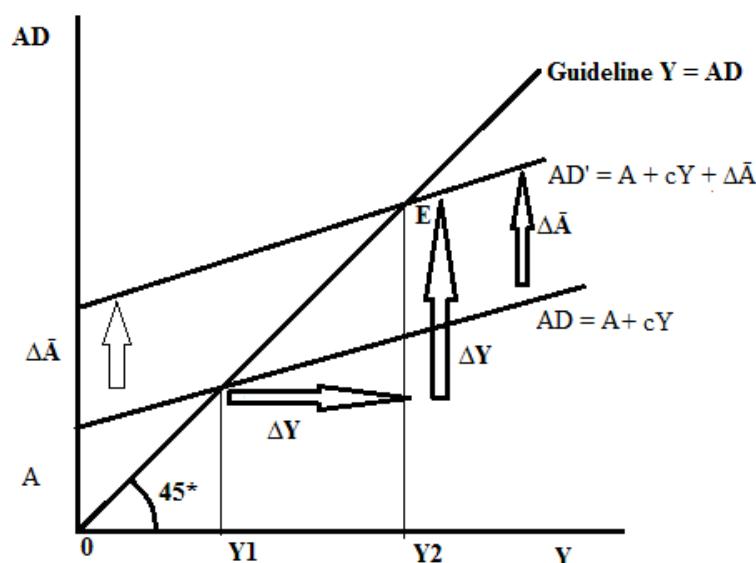
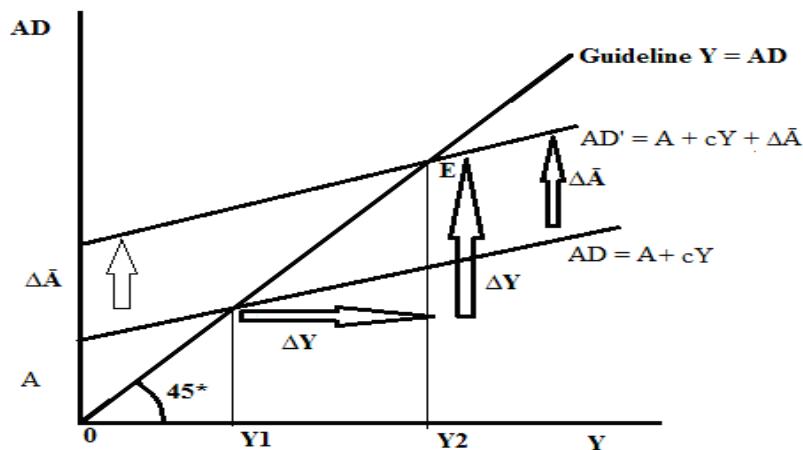


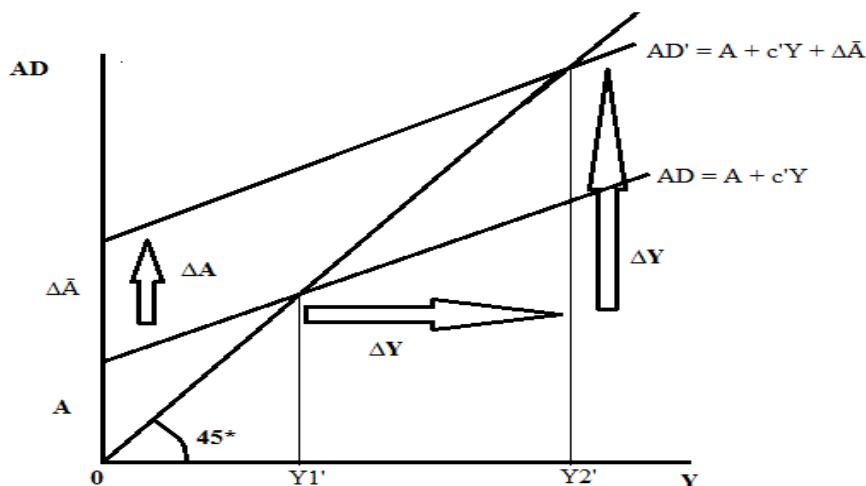
Figure 6: Multiplier in Two Sector Economy

The figure above shows original Aggregate demand curve with an intercept equal to autonomous spending and slope equal to MPC. Equilibrium is where the AD intersects the guideline shown by  $Y_1$  level of output. If there is an increase in autonomous spending by  $\Delta\bar{A}$ , the aggregate demand curve shifts parallel up by the same amount as slope is still the same (c). The new equilibrium is at  $Y_2$  level of output. The increase in output from  $Y_1$  to  $Y_2$  is the change in equilibrium level of output shown by the horizontal and vertical arrows whereas the distance between the two aggregate demand curves is  $\Delta\bar{A}$ . Thus graphically also it shows that  $\Delta Y > \Delta\bar{A}$  because of multiplier.

To show the impact of MPC on multiplier we can take the following two cases that show that as MPC increases multiplier also increases:



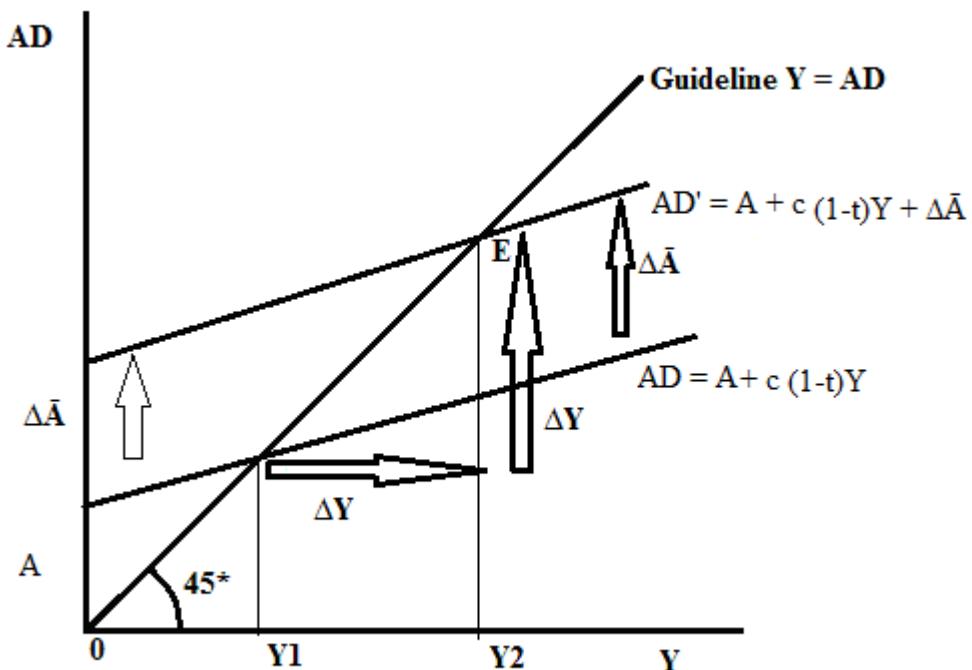
**Figure 7 (a): Multiplier and Marginal Propensity to Consume**



**Figure 7 (b): Multiplier and Marginal Propensity to Consume**

Figure in panel (a) shows aggregate demand curve corresponding to a MPC of 'c' which is less than MPC ( $c'$ ) exhibited by panel (b). Thus the slope of aggregate demand curve of panel (a) is less than that of panel (b). The intercept in both the cases is shown by autonomous spending an increase with initial equilibrium at  $Y_1$  level of output in panel (a) and  $Y_1'$  in panel (b). With an increase in autonomous spending by  $\Delta\bar{A}$  in both the cases the equilibrium is at  $Y_2$  in panel (a) and  $Y_2'$  in panel (b). the change in output is greater in case of higher MPC shoeing that there is a direct relation between MPC and multiplier which is because of the fact that aggregate demand curve is steeper in the second case as compared to the first one.

Multiplier in case of Three Sector Economy



**Figure 8: Multiplier in Three Sector Economy**

The figure above shows original Aggregate demand curve in case of three sector economy with proportionate tax with an intercept equal to autonomous spending and slope equal to  $c(1-t)$ . Equilibrium is where the AD intersects the guideline shown by  $Y_1$  level of output. If there is an increase in autonomous spending by  $\Delta\bar{A}$ , the aggregate demand curve shifts parallel up by the same amount as slope is still the same  $c(1-t)$ . The new equilibrium is at  $Y_2$  level of output. The increase in output from  $Y_1$  to  $Y_2$  is the change in equilibrium level of output shown by the horizontal and vertical arrows whereas the distance between the two aggregate demand curves is  $\Delta\bar{A}$ . Thus graphically also it shows that  $\Delta Y > \Delta\bar{A}$  because of multiplier.

The above discussion thus shows that the economy moves to a new level of equilibrium output when there is change in the autonomous spending, the quantum of change depends on the marginal propensity to consume and also on the taxation system being applicable in the economy (fixed or proportionate tax). However ever economy tries not to deviate too much from the initial equilibrium and there are certain forces imbibed in the economy itself that prevents a drastic change which are known as the automatic stabilizers. It is being taken up in the next heading:

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### **3.5 CONCEPT OF AUTOMATIC STABILIZER**

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Automatic stabilizers offset fluctuations in economic activity without direct intervention by policymakers. When incomes are high, tax liabilities rise and eligibility for government benefits falls, without any change in the tax code or other legislation. Conversely, when incomes slip, tax liabilities drop and more families become eligible for government transfer programs, such as food stamps and unemployment insurance that help buttress their income.

Two examples of Automatic stabilizers are:

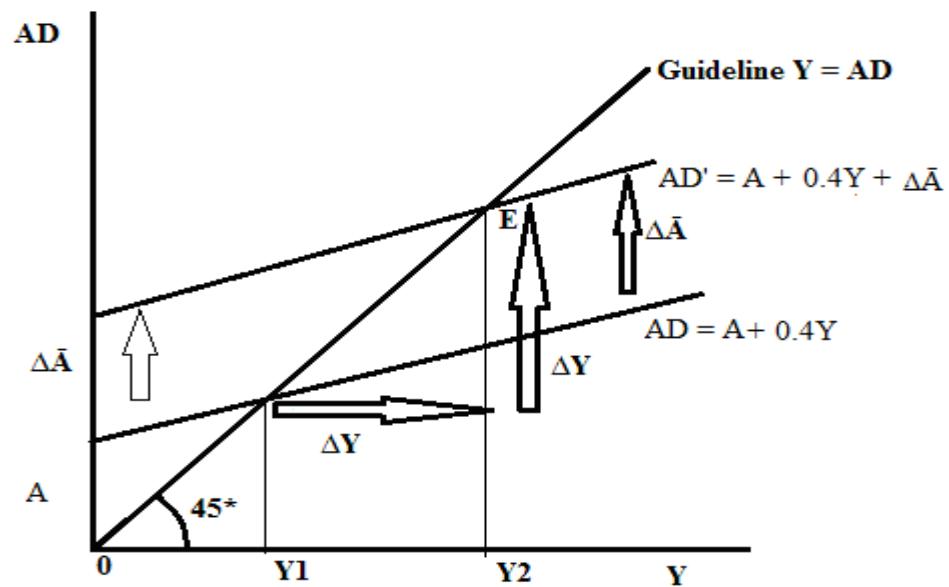
**Proportionate Tax** – The presence of proportionate tax reduces the multiplier effect thereby bringing a lesser diversion in the equilibrium income as compared to fixed tax. This is because in case of proportionate taxes whatever is the change in income because of change in the autonomous spending a part of it goes to the government in form of taxation and hence disposable income is less as compared to fixed taxes. This can be illustrated using the following example and figure:

**Example 3:** If MPC is 0.8 and tax rate is 0.5 in case of proportionate tax. The effect of automatic stabilizer can be shown as:

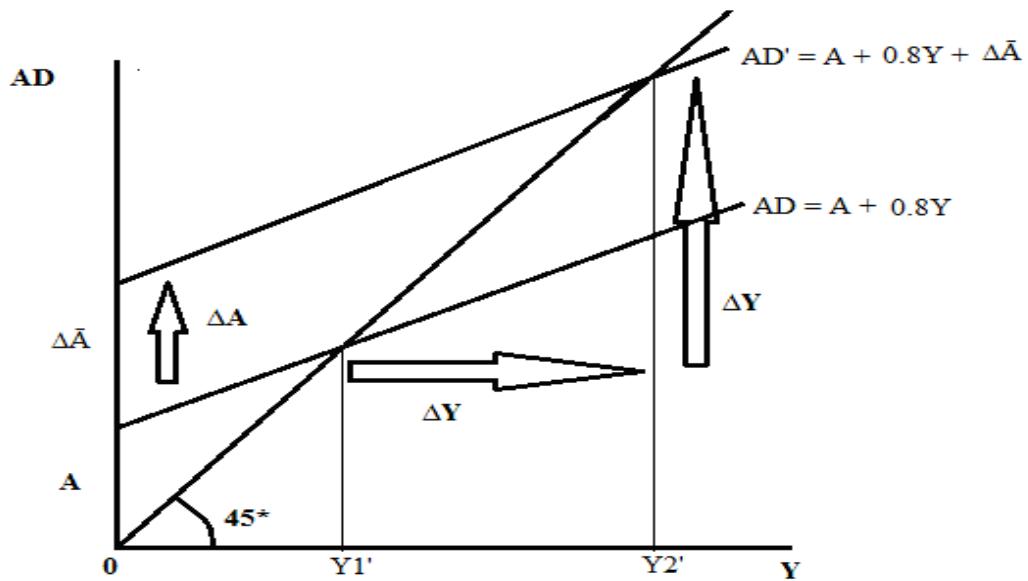
Slope of AD in case of fixed Tax =  $c = 0.8$

Slope of AD in case of Proportionate Tax =  $c (1-t) = 0.8 (1-0.5) = 0.4$

Thus AD is flatter in case of proportionate tax as compared to fixed tax and change in equilibrium using above data can be shown as:



**Figure 9 (a): Change in Equilibrium Output in case of Proportionate Tax**



**Figure 9 (b): Change in Equilibrium Output in case of Fixed Tax**

Thus in case of Fixed Tax the change in equilibrium level of output is greater as multiplier effect is more as can be shown mathematically too:

Multiplier Effect in case of Fixed Tax:  $1/(1-c) = 1/(1-0.8) = 5$  times

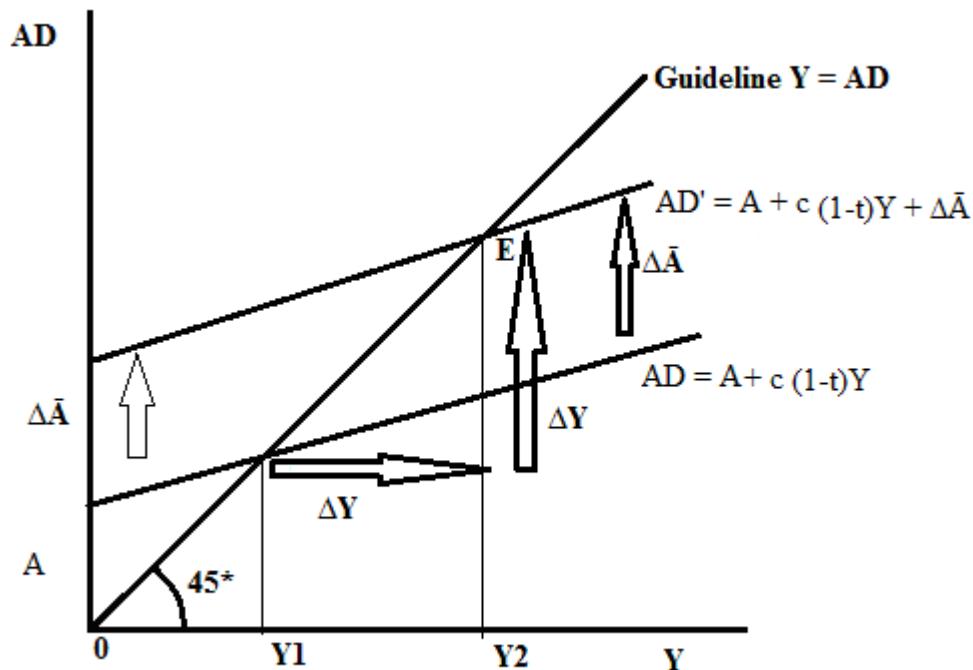
Multiplier Effect in case of Proportionate Tax:  $1/(1-c(1-t)) = 1/(1-0.8(1-0.5)) = 1.67$  times

Thus it is visible that multiplier effect weakens in case of proportionate tax because of reduction in disposable income as with every increase in income a part of it goes towards payment of taxes and hence less is available with the households for consumption as compared to fixed tax where tax is fixed irrespective of the level of income and hence disposable income is greater than provides greater change in the output.

**Unemployment Benefits** – The change in equilibrium output reduces if government provides unemployment benefits to the households thus acting as a stabilizing agent.

### Impact of Fiscal Policy on the Equilibrium Level of Output

Fiscal policy refers to change in the government policy with respect to change in government expenditure or taxation policy. There are two types of Fiscal policy – Expansionary fiscal policy where there is either increase in Government purchases or decrease in taxes and contractionary fiscal policy where the government reduces the government purchases or increases the tax. The former brings an upward shift in the aggregate demand curve causing a change in the equilibrium level of output as shown below:



**Figure 10: Effect of Fiscal policy on Equilibrium**

The figure above shows that original equilibrium is at  $Y_1$  level of output where  $AD$  is intersecting the guideline. With an increase in government purchases there is an increase in

autonomous spending as government purchases is a part of autonomous spending. This shifts the AD curve parallel up and new equilibrium is at  $Y_2$ . The change in equilibrium level of output from  $Y_1$  to  $Y_2$  is because of fiscal policy. This change is more than change in government purchases because of presence of government multiplier.

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### **3.6 SUMMARY**

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Micro Economics and macro economics are two parts that are studied in Economics. While micro economics deals with an individual unit – its equilibrium determination, pricing decisions and policies. Macro economics is wider in sense as it covers all the components of an economy. The equilibrium condition in both the economics is broadly the same that is where demand and supply are equal and there is neither excess demand nor excess supply. In macro we just change the demand to aggregate demand and supply to total output or total income. Macro Economics can be a two sector economy comprising of only households that spend on consumption expenditure and private firms that go for investment expenditure, a three sector economy having Government in addition to the above two sectors that spends on purchases, collect taxes and provides subsidies and a four sector economy that is also called open economy as it includes the external sector too in addition to above three, it makes expenditure on imports and earns through exports. Equilibrium condition is where total output produced in an economy is exactly equal to the total demand by the different sectors and in case the two are not equal there are changes in the unplanned inventory and automatic forces that bring the economy back to equilibrium. Further once equilibrium is attained it may change over a period of time if any component of autonomous spending changes but the change in equilibrium level of output is more than the change in autonomous spending and this is because of the presence of multiplier which is dependent on marginal propensity to consume and/or proportionate taxes. This change in the equilibrium level of output should not be very large as that can be destabilizing for the economy so there are some automatic stabilizers in the economy that prevents the economy from moving too far off from the initial equilibrium. There are two main stabilizers that is proportionate tax and unemployment benefits that help in reducing the gap between original and new equilibrium level of output.

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### **3.7 SELF ASSESSMENT QUESTIONS**

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#### **Check your progress**

#### **Exercise 1: True and False**

- (a) Macro Economics is narrower as compared to Micro Economics
- (b) Both micro and macro economics attain equilibrium when demand and supply are equal.
- (c) A two sector Economy is also called open economy.
- (d) Taxes in a three sector economy are always assumed to be autonomous.
- (e) Multiplier shows the change in equilibrium level of output because of change in autonomous spending.
- (f) Equilibrium level of output depends on the slope of Aggregate demand curve

**Ans.** 1(F), 2(T), 3(F), 4(F), 5(T), 6(T)

### **Exercise 2: Fill in the Blanks**

- (a) A three sector economy has three components namely \_\_\_\_\_.
- (b) If MPC is 1 then value of multiplier is \_\_\_\_\_.
- (c) The two automatic stabilizers are \_\_\_\_\_ and \_\_\_\_\_.
- (d) An open economy is one where there is \_\_\_\_\_ in addition to households, firms and government purchases.

**Ans** 1. Households, Firms and Government 2. Infinity 3. Proportional Tax and Unemployment Benefits 4. External Sector.

### **Exercise 3: Questions**

1. Explain the equilibrium in case of two sector Economy.  
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2. Why the change in equilibrium level of output is greater than change in autonomous spending.  
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3. How is equilibrium attained in case of three sector economy with proportionate tax.  
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4. Explain the concept of automatic stabilizers by giving suitable example.  
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5. Explain how fixed taxes bring more change in equilibrium as compared to proportionate tax.  
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6. Explain the concept of multiplier in a two sector economy.  
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7. What is the effect of expansionary fiscal policy on the equilibrium level of output.  
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8. What is the role of government in a three sector economy.  
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### **3.8 SUGGESTED READINGS**

Mankiw, N. Gregory, *Macro Economics*, Macmillan Worth Publishers New York, Hampshire U.K..

Dornbusch, Rudiger and Stanley, Fischer, *Macro Economics Theory*, McGraw-Hill  
Barro Robert J., *Macroeconomics Theory and Applications*, MIT Press.

**UNIT IV**  
**OPEN ECONOMY**



# LESSON 1

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## OPEN ECONOMY – LARGE AND SMALL

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### **3. STRUCTURE**

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- 3.1 Objective
- 3.2 Introduction
- 3.3 Small Open Economy and Large Open Economy
- 3.4 Effect of Policies on small and large open economy
- 3.5 Exchange rate determination
- 3.6 Summary
- 3.7 Self Assessment Questions
- 3.8 Suggested Readings

#### **3.1 OBJECTIVE**

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After reading this lesson, you should be able to:

- a) Explain the concept of small and large open economy.
- b) Effect of policies on small and large open economy and how they differ.
- c) Determination of exchange rate using fixed exchange rate and flexible exchange rate regime.
- d) Analyze the impact of exchange rate variation on the small and open economy
- e) Examine the relation between exchange rate and equilibrium output

#### **3.2 INTRODUCTION**

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Unit two discussed derivation of IS-LM curves in a closed economy but there is no economy in the world today that can be called a closed economy, hence to make the model more realistic this unit would talk about IS-LM model in an open economy system. There are basically two types of open economies – small and large open economy that would be discussed in the chapter and how different policies have different impact on the output depending upon the fact whether it is an open economy or a closed economy. In the IS-LM determination the model being closed one there was no discussion about the exchange rate impact on the various variables but that is an important component of this unit as it talks about open economy where exchange rate is an important variable. IS-LM model showed relation between different levels of real rate of interest and equilibrium level of output whereas open economy IS-LM model also known as Mundell-Fleming model shows relation between exchange rate and equilibrium level of output which is derived from the IS-LM model itself. This is because of the fact in an open economy exchange rate is one such important variable that has an impact on all the policies and the equilibrium output.

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### **3.3 SMALL OPEN ECONOMY VS LARGE OPEN ECONOMY**

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The aggregate demand as done in unit two included consumption expenditure by the households, investment expenditure by private firms and government expenditure. The aggregate demand however in an open economy is more than that as it includes one more variable namely the net exports which is exports minus imports. Now an open economy can be a small open economy or a large open economy based upon two characteristics:

1. If the real interest rate in the world economy can be impacted by our economy it is known as the large open economy whereas if the world interest rate is not influenced by domestic interest rate and domestic interest rate always equates itself to the world interest rate then it is called a small open economy.
4. The second point of difference comes from the flow of capital, if there is free flow of capital in and out of the domestic economy it is called a small open economy however in large open economy there are restrictions on the free flow of capital may be because of domestic investment preference or other reasons.

To establish the equilibrium in an open economy we proceed with the mathematical derivation as:

Equilibrium in goods market is when  $Y = AD$  or  $Y = C + I + G + NX$ . To prove this we assume that the total output produced in an economy is  $Y$  which would be distributed amongst households, firms, government and what is left is exported.

$$Y = C^d + I^d + G^d + X \quad \dots \dots \dots (1)$$

Also Total consumption of the households of an economy includes consumption of domestically produced goods as well as foreign goods. Thus it can be written as:

$$C = C^d + C^f \text{ or } C^d = C - C^f$$

Similarly Total investment of the private firms of an economy includes consumption of domestically produced goods as well as foreign goods. Thus it can be written as:

$$I = I^d + I^f \text{ or } I^d = I - I^f$$

Similarly total expenditure by the government sector of an economy includes consumption of domestically produced goods as well as foreign goods. Thus it can be written as:

$$G = G^d + G^f \text{ or } G^d = G - G^f$$

Substituting these in the equation (1) above we get:

$$Y = C - C^f + I - I^f + G - G^f + X$$

$$Y = C + I + G + X - (C^f + I^f + G^f)$$

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

$$Y = C + I + G + NX \text{ or } NX = Y - (C + I + G) \dots\dots\dots (2)$$

Where  $Y$  = Total output

$C$  = Total consumption by the domestic households whether on domestically produced goods or foreign goods

$I$  = Total expenditure by the domestic private firms whether on domestically produced goods or foreign goods

$G$  = Total expenditure by the domestic government whether on domestically produced goods or foreign goods

$NX$  = Net exports that is exports minus imports

Equation (2) can be further modified as:

$$Y - C - G = I + NX$$

$$Y - C - G + T - G = I + NX, (Y - T - C) + (T - G) = I + NX,$$

$$S = I + NX \quad \text{or} \quad S - I = NX \dots\dots\dots (3)$$

As  $Y - C - G$  refers to savings by private households and  $T - G$  refers to public savings. Thus total  $Y - C - G + T - G$  refers to national savings.

Where  $S - I$  refers to net capital outflow and  $NX$  is net exports or trade balance.

Thus from equation (2) and (3) there can be three situations:

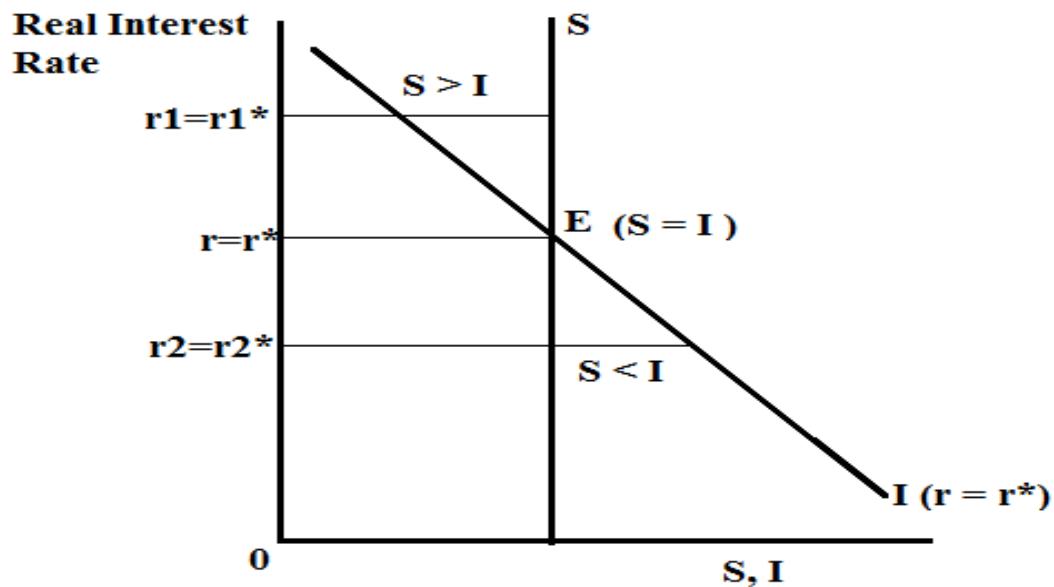
- 1) If  $Y = C + I + G$  then it means that  $NX = 0$ . It is a situation of trade balance as domestic output is equal to domestic spending. Also from equation (3) if  $NX = 0$  then  $S = I$ . That is domestic savings are enough to fund domestic investment and hence there is no need to borrow or lend from or to abroad.
- 2) If  $Y > C + I + G$  then it means that  $NX > 0$ . It is a situation of trade surplus as domestic output is more than the domestic spending. Also from equation (3) if  $NX > 0$  then  $S > I$ . That is domestic savings are more than enough to fund domestic investment and hence there is a need to lend to foreigners abroad.
- 3) If  $Y < C + I + G$  then it means that  $NX < 0$ . It is a situation of trade deficit as domestic output is less than the domestic spending. Also from equation (3) if  $NX < 0$  then  $S < I$ . That is domestic savings are not enough to fund domestic investment and hence there is need to borrow from foreigners abroad.

### **3.4 EFFECTS OF POLICIES ON REAL INTEREST RATE IN SMALL OPEN ECONOMY**

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Now to establish equilibrium rate of interest in small open economy and to show the effects of different policies on interest rates in a small open economy we make the following assumptions:

Total output that is  $Y$  is constant, also output depends on disposable income and interest rate depends on real interest rate. Using these we get the following figure:



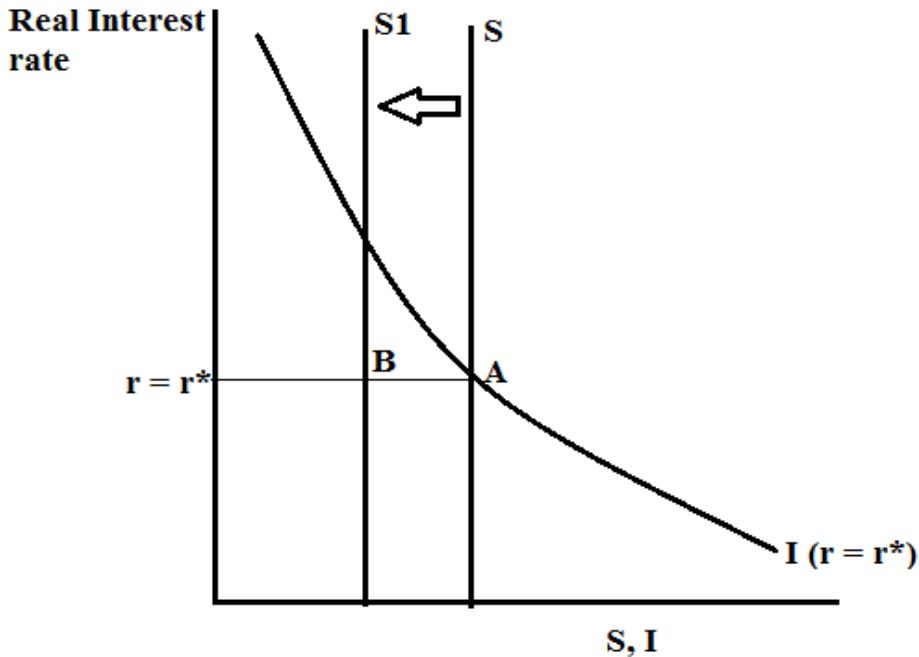
**Figure 1: Equilibrium rate of interest in small open economy**

In small open economy the real interest rate in the domestic economy is equal to real interest rate in the world economy. If world's interest rate is  $r^*$  then the domestic interest rate is also the same. And here savings is equal to investment or there is balanced trade as net exports are zero. If world interest rate increases to  $r_1^*$  then interest rate in the domestic economy also increases to  $r_1$  and here investment reduces as there is inverse relation between rate of interest and investment however savings are constant so at increased interest rate savings become more than investment hence there is trade surplus and the small open economy lends to the foreigners as savings are more than investment. If world interest rate decreases to  $r_2^*$  then interest rate in the domestic economy also decreases to  $r_2$  and here investment increases as there is inverse relation between rate of interest and investment however savings are constant so at decreased interest rate savings become less than investment hence there is trade deficit and the small open economy borrows from the foreigners as savings are less than investment.

The impact of three different policies on the interest rate in the small open economy would be shown as follows:

#### **Expansionary Fiscal Policy at Home**

When government of domestic economy which is a small open economy goes for expansionary fiscal policy that is either increases its government expenditure or reduces the taxes with an incentive to increase the level of output the impact can be shown as:

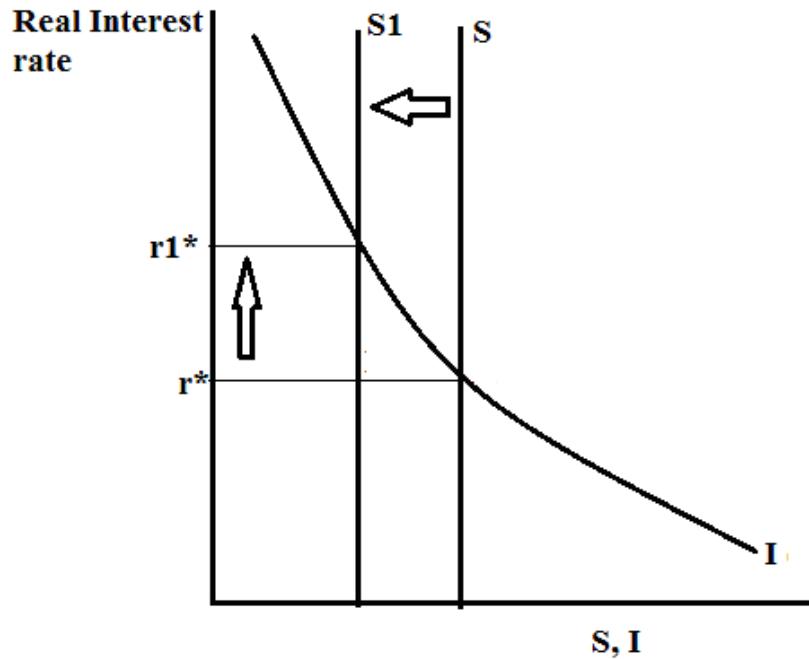


**Figure 2: Impact of Expansionary Fiscal Policy at home (small open economy)**

In the figure above investment function is downward sloping showing inverse relation between real rate of interest and investment by private firms. Savings are fixed as all the components of savings are assumed to be constant for simplicity. Initially if we assume that rate of interest prevailing in the outside world is  $r^*$  then the real interest rate in the small open economy too would be fixed at  $r$  which is equal to  $r^*$  and it would change only when world interest rate changes. So initial equilibrium is at point 'A' in figure above where we assume there is balanced trade as savings and investment are equal and there is no lending or borrowing from the outside world. Now if small open economy goes for expansionary fiscal policy then national savings reduce as expenditure of government increases or tax revenue decreases, there is thus a leftward shift in the savings function. If the economy would have been a large open economy the rate of interest would have increased but it cannot happen in a small open economy as the rate of interest is constant at  $r = r^*$ . Thus at the same interest rate equilibrium is now at point 'B' where savings are less than investment and hence there is trade deficit in the economy. The small open economy has to borrow from the outside world to finance its deficit investment.

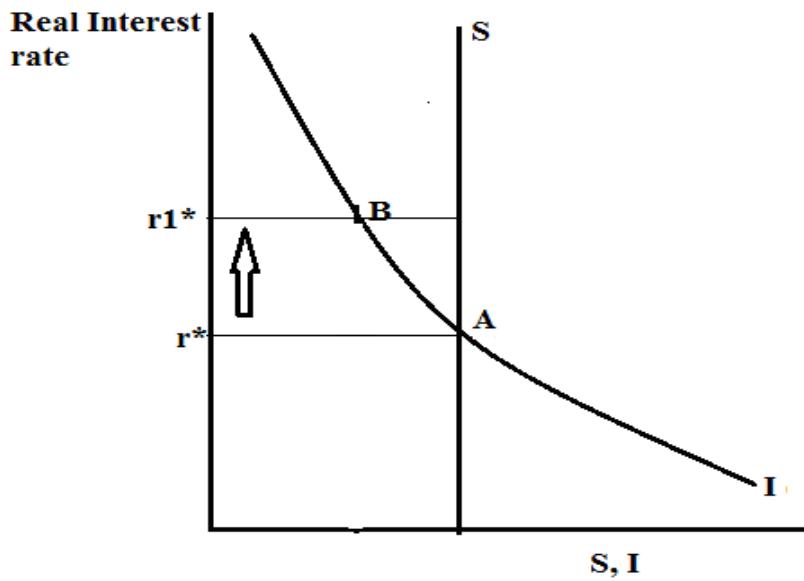
#### **Expansionary Fiscal Policy Abroad.**

Now if there is expansionary fiscal policy in the world economy which we assume to be a large open economy the impact on the home economy which is a small open economy would be different as can be seen from the figures below:



**Figure 3: Impact of Expansionary Fiscal Policy abroad (large open economy)**

Here initially we assume that the equilibrium is where saving curve shown by 'S' and investment function intersect giving the equilibrium interest rate of  $r^*$  which has to be accepted by the small open economy as it is. Now if there is expansionary fiscal policy in the large open economy then savings function shift to the left and rate of interest increases to  $r1^*$  which raises the interest rate in the small open economy too which is shown in figure below.

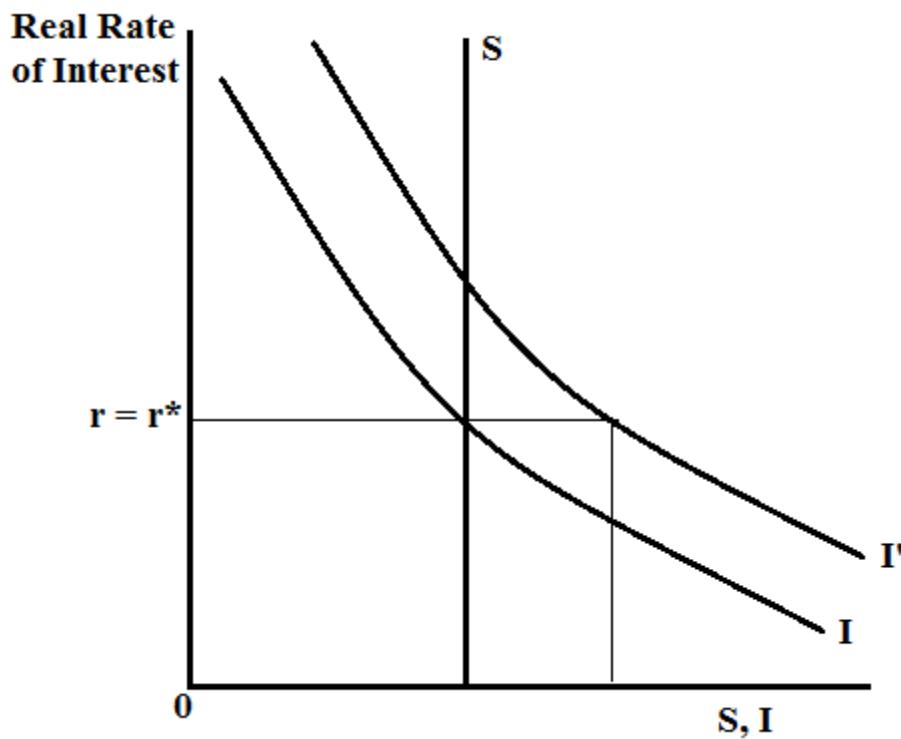


**Figure 4: Impact of Expansionary Fiscal Policy abroad on the home economy (small open economy)**

Here initially the rate of interest is  $r^*$  which is given by the large open economy where the small open economy is at balanced trade. Now because of the action of large open economy when rate of interest increases to  $r_1^*$  the rate of interest increases in small open economy too. Thus at increased rate of interest investment falls and savings are fixed which means investment becomes less than savings leading to trade surplus and small open economy becomes net lender to the world economy.

### Increase In Investment Demand

If there is a shift in the investment demand and it shifts to the right may be because of credit given by government on investment or anything else, it leads to a rightward shift in the investment function as at every rate of interest there is now increased investment which can be shown as:



**Figure 5: Impact of Investment credit at home (small open economy)**

Here original investment curve is  $I$  and savings curve is fixed at  $S$  thereby at given interest rate of  $r = r^*$  which is given by world economy. We assume that originally the economy is at trade balance where savings and investment are equal. Now if investment credit is given then there is rightward shift in the investment curve so at every rate of interest now the investment is more as compared to previous level. At interest rate of  $r^*$  the investment now is more than the savings which leads to trade deficit and small open economy becomes net lender to the world economy.

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### **3.6 SUMMARY**

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All the economies in the world can be divided into two types that is closed economy which does not have any interaction with the rest of the world and open economy which is integrated with the other economies of the world. Though there is no such economy which can be called purely a closed economy. Further there can be two types of open economy – small open economy and large open economy. The small open economy is one where there is no restriction on capital movement and the world interest rate determines the real interest rate prevalent in the small open economy. In the latter that is large open economy there are certain restrictions on the capital movement in and out of the economy which can be because of investors' preference for domestic investment or government restrictions on free mobility. Also the world interest rate can be influenced by the real interest rates prevailing in the large open economy.

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### **3.7 SELF ASSESSMENT QUESTIONS**

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#### **Check your progress**

##### **Exercise 1: True and False**

- (a) Large open economy can influence the world interest rate.
- (b) When savings are more than the investment it means we are lending funds to the foreigners.
- (c) A two sector Economy is also called open economy.
- (d) Fiscal policy in the home country which is a small open economy has no impact on the interest rates.
- (e) Small open economy has unrestricted capital flows in and out of the economy.
- (f) Equilibrium level of output depends on the slope of Aggregate demand curve

**Ans.** 1(T), 2(T), 3(F), 4(T), 5(T), 6(T)

### **Exercise 2: Fill in the Blanks**

- (a) An economy with households, firms, government and external sector is termed as \_\_\_\_\_.
- (b) If there is expansionary fiscal policy in rest of the world it \_\_\_\_\_ the interest rate in the small open economy.
- (c) Exchange rate is the rate at which currency of one country is exchanged for currency of \_\_\_\_\_ country .
- (d) Fisher effect shows relation between \_\_\_\_\_ and \_\_\_\_\_.

**Ans** 1. Open economy 2. Increases 3. Another 4. Inflation and Interest Rate

### **Exercise 3: Questions**

1. Differentiate between small open and large open economy.

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2. What is the impact of contractionary fiscal policy in the small open economy on the equilibrium?

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3. Explain the concept of exchange rate.

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4. Differentiate between nominal and real exchange rate.

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5. Net foreign investment always equals the trade balance in a small open economy. Elaborate

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6. Explain the concept of Natural rate of Unemployment.

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7. What is the difference between investment credit and fiscal policy on the equilibrium in a small open economy.

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8. Why is world interest rate equal to interest rate in the small open economy.

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### **3.8 SUGGESTED READINGS**

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Mankiw, N. Gregory, *Macro Economics*, Macmillan Worth Publishers New York, Hampshire U.K..

Dornbusch, Rudiger and Stanley, Fischer, *Macro Economics Theory*, McGraw-Hill

Barro Robert J., *Macroeconomics Theory and Applications*, MIT Press.

## **LESSON 2**

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### **OPEN ECONOMY- MUNDELL FLEMING MODEL**

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#### **2. STRUCTURE**

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- 2.1 Objective
- 2.2 Introduction
- 2.3 Equilibrium in Large open economy
- 2.4 Mundell – Fleming Model
- 2.5 Impact of policies on equilibrium
- 2.6 Summary
- 2.7 Self Assessment Questions
- 2.8 Suggested Readings

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#### **2.1 OBJECTIVE**

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After reading this lesson, you should be able to:

- a) Differentiate between small and large open economy.
- b) Effect of policies on large open economy and how they differ.
- c) Determination of IS-LM Mundell Fleming model
- d) Analyze the impact of exchange rate variation on the small and open economy
- e) Examine the relation between various policy changes and equilibrium

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#### **2.2 INTRODUCTION**

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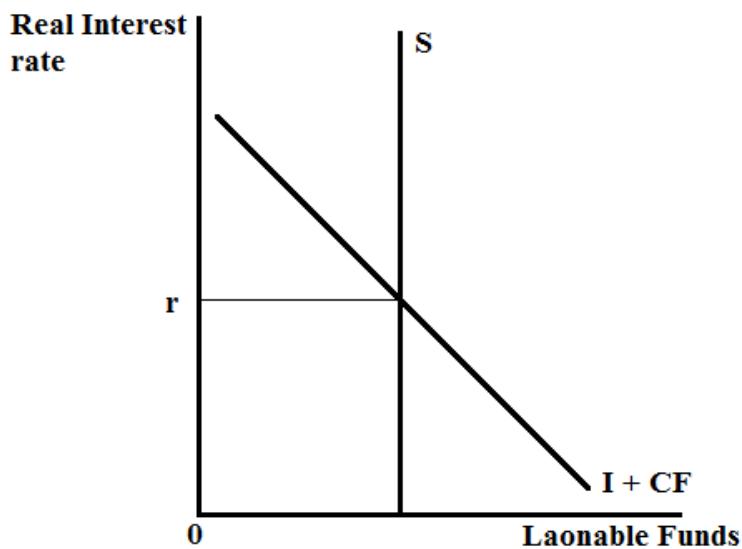
The earlier chapter talked about small open economy where there is no restriction on the capital flows in and out of the economy, this chapter would focus on large open economy and the impact of various policies on the equilibrium in large open economy. The chapter would also discuss the IS-LM model applicable in case of a small open economy. The IS-LM model that was discussed in unit two was operative in a closed economy where there was no external sector and no imports or exports. A large open economy has capital movements in and out of the economy but there is not an absolute free movements as investors prefer domestic investment rather than outside investment. This fact is reflected in the difference in the real interest rates that prevail in the domestic economy and world economy.

## **2.3 EQUILIBRIUM IN LARGE OPEN ECONOMY**

A large open economy has the following two features:

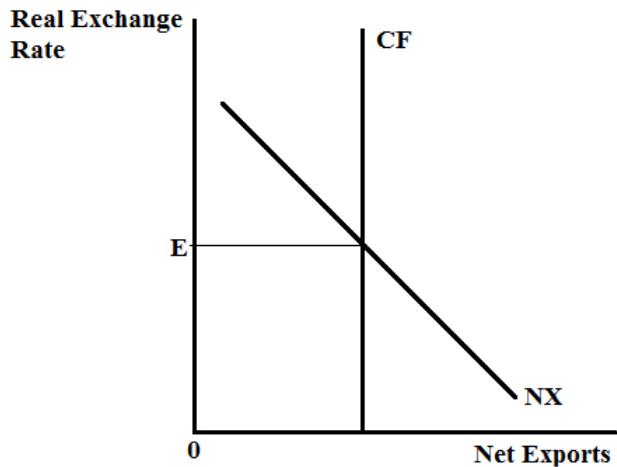
1. Real interest rate in the domestic large open economy is not equal to the world real interest rate
2. There are restrictions on the capital movements in and out of the large open economy as investors have preference for the local economy rather than the rest of the world.

To attain the equilibrium in a large open economy two markets are to be studied simultaneously that is market for loanable funds where the real interest rates are determined and then the market for foreign exchange where the equilibrium exchange rate is determined. It can be shown using the following diagrams:



**Figure 1: Equilibrium Real interest rate**

Figure above shows that the savings of an open economy can be used either for domestic investment or for lending abroad. That is  $S = I + CF$ . Also savings are constant as it is not dependent on the real interest rate whereas investment and net capital outflow both are inversely related to the real interest rate. Hence the curve is downward sloping. Equilibrium is when savings and investment and net capital outflows care equated. It provides 'r' as the real interest rate that would prevail in the large open economy.



**Figure 2: Equilibrium Exchange rate**

The derivation in the previous chapter showed that  $S - I = NX$ , also  $CF = NX$ . Thus equilibrium is where the net exports which is inversely related to real exchange rate and net capital outflow which is independent of real exchange rate are equal. This gives 'E' as the equilibrium exchange rate.

#### **2.4 MUNDELL – FLEMING MODEL**

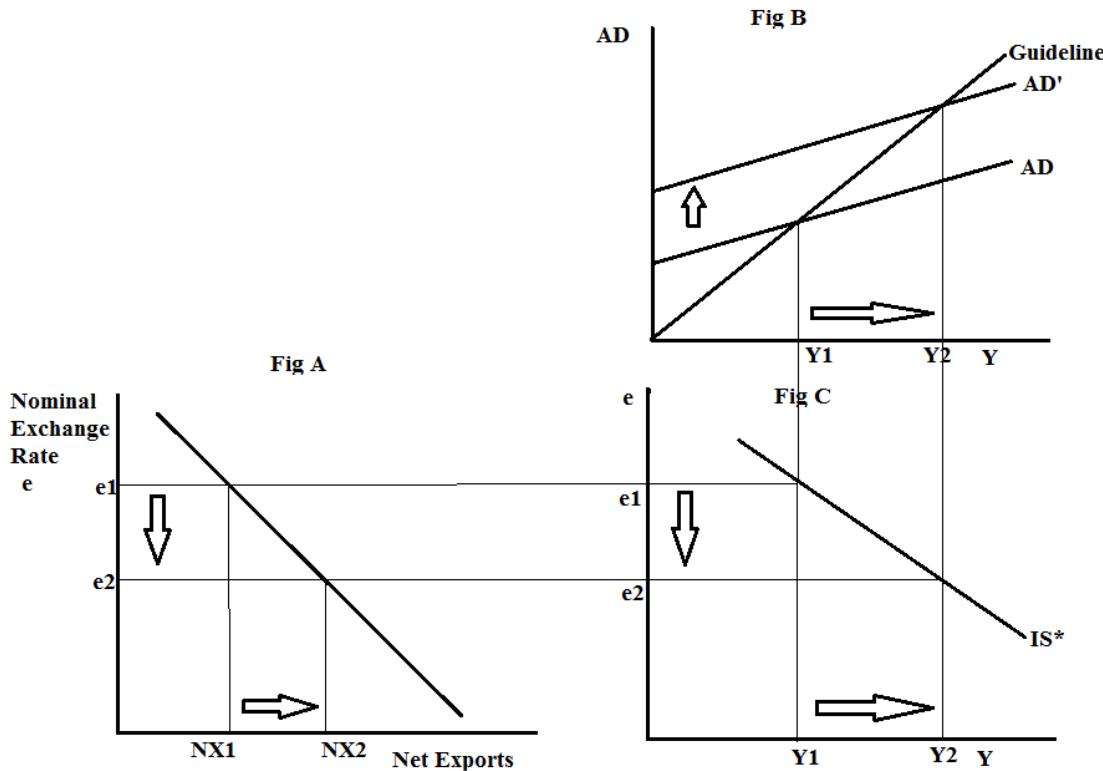
Mundell Fleming model is an extension of the closed economy IS-LM model as Mundell Fleming model is applicable in an open economy and that too a small open economy and hence it is also called balance of payment IS-LM model. Here we derive  $IS^*$  and  $LM^*$  to attain the simultaneous equilibrium.

Derivation of  $IS^*$ : Equilibrium in the goods market in an open economy is when

$$Y = AD, Y = C + I + G + NX$$

$$Y = C(Y_d) + I(r = r^*) + G + NX(e)$$

It shows that in a small open economy model aggregate demand is a combination of consumption function which is a function of disposable income, investment which is a function of real interest rate prevalent in the domestic economy which in turn is dependent on the world real interest rate, government expenditure which is taken to be constant and net exports which is a function of nominal exchange rate. Earlier inverse relation was shown between real exchange rate and net exports but here as it is a model applicable in short run so price levels are constant in both the domestic economy and world economy and hence nominal exchange rate has been used in place of real exchange rate. The graphical derivation can be shown as follows:



**Figure 3: Mundell Fleming  $IS^*$  curve**

To derive  $IS^*$  curve which shows goods market equilibrium in a small open economy there are three figures that are two figures that are required simultaneously to derive the relation between nominal exchange rate and equilibrium level of output. In figure A the net exports curve has been drawn showing inverse relation between nominal exchange rate and net exports. Initially the nominal exchange rate is  $e_1$  where net exports is  $NX_1$ . Corresponding to this net exports in fig B there has been drawn the Keynesian cross showing the AD curve corresponding to  $NX_1$  level of net exports and equilibrium output at this level is  $Y_1$ . Dragging  $e_1$  from fig A and  $Y_1$  from fig B we get a point of  $IS^*$  in fig C. Now if nominal exchange rate falls to  $e_2$  then there being inverse relation between exchange rate and net exports the net exports increases to  $NX_2$ . With an increase in net exports the aggregate demand curve shifts parallel upwards where the new equilibrium output also increases to  $Y_2$ . Dragging the new nominal exchange rate and corresponding equilibrium level of output at which goods market is in equilibrium there is a new combination of the  $IS^*$ . Joining the two there is downward sloping  $IS^*$  curve showing inverse relation between nominal exchange rate and equilibrium level of output.

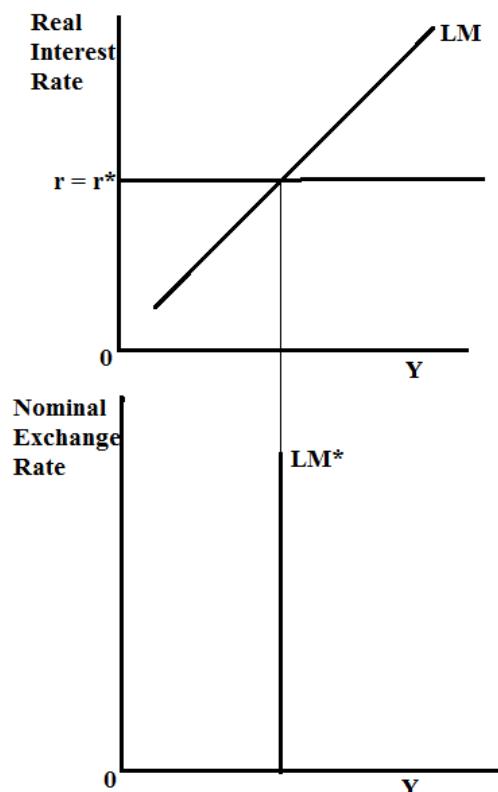
$IS^*$  curve shows different combinations of nominal exchange rate and equilibrium level of output where the goods market in a small open economy is in equilibrium. It is a

downward sloping curve as it shows that there is an inverse relation between the exchange rate and income level. The reason is that when nominal exchange rate reduces the aggregate demand in the economy increases because exports increase leading to an increase in net exports and to establish the equilibrium the increased aggregate demand has to be matched by an increase in the corresponding level of output which gives the  $IS^*$  curve its downward slope.

Now we derive the equilibrium in the money market that is shown by  $LM^*$  curve as follows:

**Derivation of  $LM^*$ :** Equilibrium in the money market in an open economy is when money demand is equal to money supply.

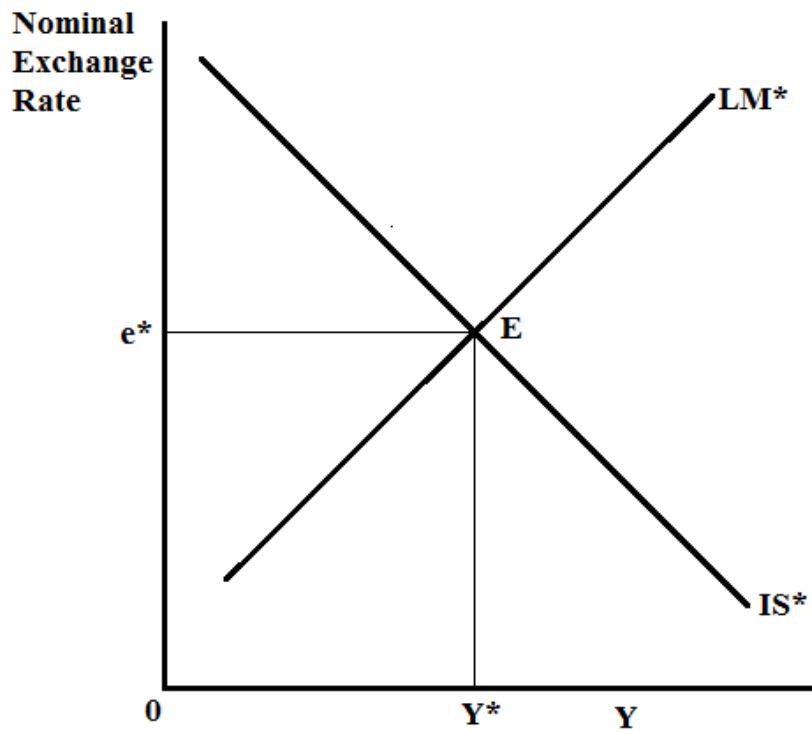
$M_d = M_s$ ,  $kY - hr = M/P$  where money demand is shown by  $kY - hr$  that is it is directly related to income and inversely related to real rate of interest. Money supply is shown as the ratio between nominal money supply and price level and being a short run model price level is constant. Now none of the variables of money demand or money supply is related to nominal exchange rate and hence  $LM^*$  would be a vertical straight line parallel to Y axis at a level where real interest rate and LM curve intersects as shown below:



**Figure 4: Mundell Fleming  $LM^*$  curve**

To derive the  $LM^*$  curve there are two panels required, in the above part there is LM curve of a closed economy showing relation between real interest rate and equilibrium level of output. Assuming the world real interest rate to be  $r^*$  the domestic interest rate would be equal to that such that the LM curve intersects the  $r^*$  line which is dragged below to get the  $LM^*$  curve of an open economy. It is a vertical straight line showing that there is no specific relation between nominal exchange rate and equilibrium level of output. If there is any change in the world interest rate then there is a corresponding shift of the LM curve and hence the  $LM^*$  curve.

Simultaneous equilibrium in small open economy from  $IS^*$  and  $LM^*$  curve can be shown as follows:



**Figure 5: Simultaneous equilibrium in small open economy**

Any point on the  $IS^*$  curve shows equilibrium in the goods market of a small open economy while any point on the  $LM^*$  curve shows equilibrium in the money market in the small open economy. For an economy to be in simultaneous equilibrium the point should be on both the  $IS^*$  and  $LM^*$  curve which occurs at 'E' in the figure above showing that the equilibrium nominal exchange rate is  $e^*$  and equilibrium level of output is  $Y^*$ .

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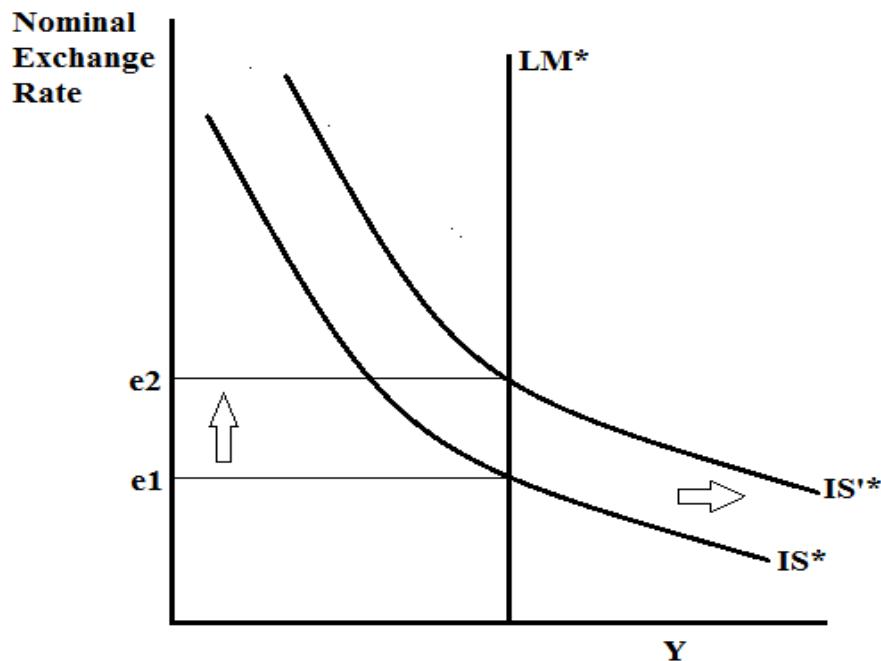
## 2.5 IMPACT OF DIFFERENT POLICIES ON SMALL AND LARGE OPEN ECONOMY

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### Case 1: Impact of Expansionary Fiscal and monetary policy on Mundell Fleming

Equilibrium under Fixed and Floating Exchange rate: Floating exchange rate means exchange rate that can change depending upon the market conditions whereas fixed exchange rate is one where central bank fixes the exchange rate and it might be more or less than the equilibrium exchange rate that market forces determine. But the arbitrageurs make sure that their buying and selling action keeps the exchange rate as that fixed by the central bank. Thus in fixed exchange rate the exchange rate is fixed at the central banks' rate and exchange rate is not allowed to fluctuate.

- a) Expansionary Fiscal Policy in case of floating Exchange Rate

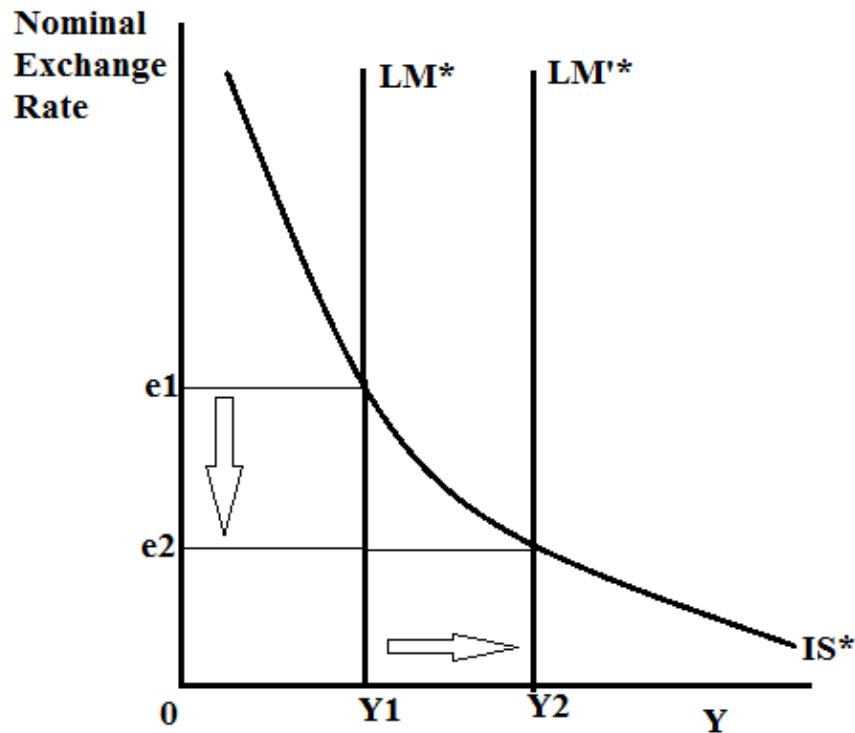


**Figure 6: Expansionary Fiscal Policy: Floating Exchange Rate**

Here  $IS^*$  is the original goods market curve and  $LM^*$  is the original money market curve. The original equilibrium exchange rate is  $e_1$ . Now if there is expansionary fiscal policy in the small open economy then  $IS^*$  shifts parallel to right to  $IS'^*$ . The

new equilibrium exchange rate is  $e_2$  that is there is appreciation of domestic currency because of which net exports falls and hence the equilibrium output is at same level because the increase in aggregate demand because of increase in government expenditure is offset by decrease in net exports. Hence the new equilibrium is at higher exchange rate but at same level of equilibrium level of output.

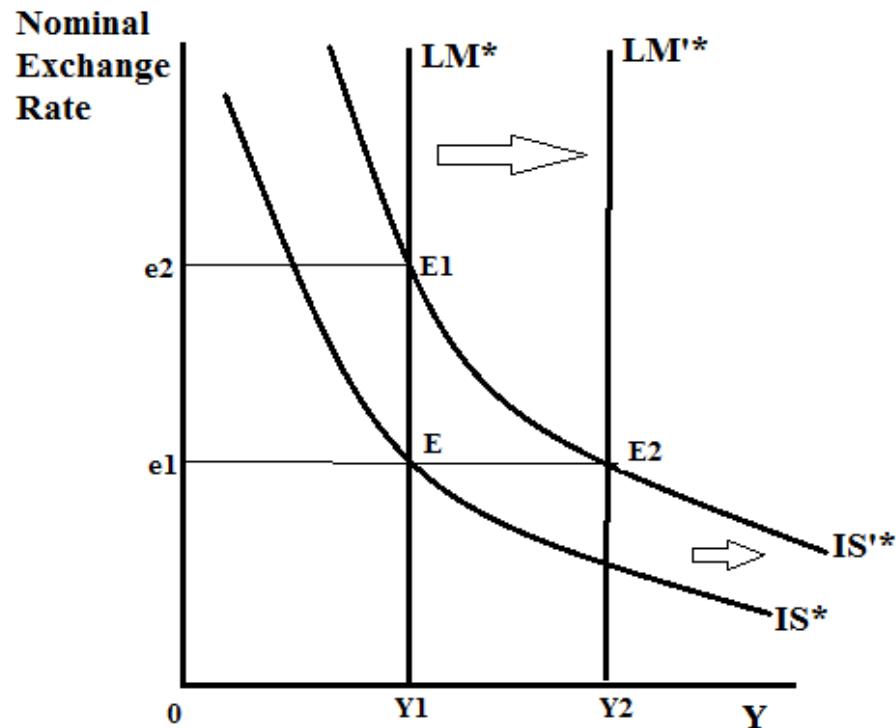
b) Expansionary Monetary Policy in case of floating Exchange Rate



**Figure 7: Expansionary Monetary Policy: Floating Exchange Rate**

Here  $IS^*$  is the original goods market curve and  $LM^*$  is the original money market curve. The original equilibrium exchange rate is  $e_1$ . Now if there is expansionary monetary policy in the small open economy then  $LM^*$  shifts parallel to right to  $LM'^*$ . The new equilibrium exchange rate is  $e_2$  that is there is depreciation of domestic currency because of which net exports rises and hence the equilibrium output is at increased level. Hence the new equilibrium is at lower exchange rate and at increased level of equilibrium level of output.

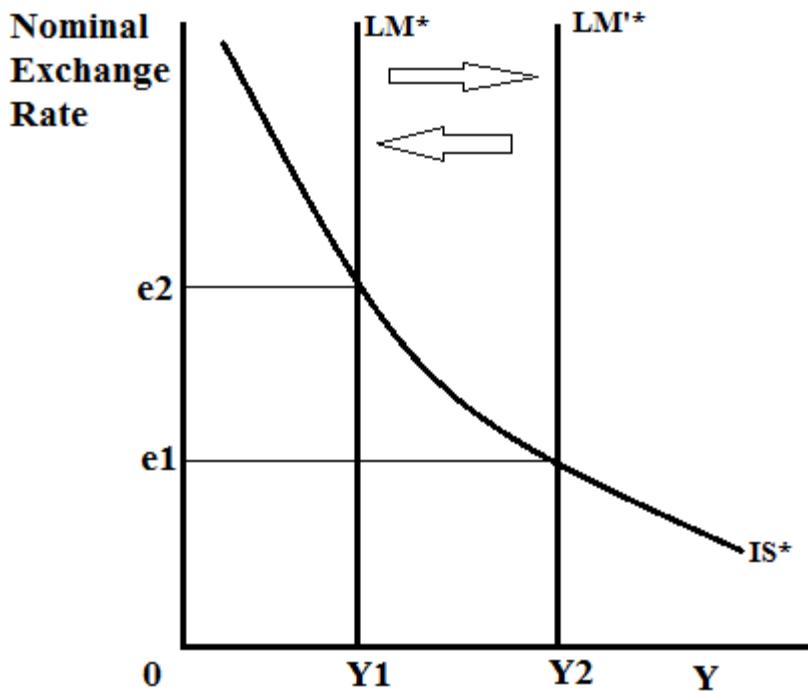
- c) Expansionary Fiscal Policy in case of fixed Exchange Rate



**Figure 8: Expansionary Fiscal Policy: Fixed Exchange Rate**

This is the case of a fixed exchange rate regime where the central bank has fixed the exchange rate at  $e_1$ , now if the government of the small open economy goes for an expansionary fiscal policy then the  $IS^*$  curve shifts to right to  $IS'^*$ , now if the exchange rate would have been floating then exchange rate would have appreciated to  $e_2$ . But it being a fixed exchange rate scenario, the moment exchange rate in the foreign exchange market increases to  $e_2$ , arbitragers come into force and increase the money supply of domestic currency till the exchange rate in the foreign exchange market also comes down to the rate fixed by central bank.. Hence  $LM^*$  also shifts to the right and at new equilibrium the exchange rate is same but equilibrium output has increased unlike fixed exchange rate policy where there was a change in exchange rate and no change in equilibrium output.

- d) Expansionary Monetary Policy in case of fixed Exchange Rate

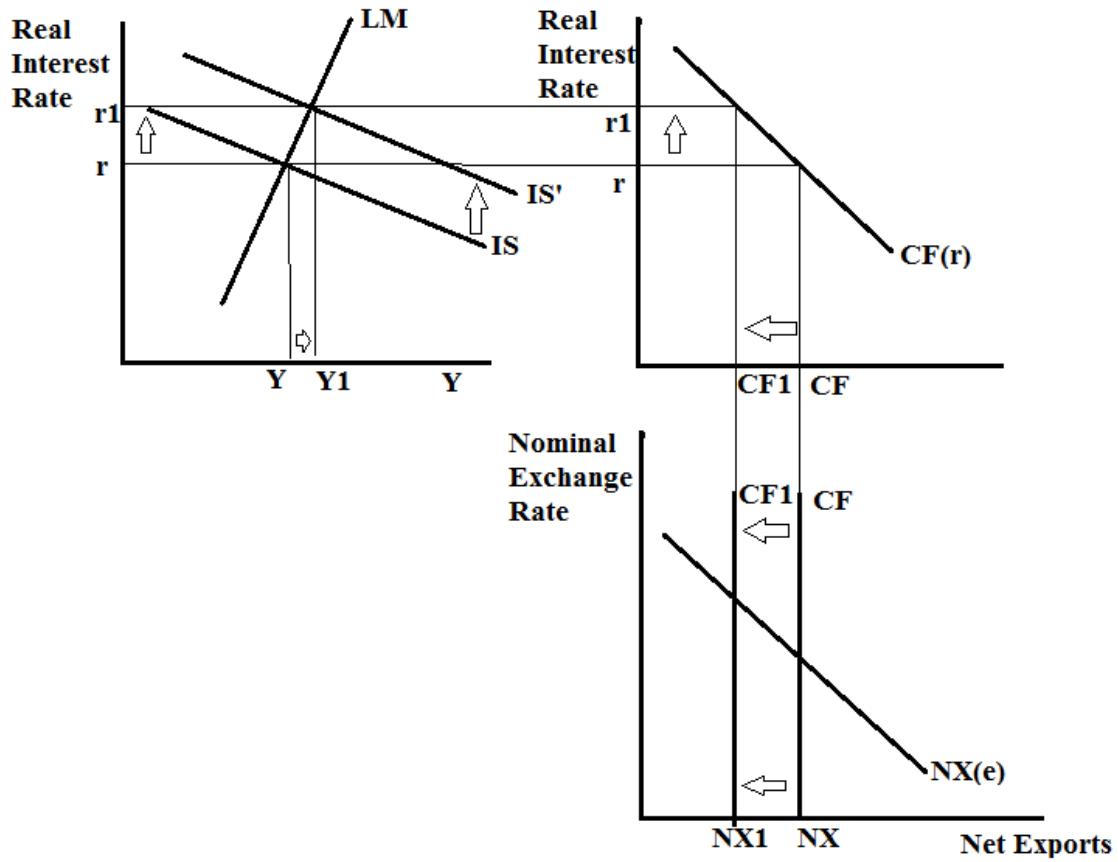


**Figure 9: Expansionary Monetary Policy: Fixed Exchange Rate**

This is the case of a fixed exchange rate regime where the central bank has fixed the exchange rate at  $e_2$ , now if the government of the small open economy goes for an expansionary monetary policy then the  $LM^*$  curve shifts to right to  $LM'^*$ , now if the exchange rate would have been floating then exchange rate would have depreciated to  $e_1$ . But it being a fixed exchange rate scenario, the moment exchange rate in the foreign exchange market decreases to  $e_1$ , arbitragers come into force and decrease the money supply of domestic currency till the exchange rate in the foreign exchange market also comes to the rate fixed by central bank. Hence  $LM^*$  also shifts to the left and at new equilibrium the exchange rate as well as output is same.

#### **Case 2: Impact of Expansionary Fiscal and Monetary policy on Large open economy.**

- a) Effect of Expansionary Fiscal Policy



**Figure 10: Expansionary Fiscal Policy: Large open economy**

In a large open economy the equilibrium in the goods and money market is obtained when following condition holds good

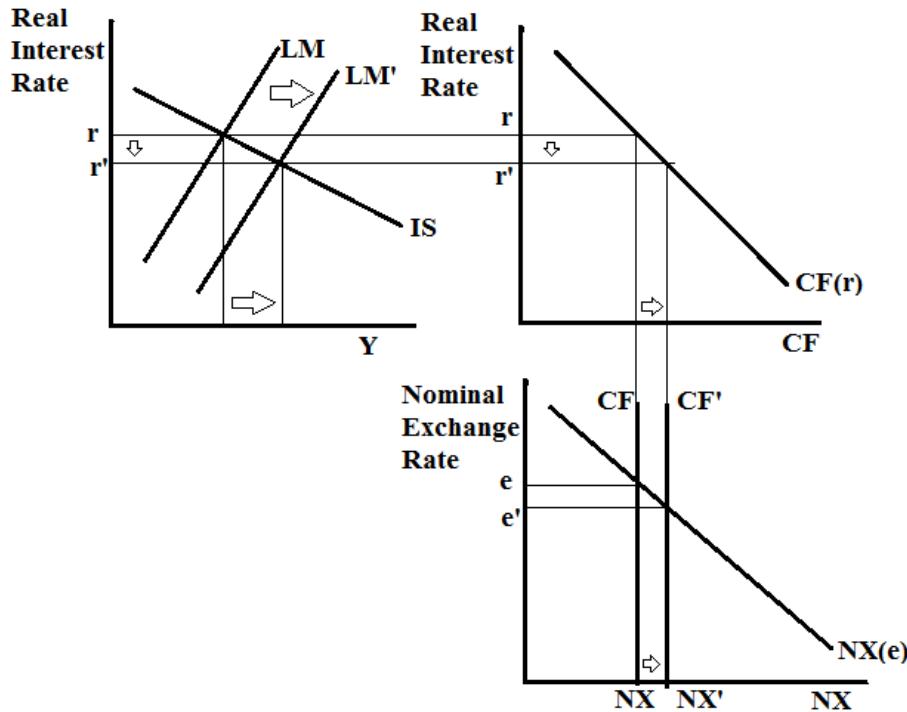
$Y = AD$ ,  $Y = C(Y_d) + I(r) + G + NX(e)$  that is consumption is a function of disposable income, investment is a function of real interest rate prevailing in the domestic economy, government spending which is assumed to be autonomous and net exports which is a function of nominal exchange rate (as it is a short run policy change so taken nominal exchange rate and not real exchange rate).

In a large open economy there is one more condition that is  $NX(e) = CF(r)$  that is net exports which is a function of nominal exchange rate and net capital outflow which is a function of real interest rate should be equal. Thus substituting this in equation above we get:

$$Y = C(Y_d) + I(r) + G + CF(r)$$

So the equilibrium in goods market has two factors namely investment and net capital outflow that are inversely related to real interest rate and hence IS curve here is more flatter. To show the impact of Expansionary fiscal policy there are three figures that have to be drawn simultaneously, the first one shows simultaneous equilibrium where IS and LM intersect and original equilibrium rate of interest is ' $r$ ' and equilibrium output is ' $Y$ '. With an increase in fiscal policy IS curve shifts parallel to right and equilibrium rate of interest increases which brings a decrease in the net capital outflow in the second panel as it is inversely related to rate of interest. In the last panel is the curve showing relation between net exports and net capital outflow. Initial equilibrium is when CF and NX curve intersects. Now when CF shifts to left the new equilibrium is at  $NX_1$ . Thus at new equilibrium the exchange rate has appreciated and net exports reduced with an increase in the equilibrium level of output and increase in real interest rate.

### b) Effect of Expansionary Monetary Policy



**Figure 11: Expansionary Monetary Policy: Large open economy**

To show the impact of Expansionary monetary policy there are three figures that have to be drawn simultaneously, the first one shows simultaneous equilibrium where IS and LM intersect and original equilibrium rate of interest is ' $r$ ' and equilibrium output is ' $Y$ '. With an increase in monetary policy LM curve shifts parallel to right and equilibrium rate of interest decreases which brings an increase in the net capital outflow in the second

panel as it is inversely related to rate of interest. In the last panel is the curve showing relation between net exports and net capital outflow. Initial equilibrium is when CF and NX curve intersects. Now when CF shifts to right the new equilibrium is at NX'. Thus at new equilibrium the exchange rate has depreciated and net exports increased with an increase in the equilibrium level of output and decrease in real interest rate.

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## **1.6 SUMMARY**

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In an open economy with the presence of external sector there can be either a small open economy or a large open economy with the basic difference lying in the fact as to how free is the capital movement in and outside the economy and how the interest rates in the domestic economy are being impacted by the rest of the world. While in a small open economy there are no restrictions on the capital movements but the interest rates ie n the small open economy is determined by the world interest rate and the changes in the interest rate in the small open economy have no impact on the world interest rate. A large open economy on the other hand has certain restrictions on the capital movements as investors here prefer domestic investments rather than outside investment. IS-LM model as studied in unit 2 was about goods and market equilibrium in a closed economy with just households, firms and government. Mundell and Fleming gave an extension of the goods and market equilibrium by extending it to the open economy. It is known as IS\*-LM\* model that studies relationship between nominal exchange rate and equilibrium level of output where both the goods and money market are in equilibrium in an open economy. It also showed how various policies have an impact on the large and small open economy in the presence of fixed and floating exchange rate.

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## **1.7 SELF ASSESSMENT QUESTIONS**

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### **Check your progress**

#### **Exercise 1: True and False**

- (a) Small open economy can influence the world interest rate.
- (b) Mundell Fleming is a short run model.
- (c) A four sector Economy is also called open economy.
- (d) Fiscal policy in the home country which is a small open economy has no impact on the interest rates.
- (e) In fixed exchange rate policy monetary policy has no impact on the equilibrium in small open economy.
- (f) Equilibrium level of output depends on the slope of Aggregate demand curve.

**Ans.** 1(F), 2(T), 3(T), 4(T), 5(T), 6(T)

### **Exercise 2: Fill in the Blanks**

- (a) An economy with households, firms, government and external sector is termed as \_\_\_\_\_.
- (b) If there is expansionary fiscal policy in a small open economy with fixed exchange rate it brings an \_\_\_\_\_ in the output.
- (c) Exchange rate is the rate at which currency of one country is exchanged for currency of \_\_\_\_\_ country .
- (d) Expansionary Fiscal Policy leads to \_\_\_\_\_ in net exports.

**Ans** 1. Open economy 2. Increases 3. Another 4. Decrease

### **Exercise 3: Questions**

1. Differentiate between small open and large open economy.

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2. What is the impact of expansionary fiscal policy in the small open economy on the equilibrium?

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3. Explain the equilibrium in large open economy.

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4. How does fixed exchange system operate when equilibrium exchange rate is more than the fixed exchange rate..

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5. Net foreign investment always equals the trade balance in a small open economy.  
Elaborate

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6. Explain the concept of floating and fixed rate system

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7. How  $I_s^*$  and  $LM^*$  are derived using mundell fleming model.

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8. Derive aggregate demand curve in a small open economy.

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## **1.8 SUGGESTED READINGS**

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Mankiw, N. Gregory, *Macro Economics*, Macmillan Worth Publishers New York,  
Hampshire U.K..

Dornbusch, Rudiger and Stanley, Fischer, *Macro Economics Theory*, McGraw-Hill

Barro Robert J., *Macroeconomics Theory and Applications*, MIT Press.

# MONEY AND CREDIT CREATION

## Definition, Functions and Role of Money

### Introduction

Life was very simple in the beginning of human existence. The basic human needs of food, clothing and shelter were fulfilled by man himself or the group in which he lived. Whatever simple production was there, was for self-consumption. There was no division of labour and no scope for exchange. But as time passed, human wants became varied and innumerable. It was simply not possible for any person to satisfy all his/her wants through own-production. Moreover, man realised the value of division of labour in enhancing production and making the process more efficient. This led to a complex division of labour and specialisation in production. Manufacturing of even a single commodity today is divided into many parts and production has become a joint venture in which large number of people participate. Every person gets his/her income through performing a very limited economic activity and spends this income on the commodities of his choice. Therefore, exchange has become a very important part of the economy. In the initial stages, the form of exchange was different and goods were exchanged for other goods. This was called barter. But this kind of exchange was possible in a small society where people had limited wants and knew of each other's wants. But barter was no longer practical in a big economy composed of innumerable people with innumerable wants. The necessary condition for barter to take place is double coincidence of wants, i.e., a person having a surplus of one commodity should be able to find another person who wants that very commodity and has something acceptable to offer in exchange at an agreed rate of exchange. But it is difficult to decide the terms of exchange as there is no common measure of value. Moreover, indivisibility of commodities and difficulty of storage make the barter system extremely difficult. In a complex economy, people invariably produce for others and cannot fulfil their wants except through a practical method of exchange, i.e. sale and purchase. This need resulted in the invention of money, something which is generally accepted in the process of exchange. Money may be any commodity chosen by common consent as a medium of exchange and all other commodities are expressed and valued in terms of this commodity.

It is not easy to go into the hoary origin of money and spell out precisely how and when it emerged in the pre-historic period. One theory is that the origin of money is not the result of man's conscious efforts, but it was discovered accidentally. According to Spalding, due to difficulties of the barter system (mentioned above), exchange must have become very difficult and some widely acceptable medium of exchange might have emerged e.g. articles of necessity or ornaments. The other theory contends that money was the result of man's rational efforts to find a common measure of value. According to G. Crowther, money "undoubtedly was an invention, it needed the conscious reasoning power of man to make the step from simple barter to money accounting." Adam Smith also believed that money resulted from the rational effort of man, but unlike Crowther, he thought that it was discovered as a medium of exchange and not as a unit of account. Whatever the origin of money, whether it emerged accidentally or was invented consciously, it is clear that it existed in societies which had no contact amongst themselves. Therefore, we can safely assume that it originated in different societies separately. Also, historically there is a set pattern of the evolution of money.

### Self-Check Exercise

Carefully note that whether money was invented through conscious human effort or discovered accidentally, what is important to know about money is that it removed the difficulties of barter and by lubricating the wheels of exchange, it facilitated division of labour and consequent increases in productivity.

#### Kinds of Money

It is agreed that the earliest form of money used in primitive societies was **commodity money**. Things which were commonly demanded (like salt, corn, utensils, furs, skins etc.) were used as money. In some regions, goats, cow or ox were chosen as medium of exchange. While elephant tusks, plumage of birds or tiger teeth served as money in tropical countries, it was shells in countries located on the sea-shore. Money took the form of tea in Tibet, rice in Japan and cattle in Vedic India. Even today, goats serve as money in some areas of Africa. Evidently, such commodities cannot perform efficiently as medium of exchange due to being indivisible, perishable and non-uniform.

With advancement of knowledge and civilisation, people started using metals as money. Metals had some merits and did not have the inadequacies of commodity money. To start with, pieces of brass, copper, iron, silver and gold were used as medium of exchange, but later on it was realised that iron, brass and copper were not good money materials as these were not scarce. Therefore, pieces of gold and silver and later on coins of gold and silver issued by rulers of various countries were used as money. Historical evidence shows that metal coins were circulating as money in our country around 400 B.C. Even today metal coins continue to be used as money though the techniques of coinage and quality of coins have improved tremendously.

Initially, the kings used to issue coins in their own image, certifying the weight and quality of the metal. Since intrinsic worth of these coins was no less than their face-value, these were called **standard coins** or **standard money**. Under gold standard, the banks and the government were supposed on demand to pay out gold in exchange for any form of money. **Token money**, on the other hand, is different from the full-bodied standard money as the face-value of the token coins is much higher than their metallic worth. It is not of any use to melt the token coins into metal. Today one, two and five rupee coins are an example of token money. Another important step in the development of money was the emergence of **paper money** which was slow and gradual. In the earlier times, goldsmiths used to issue receipts to people who deposited cash with them for safety reasons. In course of time, these paper receipts came to be accepted as money due to their credibility. Later on, paper money was issued by the state or by the central bank. It is believed that the Chinese were the first to use paper money which had the sanction of the state. Earlier, the currency notes issued were convertible into precious metals and in fact, represented gold reserves. But when paper money became widely acceptable, it became inconvertible. Today, the currency notes in circulation in different countries are not convertible, but they derive their acceptability from faith in the government.

The latest step in the development of money is **bank money** or **credit money**. This money came into being with the introduction and development of the banking system. Banks all over the world accept deposits which can be withdrawn or transferred through cheques. Banks promise to honour all the cheques issued by the depositors for amounts generally not exceeding the balance in their accounts. The cheque is an instrument through which the bank deposits become payable on

demand and can be transferred from one person or party to another. Though cheque in itself is not legal tender money (i.e. money which has the sanction of law), but it can be used to perform the same functions as money. One can pay for purchases through cheques and also receive the proceeds of sales through cheques. Bank money is generally more convenient than money, easier to carry and can be used to make or receive big payments. It is widely used in developed countries, but even in underdeveloped countries like India, it constitutes about 50 per cent of the money supply in the country. Bank money constitutes cheques, bank drafts and other credit instruments issued by the banks to transfer deposits.

### Definition of Money

As far as the definition of money is concerned, some economists like Withers, Hicks and Bain define it with reference to its functions. According to these descriptive definitions, 'money is what money does' and what money does is described as working as a medium of exchange, measure of value, standard of deferred payments and store of value. Other economists like Hawtrey and Knapp adopt a legalistic view and argue that a commodity acquires the characteristic of general acceptability only when it is made legal tender by the state. According to this definition, a commodity cannot function as money unless it has the necessary backing of the state. This definition is allright in normal conditions, but in a situation of hyper-inflation (when the general price-level is rising very fast), even legal tender money loses the characteristic of general acceptability. Moreover, such money does not include demand deposits of banks. Most economists define money in terms of its general acceptability. Marshall, Cole and Keynes emphasize this aspect greatly in their writings. According to this definition, a commodity may or may not be legal tender, but it should possess general acceptability if it is to be used as money. Money may be classified on the basis of (1) legality and (2) liquidity. Legal tender money is backed by law and people are bound to accept it in exchange for goods and services or in discharge of debts. Non-legal tender money is generally accepted by people as a medium of exchange, but it is upto the person to accept it or not. Cheques, bank drafts, hundis, bills of exchange etc. are examples of non-legal tender or optional money. Money in the form of coins and currency notes is highly liquid and can be exchanged for any type of asset immediately. But there are other forms of money which are not as liquid as coins and notes, but can be converted into money involving some inconvenience, time and loss of value. Saving deposits with banks or post offices, time deposits, bills of exchange, debentures, bonds etc. fall in this category. These claims do not circulate as medium of exchange and are not actual money, but these can be called quasi-money or near money.

### Self-Check Exercise

Note that the most important attribute of money is its general acceptability in exchange transactions and in settlement of debts. Money loses its utility the moment public loses confidence in its acceptability in transactions.

### Functions of Money

Since the definition of money is also usually in terms of its functions, let us discuss the functions in some detail. The functions of money have been summed up in a couplet :

Money is a matter of functions four;

A medium, a measure, a standard, a store.

**Medium of Exchange** : The most important and primary function of money is that of acting

as a medium of exchange. This is, in fact, the most distinguishing characteristic of money which separates money from near-money and non-money assets. It also brings out the importance of the feature of general acceptability since no commodity can act as a medium of exchange unless it is acceptable to everyone. Money as a medium of exchange breaks up the act of exchange into two parts : sale and purchase. This removes the major difficulty of barter, i.e. double coincidence of wants. Hungry weavers who have surplus cloth do not have to search for naked farmers who have surplus food, but no cloth. This saves a lot of time, energy and resources. Thus money brings efficiency into exchange transactions. Moreover, it also promotes efficiency in allocation of resources by making it possible to exploit gains from specialisation in production and trade. People can engage in production, get income (in the form of money) from the proceeds of goods sold and spend that income or money on the goods and services they require. Thus money which is the general purchasing power, acts very efficiently as a medium of exchange.

**Measure of Value** : Money serves as a common unit of account or measure of value in terms of which the values of all goods and services are expressed. Thus money measures the value of economic goods and this value is expressed in terms of their money prices. In a money economy, it is possible to ascertain the relative exchange values of goods by comparing their market-prices. According to Crowther, "Money acts as a yardstick or standard measure of value to which all other things can be compared." There is a close relationship between the two primary functions of money. The commodity which is used as a medium of exchange in a society, is also used for measuring the values of various goods and services. In fact, the function of money as a unit of account is performed first, i.e. we first measure the value of goods and services to be exchanged and only then exchange various goods and services at pre-determined rates. Moreover, it is possible to measure the total value of different kinds of goods and services (measured in different units e.g. metres, kilograms, litres etc.) in terms of money. There is no other way to measure the national income of a country except in terms of money. Money as a measure of value is used for making all kinds of economic calculations. But sometimes there is a dichotomy and medium of exchange cannot be used as a unit of account. There is the famous case of German mark whose value declined so much due to hyper-inflation after the First World War that it was impossible to use it as a unit of account. Therefore American dollar or Swiss franc were used as a measure of value, but German mark remained in circulation as a medium of exchange. China faced a similar situation during the Second World War.

**Standard of Deferred Payments** : Credit plays a very important role in a modern capitalist economy. In most of the transactions, instant payments are not made. Debtors promise to pay on some future date and the debt as well as interest, if any, is settled in terms of money. This also applies to payments of rents, salaries, pensions, insurance premia etc. In an underdeveloped economy like India which is based on agriculture, there are instances of rent and wages being fixed and paid in kind. But in a money-using economy, most of the deferred payments and future obligations are stipulated in terms of money. This is for the simple reason that money can be expressed in definite and standardised units and its value (in terms of its purchasing power) remains generally stable over time. But in times of inflation or deflation, the value of money varies over time and money not only becomes a poor measure of value, but also a poor standard of deferred payments. All the same, in the absence of another universally acceptable standard, money continues to perform this function of settlement of debts. Therefore, just as money facilitates current transactions of goods and services through its function as a medium of exchange, it also facilitates credit transactions (i.e. exchange of present goods against future goods) through its function as a standard of deferred payments.

**Store of Value** : Another important function of money is serving as a store of value. People can hold their wealth in the form of money. This function is also derived from the use of money as a medium of exchange. As stated earlier, money breaks up the exchange transaction into two separate transactions of sale and purchase. Under barter, the two transactions are simultaneous, but the use of money separates them in time also. In a money-using economy, people get their incomes in the form of wages, salaries, rent, interest and profits at certain points of time. They may decide to spend the same immediately or at a later point of time. In the latter case, the full or at least a part of the income received is held in the form of money for varying periods. It is possible to do so because money has the unique feature of being a generalised purchasing power and is also the most liquid asset. This ensures that goods and services can be purchased by money at any time in future without delay or loss of value. Therefore money can be stored without loss in value (unless a situation of hyper-inflation prevails in the economy). Since man always felt the need of holding wealth, under the barter system he did so by storing commodities. But it involved substantial storage costs and loss in value of perishable commodities due to deterioration. Other assets can also serve as store of value, but money being the most liquid, is unique in this respect. According to Keynes, the role played by money as a store of value is no less important than its role as a medium of exchange. Money, in fact, acts as a bridge between present and future. But it is equally true that fluctuations in the value of money (due to inflation and deflation) affect its function as a store of value just as they affect its functions as a measure of value and a standard of deferred payments.

There are some other functions too that money performs. It helps us to transfer value from one person to another, from one place to another and over time due to its general acceptability. Many a time, such functions are performed by near-money such as cheques and bank drafts. Money also helps consumers in maximising their utility by equalising the ratio of marginal utilities to that of respective prices (expressed in terms of money). It also helps producers to maximise production by equalising the marginal productivities of various factors of production. Money also facilitates the distribution of national income among the various factors of production on the basis of their marginal productivities. Banks and firms keep sufficient money reserves for meeting their liabilities lest they become insolvent and lose their goodwill. Money, on account of its perfect liquidity, can be converted into any type of asset according to its profitability at a point of time. Money is also the basis of credit since circulation of credit instruments is not possible in the absence of sufficient cash balances.

#### Self-Check Exercise

Note that people accept money in exchange and hold it for short or long duration (as a store of value) in the belief that other people will similarly accept it whenever the need arises.

Money is also used as a standard measure (a yardstick) of value; current and future (deferred payments).

#### Role of Money

The importance of money in an economy cannot be over-emphasized. Money may not produce anything, but not much can be produced without the help of money today. Money renders invaluable services in various economic processes going on in a modern capitalist economy. According to Dey, "Money is one of the most fundamental of all Man's inventions..... in the whole commercial side of Man's social existence, money is the essential invention on which all the rest is based." The important position of money is largely due to its two main characteristics. Money being a medium of exchange, is used for making all transactions and settling most of the debts. Purchases of consumer

goods and services, factors of production and claims such as bonds, bills, payment of taxes, are all made through money. As a result of this, money is used for distributing national income to workers, traders, government employees, shareholders and all others. Secondly, since money is general purchasing power and can be conveniently used to lay claims on goods and services, people generally prefer to hold their wealth in the form of money (which includes both currency and bank deposits).

In a capitalist economy, all the three central problems of what, how and for whom to produce, are solved through the price-mechanism which consists of prices of all goods and factors of production expressed in money. This economy is basically unplanned where a large number of consumers and producers take their decisions individually and it is only money prices of various goods and factors determined in more or less free markets, that bring order into the system. Since money splits exchange transaction into purchase and sale, two classes of buyers and sellers come into existence and their desires find their expression in the form of demand and supply respectively and influence various prices. Equilibrium between demand for and supply of a commodity/factor of production determines its price in the market. The set of goods prices helps consumers in choosing the basket of commodities according to their preferences and enables them to maximise their utility within the constraint of their income. The sets of goods and factor prices help the producer in choosing the most profitable line and technique of production. Profit is nothing but the difference between the price and cost of a commodity where the latter depends upon the prices and quantities of various factors of production used in the process of producing this commodity. The share of each person in the national income also depends upon the quantities of various factors of production supplied by him and their prices. To what extent that share in income (expressed in money) enables the person to lay claim on goods and services depends upon the prices of the latter. Thus, all the three problems of allocation of resources, choice of technique of production and distribution of income are solved in a capitalist economy through the price mechanism which is nothing but the value of various commodities and factors of production expressed in terms of money.

Money is essential for the development of an organised credit market. Such a credit market is not possible in a barter economy. Money also removes all trade barriers at national as well as international level by making specialisation and exchange of goods and services possible. Money is also important for the government in the sense that all taxes, fees, fines and other public revenues are realised in money only. The government also organises its public expenditure on activities that ensure maximum social advantage. Moreover, money is not only a technical device serving as a medium of exchange, measure of value, standard of deferred payments and store of value, but also influences the behaviour of such vital economic variables as level of output and employment in the economy. In a situation of unemployment in a modern capitalist economy, monetary adjustments are found useful to solve this problem. By increasing the supply of money (which we shall study shortly), rate of interest is sought to be reduced so that investment is encouraged, increasing output and employment. Also by increasing the monetary expenditure on consumption and investment through reduction in taxes and undertaking government projects, output and employment are sought to be increased. In a situation of inflation, the opposite kind of monetary policy (contractionary in nature) is adopted. Therefore, we can say that money is not wanted merely because it performs some useful functions, but it has become indispensable for the efficient management of a modern economy.

The role of money is not restricted to the capitalist economy. In a socialist economy also, where all the economic activities are coordinated by the central planning authority, money has to be used mainly as a medium of exchange and a unit of account. Resources are allocated on the basis of shadow prices which are also expressed in money. Wages and salaries are paid in terms of money.

People are free to organise their consumption on the basis of prevailing prices which may be partly or wholly controlled by the government. Therefore, even in a socialist society based essentially on economic planning, money and the price mechanism play a major role in the allocation of resources, distribution of income and expenditure on consumption. Lenin himself pointed out that a socialist economy could not be a moneyless economy.

Despite the crucial role that money plays in any modern economy, it cannot be considered as an unmixed blessing. It does promote employment, economic growth and welfare if it is properly managed. But if mismanaged, it can cause economic recession or inflation and result in untold miseries for the common people. As stated before, money acts as a measure of value, but its performance depends upon the extent of stability in its value in terms of goods and services or general purchasing power. We are able to measure wheat in quintals and cloth in metres simply because the weight of a quintal as well as the length of a metre is fixed. But if the yardstick itself is variable, all measurements lose their precision. Because of this, there emerges a difference between real values and monetary values of economic variables like national income, wages and other factor prices. Keynes talked of money illusion that workers suffer from because they cannot distinguish between money wages and real-wages. But these days workers and their trade unions are aware of the effect of rising prices on their real wages and try to link their wages to the rate of inflation (through dearness allowance). But the problem of economic fluctuations caused by imperfections in various techniques of monetary control is quite real and causes hardships to the people.

To conclude, we can say that money is a tool and a very useful tool at that, but like all tools, it has to be used properly and efficiently so that it does not cause any harm to the user.

#### **Self-Check Exercise**

In a money economy money does many things. However, its most basic function is its use in exchange transactions and as a store of value. Imagine what will happen to productivity if money was not available.

## MEASURES OF MONEY SUPPLY

Having defined money, described its functions and importance in a modern economy, we now intend to discuss the supply of money and its various measures. But before we talk about the supply of money, let us say something briefly about the demand for money. It is obvious that unlike other consumer goods, money is not demanded for its own sake, nor does it possess any utility to satisfy human wants. It represents general purchasing power and is demanded because it helps people to gain command over goods and services which possess utility. It is also true that money is a barren and unproductive asset and does not yield anything. Other assets like stocks and shares, houses etc. yield returns in terms of dividends and rent. Money given on loan also yields interest. But even then people (households as well as firms) do hold their wealth in the form of money for three purposes.

According to classical economists, money is held by people for (1) transaction and (2) precautionary motives. Derived from the principal function of money as a medium of exchange is the **transaction demand** for money. Consumers require money to purchase goods and services while producers need money to obtain factors of production and intermediate goods which are required in the process of production. Therefore, the transaction demand for money depends upon the total volume of transactions in an economy. In addition to the money required for meeting certain and foreseen expenditures, people also keep money to cover unexpected expenditures resulting from uncertain and unforeseen circumstances e.g. accident, sudden illness, loss of job etc. Thus the motive to hold money to guard against future uncertainties is called **precautionary motive**. The demand for money on this account depends upon the level of income and also the access to credit market and the degree of liquidity of other assets. If there is a developed and organised money market, people can easily borrow or convert their assets into money to meet their unexpected needs. Precautionary motive is also a kind of transaction motive where the transactions are unforeseen and uncertain.

Keynes' innovation is the **speculative motive** for holding money. Both transaction and precautionary demand for money are derived from its function as a medium of exchange. But speculative demand for money is totally alien to the classical economics. In Keynesian theory, however, this demand for money occupies a strategic position. According to Keynes, speculative demand for money results from people's desire to make capital gains by buying bonds and other financial assets when their prices are low and selling them when their prices rise. In other words, people speculate about the future level of prices of various securities. As rational individuals who try to maximise their gains, they would hold those securities whose prices they expect to rise and try to dispose off those securities whose prices they anticipate to fall. Keynes defined the speculative motive as "**the desire of earning profit by knowing better than the market what the future will bring forth.**" Obviously, speculative demand for money makes use of the function of money as a store of value. People tend to hold money (which is the most liquid asset) so that they can convert it into securities the moment it becomes profitable. Keynes related the speculative demand for money to the rate of interest. Since the total monetary return on bonds is fixed, their prices are inversely related to the rate of interest. When the bond prices rise, the rate of interest falls and vice-versa. People buy bonds only when their prices are low and the rate of interest is high. Otherwise, if the bond prices are high and the rate of interest is low, they prefer to hold money so that they can buy bonds as soon as their prices fall. Also, if they expect the interest rate to rise, they will convert their bonds into money and if they expect the rate of interest to fall, they will buy bonds with the stock of money they have. Thus, the speculative demand for money varies inversely with the rate of interest.

and expectations about the rate of interest and bond prices also play a role.

Let us now discuss the supply of money and its various measures. Supply of money is the total volume of money held by the public where public includes the private individuals and business firms operating in the economy and excludes the producers of money which are government, central bank and commercial banks. Thus the money held by the government and the currency lying with the central bank and commercial banks is not included in the money supply. Therefore, the money supply of a country at any point of time (this means it is a stock) is the total amount of money in circulation. This may be held by individuals, households, business firms, institutions, local authorities, non-bank financial institutions and non-departmental public sector undertakings (like Indian Airlines, Hindustan Steel, etc.) and even foreign banks, governments and International Monetary Fund. The reason for measuring the stock of money in this way is to separate the producers or suppliers of money from the holders or demanders of money.

Since money is measurable, we can calculate the total stock of money at a particular point of time. Measuring money at different points of time, we can construct a whole time series of money supply which will show the behaviour of money supply over time. This information can be used to analyse the effects of changes in the money-supply on several important economic variables like level of income, prices, employment, rate of interest, investment, balance of payments etc., and to control the supply of money to attain certain policy goals. We shall discuss this aspect later, but let us now concentrate on various components of the money-supply.

The simplest measure of money-supply (denoted by  $M$  or  $M_1$ ) consists of currency with the public (notes and coins), demand deposits (DD) at commercial banks and other deposits of the Reserve Bank of India (RBI). Currency includes coins and notes out of which coins and one rupee notes are issued by the government of India while notes of denomination of rupees two and above are issued by the RBI. All this is legal tender money. Demand deposits are defined as bank deposits payable on demand through cheques or otherwise. These deposits can serve as a medium of exchange if these are acceptable to the other party. If not acceptable, these can be immediately converted into cash. Thus, demand deposits are as liquid as currency. Other deposits of the RBI are its deposits other than those held by the government and banks. They include demand deposits of quasi-govt. institutions (like IDBI), foreign central banks and governments, IMF and the World Bank, etc. However, these other deposits (OD) of the RBI constitute a very small proportion (say less than one per cent) of the total money supply and hence can be ignored. Till 1967-68 in our country, the RBI used to publish only a single measure of money supply ( $M$ ) defined as the sum of currency and demand deposits, both held by the public. From 1967-68, the RBI started publishing additionally a broader measure of money supply called 'aggregate monetary resources' (AMR). It was defined as  $M$  or  $M_1$  plus the time-deposits of banks held by the public. From April 1977, another change was introduced and since then the RBI has been publishing data on four alternative measurers of money-supply,  $M_1$ ,  $M_2$ ,  $M_3$  and  $M_4$ .

$M_1 = C + DD + OD$  (where  $C$  denotes currency,  $DD$  denotes demand deposits and  $OD$  denotes Other deposits of the RBI).

$M_2 = M_1 + \text{Savings deposits with post office savings banks.}$

$M_3 = M_1 + \text{net time deposits of banks.}$

$M_4 = M_3 + \text{total deposits with the Post Office savings organisations (excluding National Savings Certificates).}$

We have already explained  $M_1$ . Currency consists of paper currency as well as coins. Demand

deposits are the net demand deposits of banks and not their total deposits. Total deposits include both deposits from the public and inter-bank deposits while the latter are excluded from the definition of money. We have already discussed what other deposits of the RBI include and also pointed out their quantitative insignificance.  $M_1$  is the same as AMR which, apart from  $M_1$ , includes time deposits of all banks (net of inter-bank deposits).  $M_2$  and  $M_4$  include Post Office deposits in addition to  $M_1$  and  $M_3$  respectively. It should be remembered that these deposits are not withdrawable by cheque as are demand deposits of banks. While  $M_2$  includes only savings deposits of post offices,  $M_4$  includes all post office deposits, whether savings or time deposits.

In all the different concepts of money supply described above, currency is the most liquid asset, followed by demand deposits of banks which can be easily converted into cash if the need arises. Saving deposits with post offices fall next in terms of liquidity and can be converted into money at a short notice. Time-deposits, whether of banks or post offices, come last in terms of liquidity and cannot be redeemed into money before the stipulated maturity period without loss of time and money. The RBI also views the four measures of money-supply to represent different degrees of liquidity,  $M_1$  being the most liquid and  $M_4$  being the least liquid. When it comes to the choice of the measure of money supply to be used, it all depends upon the context. It is necessary to know the reasons for which money is demanded and the sources from which this demand can be met. The most common measure of money supply is that provided by  $M_1$  which is considered appropriate by most of the economists.  $M_3$  is another important and broader measure of money supply which encompasses time-deposits of banks also.

But whatever the measure of money supply used, one thing that stands out clearly is that the quantity of money in circulation has increased over time and even its rate of growth has accelerated over time. For example, the rate of growth of  $M_1$  increased from 3.6% during the fifties to more than 13% during the eighties. You may ask who controls the supply of money? Basically it is the central bank, commercial banks and government who can influence or control the supply of money in the economy. The central bank not only issues currency, but also influences deposit money through its monetary policy. It can increase the supply of money by following a cheap money policy and decrease it through a tight money policy. Commercial banks can create credit in terms of demand deposits on the basis of money deposited with them by the people. The government can influence the supply of money through its fiscal policy (relating to revenue and expenditure) and public borrowing. An expansionary fiscal policy increases the supply of money by reducing taxes and increasing government expenditure (which may be partly financed by deficit financing). The opposite happens in case of a contractionary fiscal policy.

#### Self-Check Exercise

Carefully note that :

1. Supply of Money in an economy means the stock of money in the hands of the users of money (i.e. individuals, households, business firms, institutions, local authorities, non-bank financial institutions etc.) and not the amounts lying in the vaults of producers of money (i.e. The RBI, Commercial Banks and government)
2. Various types of money are distinguished on the basis of their liquidity i.e., the ease with which these can be used in exchange transactions. Currency is the most liquid form of money; it can be used in exchange, as and when needed without loss of time and value. On the other hand, Savings Bank Deposits are less liquid form of money since their use involves a cost (loss of interest) and loss of time.

## MONEY AND PRICES

As you know, money does not have any utility of its own and does not satisfy human wants directly. However, people exchange goods and services for money and it functions as a measure of value. As mentioned earlier, this measure of value is not constant itself and its own value keeps on changing. What is the value of money ? Since money helps us to gain command over goods and services which satisfy our wants, its value is determined by what a unit of money will buy in terms of a representative assortment of goods and services. In other words, the value of money is nothing, but its purchasing power which varies inversely with the general price-level. By general price-level, we mean prices of all the goods and services as distinct from prices of individual goods relative to those of other goods (which are called relative prices). Change in relative prices performs the function of allocation of resources in an economy. For example, a rise in the price of X-good relative to the price of Y-good, raises profits in the production of X and induces producers to shift resources from the production of Y to that of X. But when all prices in the economy rise or fall together, relative prices remain unchanged so that no transfer or reallocation of resources takes place. What happens when the general price level rises ? When that happens, the value of money declines, as a unit of money now commands a smaller amount of goods and services. On the contrary, a fall in general price-level raises the value of money since a unit of money can now buy more of goods and services.

### The Quantity Theory of Money

We have related the value of money to the general price-level. It will be interesting to go into the reasons for changes in the general price level/value of money. Why do the variations in general price level take place ? The classical theory in this regard is known as the 'Quantity Theory of Money' or 'Fisher's Equation' (since it was formulated by Irving Fisher). According to this theory, changes in the general price-level are direct result of changes in the quantity of money in circulation. The equation formulated by Fisher is written as :

$$MV = PT$$

where M stands for the quantity of money in circulation in the economy and V stands for the velocity of circulation i.e. the number of times a unit of money changes hands on the average during a given period of time. (If a 100 rupees note changes hands 10 times during a month, it performs the function of 1000 rupees, not 100). Thus MV stands for the effective supply of money over a given period of time. On the right hand side of the equation, P stands for the average price-level and T for the volume of real transactions. Thus PT represents the money value of all transactions in the economy. What does the equation  $MV = PT$  really signify ? It refers to the simple fact, which has to be true under all circumstances, that the stock of money multiplied by its velocity (i.e. the total supply of money) is always equal to the total value of all the transactions (i.e. the total transaction demand for money). In other words, this equation is an identity and conveys only this that all transactions have to be carried out through money. A change in any of the four variables (M, V, P and T) has to be compensated by equal change in one or more remaining variables. For example, if the amount of real transactions (T) increases, but the money supply (M) is fixed, then either each unit of money will be used a greater number of times to carry out the larger volume of transactions (i.e. V will increase) or the average price-level P must fall. Suppose T increases from 500 to 1000 and M remains constant at 500, then either V must double or P must fall to one-half of its previous value. On the other hand, if the product MV on the left side of the equation remains constant (either

because of constant M and V or because of compensating opposite changes in M and V) and T increases, then P will have to fall proportionately to make the product PT equal to the constant MV. As an identity, the equation  $MV = PT$  conveys nothing more than the simple fact that the total value of all transactions in the economy (PT) must be executed through the effective money-supply in the system, i.e., MV.

But according to the classical economists, the equation  $MV = PT$  was not merely a definitional identity, it was a theory which relates changes in the general price level (P) directly to the changes in the quantity of money (M). Their main hypothesis was that changes in the general price level are directly proportional to changes in the quantity of money in circulation because volume of real transactions (T) and velocity of circulation of money (V) are assumed constant. If V and T are assumed constant, it is quite obvious that changes in P will naturally be proportional to the changes in M. If M doubles, P will also double and if M decreases, P will also be pulled down proportionately. Thus so long as we accept the assumption of constant T and V, the conclusion of the quantity theory of money that changes in the quantity of money cause proportionate changes in the general price-level, holds true. But if a rise in the quantity of money is offset either by a decline in V or an increase in T, it will not lead to a proportional rise in the general price level.

#### Self-Check Exercises

1. Construct examples to show that if V and T are held constant, P will rise and fall proportionately to rise and fall in the quantity of M.
2. Construct another example to show that P may change in the opposite direction to changes in the quantity of M if V and T are allowed to vary.

#### Evaluation of the Quantity Theory

This equation was criticised by some economists for ignoring credit money which is a very important component of money supply in a modern economy. Therefore, Fisher extended this original equation by incorporating the volume of bank deposits ( $M'$ ) and its velocity of circulation ( $V'$ ). The extended version stands as follows :

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

If  $M = 200$ ,  $V = 6$ ,  $M' = 500$ ,  $V' = 4$  and  $T = 1600$

$$\text{then } P = \frac{MV + M'V'}{T} = \frac{200 \times 6 + 500 \times 4}{1600} = \frac{3200}{1600} = 2. \text{ The value of money can be determined}$$

by  $\frac{1}{P}$  or  $\frac{T}{MV+M'V'}$ . In the above case, value of money is  $\frac{1}{2}$  or 0.5. Now suppose V, V' and T remain constant, but M rises from 200 to 400 and M' rises from 500 to 1000, then P will rise to

$$\frac{MV + M'V'}{T} = \frac{400 \times 6 + 1000 \times 4}{1600} = \frac{6400}{1600} = 4. \text{ The value of money will fall to } \frac{1}{4} = 0.25.$$

Let us examine this theory critically. The net effect of a change in the quantity of money on the general price level will depend upon the following factors :

- (a) how the change in the quantity of money affects aggregate demand ?
- (b) how the change in aggregate demand affects the level of output ?
- (c) does velocity of circulation of money remain constant or varies ?

Let us examine these questions in some detail. As far as the first question is concerned, the assumption of the classical economists that an increase in the quantity of money will result in a proportional increase in aggregate demand, is based on the notion that rational individuals have no use for idle cash balances or in other words, there is no speculative demand for money. Their argument was that if people have more money than they need for their day-to-day transactions (i.e. if they are able to save), they will lend out the surplus money to the entrepreneurs at some interest rather than keeping it idle with them. The entrepreneurs, in turn, will use the borrowed funds by investing them in capital goods because the funds have a cost in terms of the interest to be paid. Thus the savings of the people will automatically generate an equal amount of investment demand in the economy and aggregate demand will increase exactly in proportion to the increase in the quantity of money. But in our discussion of the Keynesian theory of the rate of interest, we stated that rational individuals do hold some idle cash balances for speculative purpose. Therefore, it is not necessary that an increase in the quantity of money will always be lent out to entrepreneurs for investment, thus resulting in a proportional increase in aggregate demand. It is quite possible that it may wholly or mainly be held as idle cash balances, thus not resulting in any increase in aggregate demand.

The second question whether a change in the level of aggregate demand will or will not affect the level of output in the economy, will depend on whether the economy is working at the full employment level or whether there are unemployed resources in the economy. If there is already full employment of resources in the economy, then an increase in aggregate demand resulting from a change in the quantity of money cannot lead to an increase in output and will, therefore, simply raise the general price-level. If, however, there are unemployed resources available in the economy, the increase in aggregate demand will definitely raise the level of output rather than general price-level. To what extent the increase in aggregate demand will raise output and to what extent it will raise the price-level, will depend upon the extent of unemployment in the economy. Thus when there is considerable unemployment of resources in the economy, there will be the possibility of increase in aggregate demand leading to an increase in output rather than a proportional increase in the general price level. Therefore, we can conclude that the quantity theory of money will not hold if (a) an increase in the quantity of money does not lead to an increase in aggregate demand, but only results in a greater amount of idle cash balances and (b) even if an increase in the quantity of money does raise aggregate demand, but due to unemployed resources in the economy, this increase in aggregate demand results in higher output, rather than higher price-level.

Finally, the question whether velocity of circulation of money is constant or not, is an empirical issue. Some economists consider it a fairly stable and predictable variable, while others think it is quite volatile. Famous economist Kalecki has shown that  $V$  is not constant and over short periods of time, it varies with the rate of interest. If the rate of interest is high, holding idle cash becomes costly and people try to manage their transactions with smaller cash balances by using each unit of money more often (i.e. by increasing  $V$ ). Therefore, the higher the rate of interest, the higher tends to be the velocity of circulation,  $V$ . If  $V$  is not constant, the conclusion of the quantity theory of money does not hold good.

The classical economists assumed  $T$  to be constant because they believed that the economy would always have full employment and aggregate demand would always equal aggregate supply. They assumed that rational individuals would have no use for idle cash balances (i.e. there would be no speculative demand for money) and whatever they save will generate an equal amount of

investment demand in the economy.

Thus we may say that conclusion of the Quantity Theory of Money will hold provided (a) consequent to a change in the quantity of money, aggregate demand changes proportionately i.e. no idle cash is held by people for speculative purpose; (b) when the aggregate demand changes, level of output does not change at all i.e. there is already full employment in the economy and (c) there is no change in V (velocity of circulation of money). On the other hand, it is equally possible that changes in the quantity of money may not affect the price-level at all. This will happen if (i) the whole of the newly pumped money is held as idle cash for speculative purposes i.e. aggregate demand does not increase at all; (ii) in case there is some increase in aggregate demand (proportionate or less than proportionate), this is completely neutralised by increase in output because there are sufficient unemployed resources available in the economy and (iii) the impact of an increase in the quantity of money is neutralised by a compensating change in V. However, these two are extreme possibilities and normally we can expect an increase in the quantity of money leading partly to an increase in the general price-level and partly to an increase in the level of output. Therefore, normally the conclusion of the quantity theory of money will hold, but partly.

There are many weaknesses of the Quantity Theory of Money. It takes M, V and T as independent variables (out of which it assumes V and T to be constant and this may not be correct in reality) and considers only P as the dependent variable. In fact, changes in P may also affect V, T and M. Also, it emphasizes only one function of money i.e. the medium of exchange function and ignores its function as a store of value. Moreover, the rate of interest is completely ignored by this theory. Perhaps the biggest weakness of this theory is that it does not explain how changes in the quantity of money work their way into the economic system and what is the chain of events that follows.

#### **Self-Check Exercises**

Note the following points :

1. Because of the speculations motive, aggregate demand may not rise at all consequent to an increase in the quantity of M.
2. Even if aggregate demand rises in proportion to a change in the quantity of M, the price level may remain unchanged if enough unemployed resources are available in the economy.
3. The biggest defect of the Quantity Theory of Money is its failure to explain the channel by which an increase in M bids up the price level.

#### **The Income and Expenditure Approach**

It was Keynes who explained the Income and Expenditure Approach according to which changes in the quantity of money work their way into the economic system through a certain process and the net effect of such changes on the price-level depends on a number of 'ifs' and 'buts'. We can describe the sequence of events roughly as follows. An initial change in the quantity of money will affect bond-prices (by increasing the demand for bonds) and the rate of interest since bond-prices and rate of interest are inversely related to each other and are two sides of the same coin. Normally, an increase in the quantity of money may be expected to raise bond-prices and thus lower the rate of interest. A reduction in the quantity of money may be expected to produce the opposite effects viz. a fall in bond-prices and a rise in the rate of interest. A lowering of the rate of interest (caused by an increase in the quantity of money) normally induces producers to make larger investment

because the cost of investment (in terms of the rate of interest) is now lower than before. Here we assume that other factors affecting producers' profit-expectations remain constant. Now, even if consequent upon an increase in the quantity of money, the rate of interest does fall and the investment is stimulated, the extent of rise in aggregate demand will depend upon that in aggregate income which in turn depends on the value of the multiplier. Finally, the increase in aggregate demand will raise the general level of prices provided the economy is working at the full employment level and there are no unemployed resources available in the economy. Thus, we can see that it is not possible to relate changes in the general price-level directly to changes in the quantity of money as the Quantity Theory of Money does. In fact there is many a slip between the cup and the lip.

First of all, an increase in the quantity of money may be neutralised by an increase in idle cash balances and may fail to lower the rate of interest. This will happen if the rate of interest is already so low that people expect it to rise and hence postpone the purchase of bonds. Secondly, even if the rate of interest does fall, it may not stimulate investment if the marginal efficiency of capital also falls due to technological, social, political or economic factors. Thirdly, even if a fall in the rate of interest does stimulate investment, it may not lead to much increase in the level of income if the value of the multiplier is low. Finally, even if an increase in investment does result in a greater increase in income-level via the multiplier and hence an increase in aggregate demand, it may not affect the general level of prices if the level of total output increases in proportion to that of aggregate demand due to availability of unemployed resources in the economy. Therefore, the Keynesian Income and Expenditure Approach describes all the conditions which should be fulfilled if the changes in the quantity of money are to result in proportionate changes in the general price level. Increase in the quantity of money should raise bond-prices and lower the rate of interest. A decline in the rate of interest should induce more investment which should raise the income-level through the multiplier. A rise in the income-level should raise aggregate demand, but not the level of output in the economy so that the general price-level rises proportionately. If any one of these conditions is not fulfilled, the direct relationship between the quantity of money and general price-level breaks. Thus, the Income and expenditure Approach explains how changes in the quantity of money work their way through the economic system step by step and eventually result in changes in the general price-level.

#### Self-Check Exercises

Carefully note the 'ifs' and 'buts' in the way changes in the quantity of M work their way through the economic system.

1. A change in the quantity of M is expected to change the rate of interest. How ? When it may not ?
2. A change in the rate of interest is expected to affect investment. How ? When it may not ?
3. A change in investment is expected to affect the levels of output and employment through the multiplier process.
4. It is possible that in one situation the change affects only output and in another situation it affects only the price level.

## CREDIT CREATION

It is common knowledge that people deposit money in the banks. This is done keeping in mind several things. It is not safe to keep large sums of liquid money (currency notes, etc.) at home because they may be stolen. A safer course would be to keep them in a bank and withdraw the amount as and when the need arises. People who save would also like to earn interest on their savings. Cash balances lying idle at home do not yield an income, but if put in the bank they start earning an interest. The rate of interest depends, however, on the period for which these balances are left with the bank. If it is for a short period of a few months, the rate of interest is low and if it is for a longer period of a year, two years or five years or even more, the rate of interest is higher. The longer the period for which a depositor decides to keep his money with a bank, the higher is the rate of interest. The lending activities of a bank are planned after determining the requirements of cash to satisfy the demands of customers who come to withdraw their money. People also save in order to tide over certain emergencies. Another reason why people save is that a man is able to earn only during the active part of his life and he must provide for old age. Similarly, there are demands which require large sums of money that can not be provided out of monthly income. For instance, the purchase of a TV set or a refrigerator or the construction of a house or the marriage of a daughter, all these require large sums of money. Wise people foresee their further wants and save for them over a period of time and keep their savings in a bank.

But generally all the people who keep their savings in a bank, do not simultaneously want to withdraw them. At a point of time, only a fraction of people approach the bank to withdraw the money in order to meet their needs. Once the bank understands this fact, it can keep a fraction of the cash as reserve and lend the remaining amount to people who demand loans for their business and industry. In this way, the bank can convert idle money into income-yielding assets. Thus, the fact that the people who deposit money in the banks, do not all withdraw the whole amount simultaneously, is the basis of credit creation by the banks. Generally, the amount of credit created is a multiple of the amount deposited with the banks.

In order to understand the process of credit creation, let us take an example. Suppose a businessman seeks a loan of Rs. 1,00,000 from a bank. The bank would ask him to furnish a security. This security can be in the form of fixed assets like a house, a factory or a machine. The purpose of this probe is to establish credit worthiness of the borrower. While granting loans to the farmers or the small entrepreneurs, the banks explore their capacity to repay by an estimate of the value of crop which is likely to be produced or the estimate of the value of the prospective output of a small enterprise. In either case, whether the loan is given against fixed capital or circulating capital, a bank ensures the credit worthiness of the borrower. The value of the capital or circulating capital kept as a mortgage against the loan advanced is generally higher by a certain amount (say 30 per cent) called as 'margin'. The purpose of keeping a margin is that in case a borrower fails to pay back the loan as specified in agreement with the bank, the latter should be able to recover it by auctioning the assets mortgaged with the bank. It is in this sense that it may be said that banks create credit not out of thin air but against the securities furnished by the borrowers. But whenever a bank has to make a payment, it does not hand over the requisite amount in currency but places the sum in credit of the payee in its account books and hands over a cheque book to him. The payee would, of course, draw cheques for discharging his obligations. Now as these cheques are presented for encashment at the counter, the bank would find itself in difficulty if it had not kept in reserve cash to the tune of the total amount it placed in this manner at the disposal of the borrower. And if all the people cash their cheques, bank will never be able to add to the total supply of money. Some, of course, will do that, but many of the recipients of cheques would be satisfied by depositing them

in their respective accounts in the same bank or what is more likely, in other banks. What if those other banks demand cash from the first bank? Of course they would, but as at the same time they would also be doing similar business, there would be a fair amount of cancellation of inter-bank obligation, so that the first bank when placing deposit money at the disposal of borrower must have in hand enough cash to put out to those who cash their cheques and to settle the balance of indebtedness with other banks. This would generally be a fraction of the total loans given. That is why this type of banking is called *fractional reserve deposit banking* and the ratio of the amount of cash held to the total deposits is called 'safe cash reserve ratio'.

The process of creation of credit can be illustrated with the help of an imaginary balance sheet of a bank.

*First stage— Depositors deposit money in the bank.*

**BANK A**

Liabilities	Rs.	Assets	Rs.
Deposits	1,00,000	Cash	1,00,000

The bank knows that many of their depositors would let their money lie with the bank. If some withdraw, others would deposit. The law of large numbers would enable the bank to calculate with a fair degree of accuracy what percentage of the total money deposited will be lying idle with the bank at any time. Once the banker knows this, he can set about making profitable use of the idle money. He would, of course, keep a certain percentage as reserve. This is called safe cash reserve ratio. Let us suppose, the bank keeps 20% as reserve against advances and the rest it creates deposits.

*Second stage— The banker gives loans.*

Liabilities	Rs.	Assets	Rs.
Deposits (primary)	1,00,000	Cash	1,00,000
Deposits (Secondary)	80,000	Assets against loans	80,000
Total	1,80,000	Total	1,80,000

The bank has given loans amounting to Rs. 80,000 keeping Rs. 20,000 reserves against the primary deposit of Rs. 1,00,000. Now, suppose, all those to whom cheques are paid by the borrowers deposit their cheques in other banks.

**BANK A**

*Third Stage*

Liabilities	Rs.	Assets	Rs.
Deposits	1,00,000	Cash	20,000
		Assets against loan	80,000
	1,00,000		1,00,000

**Other Banks**

(How the other banks are affected)

Increase in liability	Rs.	Increase in assets	Rs.
Deposits	80,000	Cash	80,000

Now, the other banks in turn would start the process of creation of credit by giving loans all over again and lend what they consider to be excessive cash, keeping with them only a fraction, determined as safe cash-reserve ratio, as reserve. The multiplication process will continue till the whole of Rs. 1,00,000 is absorbed in what the banks consider necessary balance of cash reserve

against deposits and the deposit money would go on increasing in the following manner: Rs. 1,00,000 + Rs. 80,000 + Rs. 64,000 + Rs. 51,200 + .... etc. each subsequent figure being 20 per cent less than the previous one as each time, 20 per cent is retained by a bank as necessary cash reserve. In case, the cash reserve is Rs. 20,000 the banking system, under normal conditions, can satisfy the demands for withdrawals by depositors holding credits worth Rs. 1,00,000. In case, the bank or the banking system keeps Rs. 1,00,000 as case reserve, it can lend to the tune of a total of Rs. 5,00,000 (given 20 per cent as the safe cash-reserve ratio).

The table below bring out clearly the process of credit creation by the banking system. A new deposit of Rs. 1,00,000 created in the 1st series of banks permits after keeping a cash reserve of Rs. 20,000, a creation of new loans and investment to the extent of Rs. 80,000 which is deposited in the second series of banks as new deposit. After retaining 20 per cent as cash reserve, would enable the second series of banks to lend Rs. 64,000. This creates a new deposit of Rs. 64,000 in the 3rd series of banks which after retaining Rs. 12,800 as cash reserve can create new loans and investment to the tune of Rs. 51,200. Thus the process moves on and on till the total deposits reach a total of Rs. 5,00,000 and new loans and investments are Rs. 4,00,000 with a cash reserve balance of Rs. 1,00,000.

### **PROCESS OF CREDIT CREATION THROUGH THE BANKING SYSTEM**

	New Deposits	New Loans & investments	Cash Reserve balance
	Rs.	Rs.	Rs.
Ist series banks	1,00,000	80,000	20,000
2nd series banks	80,000	64,000	16,000
3rd series banks	64,000	51,200	12,800
4th series banks	51,200	40,960	10,240
Total	2,95,200	2,36,160	59,040
All the remaining banks Total for the banking system	2,04,800	1,63,840	40,960
	5,00,000	4,00,000	1,00,000

#### **Limits of Credit Creation**

There are two limits to the process of credit creation by the banks. They are (a) quantity of cash deposits with the commercial banks and (b) safe cash deposit ratio.

(a) *Quantity of cash deposits with commercial banks*— Since the people have to deposit currency with the banks as the currency deposit, the extent of the cash deposit will depend upon the total amount of state money, viz., currency issued by the central bank of the country. In case, the central bank increases the state money supply by issuing more currency, the quantity of cash deposit can also increase. The second factor that determines the cash deposit is the banking habits of the people. In underdeveloped countries, banking habits being not very highly developed people prefer to pay the grocer, the washerman, the milkman and several other sundry creditors in cash; but in developed countries, even these payments are made in cheques. Obviously; the quantity of cash required for day-to-day transactions is much lower in developed countries than in underdeveloped countries. In other words, the proportion of total currency which is deposited with the commercial banks in developed countries is higher than in underdeveloped countries and consequently, the limits of credit creation shall also be higher in the former than in the latter.

(b) *Safe Cash Reserve Ratio*— Another factor that limits credit creation is the safe cash reserve ratio. This depends upon the extent to which people are accustomed to the use of credit

instruments in discharge of their business obligations. In other words, the extent of confidence of the public in the banking system determines the safe cash reserve ratio and the latter, in turn, sets the limit to the creation of credit. For instance, if the cash reserve ratio is 20 per cent, it would be possible to expand total credit to the tune of Rs. 5,00,000 with a cash deposit of Rs. 1,00,000. But in a developed country where cash reserve ratio is lower, say 10 per cent, it would be possible to expand total credit to tune of Rs. 10,00,000 with a cash deposits of Rs. 1,00,000. The capacity of credit creation by the banking system is thus limited by safe cash reserve ratio.

The discussion makes it clear that banks can lend more than their deposits. Banks also prescribe for themselves the cash reserve ratios depending upon the experience of the past, the stage of development in banking reached by a country and the degree of confidence the people have in a bank.

But there can be a miscalculation on the part of a bank in determining the safe cash reserve ratio. What happens in the event of miscalculation?

A look at the balance-sheet of any bank will help us in answering this question. The remarkable fact you will notice will be that most of the liabilities are short period liabilities i.e., money liable to be withdrawn without notice. How does the bank manage to meet its liabilities? The bank conducts its business on the assumption that all the people will not withdraw money at the same time. As some withdraw, there would be others depositing and the bank would require cash to meet only the net outflow. If a bank has been giving loans at a rate far in excess of other banks, it will have to make arrangements to pay cash at the time of demand. Or if the public demand is against a bank so that depositors are withdrawing their money and no new deposits are being made, it will have to take exceptional measures to meet the cash drain. Otherwise, it would not be able to carry on its business by maintaining the normal cash deposits ratio which is normally ten per cent these days.

If a bank finds itself hard pressed for cash, it would realise some of its assets and slow the rate at which it is creating fresh credit. A bank's portfolio of assets should be such that there are assets falling due simultaneously with claims. There should also be certain percentage of short period assets which can be called in as and when more cash is needed. The two considerations which the banker keeps in mind while choosing assets are profitability and liquidity. Liquidity means the ease with which an asset can be exchanged for money at little loss. The liquidity of an asset is determined by the nature of the market on which it is traded. Highly liquid assets other than cash and bank deposits are post office savings, treasury bills and money at call and short notice. A bank is a joint stock company. It has to declare a dividend to satisfy its owners. The rate of interest which a bank pays to its depositors is lower than the rate at which it lends money. The rate of interest it charges from borrowers or the profits it realises on its investments, are in direct proportion to the difficulty, delay and risk of capital depreciation involved. The less liquid the asset, the higher, in general is its yield. A right balance between the opposites—liquidity and profitability—is the hallmark of successful banking. The bank can neither afford to be less liquid nor lose an opportunity to earn profits. But accidents always happen and then the bank has to suspend payments. The bank failures have been none too rare in the history of banking all the world over. Thus, in the interest of stability it is necessary to have check on the power of a bank to create credit. But even if there were no risks of bank failure—as would happen when all the banks are simultaneously expanding deposits—the aggregate of currency is expanding and banks are carrying on their business with judicious care, it would still be necessary to safeguard the economic system against a continuous expansion of bank credit. The need for putting a limit on the expansion of credit and through it controlling the total supply of money arises due to the fact that an increase in the supply of money, unaccompanied by an increase in total output may lead to inflation, i.e., a rise in the general price level. The adverse effects of inflation on the distribution of incomes have been hinted at in section 2 above.