

## 16.1 Introduction

In simple terms, national income is the money value of goods and services produced in an economy within a given period of time. In economics, national income is defined by taking three viewpoints, namely production viewpoint, income viewpoint, and expenditure viewpoint. In production viewpoint, national income can be defined as the sum of money value of final goods and services produced for consumption in society during a particular time period. According to income viewpoint, national income is the sum of factor income earned by the residents of a country in the form of rents, wages, interest, and other sources of income within a particular period of time. The expenditure viewpoint defines national income as the net flow of output that is transferred from a country's productive system to final consumers. National income constitutes an important part in determining the performance of an economy.

National income is generally measured by using three methods, namely value-added method, income method, and final expenditure method. In value-added method, national income is calculated by measuring the contribution of different sectors in the total output of an economy. In income method, national income is estimated by measuring factor incomes paid out by different sectors of an economy. In final expenditure method, national income is estimated by calculating total expenditure incurred on final consumption and investment.

The chapter begins by explaining the concept of national income and its significance. Further, it elaborates on different concepts of national income, such as gross domestic product, gross national product, net national product, personal income, and transfer payments. Finally, the chapter sheds light on different methods of calculating national income. These methods include value-added method, income method, and final expenditure method.

## 16.2 Concept of National Income

In general terms, national income can be defined as the total money value of goods and services produced by a country in a particular period of time. The duration of this period is usually one year. Some of the management experts have defined national income as follows:

*According to National Committee appointed by the Government of India in 1949, "A national income estimate measures the volume of commodities and services turned out during a given period of time counted without duplication."*

*According to Dr. Alfred Marshall, "labor and capital of a country acting on its natural resources, produce annually a certain net aggregate of commodities, material and immaterial, including services of all kinds. The word net means that from the gross value of the output depreciation of capital must be deducted."*

*According to Pigou, "national income is that part of the objective income of the community including, of course, income derived from abroad, which can be measured in money."*

*According to Prof. Fisher, "national income refers solely to services received by ultimate consumers, whether from material or human environment."*

From the aforementioned definitions, it can be concluded that national income is the aggregate income that is generated from the production of goods and services by using different factors of production, such as labor and land. National income constitutes an important part in the growth of an economy. The significance of national income is explained in the following points:

- Reflects the overall performance of an economy
- Represents the standard of living of people in an economy
- Helps in determining the contribution of different sectors in an economy
- Helps in determining total consumption, saving, and investment in an economy
- Helps in comparing the standard of living with different countries

National income comprises a number of interrelated concepts, such as gross national product, gross domestic product, and net national product. These concepts form the basis of understanding the theory of national income. Let us discuss these concepts in the next sections.

### 16.2.1 Gross National Product

Gross National Product (GNP) is defined as the total market value of all final goods and services produced in a country during a specific period of time, usually one year. It measures the output generated by a country's organizations located domestically or abroad. Therefore, it can be said that national income is the measure of the current output of economic activity of the country. In GNP, the word gross indicates total national product including depreciation. Depreciation indicates a decrease in the value of an asset with time. It is also called consumption of fixed capital.

As we know, during a production process, a good undergoes a series of stages before it is converted as a final good. GNP only includes the market value of final goods, whereas it ignores the value of goods processing in initial and medium stages of the production process. In other words, the sale of final goods is included in GNP, while the sale of intermediate goods is excluded from GNP. This is because the value of intermediate goods is already included in the value of final goods. For example, cloth is a final good, while cotton is an intermediate good used in the production of cloth. In such a case, while measuring the contribution of garment industry in total GNP, the value of cloth is taken into account, while the value of cotton is ignored. This is because the value of cotton is added in the value of cloth while calculating GNP. Therefore, if the value of the cotton is included in GNP, this would lead to double counting and inaccuracy in the estimate of GNP.

## 16.2.2 Gross Domestic Product

Gross Domestic Product (GDP) refers to the market value of final goods and services produced in a country in a given time period. It includes income earned by foreign players locally minus income earned by national players in abroad. GDP shows the standard of living of the country. The term domestic in GDP indicates its relevance within the domestic economic territory. On the other hand, the word gross in GDP indicates the inclusion of depreciation of fixed capital. GDP is calculated at the market price (GDP<sub>mp</sub>), which signifies that the value of production is calculated by multiplying the price that buyers pay and not the price which production units actually receive. The price received by the production units equals market price less indirect taxes. Thus, GDP<sub>mp</sub> indicates that the value of domestic product is undiminished by net indirect taxes.

### EXHIBIT-1

#### Net Indirect Taxes

Net indirect taxes are calculated by subtracting subsidies from indirect taxes. Indirect taxes are those taxes which are incurred on the production of goods and services. For example, customs duty, sales tax, service tax, and entertainment tax. These are called indirect taxes because the responsibility of paying taxes is shifted to consumers from producers. On the other hand, subsidies refer to the financial help given by the government to an organization for producing goods and services or to consumers. It is also called compensation for selling good whose price is fixed by the government, which is below the market price. For example, subsidies are given to encourage exports of goods. Similar to indirect tax, subsidy is also passed to consumers. However, it is beneficial for consumers. For example, the government provides subsidies on cooking gas to consumers. This helps consumers to avail cooking gas at low prices as compared to market price.

GDP is almost similar to GNP; however, there is a significant procedural difference in their calculation. GNP includes the income earned by local players in abroad and excludes the income earned by foreign players in national boundaries. On the other hand, in case of GDP, it is reversed because the income earned by foreign players in national boundaries is added and the income earned by local players in abroad is deducted.

The GNP can be calculated with the help of the following formula:

$$\text{GNP} = \text{GDP} + \text{Net Factor Income from Abroad (NFIA)}$$

From the aforementioned formula, we can calculate GDP as follows:

$$\text{GDP} = \text{GNP} - \text{NFIA}$$

### EXHIBIT-2

#### Net Factor Income from Abroad

NFIA is equal to factor income received by residents from abroad minus factor income paid to non-residents. It can be calculated with the help of the following formula:

$\text{NFIA} = \text{Factor income received by the residents from abroad} - \text{factor income paid by production units located in the economic territory to non-residents}$

Or

$\text{NFIA} = \text{Net compensation of employees from the rest of the world} + \text{net property and entrepreneurial income from the rest of the world.}$

## 16.2.3 Net Domestic Product

Net Domestic Product (NDP) is equal to GDP minus depreciation. GDP indicates the gross availability of final goods, whereas NDP shows the net availability of final goods after deducting depreciation. Therefore, NDP indicates the real picture of an economy's health. A large difference between GDP and NDP indicates the increasing obsolescence of capital goods; whereas a small difference reflects an improvement in the condition of capital goods. NDP can be calculated at market price (NDP<sub>mp</sub>) as well as at factor cost (NDP<sub>fc</sub>).

NDP<sub>mp</sub> refers to the market value of final goods and services produced by all the production units in the domestic territory of a country during a given time period. It excludes depreciation and includes indirect taxes. It is equal to the net value added at market price. NDP<sub>mp</sub> can be calculated as follows:

$NDP_{mp} = GDP_{mp} - \text{depreciation}$

On the other hand,  $NDP_{fc}$  refers to the market value of final goods and services produced by all the production units in the domestic territory of a country during a given time period excluding depreciation and net indirect taxes.  $NDP_{fc}$  is also known as Net Domestic Income (NDI). It can be calculated as follows:

$NDP_{fc} = GDP_{mp} - \text{depreciation} - \text{Net Indirect taxes}$

Or

$NDP_{fc} = NDP_{mp} - \text{Net Indirect Taxes} = NDP_{mp} - \text{Indirect Taxes} + \text{Subsidies}$

#### 16.2.4 Net National Product

Net National Product (NNP) is equal to GNP minus depreciation. It indicates the net output available for the consumption by society where society includes consumers, producers and government. NNP is the actual measure of the national income. If NNP is divided by the population of the country, then it gives per capita income in an economy. Similar to NDP, NNP can also be calculated at market price ( $NNP_{mp}$ ) as well as at factor cost ( $NNP_{fc}$ ).

$NNP_{mp}$  can be defined as the value of contribution by the residents of a country in economic production excluding depreciation but including net indirect taxes. It can be calculated as follows:

$NNP_{mp} = NDP_{mp} + NFIA$

$NNP_{fc}$  is defined as the measure of the factor earnings of the residents of a country, both from economic territory and abroad. Therefore,  $NNP_{fc}$  is equal to national income of country. It can be calculated as follows:

$NNP_{fc} = NDP_{fc} + NFIA$

#### 16.2.5 Personal Income

Personal Income (PI) can be defined as the sum of income actually received by individuals or households from different sources in an economy during a given time period. PI includes income earned through wages, salaries, fees, commissions, dividends, and interests. It also includes transfer income, such as pensions, sickness allowances, and old age benefits. PI can be calculated as follows:

$PI = \text{National Income} - \text{Social Security Contributions} - \text{Corporate Income Taxes} - \text{Undistributed Corporate Profits} + \text{Transfer Payments}$

NNP is also calculated by making some additions to PI, which is as follows:

$NNP = PI + UDP + SPU + RPP$

Where,

$UDP = \text{Undistributed Company Profits}$

$SPU = \text{Surplus of Public Undertakings}$

$RPP = \text{Rentals of Public Properties}$

#### 16.2.6 Disposable Income

Disposable income refers to the part of personal income, which is left after the payment of taxes, such as income tax and property tax, to government. In other words, disposable income can be defined as personal income left for consumption and saving by individuals after the payment of taxes. It is calculated as:

$\text{Disposable Income} = \text{Personal Income} - \text{Personal Taxes}$

Or

$\text{Disposable income} = \text{Consumption} + \text{Saving}$

Disposable income can be saved or consumed by individuals. Here, it should be noted that what remains after saving is personal outlay, which is also called disposable outlay.

Thus,  $\text{Disposable Outlay} = \text{Disposable Income} - \text{Savings}$

#### 16.2.7 Transfer Payments

While measuring national income of a country, all incomes are not considered as factor income payments or receipts. For example, gifts received by employees are not added as remuneration for the work. On the other hand, paying taxes to government is also not considered as factor income payment because there is no such agreement between the government and the producer to exchange goods or services. The producer has to pay taxes, irrespective of whether the government provides services or not. Other examples of transfer payments are donations, charity, scholarships, pocket money, lotteries, and prizes.

A transfer can be defined as a transaction in which the payers provide a good, service, or asset without receiving any good, service or asset in return from the recipient. In simple words, it is a payment without getting any good or service in return. All the types of

## 17.4 Determinants of Income and Employment

In the previous section, you have learned to determine the equilibrium level of income and employment. In the equilibrium position, aggregate demand and aggregate supply are equal to each other. In addition, you have also learned that the theory of employment can be obtained by effective demand. In turn, the effective demand is equivalent to the expenditure made on consumption and investment products. Therefore, an increase in consumption or investment would lead to an increase in the effective demand. As a result, employment in an economy would also increase. Thus, we can say that consumption and investment play a crucial role in determining income and employment.

Keynes has proposed several concepts regarding the consumption and investment that would help in determining income and employment. Keynes has provided a concept called propensity to consume with respect to consumption. In addition, for investment, he has given the concept inducement to invest. The concept of propensity to consume helps in determining consumption expenditure in an economy. On the other hand, inducement to invest helps in determining income with the help of marginal efficiency of capital and rate of interest. Marginal efficiency of capital depends on two factors, namely, expected profit in future and cost of replacing capital goods. If the expected profit rate in future is greater, then the inducement to invest would also be high. In addition, the inducement to invest would also be greater, if the replacement cost of a machinery or equipment is less. On the other hand, if the expected profit rate is same while the rate of interest decreases, then it would lead to an increase in the inducement to invest.

Let us understand the concepts of propensity to consume and inducement to invest in detail in the next sections.

### 17.4.1 Propensity to Consume

Propensity to consume is the part of income spent on the consumption of products and services. It is not referred to the consumption done by an individual, but it is the total consumption of all the individuals in an economy. However, for understanding the consumption pattern of individuals in an economy, the individual consumption pattern would provide valuable information. The consumption pattern also provides an idea about the saving behavior of individuals in an economy as the part of income not consumed represents the saving. Propensity to consume is also termed as consumption function that depends on the aggregate consumption in an economy.

Consumption and consumption function are two different terms. Consumption represents the spending made on the consumption of products and services at the specific income level. However, consumption function or propensity to consume represents the schedule of consumption expenditure at different levels of income. The increase in income would lead to an increase in the consumption expenditure. Therefore, the consumption function provides a relationship between two factors, namely, total consumption expenditure and gross national income.

The consumption rate can be influenced by a number of factors, such as real income of an individual, past savings, and rate of interest. Among these factors, real income is the major factor that affects the consumption rate. This is because past savings of individuals are generally very less in the form of life insurance, provident funds, and fixed deposits. Individuals are not able to take out such savings for immediate consumption purposes. Therefore, past savings have a very small or negligible impact on the consumption of an individual.

In case of rate of interest, an increase in it would make individuals to save more as they would be able to earn more. However, if individuals are saving for a specific purpose and rate of interest rises, then they would save less and get the same amount of return. For example, if individual A wants to get ₹ 110, he is required to save ₹ 100. In case the rate of interest increases to 10%, then he/she would save less than ₹ 100 and can get ₹ 110 after one year.

#### Average and Marginal Propensity to Consume

Average and marginal propensity to consume helps in determining the relationship between income and consumption. Average propensity to consume indicates a relationship between total consumption and total income in a particular time frame. On the other hand, marginal propensity to consume represents an incremental change produced in the consumption rate due to the change in income. The average propensity to consume can be represented as follows:

$$APC = \frac{C}{Y}$$

Where, C = Consumption

Y = Income

Marginal propensity to consume can be expressed as follows:

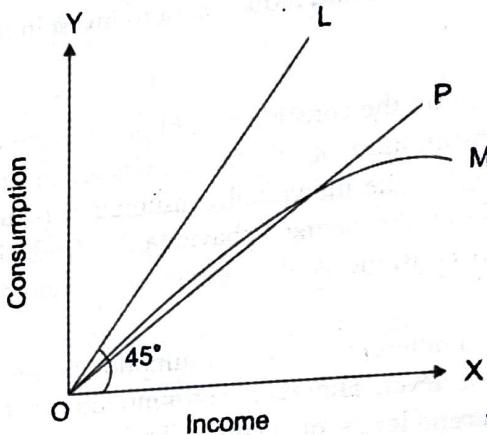
$$MPC = \frac{\Delta C}{\Delta Y}$$

Where,  $\Delta C$  = Incremental change in consumption

$\Delta Y$  = Incremental change in income

100	115	45
150	155	55
200	195	
250		

Figure-4 represents the graphical representation of Table-1:



**Figure-4: Relationship between Income and Consumption**

In Figure-4, line OL, representing an equal distance from X and Y axes, signifies a relationship between income level and consumption rate. It makes an angle of  $45^\circ$  from both the axes. In Figure-4, OP and OM curves also represent the income-consumption relationship; however, they are not alike. If the OP curve moves along with the OL line, then it would show that marginal propensity to consume is equal to one, which is not a real concept. Therefore, income-consumption curve, OP is not drawn at  $45^\circ$  angle. The marginal propensity to consume can be determined by drawing a tangent to the angle produced by the income-consumption curve with the X-axis, which is expressed as follows:

$$MPC = \tan \angle POX$$

The OP curve represents a straight line, which shows that marginal propensity to consume remains constant. However, it is not necessary that the slope of income-consumption curve is always a straight line; it can also be flattened. A flat income-consumption relationship curve shows that with increase in income, the consumption needs are more satisfied. This in turn, increases the savings in an economy. This phenomenon is represented by OM curve, which shows that with the increases in income the marginal propensity to consume decreases.

### Keynes View on Consumption Function

As discussed in previous sections, Keynes has given a number of concepts to determine the income and consumption. Some of the concepts given by Keynes to understand the consumption function are as follows:

- **APC:** Stands for average propensity to consume. The formula used for calculating APC is as follows:

$$APC = \frac{C}{Y}$$

Where, C = Consumption

Y = Income

- **MPC:** Stands for marginal propensity to consume. It represents the percentage change produced in consumption rate due to the percentage change in income. The formula used for calculating MPC is as follows:

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

Where,  $\Delta C$  = Incremental change in consumption

$\Delta Y$  = Incremental change in income

- **APS:** Stands for average propensity to save. The formula used for calculating APS is as follows:

$$APS = \frac{S}{Y}$$

Where, S = Savings

Y = Income

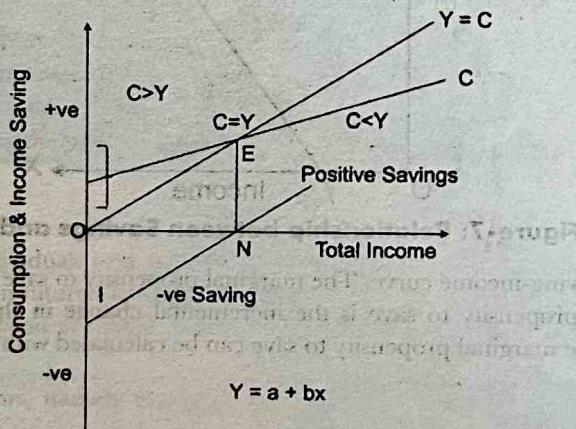
- **MPS:** Stands for marginal propensity to save. It represents the percentage change produced in savings due to the percentage change in income. The formula used for calculating MPS is as follows:

$$MPS = \frac{\Delta S}{\Delta Y}$$

Where,  $\Delta C$  = Incremental change in consumption

$\Delta Y$  = Incremental change in income

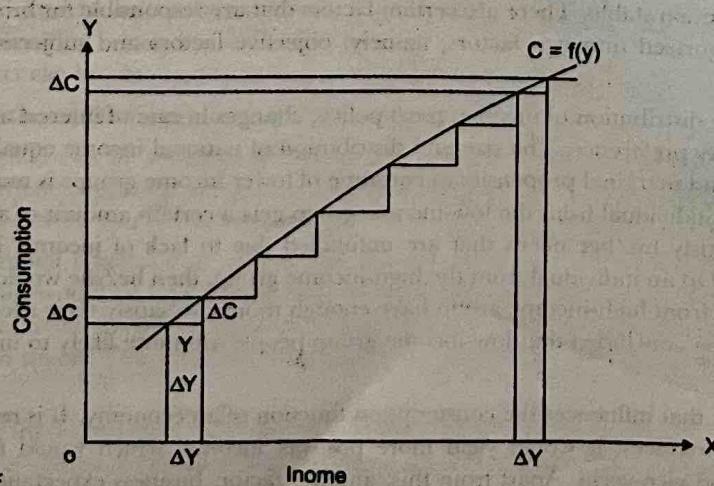
Figure-5 represents a relationship between propensity to consume and propensity to save:



**Figure-5: Relationship between Propensity to Consume and Save**

In Figure-5, C represents the consumption curve at  $45^\circ$  angle in which consumption and income become equal. At point E, C is equal to Y ( $C=Y$ ). Before reaching the point E, C is greater than Y ( $C>Y$ ). It implies that consumption is more than income and savings are negative. Individuals generally utilize their past savings for consumption purposes. However, when C is greater than Y, income is higher, but consumption is less.

According to the Keynes Fundamental Law of Consumption, an increase in income would increase the consumption rate but at a slower pace than the income. In developing countries, the consumption rate is higher than their respective income ( $C>Y$ ). On the other hand, in developed countries, the income is higher and consumption is low ( $C<Y$ ). The Fundamental Law of Consumption is represented graphically in Figure-6:

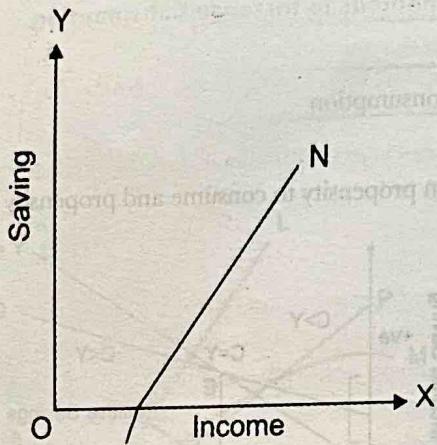


**Figure-6: Consumption Law of Keynes**

In Figure-6, the curve of consumption is represented as  $C = f(y)$ . Initially, MPC is higher, which implies that the change produced in consumption due to the change in income is quite high. Generally, increase in income brings a greater change in the consumption pattern of individuals. However, as shown in Figure-6, when there is a movement in mpc curve at the right side, an increase in income leads to a decrease in consumption rate. Thus, Keynes proved that an increase in income would lead to an increase in consumption rate, but at a slower pace.

### Propensity to Save

The relationship between income and consumption provides information regarding the saving pattern of individuals in an economy. Let us understand the concept of propensity to save by plotting a graph that represents income and savings of individuals in an economy, as shown in Figure-7:



**Figure-7: Relationship between Savings and Income**

In Figure-7, line N represents the saving-income curve. The marginal propensity to save can be determined with the help of the slope of saving-income curve. Marginal propensity to save is the incremental change in the savings produced due to the incremental change in income of individuals. The marginal propensity to save can be calculated with the help of following formula:

$$MPS = \frac{\Delta S}{\Delta Y}$$

It can also be calculated by using the following formula:

$$MPS = 1 - \frac{\Delta C}{\Delta Y}$$

Or,

$$MPS = 1 - MPC$$

### Factors Affecting Consumption Function

When propensity to consume is stable, it does not imply that consumption expenditure would also be constant. The consumption expenditure always changes with change in income. However, consumption changes in a set pattern. In such a case, the change in income produces change in consumption, while keeping the consumption-income schedule constant. However, in the long run, the propensity to consume does not remain stable. There are certain factors that are responsible for bringing changes in the propensity to consume. They are broadly categorized into two factors, namely, objective factors and subjective factors. These two factors are explained as follows:

- **Objective Factors:** Include distribution of income, fiscal policy, changes in rate of interest and business expectations, windfall profits and losses, and liquidity preference. The size and distribution of national income equally affect the consumption pattern of individuals. The average and marginal propensity to consume of lower income groups is more than high income groups in an economy. For example, if an individual from the low-income group gets a certain amount of additional income, say ₹ 100, then he/she would spend it to satisfy his/her needs that are unfulfilled due to lack of income. However, if the same amount of additional income is provided to an individual from the high-income group, then he/she would save it for future. This is because of the reason that individuals from high-income group have enough money to satisfy their needs and do not have an immediate desire to fulfill. Thus, it can be concluded that low-income group people are more likely to involve in consumption while high-income group prefer savings.

Fiscal policy is another factor that influences the consumption function of an economy. It is related to the taxation schemes of a government. If the tax rate reduces, it would yield more post-tax income, which would further increase the consumption expenditure of individuals and vice-versa. Apart from this, another factor, business expectations also play an important role in determining the income-consumption relationship or consumption function by affecting the income of some classes of individuals. The windfall profits and losses bring changes in the savings of individuals more than their consumption patterns.

Therefore, the effect of business expectations on consumption function is less. Similarly, when an individual keeps income in liquid form, it would reduce their consumption, thus, hardly affects the consumption function.

**Subjective Factors:** Involve the behavior pattern of individuals and organizations in determining the consumption function. According to Keynes, these are the major factors that directly affect the consumption function. Individuals save or consume their income according to their desires and requirements. There are various factors that encourage individuals to save some part of their income for future use. These factors can be children education, daughters' marriage, illness and unemployment in future, comfortable life at the old age, and providing a better life to successors. On the other hand, organizations require savings for expanding their business, having financial support against depreciation and obsolescence, and coping with natural calamities.

#### **EXHIBIT-2**

#### **Methods to Increase Consumption**

Consumption is a major factor for determining income and employment. Therefore, to increase income and employment in an economy, it is required to increase the consumption rate. Some of the methods for increasing consumption in an economy are as follows:

- **Redistribution of the national income:** Helps in bringing all individuals at same income level. This further helps in keeping the rate of saving and consumption equal to each other.
- **Formulation of policies:** Includes financial support in the form of pension, insurance policies, and free education for people belonging to low-income group. This helps in increasing the standard of living.
- **Promotion of new ventures:** Helps in encouraging new entrepreneurs by providing them credit on easy terms. This further helps in inducing the level of investment in the country.
- **Reduction in taxes:** Helps in increasing the post-tax income, which further increases the level of consumption and investment.

#### **17.4.2 Inducement to Invest**

Inducement to invest means encouraging individuals and organizations for investment. Public organizations invest in projects that would yield them high profit immediately or in future. According to **Dillard**, "The inducement to invest is determined in Keynes' analysis by the businessmen's estimation of the profitability of investment in relation to the rate of interest on money for investment. The expected profitability of new investment is called the marginal efficiency of capital."

Inducement to invest is affected by two factors, namely marginal efficiency of capital and rate of interest. These two factors are explained as follows:

- **Marginal Efficiency of Capital:** Indicates the profit that can be derived by employing an additional unit of capital. The sources of investment for an investor are either his/her own saving or borrowed funds. In case the investor is utilizing his/her own savings, then he/she not only has to bear the risk, but also has to lose the interest that he/she can earn on savings. Likewise, if the investor is borrowing funds, then he/she needs to pay interest to the creditors as well as need to go through risks. Therefore, an investor would only invest when the expected income on investment is more than the rate of interest. Keynes has termed the expected income on investment as marginal efficiency of capital. Inducement to investment can be determined by taking the difference of marginal efficiency of capital and rate of interest. When the difference between the marginal efficiency of capital and rate of interest is greater or marginal efficiency of capital is greater than the rate of interest, then the inducement to investment is also high. Marginal efficiency of capital is dependent on the following factors:

⇒ **Prospective Yield:** Refers to the income derived from an asset, such as machinery and plant, in its life span. Net income of an asset can be determined by taking the difference between the total output and cost incurred on the asset in a year. Prospective yield of an asset can be obtained by taking an aggregate of the net income of every year throughout its life span.

⇒ **Supply Price:** Refers to the replacement cost of a fixed asset, such as machines.

Marginal efficiency of capital can be obtained by taking the difference between the prospective yield and supply price. However, supply price remains constant every time; therefore, the marginal efficiency of capital is more influenced by prospective yield as it varies every year due to long and short term expectations of organizations.

Apart from this, the marginal efficiency of capital can also be influenced by behavior of individuals. For example, if investors are optimistic, they would be keen to take risks, which would further result in increase in the marginal efficiency of capital and inducement to invest. However, pessimistic approach of investors leads to a decrease in marginal efficiency of capital and inducement to invest. This generally happens in the depression period when people resist to invest even at a lower interest rate.

- **Rate of Interest:** Influences the inducement to invest to a larger extent. There can be two types of interest rates associated with the investment. One rate of interest is that in which the investor needs to pay a fixed amount of interest to the creditor from whom he/she had borrowed for making investment. Another rate of interest is that in which the investor earns interest on his/her own savings by buying government bonds and fixed deposits.

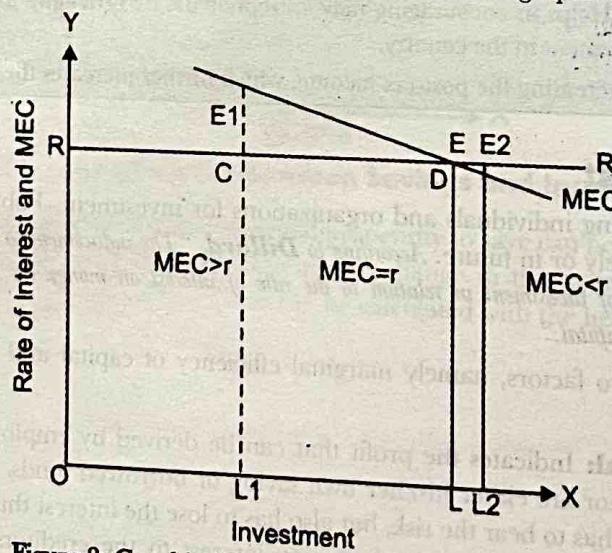
Keynes has defined rate of interest that can be obtained by both supply and demand of money that he further termed as liquidity preference. In short-run, the supply of money does not vary. Therefore, rate of interest is mainly affected by demand of money. According to Keynes, "Interest is the reward for parting with liquidity." In other words, an increase in the rate of interest would decrease the liquidity preferences and vice versa. The rate of interest is also dependent on liquidity preference. When the liquidity preference is more, then rate of interest is also high and a lower liquidity preference would result in low rate of interest.

While making investments, it is required to compare the marginal efficiency of capital (MEC) and rate of interest ( $r$ ) to determine the actual profit that can be obtained by investing. The investor would invest till the time marginal efficiency of capital becomes equal to rate of interest. When the marginal efficiency of capital is greater than rate of interest, then the investor would invest more. On the other hand, when the marginal efficiency of capital is less than rate of interest, then the inducement to invest would be nil. This is summarized in Table-2:

**Table-2: Behavior of Investor According to Condition**

Condition	Effect on Investor
$MEC > r$	Investment
$MEC = r$	Break-even point
$MEC < r$	No Investment

The relationship between marginal efficiency of capital and investor behavior is graphically shown in Figure-8:



**Figure-8: Graphical Representation of Investor Behavior**

In Figure-8, RR curve denotes the rate of interest while MEC curve shows the marginal efficiency of capital. Let us assume that rate of interest remains fixed at OR level and RR is the fixed rate of interest. At the investment level of OL<sub>1</sub>, MEC (E<sub>1</sub>L<sub>1</sub>) is greater than r (OR). Therefore, in such a case, investors would invest more and the investment level would reach to OL level. At OL level of investment, MEC (EL) is equal to r (OR). After that, the investor would not have any inducement to invest. In case, the investor invests further, then MEC (E<sub>2</sub>L<sub>2</sub>) would be lower than r (OR), then investor needs to incur losses.



### Case Study-1: Employment Level of ABC Country

The unemployment rate of ABC country was increasing at a rapid rate for five consecutive years. Therefore, the government of the country was striving to determine the factors affecting the employment rate of the country, so that it could take possible measures for the same. For this, it had started conducting a survey to find out the reasons for the problem. In addition, it had started using various secondary sources for collecting information regarding unemployment in the country. These sources are magazines, newspapers, previous government records, and the Internet. After collecting information, a report was prepared and presented to the concerned government official to take up the required action. According to the report, the consumption rate of the country was very low as well as people were not willing to invest. However, the high-income group was enjoying all comforts. In such a situation, increasing consumption and investment level was only the alternative to increase the level of employment in the country. According to the problems mentioned in the report, the government had taken the following steps to increase the employment level:

- Redistribution of the national income:** Helped in bringing all individuals at a similar level of income.

## 18.1 Introduction

In the preceding chapters, we have discussed the concept and importance of national income. National income refers to the total value of goods and services produced by a country over a period of time, usually one year. In other words, national income can also be defined as the outcome of economic activities of a country. Therefore, it is necessary to measure the national income of a country to determine its economic performance. Measuring national income helps the government to compare the present economic growth of the country with the previous year and formulate appropriate development plans and policies. Apart from this, it enables organizations to forecast the demand of their products and services in future.

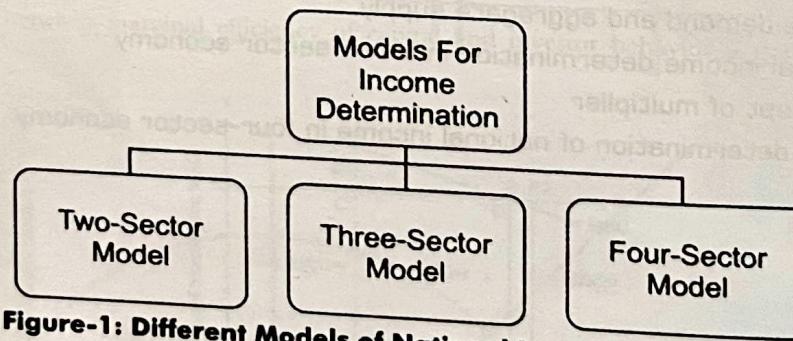
Estimating national income is concerned with two major aspects, namely, factors that determine the national income and the equilibrium level of national income. These two aspects were first discussed by J. M. Keynes in his book *The General Theory of Employment, Interest and Money*. According to Keynes, income can be generated from various sources, such as households, businesses, government, and foreign trades. Therefore, he has developed three models for determining national income. The three models are two-sector model of economy, three-sector model of economy, and four-sector model of economy. The two-sector model of economy comprises households and businesses, whereas three-sector model of economy includes households, businesses, and government. On the other hand, four-sector model of economy is composed of households, businesses, government, and foreign trades.

Apart from this, Keynes has also provided two approaches for determining national income. These two approaches are income-expenditure approach and saving-investment approach. In income-expenditure approach, the equilibrium level of national income can be attained when aggregate demand is equal to aggregate supply of goods and services. On the other hand, in saving-investment approach, the equilibrium level of national income is achieved when savings are equal to investment.

The chapter begins by explaining the Keynesian theory of national income determination. According to Keynesian theory, there are three models of determining the national income. These models are two-sector model, three-sector model, and four-sector model. Further, the chapter elaborates on determining the national income under these three models of an economy. It also details upon approaches given by Keynes for determining national income. Apart from this, the chapter sheds light on various important concepts, such as aggregate supply, aggregate demand, multiplier, export function, and import function, which are used in determining the national income.

## 18.2 Keynesian Theory of National Income Determination

According to Keynes, there can be different sources of national income, such as government, foreign trade, individuals, businesses, and trusts. For determining national income, Keynes had divided the different sources of income into four sectors, namely, household sector, business sector, government sector, and foreign sector. He prepared three models for the determination of national income, which are shown in Figure-1:



**Figure-1: Different Models of National Income Determination**

The two-sector model of economy involves households and businesses only, while three-sector model represents households, businesses, and government. On the other hand, the four-sector model contains households, businesses, government, and foreign sector.

Let us discuss these three types of models of income determination given by Keynes in the next sections.

### 18.2.1 Determination of National Income in Two-Sector Economy

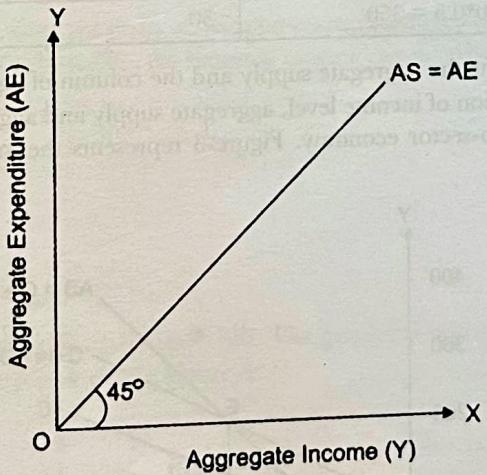
As discussed in the previous section, two-sector economy involves households and businesses. The determination of level of national income in the two-sector economy is based on an assumption that two-sector economy is an economy where there is no intervention of the government and foreign trade. Apart from this, an economy can be a two-sector economy if it satisfies the following assumptions:

- Comprises only two sectors, namely, households and businesses. The households are the owners of factors of production and provide factor services to businesses to earn their livelihood in the form of wages, rents, interest, and profits. In addition, the households are the consumers of final goods and services produced by businesses. On the other hand, businesses purchase factor services from households to produce goods and services and sell it to households.
- Does not have government interference. If government is there, it does not have any role to play in the economic activity of a country. For example, in the two-sector economy, the government is not involved in activities, such as taxation, expenditure, and consumption.
- Comprises a closed economy in which the foreign trade does not exist. In other words, import and export services are absent in such an economy.
- Contains no profit that is undistributed or savings by the organization. In other words, the profit earned by an organization is completely distributed in the form of dividends among shareholders.
- Keeps the prices of goods and services, supply of factors of production, and production technique constant throughout the life cycle of organization.

Keynes believed that there are two major factors that determine the national income of a country. These two factors are Aggregate Supply (AS) and Aggregate Demand (AD) of goods and services. In addition, he believed that the equilibrium level of national income can be estimated when  $AD = AS$ . Before representing the relationship between AS and AD on a graph, let us understand these two concepts in detail in the next section.

### Aggregate Supply

AS can be defined as total value of goods and services produced and supplied at a particular point of time. It comprises consumer goods as well as producer goods. When goods and services produced at a particular point of time is multiplied by the respective prices of goods and services, it provides the total value of the national output. The national output is the aggregate supply in the form of money value. The Keynesian AS curve is drawn based on an assumption that total income is equal to total expenditure. In other words, the total income earned is fully spent on different types of goods and services. The correlation between income and expenditure is represented by an angle of  $45^\circ$ , as shown in Figure-2:



**Figure-2: Aggregate Supply Curve**

According to Keynes theory of national income determination, the aggregate income is always equal to consumption and savings. The formula used for aggregate income determination:

$$\text{Aggregate Income} = \text{Consumption}(C) + \text{Saving}(S)$$

Therefore, the AS schedule is usually called C + S schedule. The AS curve is also named as Aggregate Expenditure (AE) curve.

### Aggregate Demand

AD refers to the effective demand that is equal to the actual expenditure. Aggregate effective demand refers to the aggregate expenditure of an economy in a specific time frame. AD involves two concepts, namely, AD for consumer goods or consumption (C) and aggregate demand for capital goods or investment (I). Therefore, the AD can be represented by the following formula:

$$AD = C + I$$

Therefore, AD schedule is also termed as C+I schedule. According to Keynes theory of national income determination, in short-run, investment (I) remains constant throughout the AD schedule, while consumption (C) keeps on changing. Therefore, consumption (C) acts as the major determinant or function of income (Y). The consumption function can be expressed as follows:

$$C = a + bY$$

Where,  $a$  = constant (representing consumption when income is zero)

$$b = \text{proportion of income consumed} = \frac{\Delta C}{\Delta Y}$$

By substituting the value of consumption in the equation of AD, we get:

$$AD = a + bY + I$$

Let us prepare an AD schedule by assuming that the investment is ₹ 50 billion and consumption function of a product is:

$$C = 50 + 0.5Y$$

Therefore, aggregate demand would be:

$$AD = a + bY + I$$

$$AD = 50 + 0.5Y + 50$$

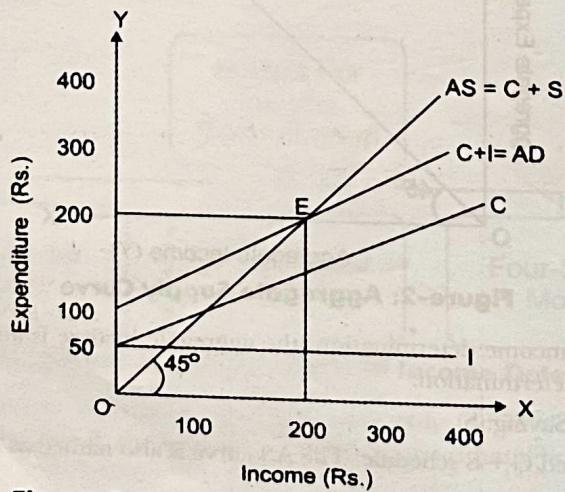
$$AD = 100 + 0.5Y$$

The aggregate demand schedule at different income levels is represented in Table-1:

**Table-1: Aggregate Demand Schedule**

Income (Y)	$C = 50 + 0.5Y$	$I = 50$	Aggregate Demand = $C + I$
0	$50 + 0*0.5 = 50$	50	100
50	$50 + 50*0.5 = 75$	50	125
100	$50 + 100*0.5 = 100$	50	150
200	$50 + 200*0.5 = 150$	50	200
300	$50 + 300*0.5 = 200$	50	250
400	$50 + 400*0.5 = 250$	50	300
500	$50 + 500*0.5 = 300$	50	350
600	$50 + 600*0.5 = 350$	50	400

In Table-1, the column of income represents the aggregate supply and the column of aggregate demand represents expenditure. In Table-1, it can be noticed that at ₹ 200 billion of income level, aggregate supply and aggregate demand are equal. Therefore, ₹ 200 billion is the equilibrium point for the two-sector economy. Figure-3 represents the graphical representation of national income determination in the two-sector economy:



**Figure-3: National Income Determination**

In Figure-3, while drawing AS schedule it is assumed that the total income and total expenditure are equal. Therefore, the numerical value of AS schedule is one. AD schedule is prepared by adding the schedule of  $C$  and  $I$ . The aggregate demand and aggregate supply intersect each other at point E, which is termed as equilibrium point. The income level at point E is ₹ 200 billion, which represents the national income of the economy. The schedule curve after point E represents that the AS is greater than AD ( $AS > AD$ ). In such a situation, the products and services are costing more than ₹ 200 billion; therefore, households are not willing to buy them. Therefore, the supply of products and services exceeds their demand. As a result, businesses would have a pile of unsold stocks. For example, in Table-1, when the income or aggregate supply is at ₹ 300 then the aggregate demand or expenditure

is ₹ 250, which is less than the aggregate supply. Similarly, beneath point E, the AD and AS schedules represent that the aggregate demand is more than aggregate supply. In such a case, the production by businesses is less than the demand of households. Therefore, businesses start producing more and more products and services. For example, in Table-1, when the income or aggregate supply is ₹ 100 then the aggregate demand is ₹ 150, which is more than the aggregate supply.

The equilibrium condition of national income determination can be expressed as follows:

$$\text{Aggregate demand} = \text{Aggregate supply}$$

$$C + I = C + S$$

$$\text{Therefore, } I = S$$

Thus, the national income can be determined by using either aggregate demand and aggregate supply schedules or investment and savings schedules. These two methods of income determination are classified as income-expenditure approach and saving-investment approach. Let us learn about these two approaches in detail in the next sections.

### Income-Expenditure Approach

Income-expenditure approach refers to the method in which the aggregate demand and aggregate supply schedules are used for the determination of national income. In this method, the equilibrium point is achieved when the following condition is satisfied:

$$C + I = C + S$$

As,  $C + S = Y$ , therefore, the equilibrium condition of national income determination would become:

$$Y = C + I$$

At equilibrium point, the consumption is equal to:

$$C = a + bY$$

Substituting the value of C in the national income equilibrium condition, we get:

$$Y = a + bY + I$$

$$\text{Or, } Y(1 - b) = a + I$$

$$\text{Thus, } Y = \frac{1}{1-b}(a + I)$$

For the determination of national income with the help of income-expenditure approach, let us assume that the consumption function is  $C = 200 + 0.50Y$  and  $I = 150$ . In such a case, the national income can be calculated as follows:

$$Y = C + I$$

$$Y = 200 + 0.50Y + 150$$

$$Y = \frac{1}{1-0.50}(200 + 150)$$

$$Y = \frac{1}{0.50}(350)$$

$$Y = 700$$

Therefore, the national income equilibrium in this case is at ₹ 700. The graphical representation of national income determination with the help of income-expenditure approach is shown in Figure-4:

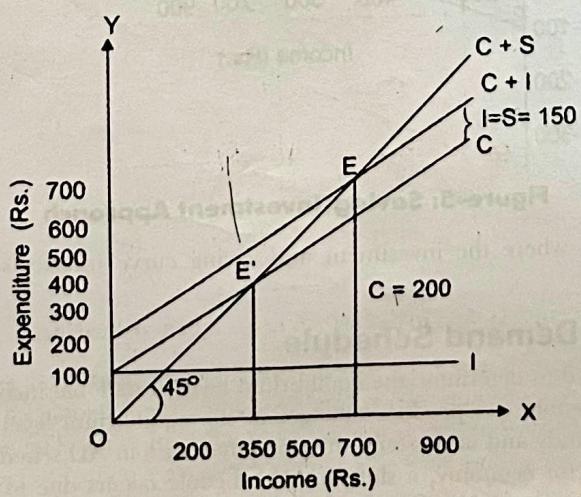


Figure-4: Income-Expenditure Approach

In Figure-4, the schedule of  $C + S$  shows the aggregate supply of income while the  $C + I$  schedule denotes the aggregate demand. Aggregate demand schedule is drawn by adding  $C$  and  $I$  schedules. Aggregate demand and aggregate supply schedule intersect each other at point E and the income level at this point is ₹ 700. This implies that the national income in the two-sector economy is ₹ 700. In short-run, the equilibrium point remains constant that is the level of national income remains constant. If there is any type of increase or decrease in the aggregate supply/demand, then they themselves fluctuate in a manner, so that they reach back at the equilibrium point.

### Saving-Investment Approach

Saving-investment approach refers to the method in which the saving ( $S$ ) and investment ( $I$ ) are used for the determination of national income. The condition for achieving equilibrium with the help of saving-investment approach is that the saving and investment are equal ( $I = S$ ). Let us take the previous assumption that consumption function is equal to  $C = 200 + 0.50 Y$  and  $I = 150$  for the determination of national income by using the saving-investment approach. In such a case, the saving function can be determined as follows:

$$Y = C + S$$

$$Or,$$

$$S = Y - C$$

$$S = Y - (a + bY)$$

$$S = Y - a - bY$$

$$S = -a + (1 - b)Y$$

Therefore, in the present case, the saving function would be:

$$S = -200 + (1 - 0.50)Y$$

$$S = -200 + 0.50Y$$

At equilibrium point  $I = S$ , therefore, the national income equilibrium would be:

$$150 = -200 + 0.50Y$$

$$Y = 700$$

The national income level at equilibrium point is same in both the cases, income-expenditure approach and saving-investment approach. Figure-5 provides a graphical representation of national income determination by using the saving-investment approach:

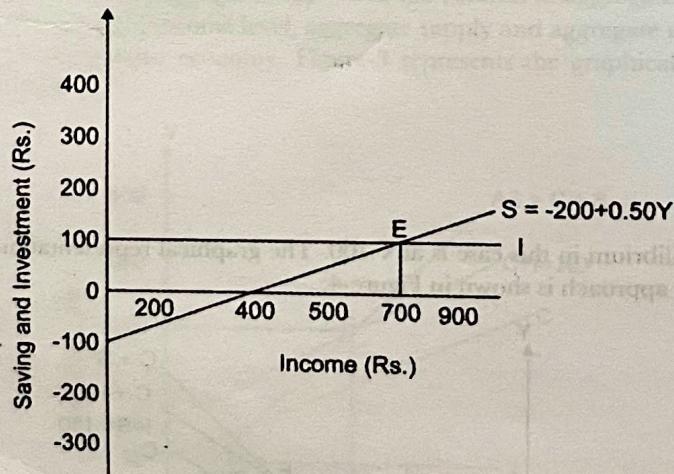


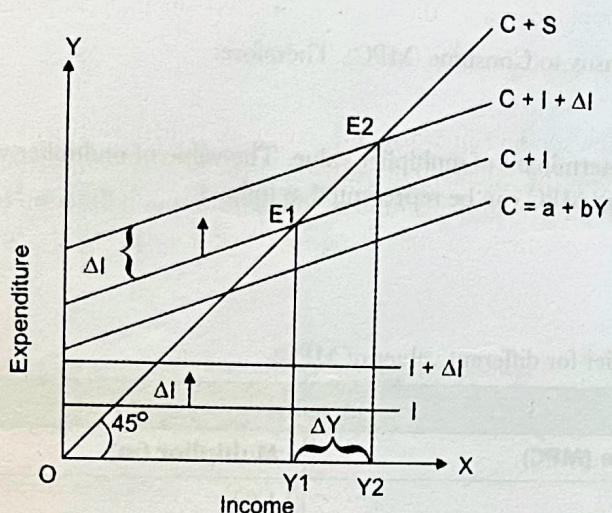
Figure-5: Saving-Investment Approach

In Figure-5, equilibrium point is at E where the investment and saving curve intersects each other. The national income at equilibrium level is ₹ 700.

### 18.2.2 Shifts in Aggregate Demand Schedule

In the previous section, you have learned to determine the equilibrium level of national income under a given AD schedule that is  $C+I$ . A shift in aggregate demand schedule can produce changes in the equilibrium level of national income in the two-sector economy. Therefore, it is necessary to study and understand the shifts that arise in AD schedule and determine measures to get the equilibrium position back. In a two-sector economy, a shift in AD schedule occurs due to a shift in consumption or investment schedule or in both, simultaneously. However, shifts in consumption schedule are very rare as it is an income function, whereas investment schedule can fluctuate because of autonomous factors, such as risks and individual perceptions. Therefore, the shift in AD schedule is because of the shifts in investment schedule.

For understanding the impact of shift in AD schedule on equilibrium point, let us assume that the AD schedule is showing an upward shift due to a permanent upward shift in the investment schedule. The investment schedule is shifting due to the autonomous investment in some venture. As a result, the equilibrium point also shifts in the upward direction and the national income also increases. Figure-6 demonstrates the shift in national income due to shift in equilibrium point and AD schedule:



**Figure-6: Shifts in Aggregate Demand Function and National Income**

In Figure-6,  $C + I$  schedule represents the initial AD schedule. The initial equilibrium is at point  $E_1$  where  $C+S$  schedule or AS schedule intersects AD schedule and the level of national income is  $Y_1$ . Suppose investment increases, which leads to a movement in the investment schedule from  $I$  to  $I + \Delta I$ , showing an upward shift. Consequently, the AD schedule also moves from  $C + I$  to  $C + I + \Delta I$ . With the shift in AD schedule, the equilibrium point reaches to  $E_2$  and level of national income reaches to  $Y_2$ . The increase in national income can be calculated as follows:

$$\Delta Y = Y_2 - Y_1$$

The national income increases due to increase in the investment. Let us determine the relationship between change in national income ( $\Delta Y$ ) and change in investment ( $\Delta I$ ) by understanding the concept of multiplier in the next section.

### Concept of Multiplier

The concept of multiplier can be understood by determining the relationship between change in national income ( $\Delta Y$ ) and change in investment ( $\Delta I$ ). According to Figure-6, at equilibrium point  $E_1$ , the national income is as follows:

$$Y_1 = C + I$$

The consumption is equal to:

$$C = a + bY$$

By substituting the value of  $C$  in the equation of national income at point  $E_1$ , we get:

$$Y_1 = a + bY_1 + I$$

$$Y_1 = \frac{1}{1-b}(a + I)$$

Similarly, at equilibrium point  $E_2$ , the national income would be:

$$Y_2 = C + I + \Delta I$$

$$Y_2 = a + bY_2 + I + \Delta I$$

$$Y_2 = \frac{1}{1-b}(a + I + \Delta I)$$

By subtracting  $Y_1$  from  $Y_2$ , we get:

$$\Delta Y = \frac{1}{1-b}(a + I + \Delta I) - Y_1 = \frac{1}{1-b}(a + I)$$

$$\Delta Y = \frac{1}{1-b} \Delta I$$

The preceding equation of  $\Delta Y$  determines the relationship between  $\Delta Y$  and  $\Delta I$ . It implies that  $\Delta Y$  is  $1/(1-b)$  times of  $\Delta I$  and  $1/(1-b)$  is termed as multiplier ( $m$ ). The formula used for calculating multiplier is as follows:

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1-b}$$

$$\text{So, } m = \frac{1}{1-b}$$

In mathematical terms, the multiplier is defined as the ratio of change in national income that occurs due to change in investment. It is also termed as investment multiplier because change produced in national income is due to change in investment.

As discussed earlier that  $b$  can be calculated with the help of the following formula:

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

This is the equation of Marginal Propensity to Consume (MPC). Therefore:

$$MPC = b = \frac{\Delta C}{\Delta Y}$$

Thus, it can be said that MPC is the determinant of multiplier value. The value of multiplier would be higher if the value of MPC is greater. The relationship between  $m$  and MPC can be represented as follows:

$$m = \frac{1}{1-b}$$

$$m = \frac{1}{1-MPC}$$

Table-2 represents the value of multiplier for different values of MPC:

**Table-2: MPC and Multiplier**

Marginal Propensity to Consume (MPC)	Multiplier (m)
0.00	1.00
0.10	1.11
0.20	1.25
0.30	1.43
0.40	1.67

Multiplier can also be calculated with the help of Marginal Propensity to Save (MPS). In the previous chapter, you have learned that  $MPS = 1 - MPC$ . So, the formula for calculating multiplier with the help of MPS is as follows:

$$m = \frac{1}{MPS} = \frac{1}{1-MPC}$$

Therefore, multiplier can also be termed as the reciprocal of MPS.

The multiplier can be of two types on the basis of its application. The two types of multiplier are explained in the following points:

- **Static Multiplier:** Refers to a multiplier in which it is assumed that the change in investment and income are simultaneous. There is no time lag between change in investment with respect to change in income. For example, in Figure-6, the shift in the equilibrium position from  $E_1$  to  $E_2$  is the result of change in investment ( $\Delta I$ ) without any time lag. In case of static multiplier, when the equilibrium position shifts from one point to another, the aggregate MPC does not show any change. In addition, it is also assumed that the consumer tastes and preferences and income distribution remains constant. It is also called comparative static multiplier, simultaneous multiplier, logical multiplier, timeless multiplier, and lagless multiplier.

- **Dynamic Multiplier:** Refers to the multiplier that analyzes the movement of equilibrium position from one point to another. In a logical sense, there is a time gap between an increase in income with the corresponding increase in autonomous investment. The income cannot rise immediately when an autonomous investment is made because there is always a time lag in increase in income and consumption expenditure. Let us understand the process of dynamic multiplier with the help of an example. Suppose the autonomous investment increases by ₹ 100 and MPC is equal to 0.8, with no expenditure, except consumption expenditure. The increase in investment would result in the equal increase of income, which is described as follows:

$$\Delta I = 100 = \Delta y_1$$

When the income of individuals increases to ₹ 100, the consumption expenditure will increase by ₹ 80. This is because MPC is 0.8, so the increase in income will lead to an increase in consumption expenditure.