CHAPTER – 6
DETERMINATION OF NATIONAL INCOME

UNIT – I
NATIONAL INCOME ACCOUNTING

INTRODUCTION

The performance of an economy depends on the output of goods and services produced by it. Just as there are accounting conventions which measure the performance of business, there are conventions for measuring and analyzing the economic performance of a nation. National Income Accounting, pioneered by the Nobel prize-winning economists Simon Kuznets and Richard Stone, is one such measure. National income is an important macroeconomic aggregate forming the basis of modern macroeconomic analysis and provides detailed measures of the value and composition of national output and incomes generated in the production of that output.

National Income is defined as the net value of all economic goods and services produced within the domestic territory of a country in an accounting year plus the net factor income from abroad. According to the Central Statistical Organisation (CSO) 'National income is the sum total of factor incomes generated by the normal residents of a country in the form of wages, rent, interest and profit in an accounting year'.

Quick Notes

Feel free to note your thought.....

TOPIC - 1
MEANING OF NATIONAL INCOME

QUIZ!

Question 1

National income estimates in India are prepared by:

   a) **Central Statistical Organization**   b) **Ministry of Finance**
   c) **National Development Council**   d) **Planning Commissi**

Answer: 1(a)

USEFULNESS AND SIGNIFICANCE OF NATIONAL INCOME ESTIMATES

National income accounts are fundamental aggregate statistics in macroeconomic analysis and are extremely useful, especially for the emerging and transition economies.

1. _Comprehensive, conceptual and accounting framework_

   National income accounts provide a comprehensive, conceptual and accounting framework for analyzing and evaluating the short-run performance of an economy. The level of national income indicates the level of economic activity and economic development as well as aggregate demand for goods and services of a country.

2. _Distribution patterns_

   The distribution pattern of national income determines the pattern of demand for goods and services and enables businesses to forecast the future demand for their products.

3.Economic welfare

Economic welfare depends to a considerable extent on the magnitude and distribution of national income, size of per capita income and the growth of these over time.
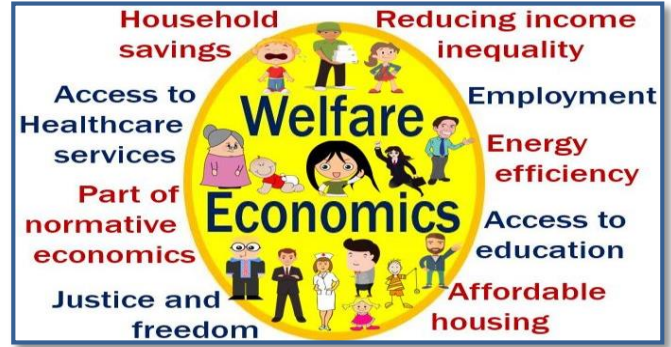
### 4.Composition and structure of national income in terms of different sectors

The estimates of national income show the composition and structure of national income in terms of different sectors of the economy, the periodical variations in them and the broad sect oral shifts in an economy over time. It is also possible to make temporal and spatial comparisons of the trend and speed of economic progress and development. Using this information, the government can fix various sector-specific development targets for different sectors of the economy and formulate suitable development plans and policies to increase growth rates.
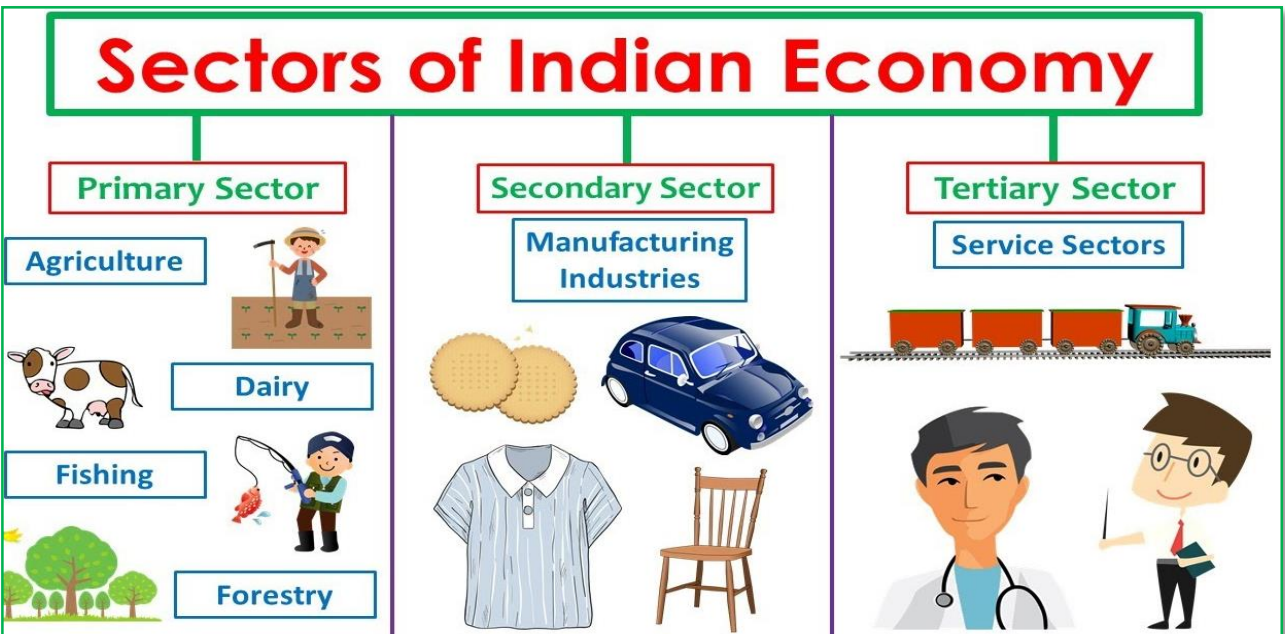
5Quantitative basis

National income statistics also provide a quantitative basis for macroeconomic modeling and analysis, for assessing and choosing economic policies and for objective statement as well as evaluation of governments' economic policies. These figures often influence popular and political judgments about the relative success of economic programmes.
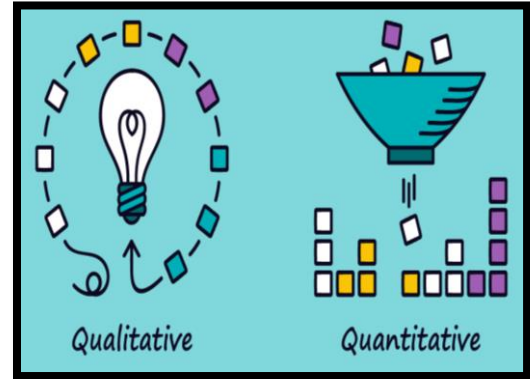
6.Income distribution and the possible inequality

National income estimates throw light on income distribution and the possible inequality in the distribution among different categories of income earners. It is also possible to make comparisons of structural statistics, such as ratios of investment, taxes, or government expenditures to GDP.

7.International comparison

International comparisons in respect of incomes and living standards assist in determining eligibility for loans, and/or other funds or conditions under which such loans, and/ or funds are made available. The national income data are also useful to determine the share of nation's contributions to various international bodies.

8.Policy formation

Combined with financial and monetary data, national income data provides a guide to make policies for growth and inflation.

9.Forecasting

National income or a relevant component of it is an indispensable variable considered in economic forecasting and to make projections about the future development trends of the economy.

DIFFERENT CONCEPTS OF NATIONAL INCOME

The basic concepts and definitions of the terms used in national accounts largely follow those given in the UN System of National Accounts (SNA) developed by United Nations to provide a comprehensive, conceptual and accounting framework for compiling and reporting macroeconomic statistics for analysing and evaluating the performance of an economy. Each of these concepts has a specific meaning, use and method of measurement.

National income accounts have three sides: a product side, an expenditure side and an income side.

The product side measures production based on concept of value added. The expenditure side looks at the final sales of goods and services, whereas the income side measures the distribution of the proceeds from sales to different factors of production. Accordingly, national income is a measure of the total flow of 'earnings of the factor-owners' which they receive through the production of goods and services. Thus,

national income is the sum total of all the incomes accruing over a specified period to the residents of a country and consists of wages, salaries, profits, rent and interest.

On the product side there are two widely reported measures of overall production namely, Gross Domestic Product (GDP) and Gross National Product (GNP).

GROSS DOMESTIC PRODUCT (GDP $_{MP}$)

Gross domestic product (GDP) is a measure of the market value of all final economic goods and services, gross of depreciation, produced within the domestic territory of a country during a given time period. It is the sum total of 'value added' by all producing units in the domestic territory and includes value added by current production by foreign residents or foreign-owned firms. The term 'gross' implies that GDP is measured 'gross' of depreciation.' Domestic' refers to 'the geographic confines' of a country. For example, if a Chinese citizen works temporarily in India, her production is part of the Indian GDP. If an Indian citizen owns a factory in another country, for e.g. Germany, the production at her factory is not part of India's GDP. However, GDP excludes transfer payments, financial transactions and non-reported output generated through illegal transactions such as narcotics and gambling.

Gross Domestic Product (GDP) is in fact Gross Domestic Product at market prices (GDP MP) because the value of goods and services is determined by the common measuring unit of money or it is evaluated at market prices. Money enables us to measure and find the aggregate of different types of products expressed in different units of measurement by converting them in terms of Rupees, say tonnes of wheat may, thus, be added with millions of apples and with value of services such as airplane journeys.

> GDP_{MP} = Value of Output in the Domestic Territory – Value of Intermediate Consumption
>
> GDP_{MP} = $\sum$ Value Added

While learning about national income, there are a few important points which one needs to bear in mind:

(i) The value of only final goods and services or only the value added by the production process would be included in GDP. Final goods refer to those goods which are used either for consumption or for investment. They are neither resold nor undergo further transformation in the process of production. The distinction between intermediate goods and final goods is made on the basis of end use: if the good is for consumption or investment, then it is a final good. By 'value added' we mean the difference between value of output and purchase of intermediate goods. Value added represents the contribution of labour and capital to the production process.

(ii) Intermediate goods refer to those goods which are used either for resale or for further production in the same year. They do not end up in final consumption, and are not capital goods either. The intermediate goods or services may be either transformed or used up by the production process. They have derived demand. Intermediate goods are used up in the same year; if they remain for more than one year, then they are treated as final goods. Intermediate consumption consists of the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital. Intermediate goods

used to produce other goods rather than being sold to final purchasers are not counted as it would involve double counting. The intermediate goods or services may be either transformed or used up by the production process. For example, the value of flour used in making bread would not be counted as it will be included while bread is counted. This is because flour is an intermediate good in bread making process. Similarly, if we include the value of an automobile in GDP, we should not be including the value of the tyres separately.

(iii) Gross Domestic Product (GDP) is a measure of production activity. GDP covers all production activities recognized by SNA called the 'production boundary'. The production boundary covers production of almost all goods and services classified in the National Industrial Classification (NIC). Production of agriculture, forestry and fishing which are used for own consumption of producers is also included in the production boundary. Thus, Gross Domestic Product (GDP) of any nation represents the sum total of gross value added (GVA) (i.e, without discounting for capital consumption or depreciation) in all the sectors of that economy during the said year.

(iv) Economic activities, as distinguished from non-economic activities, include all human activities which create goods and services that are exchanged in a market and valued at market price. Non-economic activities are those which produce goods and services, but since these are not exchanged in a market transaction they do not command any market value; for e.g. hobbies, housekeeping and child rearing services of home makers and services of family members that are done out of love and affection.

(v) National income is a 'flow' measure of output per time period—for example, per year—and includes only those goods and services produced in the current period i.e. produced during the time interval under consideration. The value of market transactions such as exchange of goods which already exist or are previously produced, do not enter into the calculation of national income. Therefore, the value of assets such as stocks and bonds which are exchanged during the pertinent period are not included in national income as these do not directly involve current production of goods and services. However, the value of services that accompany the sale and purchase (e.g. fees paid to real estate agents and lawyers) represent current production and, therefore, is included in national income.

(vi) An important point to remember is that two types of goods used in the production process are counted in GDP namely, capital goods (business plant and equipment purchases) and inventory investment—the net change in inventories of final goods awaiting sale or of materials used in the production which may be positive or negative. Inventories are treated as capital. Additions to inventory stocks of final goods and materials belong to GDP because they are currently produced output.

The national income in real terms when available by industry of origin, give a measure of the structural changes in the pattern of production in the country which is vital for economic analysis.

NOMINAL GDP VERSES REAL GDP: GDP AT CURRENT AND CONSTANT PRICES

When GDP is estimated on the basis of current year's market prices, it is called 'nominal GDP' or 'GDP at current prices'. For example, GDP of year 2020-21 may be measured using prices of 2020-21. Nominal GDP changes from year to year for two reasons. First, the amount of goods and services produced

changes, and second, market prices change. Changes in GDP due to changes in prices fail to correctly explain the performance of the economy in producing goods and services.

Nominal GDP vs Real GDP

Therefore, for making comparisons of GDP at different points of time, we need to compute real GDP. Real GDP is calculated in such a way that the goods and services produced in a particular year are evaluated at some constant set of prices or constant prices. In other words, it is calculated using the prices of a selected 'base year'. For example, if 2011-12 is selected as the base year, then real GDP for 2020-21 will be calculated by taking the quantities of all goods and services produced in 2020-21 and multiplying them by their 2011-12 prices. Thus, real GDP or GDP at constant prices refers to the total money value of the final goods and services produced within the domestic territory of a country during an accounting year, estimated using base year prices. Real GDP is an inflation- adjusted measure and is not affected by changes in prices; it changes only when there is change in the amount of output produced in the economy. Real GDP is a better measure of economic well being as it shows the true picture of the change in production of an economy.

The calculation of real GDP gives us a useful measure of inflation known as GDP deflator. The GDP deflator is the ratio of nominal GDP in a given year to real GDP of that year.

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

The GDP deflator, as the name implies, can be used to 'deflate' or take inflation out of GDP. In other words, the GDP deflator is a price index used to convert nominal GDP to real GDP

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP Deflator}} \times 100$$

The deflator measures the change in prices that has occurred between the base year and the current year. In other words, it measures the current level of prices relative to the level of prices in the base year. For example, in 2019 if the nominal GDP is 6,000 billion and real GDP is 3,500 billion, the GDP deflator is 171.43. Since nominal GDP and real GDP must be the same in the base year, the deflator for the base year is always 100.

As you know, inflation is a closely monitored aspect of macroeconomic performance and a significant variable guiding macroeconomic policy. Using the GDP deflator, the inflation rate between two consecutive years can be compute using the following procedure:

$$\textbf{Inflation rate in year 2} = \frac{\textbf{GDP deflator in year 2} - \textbf{GDP deflator in year 1}}{\textbf{GDP deflator in year 1}} \times \textbf{100}$$

For example, if the GDP deflator in 2020 increased to 240 from 171 in 2019, Inflation rate in year 2 = $\frac{240-171}{171}$×100 = 40.35 percent
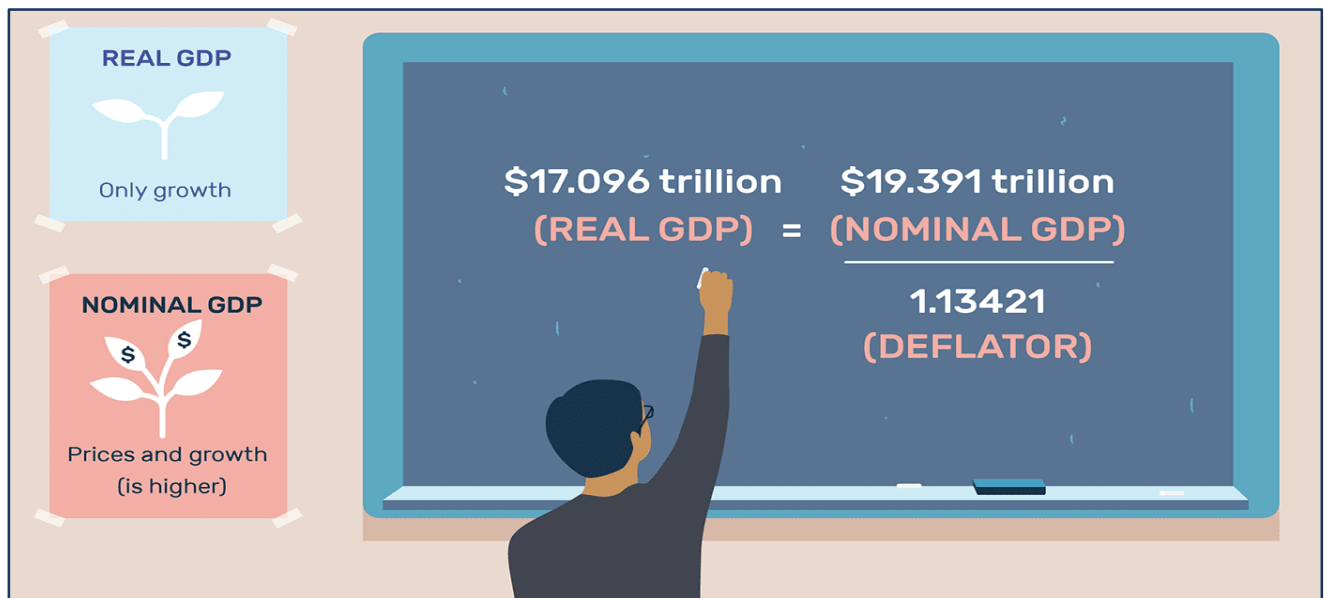
GROSS NATIONAL PRODUCT (GNP)

Gross National Product (GNP) is a measure of the market value of all final economic goods and services, gross of depreciation, produced within the domestic territory of a country by normal residents during an accounting year including net factor incomes from abroad. It is the total income earned by a nation's permanent residents (called nationals). It differs from GDP by including income that our citizens earn abroad and excluding income that foreigners earn here. In the example given in 1.3.1 above, the Chinese citizen's production is part of the Indian GDP, but it is not part of Indian GNP. (It is part of China's GNP).

Gross National Product (GNP) is evaluated at market prices and therefore it is in fact Gross National Product at market prices (GNP MP).

GNP $_{MP}$ = GDP $_{MP}$ +Factor income earned by the domestic factors of production employed in the rest of the world - Factor income earned by the factors of production of the rest of the world employed in the domestic territory.

$$\text{GNP}_{MP} = \text{GDP}_{MP} + \text{Net Factor Income from Abroad}$$

$$\text{GDP}_{MP} = \text{GNP}_{MP} - \text{Net Factor Income from Abroad}$$

NFIA is the difference between the aggregate amount that a country's citizens and companies earn abroad, and the aggregate amount that foreign citizens and overseas companies earn in that country.

$$\text{NFIA = Net compensation of employees + Net income from property and entrepreneurship + Net retained earnings}$$

If Net Factor Income from Abroad is positive, then GNP$_{MP}$ would be greater than GDP$_{MP}$.
You might have noticed that the distinction between 'national' and 'domestic' is net factor income from abroad.

$$\text{National = Domestic + Net Factor Income}$$

The two concepts GDP and GNP differ in their treatment of international transactions. The term 'national' refers to normal residents of a country who may be within or outside the domestic territory of a country and is a broader concept compared to the term 'domestic'. For example, GNP includes earnings of Indian corporations' overseas and Indian residents working overseas; but GDP does not include these. In other words, GDP excludes net factor income from abroad. Conversely, GDP includes earnings from current production in India that accrue to foreign residents or foreign-owned firms; GNP excludes those items. For instance, profits earned in India by X Company, a foreign-owned firm, would be included in GDP but not in GNP. Similarly, profits earned by Company Y, an Indian company in UK would be excluded from GDP, but included in GNP.

NET DOMESTIC PRODUCT AT MARKET PRICE (NDP $_{MP}$)

Net domestic product at market prices (NDP$_{MP}$) is a measure of the market value of all final economic goods and services, produced within the domestic territory of a country by its normal residents and non-residents during an accounting year less depreciation. The portion of the capital stock used up in the process of production or depreciation must be subtracted from final sales because depreciation represents capital consumption and therefore a cost of production.

$$\text{NDP}_{MP} = \text{GDP}_{MP} - \text{Depreciation}$$

As you are aware the basis of distinction between 'gross' and 'net' is depreciation or consumption of fixed capital.

Gross = Net + Depreciation or Net = Gross – Depreciation

NET NATIONAL PRODUCT AT MARKET PRICES (NNP$_{MP}$)

Net National Product at Market Prices (NNP$_{MP}$) is a measure of the market value of all final economic goods and services, produced by normal residents within the domestic territory of a country including Net Factor Income from Abroad during an accounting year excluding depreciation.

NNP $_{MP}$ = GNP $_{MP}$ – Depreciation

NNP $_{MP}$ = NDP $_{MP}$ + Net Factor Income from Abroad

NNP $_{MP}$ = GDP $_{MP}$ + Net Factor Income from Abroad – Depreciation

GROSS DOMESTIC PRODUCT AT FACTOR COST (GDP$_{FC}$)

The production and income approach (which we will discuss later in this unit) measure the domestic product as the cost paid to the factors of production. Therefore, it is known as 'domestic product at factor cost'. GDP at factor cost is called so because it represents the total cost of factors viz. labour capital, land and entrepreneurship.

At this stage, we need to clearly understand the difference between the concepts: 'market price' and 'factor cost.' In addition to factor cost, the market value of the goods and services will include indirect taxes and subsidies such as:
- Production taxes or subsidies that are paid or received in relation to production and are independent of the volume of actual production. Examples of production taxes are land revenues, stamps and registration fees and tax on profession, factory license fee, taxes to be paid to the local authorities, pollution tax etc. Examples of production subsidies are subsidies to railways, subsidies to village and small industries.
- Product taxes or subsidies that are paid or received on per unit of product. Examples of product taxes are excise duties, sales tax, service tax and import export duties. Examples of product subsidies are food, petroleum and fertilizer subsidies.

The market price will be lower by the amount of subsidies on products and production which the government pays to the producer. Hence, the market value of final expenditure would exceed the total obtained at factor cost by the amount of product and production taxes reduced by the value of similar kinds of subsidies. Direct taxes do not have the same effect since they do not impinge directly on transactions but are levied directly on the incomes. For example, if the factor cost of a unit of good X is .50/, indirect taxes amount to `15/per unit and the government gives a subsidy of `.10/per unit, then market price will be `55/- Thus, we find that the basis of distinction between market price and factor cost is net indirect taxes (i.e., Indirect taxes – Subsidies).

> **Market Price = Factor Cost + Net Indirect Taxes**
>
> **= Factor Cost + Indirect Taxes – Subsidies**

> **Factor Cost = Market Price - Net Indirect Taxes**
>
> **= Market Price - Indirect Taxes + Subsidies**

NET DOMESTIC PRODUCT AT FACTOR COST (NDP$_{FC}$)

Net Domestic Product at Factor Cost (NDP$_{FC}$) is defined as the total factor incomes earned by the factors of production. In other words, it is sum of domestic factor incomes or domestic income net of depreciation.

As mentioned above, market price includes indirect taxes imposed by government. We have to deduct indirect taxes and add the subsidies in order to calculate that part of domestic product which actually accrues to the factors of production. The measure that we obtain so is called Net Domestic Product at factor cost.

> **NDP$_{FC}$ = NDP $_{MP}$ – Net Indirect Taxes**
>
> **= Compensation of employees**
>
> **+ Operating Surplus (rent + interest+ profit)**

> **Gross Domestic Product at Factor Cost (GDP$_{FC}$)**
>
> **= GDP $_{MP}$ – Indirect Taxes + Subsidies**
>
> **= Compensation of employees**
>
> **+ Operating Surplus (rent + interest+ profit)**
>
> **+ Mixed Income of Self- employed**
>
> **+ Depreciation**

NET NATIONAL PRODUCT AT FACTOR COST (NNP$_{FC}$) OR NATIONAL INCOME

National Income is defined as the factor income accruing to the normal residents of the country during a year. It is the sum of domestic factor income and net factor income from abroad. In other words, national income is the value of factor income generated within the country plus factor income from abroad in an accounting year.

NNP$_{FC}$ = National Income = FID (factor income earned in domestic territory) + NFIA.
If NFIA is positive, then national income will be greater than domestic factor incomes.

PER CAPITA INCOME

The GDP per capita is a measure of a country's economic output per person. It is obtained by dividing the country's gross domestic product, adjusted by inflation, by the total population. It serves as an indicator of the standard of living of a country.

TOPIC - 2
DIFFERENT CONCEPTS OF NATIONAL INCOME

Question 1
Which of the following is correct?
   a) NNP = GNP + Depreciation
   b) NNP – GNP = Depreciation
   c) NNP + GNP = Depreciation
   d) NNP = GNP – Depreciation

Question 2
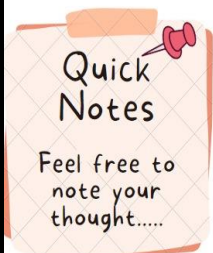**The main difference between GDP and GNP is:-**
   a) Capital gains
   b) Transfer payments
   c) Net foreign income from abroad
   d) Capital consumption allowance

Question 3
What is the consumption of Fixed Capital known as?
   a) Depreciation
   b) Capital Formation
   c) Investment
   d) All of the above

Answer: 1(d), 2(d), 3(d)

Quick Notes

Feel free to note your thought.....

PERSONAL INCOME

While national income is income earned by factors of production, Personal Income is the income received by the household sector including Non-Profit Institutions Serving Households. Thus, national income is a measure of income earned and personal income is a measure of actual current income receipts of persons from all sources which may or may not be earned from productive activities during a given period of time. In other words, it is the income 'actually paid out' to the household sector, but not necessarily earned. Examples of this include transfer payments such as social security benefits,

unemployment compensation, welfare payments etc. Individuals also contribute income which they do not actually receive; for example, undistributed corporate profits and the contribution of employers to social security. Personal income excludes retained earnings, indirect business taxes, corporate income taxes and contributions towards social security. Households receive interest payments from the firms and governments; they also make interest payments to firms and governments. As such, the net interest paid by households to firms and government is also deducted from national income. Personal income forms the basis for consumption expenditures and is derived from national income as follows:

> **PI = NI + income received but not earned – income earned but not received.**

> **PI = NI - Undistributed profits – Net interest payments made by households – Corporate Tax +Transfer Payments to the households from firms and government.**

An important point to remember is that national income is not the sum of personal incomes because personal income includes transfer payments (eg. pension) which are excluded from national income. Further, not all national income accrues to individuals as their personal income.

DISPOSABLE PERSONAL INCOME (DI)

Disposable personal income is a measure of amount of the money in the hands of the individuals that is available for their consumption or savings. Disposable personal income is derived from personal income by subtracting the direct taxes paid by individuals and other compulsory payments made to the government.

> **DI = PI - Personal Income Taxes – Non tax**

Apart from the above aggregates, a few other aggregates are reported in India. These reflect the amount of goods and services the domestic economy has at its disposal. Two more concepts need to be understood, namely:

1. NET NATIONAL DISPOSABLE INCOME

Net National Disposable Income (NNDI) = Net National Income + other net current transfers from the rest of the world (Receipts less payments)

Net National Disposable Income (NNDI) = NNI + net taxes on income and wealth receivable from abroad + net social contributions and benefits receivable from abroad.

2. GROSS NATIONAL DISPOSABLE INCOME (GNDI)

= NNDI + CFC = GNI + other net current transfers from the rest of the world (Receipts less payments)

(Other Current Transfers refer to current transfers other than the primary incomes)

(For a detailed explanation of concepts please refer 'Glossary of Main Terms' Apr 1, 2020 - National Accounts Statistics-Sources & Methods, 2007, MOSPI)

DOMESTIC INCOME MAY BE CATEGORIZED INTO:

1. Income from domestic product accruing to the public sector which includes income from property and entrepreneurship accruing to government administrative departments and savings of non-departmental enterprises.
2. Income from domestic product accruing to private sector = NDPFC - Income from property and entrepreneurship accruing to government administrative departments - Savings of non-departmental enterprises.

PRIVATE INCOME

Private income is a measure of the income (both factor income and transfer income) which accrues to private sector from all sources within and outside the country.

Private Income = Factor income from net domestic product accruing to the private sector + Net factor income from abroad + National debt interest + Current transfers from government + Other net transfers from the rest of the world.

Quick Notes

Feel free to note your thought.....
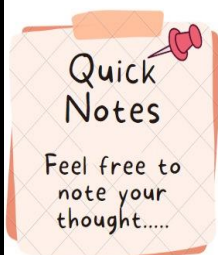
TOPIC - 3

PERSONAL INCOME & DISPOSABLE INCOME

QUIZ!

Question 1

Which of the following is true for Disposable Income?

a) Disposable Income is the difference between Private Income and Indirect Taxes

b) Disposable Income is the difference between Personal Income and Indirect Taxes

c) Disposable Income is the difference between Private Income and Direct Taxes

d) Disposable Income is the difference between Personal Income and Direct Taxes

Answer: 1(d)

MEASUREMENT OF NATIONAL INCOME IN INDIA

National Accounts Statistics (NAS) in India are compiled by National Accounts Division in the Central Statistics Office, Ministry of Statistics and Programme Implementation (MOSPI). Annual as well as quarterly estimates are published. This publication is the key source-material for all macroeconomic data of the country. As per the mandate of the Fiscal Responsibility and Budget Management Act 2003, the Ministry of Finance uses the GDP numbers (at current prices) to determine the fiscal targets.

The Ministry of Statistics and Programme Implementation has released the new series of national accounts, revising the base year from 2004-05 to 2011-12. In the revision of National Accounts statistics done by Central Statistical Organization (CSO) in January 2015, it was decided that sector-wise estimates of Gross Value Added (GVA) will now be given at basic prices instead of at factor cost. In simple terms, for any commodity the 'basic price' is the amount receivable by the producer from the purchaser for a unit of a product minus any tax on the product plus any subsidy on the product.
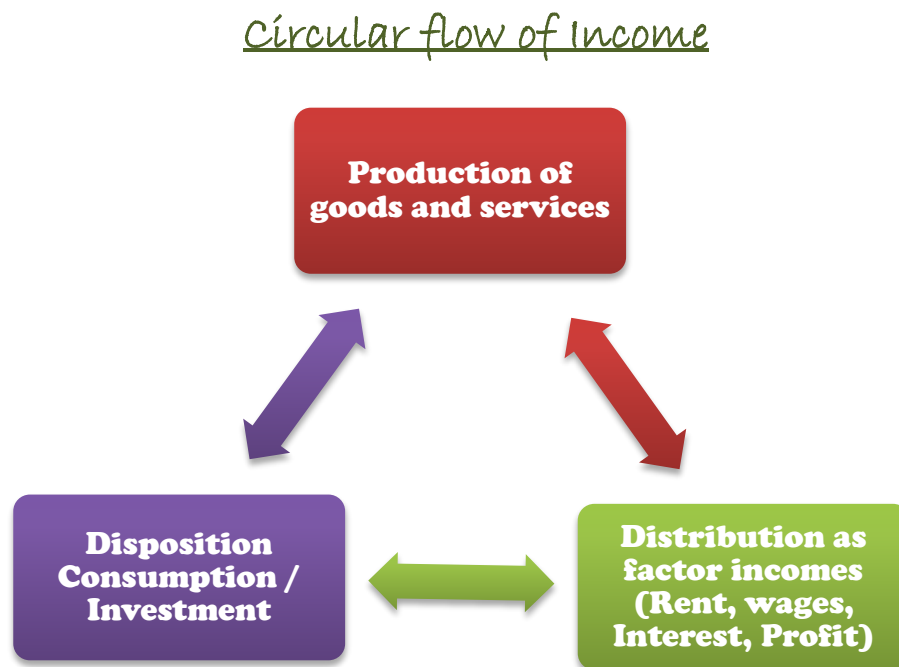
THE CIRCULAR FLOW OF INCOME

Circular flow of income refers to the continuous circulation of production, income generation and expenditure involving different sectors of the economy. There are three different interlinked phases in a circular flow of income, namely: production, distribution and disposition as can be seen from the following figure.

i. In the production phase, firms produce goods and services with the help of factor services.

ii. In the income or distribution phase, the flow of factor incomes in the form of rent, wages, interest and profits from firms to the households occurs

iii. In the expenditure or disposition phase, the income received by different factors of production is spent on consumption goods and services and investment goods. This expenditure leads to further production of goods and services and sustains the circular flow.

These processes of production, distribution and disposition keep going on simultaneously and enable us to look at national income from three different angles namely: as a flow of production or value added, as a flow of income and as a flow of expenditure. Each of these different ways of looking at national income suggests a different method of calculation and requires a different set of data. The details in respect of what is measured and what data are required for all three methods mentioned above are given in the following table.

Circular flow of Income

(i) In the production phase, firms produce goods and services with the help of factor services.

(ii) In the income or distribution phase, the flow of factor incomes in the form of rent, wages, interest and profits from firms to the households occurs

(iii) In the expenditure or disposition phase, the income received by different factors of production is spent on consumption goods and services and investment goods. This expenditure leads to further production of goods and services and sustains the circular flow.

These processes of production, distribution and disposition keep going on simultaneously and enable us to look at national income from three different angles namely: as a flow of production or value added, as a flow of income and as a flow of expenditure. Each of these different ways of looking at national income suggests a different method of calculation and requires a different set of data. The details in respect of what is measured and what data are required for all three methods mentioned above are given in the following table.

Method	Data required	What is measured
Phase of Output: Value added method(Product Method)	The sum of net values added by all the producing enterprises of the country	Contribution of production units
Phase of income : Income Method	Total factor incomes generated in the production of goods and services	Relative contribution of factor owners
Phase of disposition: Expenditure method	Sum of expenditures of the three spending units in the economy, namely, government, consumer households, and producing enterprises	Flow of consumption and investment expenditures

Corresponding to the three phases, there are three methods of measuring national income. They are: Value Added Method (alternatively known as Product Method); Income Method; and Expenditure Method.

VALUE ADDED METHOD OR PRODUCT METHOD

Product Method or Value Added Method is also called Industrial Origin Method or Net Output Method. National income by value added method is the sum total of net value added at factor cost across all producing units of the economy. The value added method measures the contribution of each producing enterprise in the domestic territory of the country in an accounting year and entails consolidation of production of each industry less intermediate purchases from all other industries. This method of measurement shows the unduplicated contribution by each industry to the total output. This method involves the following steps:

STEP1.

Identifying the producing enterprises and classifying them into different sectors according to the nature of their activities
All the producing enterprises are broadly classified into three main sectors namely:
   (i) Primary sector,
   (ii) Secondary sector, and
   (iii) Tertiary sector or service sector
These sectors are further divided into sub-sectors and each sub-sector is further divided into commodity group or service-group.

STEP 2

Estimating the gross value added (GVAMP) by each producing enterprise (This is the same as GDPMP)

> **Gross value added (GVA MP) = Value of output – Intermediate consumption**
>
> **= (Sales + change in stock) – Intermediateconsumption**

While calculating the value added, we are actually finding value of production of the firm. Production of the firm = Value added + intermediate consumption. (Note that imports are included in the value of intermediate consumption if total purchases are given. If domestic purchases are specifically mentioned, then imports will also be added. Also, sales include exports, if domestic sales are separately mentioned, exports need to be added)

STEP 3

Estimation of National Income
For each individual unit, Net value added is found out.

> **∑ (GVA MP) – Depreciation = Net value added (NVA MP)**

Adding the net value-added by all the units in one sub-sector, we get the net value-added by the sub-sector. By adding net value-added or net products of all the sub-sectors of a sector, we get the value-added or net product of that sector. For the economy as a whole, we add the net products contributed by each sector to get Net Domestic Product. We subtract net indirect taxes and add net factor income from abroad to get national income.

> **Net value added (NVA MP) – Net Indirect taxes = Net Domestic Product (NVA FC)**

> **Net Domestic Product (NVA FC) + (NFIA) = National Income (NNP FC)**

The values of the following items are also included:

  i.   Own account production of fixed assets by government, enterprises and households.
  ii.   Imputed value of production of goods for self- consumption, and
  iii. Imputed rent of owner occupied houses.
  iv.   Change in stock(inventory)

INCOME METHOD

Production is carried out by the combined effort of all factors of production. The factors are paid factor incomes for the services rendered. In other words, whatever is produced by a producing unit is distributed among the factors of production for their services.

Under Factor Income Method, also called Factor Payment Method or Distributed Share Method, national income is calculated by summation of factor incomes paid out by all production units within the domestic territory of a country as wages and salaries, rent, interest, and profit. By definition, it includes factor payments to both residents and non- residents.
Thus,

NDP_{FC} = Sum of factor incomes paid out by all production units within the domestic territory of a country

NNP_{FC} or National Income= Compensation of employees

+ Operating Surplus (rent + interest+ profit)

+ Mixed Income of Self- employed

+ Net Factor Income from Abroad

Only incomes earned by owners of primary factors of production are included in national income. Thus, while wages of labourers will be included, pensions of retired workers will be excluded from national income. Compensation of employees included, apart from wages and salaries, bonus, dearness allowance commission, employers' contribution to provident fund and imputed value of compensation in kind. Non-labour income includes rent (actual and imputed), royalty, interest on loans availed for productive services, dividends, undistributed profits of corporations before taxes and profits of unincorporated enterprises and of government enterprises.

(Note: Interest paid by government on public debt, interest on consumption loans and interest paid by one firm to another are excluded.

Profit =Corporate taxes+ dividend retained+ earnings)

While using income method, capital gains, windfall profits, transfer incomes and income from sale of second-hand goods and financial assets and payments out of past savings are not included. However, commissions, brokerages and imputed value of services provided by owners of production units will be included as these add to the current flow of goods and services.

Usually it is difficult to separate labour income from capital income because in many instances people provide both labour and capital services. Such is the case with self-employed people like lawyers, engineers, traders, proprietors etc. In economies where subsistence production and small commodity production is dominant, most of the incomes of people would be of mixed type. In sectors such as agriculture, trade, transport etc. in underdeveloped countries (including India), it is difficult to differentiate between the labour element and the capital element of incomes of the people. In order to overcome this difficulty a new category of incomes, called 'mixed income' is introduced which includes all those incomes which are difficult to separate.

EXPENDITURE METHOD

In the expenditure approach, also called Income Disposal Approach, national income is the aggregate final expenditure in an economy during an accounting year.

$$\text{GDP}_{MP} = \Sigma \text{ Final Expenditure}$$

In this approach to measuring GDP which considers the demand side of the products, we add up the value of the goods and services purchased by each type of final user mentioned below:-

1. FINAL CONSUMPTION EXPENDITURE

a) Private Final Consumption Expenditure (PFCE)

To measure this, the volume of final sales of goods and services to consumer households and non-profit institutions serving households acquired for consumption (not for use in production) are multiplied by market prices and then summation is done. It also includes the value of primary products which are produced for own consumption by the households, payments for domestic services which one household renders to another, the net expenditure on foreign financial assets or net foreign investment. Land and residential buildings purchased or constructed by households are not part of PFCE. They are included in gross capital formation. Thus, only expenditure on final goods and services produced in the period for which national income is to be measured and net foreign investment are included in the expenditure method of calculating national income.

b) Government Final Consumption Expenditure

Since the collective services provided by the governments such as defence, education, healthcare etc. are not sold in the market, the only way they can be valued in money terms is by adding up the money spent by the government in the production of these services. This total expenditure is treated as consumption expenditure of the government. Government expenditure on pensions, scholarships, unemployment allowance etc. should be excluded because these are transfer payments.

2. GROSS DOMESTIC FORMATION

Gross domestic fixed capital formation (Gross Investment) is that part of country's total expenditure which is not consumed but added to the nation's fixed tangible assets and stocks. It consists of the acquisition of fixed assets and the accumulation of stocks. The stock accumulation is in the form of changes in stock of raw materials, fuels, finished goods and semi-finished goods awaiting completion. Thus, gross investment includes final expenditure on machinery and equipment and own account production of machinery and equipment, expenditure on construction, expenditure on changes in inventories, and expenditure on the acquisition of valuables such as, jewellery and works of art.

3. NET EXPORTS

Net exports are the difference between exports and imports of a country during the accounting year. It can be positive or negative.

How do we arrive at national income or NNP$_{FC}$ using expenditure method? We first find the sum of final consumption expenditure, gross domestic capital formation and net exports. The resulting figure is gross domestic product at market price (GDP$_{MP}$). To this, we add the net factor income from abroad and obtain Gross National Product at market price (GNP$_{MP}$). Subtracting net indirect taxes from GNP**MP**, we get Gross National Product at factor cost (GNPFC). National income or NNPFC is obtained by subtracting depreciation from Gross national product at factor cost (GNPFC).

Ideally, all the three methods of national income computation should arrive at the same figure. When national income of a country is measured separately using these methods, we get a three dimensional view of the economy. Each method of measuring GDP is subject to measurement errors and each method provides a check on the accuracy of the other methods. By calculating total output in several different ways and then trying to resolve the differences, we will be able to arrive at a more accurate measure than would be possible with one method alone. Moreover, different ways of measuring total output give us different insights into the structure of our economy.

Income method may be most suitable for developed economies where people properly file their income tax returns. With the growing facility in the use of the commodity flow method of estimating expenditures, an increasing proportion of the national income is being estimated by expenditure method. As a matter of fact, countries like India are unable to estimate their national income wholly by one method. Thus, in agricultural sector, net value added is estimated by the production method, in small scale sector net value added is estimated by the income method and in the construction sector net value added is estimated by the expenditure method.

THE SYSTEM OF REGIONAL ACCOUNTS IN INDIA

Regional accounts provide an integrated database on the innumerable transactions taking place in the regional economy and help decision making at the regional level. At present, practically all the states and union territories of India compute state income estimates and district level estimates. State Income or Net State Domestic Product (NSDP) is a measure in monetary terms of the volume of all goods and services produced in the state within a given period of time (generally a year) accounted without duplication. Per Capita State Income is obtained by dividing the NSDP (State Income) by the midyear projected population of the state.

The state level estimates are prepared by the State Income Units of the respective State Directorates of Economics and Statistics (DESs). The Central Statistical Organisation assists the States in the preparation of these estimates by rendering advice on conceptual and methodological problems. In the preparation of state income estimates, certain activities such as railways, communications, banking and insurance and central government administration, that cut across state boundaries, and thus their economic contribution cannot be assigned to any one state directly are known as the 'Supra-regional sectors' of the economy. The estimates for these supra regional activities are compiled for the economy as a whole and allocated to the states on the basis of relevant indicators.

GDP AND WELFARE

Can the GDP of a country be taken as an index of welfare of people in that country? There are many reasons to dispute the validity of GDP as a perfect measure of well- being. In fact, GDP measures our ability to obtain many requirements to make our life better; yet leave out many important aspects which ensure good quality of life for all. GDP measures exclude the following which are critical for the overall wellbeing of citizens.

a) Income distributions and, therefore, GDP per capita is a completely inadequate measure of welfare. Countries may have significantly different income distributions and, consequently, different levels of overall well-being for the same level of per capita income.

b) Quality improvements in systems and processes due to technological as well as managerial innovations which reflect true growth in output from year to year.

c) Productions hidden from government authorities, either because those engaged in it are evading taxes or because it is illegal (drugs, gambling etc.).

d) Nonmarket production (with a few exceptions) and Non-economic contributors to well-being for example: health of a country's citizens, education levels, political participation, or other social and political factors that may significantly affect well-being levels.

e) The disutility of loss of leisure time. We know that, other things remaining the same, a country's GDP rises if the total hours of work increase.

f) Economic 'bads' for example: crime, pollution, traffic congestion etc which make us worse off.

g) The volunteer work and services rendered without remuneration undertaken in the economy, even though such work can contribute to social well-being as much as paid work.

h) Many things that contribute to our economic welfare such as, leisure time, fairness, gender equality, security of community feeling etc.,

i) Both positive and negative externalities which are external effects that do not form part of market transactions

j) The distinction between production that makes us better off and production that only prevents us from becoming worse off, for e.g. defence expenditures such as on police protection. Increased expenditure on police due to increase in crimes may increase GDP but these expenses only prevent us from becoming worse off. However, no reflection is made in national income of the negative impacts of higher crime rates. As another example, automobile accidents result in production of repairs, output of medical services, insurance, and legal services all of which are production included in GDP just as any other production.

Quick Notes

Feel free to note your thought.....
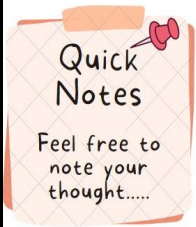
TOPIC 4
MEASUREMENT OF NATIONAL INCOME

QUIZ!

Question 1

Which of the following is a method to measure the National Income?

a) **Expenditure method**

b) **Income method**

c) **Product method**

d) **All of the above**

Answer: 1(d)

## LIMITATIONS AND CHALLENGES OF NATIONAL INCOME COMPUTATION

There are innumerable limitations and challenges in the computation of national income. The task is more complex in underdeveloped and developing countries. Following are the general dilemmas in measurement of national income.

There are many conceptual difficulties related to measurement which are difficult to resolve, such as:

a) lack of an agreed definition of national income,
b) accurate distinction between final goods and intermediate goods,
c) issue of transfer payments,
d) services of durable goods,
e) difficulty of incorporating distribution of income,
f) valuation of a new good at constant prices, and
g) valuation of government services

OTHER CHALLENGES RELATE TO:

a) Inadequacy of data and lack of reliability of available data,
b) presence of non-monetized sector,
c) production for self-consumption,
d) absence of recording of incomes due to illiteracy and ignorance,
e) lack of proper occupational classification, and
f) Accurate estimation of consumption of fixed capital.

Quick Notes
Feel free to note your thought.....
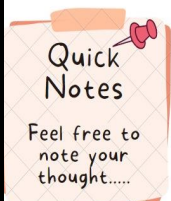
UNIT II

THE KEYNESIAN THEORY OF DETERMINATION OF NATIONAL INCOME

INTRODUCTION

In the last unit on measurement of national income, we have developed theoretical insights into the different concepts of national income and methods of measurement. In this unit, we shall focus on two issues namely, the factors that determine the level of national income and the determination of equilibrium aggregate income and output in an economy. A comprehensive theory to explain these phenomena was first put forward by the British economist John Maynard Keynes in his masterpiece 'The General Theory of Employment Interest and Money' published in 1936. The Keynesian theory of income determination is presented in three models:
-   (i)   The two-sector model consisting of the household and the business sectors,
-   (ii) The three-sector model consisting of household, business and government sectors, and
-   (iii) The four-sector model consisting of household, business, government and foreign sectors

Before we attempt to explain the determination of income in each of the above models, it is pertinent that we understand the concept of circular flow in an economy which explains the functioning of an economy.

CIRCULAR FLOW IN A SIMPLE TWO-SECTOR MODEL

Initially we consider a hypothetical simple two-sector economy. Even though an economy of this kind does not exist in reality, it provides a simple and convenient basis for understanding the Keynesian theory of income determination. The simple two sector economy model assumes that there are only two sectors in the economy viz., households and firms, with only consumption and investment outlays. Households own all factors of production and they sell their factor services to earn factor incomes which are entirely spent to consume all final goods and services produced by business firms. The business firms are assumed to hire factors of production from the households; they produce and sell goods and services to the households and they do not save. There are no corporations, corporate savings or retained earnings. The total income produced, Y, accrues to the households and equals their disposable personal income Y_d i.e., $Y = Y d$.

All prices (including factor prices), supply of capital and technology remain constant. The government sector does not exist and therefore, there are no taxes, government expenditure or transfer payments. The economy is a closed economy, i.e., foreign trade does not exist; there are no exports and imports and external inflows and outflows. All investment outlay is autonomous (not determined either by the level of income or the rate of interest); all investment is net and, therefore, national income equals the net national product.

In the figure, the circular flow of income and expenditure which presents the working of the two- sector economy is illustrated in a simple manner.
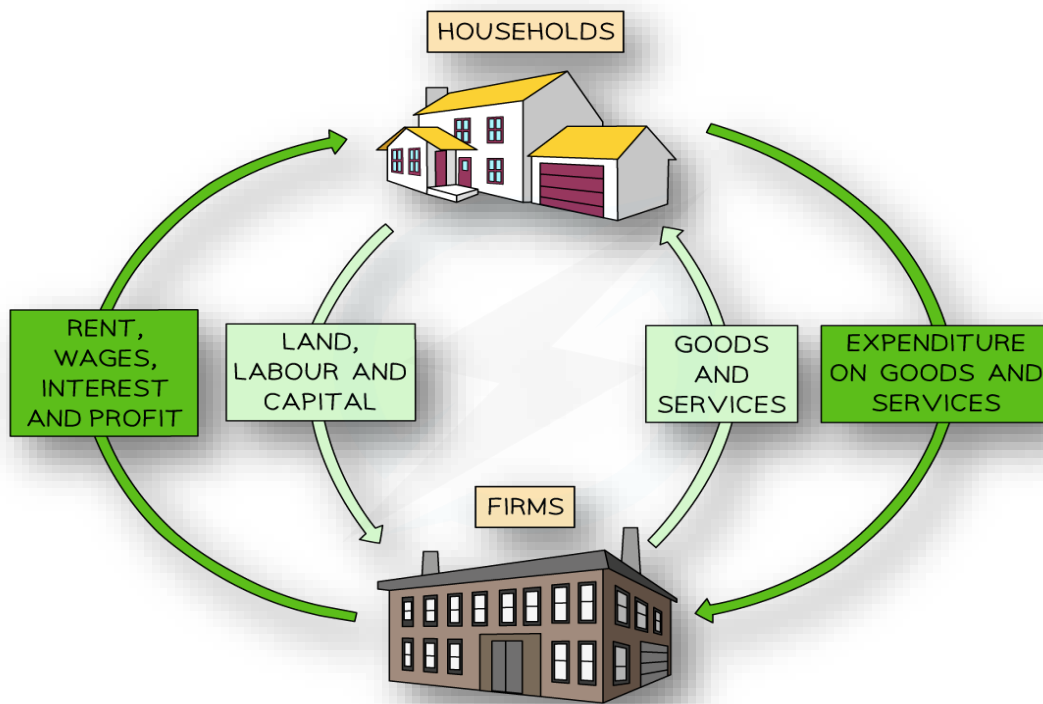
Circular flow in a simple two-sector model

The circular broken lines with arrows show factor and product flows and present 'real flows' and the continuous line with arrows show 'money flows' which are generated by real flows. These two circular flows-real flows and money flows-are in opposite directions and the value of real flows equal the money flows because the factor payments are equal to household incomes. There are no injections into or leakages from the system. Since the whole of household income is spent on goods and services produced by firms, household expenditures equal the total receipts of firms which equal value of output.

> Factor Payments = Household Income= Household Expenditure = TotalReceipts of Firms = Value of Output.

Before we go into the discussion on the equilibrium aggregate income and changes in it, we shall first try to understand the meaning of the term 'equilibrium' (defined as a state in which there is no tendency to change; or a position of rest). Equilibrium output occur when the desired amount of output demanded by all the agents in the economy exactly equals the amount produced in a given time period. Logically, an economy can be said to be in equilibrium when the production plans of the firms and the expenditure plans of the households match.

Having understood the working of the two sector model and the meaning of equilibrium output, we shall now have the formal presentation of the theory of income determination in a two-sector model which is the simplest representation of the key principles of Keynesian economics. To see the factors that determine the level of income, first we consider the factors that affect the components of aggregate demand namely, consumption and investment.

THE AGGREGATE DEMAND FUNCTION: TWO-SECTOR MODEL

In a simple two-sector economy aggregate demand (AD) or aggregate expenditure consists of only two components:

- **(i)** aggregate demand for consumer goods (C), and
- **(ii)** aggregate demand for investment goods (I)

$$AD = C + I$$

Of the two components, consumption expenditure accounts for the highest proportion of the GDP. In a simple economy, the variable I is assumed to be determined exogenously and constant in the short run. Therefore, the short-run aggregate demand function can be written as:

$$AD = C + \bar{I}$$

Where $\bar{I}$ =constant investment.

From the equation, we can infer that, in the short run, AD depends largely on the aggregate consumption expenditure. We shall now go over to the discussion on consumption function.

THE CONSUMPTION FUNCTION

The positive relationship between consumption spending and disposable income is described by the consumption function. Consumption function expresses the functional relationship between aggregate consumption expenditure and aggregate disposable income, expressed as:

$$C = f(Y)$$

The private demand for goods and services accounts for the largest proportion of the aggregate demand in an economy and plays a crucial role in the determination of national income. According to Keynes, the total volume of private expenditure in an economy depends on the total current disposable income of the people and the proportion of income which they decide to spend on consumer goods and services. The specific form of consumption–income relationship termed theconsumption function, proposed by Keynes is as follows:

$$C = a + bY$$

Where C = aggregate consumption expenditure; Y = total disposable income; a is a constant term which denotes the (positive) value of consumption at zero level of disposable income; and the parameter b, the slope of the function, $(\Delta C / \Delta Y)$ is the marginal propensity to consume (MPC) i.e the increase in consumption per unit increase in disposable income.

The Keynesian Consumption Function
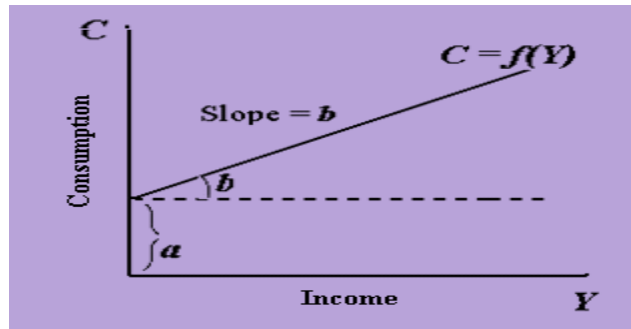
The consumption function shows the level of consumption (C) corresponding to each level of disposable income (Y) and is expressed through a linear consumption function, as shown by the line marked C = f(Y) in figure. When income is low, consumption expenditures of households will exceed their disposable income and households dissave i.e. they either borrow money or draw from their past savings to purchase consumption goods. The intercept for the consumption function, a, can be thought of as a measure of the effect on consumption of variables other than income, variables not explicitly included in this simple model.

The Keynesian assumption is that consumption increases with an increase in disposable income, but that the increase in consumption will be less than the increase in disposable income (b < 1). i.e. 0 < b < 1. This fundamental relationship between income and consumption plays a crucial role in the Keynesian theory of income determination.

MARGINAL PROPENSITY TO CONSUME (MPC)

The consumption function is based on the assumption that there is a constant relationship between consumption and income, as denoted by constant b which is marginal propensity to consume. The concept of MPC describes the relationship between change in consumption (ΔC) and the change in income (ΔY). The value of the increment to consumer expenditure per unit of increment to income is termed the Marginal Propensity to Consume (MPC).

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

Although the MPC is not necessarily constant for all changes in income (in fact, the MPC tends to decline at higher income levels), most analysis of consumption generally works with a constant MPC.

AVERAGE PROPENSITY TO CONSUME (APC)

Just as marginal propensity to consume, the average propensity to consume is a ratio of consumption defining income consumption relationship. The ratio of total consumption to total income is known as the average propensity to consume (APC).
The table below shows the relationship between income consumption and saving.

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

Relationship between Income and Consumption

Income(Y)	Consumption (C)	APC (C/Y)	MPC(ΔC /ΔY)	MPS(ΔS /ΔY) (1-MPC)
0	500	500/0 = ∞	-	-
1000	1250	1250/1000 = 1.25	750/1000 = 0.75	0.25
2000	2000	2000/2000 = 1.00	750/1000 = 0.75	0.25
3000	2750	2750/3000 = 0.92	750/1000 = 0.75	0.25
6000	5000	5000/6000 = 0.83	2250/3000 = 0.75	0.25
10,000	8000	8000/10,000 = 0.80	3000/4000 = 0.75	0.25

APC is calculated at various income levels. It is obvious that the proportion of income spent on consumption decreases as income increases. What happens to the rest of the income that is not spent on consumption? If it is not spent, it must be saved because income is either spent or saved; there are no other used to which it can be put. Thus, just as consumption, saving is a function of income. S=f(Y).

THE SAVING FUNCTION

In figure, the consumption and saving functions are graphed. The saving function shows the level of saving (S) at each level of disposable income (Y). The intercept for the saving function, (—a) is the (negative) level of saving at zero level of disposable income at consumption equal to 'a'. By definition, national income Y
= C + S which shows that disposable income is, by definition, consumption plus saving. Therefore, S = Y – C. Thus, when we represent the theory of the consumption-income relationship, it also implicitly establishes the saving-income relationship.

THE MARGINAL PROPENSITY TO SAVE (MPS)

The slope of the saving function is the marginal propensity to save. If a one-unit increase in disposable income leads to an increase of b units in consumption, the remainder (1 - b) is the increase in saving. This increment to saving per unit increase in disposable income (1 - b) is called the marginal propensity to

save (MPS). In other words, the marginal propensity to save is the increase in saving per unit increase in disposable income.

$$MPS = \frac{\Delta S}{\Delta Y} = 1 - b$$

Marginal Propensity to Consume (MPC) is always less than unity, but greater than zero, i.e., $0 < b < 1$ Also, MPC + MPS = 1; we have MPS $0 < b < 1$. Thus, saving is an increasing function of the level of income because the marginal propensity to save (MPS) = 1- b is positive, i.e. saving increase as income increases.

AVERAGE PROPENSITY TO SAVE (APS)

The ratio of total saving to total income is called average propensity to save (APS). Alternatively, it is that part of total income which is saved.

$$APS = \frac{\text{Total saving}}{\text{Total Income}} = \frac{S}{Y}$$

In figure showing the consumption and saving functions, the 45° line is drawn to split the positive quadrant of the graph and shows the income-consumption relation with Y = C (AD = Y) at all levels of income. All points on the 45° line indicate that aggregate expenditure equal aggregate output; i.e. the value of the variables measured on the vertical axis (C+I) is equal to the value of the variable measured on the horizontal axis (i.e. Y). Because aggregate expenditures equal total output for all points along the 45-degree line, the line maps out all possible equilibrium income levels. As long as the economy is operating at less than its full-employment capacity, producers will produce any output along the 45-degree line that they believe purchasers will buy.

The Consumption and saving Function
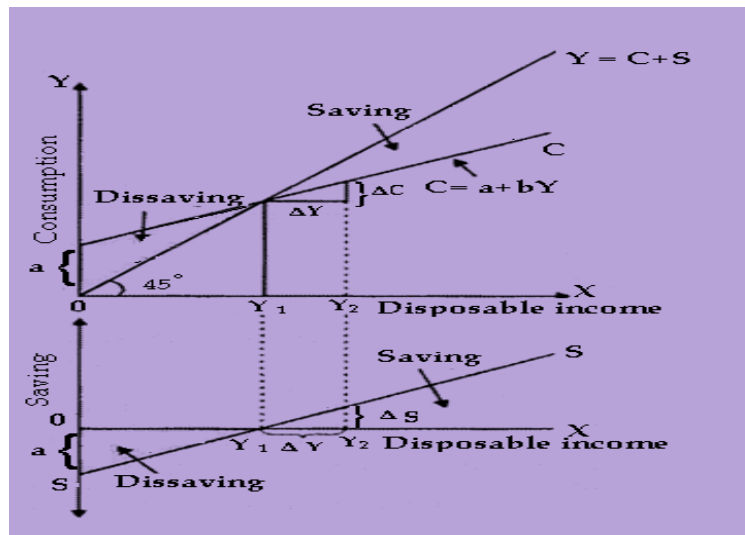
THE TWO-SECTOR MODEL OF NATIONAL INCOME DETERMINATION

In this section, we shall describe the two-sector model of determination of equilibrium levels of output and income in its formal form using the aggregate demand function and the aggregate supply function. According to Keynesian theory of income determination, the equilibrium level of national income is a situation in which aggregate demand (C+ I) is equal to aggregate supply (C + S) i.e.

$$C + I = C + S$$
$$\text{or}$$
$$I = s$$

In a two sector economy, the aggregate demand (C+ I) refers to the total spending in the economy i.e. it is the sum of demand for the consumer goods (C) and investment goods (I) by households and firms respectively. In figure, the aggregate demand curve is linear and positively sloped indicating that as the level of national income rises, the aggregate demand (or aggregate spending) in the economy also rises. The aggregate expenditure line is flatter than the 45-degree line because, as income rises, consumption also increases, but by less than the increase in income.

Determination of Equilibrium Income: Two Sector Model
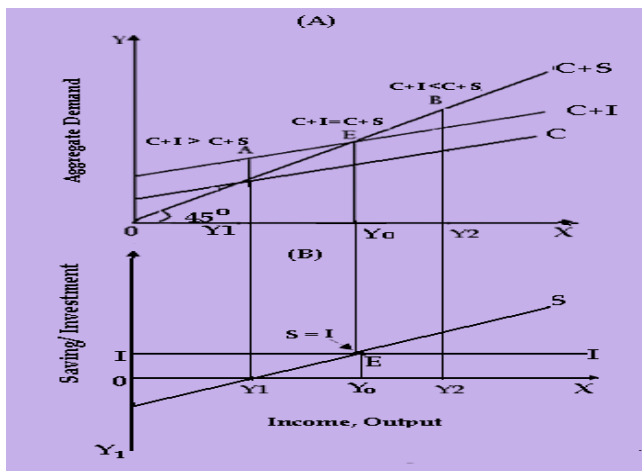
You may bear in mind the basic point that according to Keynes, aggregate demand will not always be equal to aggregate supply. Aggregate demand depends on households plan to consume and to save. Aggregate supply depends on the producers' plan to produce goods and services. For the aggregate demand and the aggregate supply to be equal so that equilibrium is established, the households' plan must coincide with producers' plan. The expectations of businessmen are realized only when aggregate expenditure equals aggregate income. In other words, aggregate supply represents aggregate value expected by business firms and aggregate demand represents their realized value. At equilibrium, expected value equals realized value. However, Keynes held the view that that there is no reason to believe that:

   (i)   consumers' consumption plan always coincides with producers' production plan, and

(ii) That producers' plan to invest matches always with households plan to save Putting it differently, there is no reason for C + I and C + S to be always equal.

The figure depicts the determination of equilibrium income. Income is measured along the horizontal axis and the components of aggregate demand, C and I, are measured along the vertical axis. The investment function (I) is shown in panel B of the figure, the (C+ I) or aggregate expenditure schedule which is obtained by adding the autonomous expenditure component namely investment to consumption spending at each level of income. Since the autonomous expenditure component (I) does not depend directly on income, the (C+I) schedule lies above the consumption function by a constant amount. Equilibrium level of income is such that aggregate demand equals output (which in turn equals income). Only at point E and at the corresponding equilibrium levels of income and output (Y_0), does aggregate demand exactly equal output. At that level of output and income, planned spending precisely matches production. Once national income is determined, it will remain stable in the short run.

Our understanding of the equilibrium level of income would be better if we find out why the other points on the graph are not points of equilibrium. For example, consider a level of income below Y_0, for example Y_1, generates consumption as shown along the consumption function. When this level of consumption is added to the autonomous investment expenditure (I), the aggregate demand exceeds income; i.e the (C +1) schedule is above the 45° line. Equivalently, at all those levels I is greater than S, as can be seen in panel (B) of the figure The aggregate expenditures exceed aggregate output. Excess demand makes businesses to sell more than what they currently produce. The unexpected sales would draw down inventories and result in less inventory investment than business firms planned. They will react by hiring more workers and expanding production. This will increase the nation's aggregate income. It also follows that with demand outstripping production, desired investment will exceed actual investment.

Conversely, at levels of income above Y_0, for example at Y_2, output exceed demand (the 45^0 line is above the C +/schedule). The planned expenditure on goods and services are less than what business firms thought they would be; business firms would be unable to sell as much of their current output as they had expected. In fact, they have unintentionally made larger inventory investments than they planned and their actual inventories would increase. Therefore, there will be a tendency for output to fall. This process continues till output reaches Y_0, at which current production exactly matches planned aggregate spending and unintended inventory shortfall or accumulation are therefore equal to zero. At this point, consumers' plan matches with producers' plan and savers' plan matches with investors' plan. Consequently, there is no tendency for output to change.

Since C + S = Y, the national income equilibrium can be written as

$$Y = C + I$$

The saving schedule S slopes upward because saving varies positively with income.
In equilibrium, planned investment equals saving. Therefore, corresponding to this income, the saving schedule (S) intersects the horizontal investment schedule (I). This intersection is shown in panel (B) of figure.

This condition applies only to an economy in which there is no government and no foreign trade. To understand this relationship, refer to panel (B) of figure 1.2.4 Without government and foreign trade, the

vertical distance between the aggregate demand (C+I) and consumption line (C) in the figure is equal to planned investment spending, I. You may also find that the vertical distance between the consumption schedule and the 45° line also measures saving (S = Y- C) at each level of income. At the equilibrium level of income (at point E in panel B), and only at that level, the two vertical distances are equal. Thus, at the equilibrium level of income, saving equals (planned) investment. By contrast, above the equilibrium level of income, Y0, saving (the distance between 45° line and the consumption schedule) exceeds planned investment, while below Y0 level of income, planned investment exceeds saving.

The equality between saving and investment can be seen directly from the identities in national income accounting. Since income is either spent or saved, Y = C + S. Without government and foreign trade, aggregate demand equals consumption plus investment, Y = C + I. Putting the two together, we have C + S = C + I, or S = I.

An important point to remember is that Keynesian equilibrium with equality of planned aggregate expenditures and output need not take place at full employment. It is possible that the rate of unemployment is high. In the Keynesian model, neither wages nor interest rates will decline in the face of abnormally high unemployment and excess capacity. Therefore, output will remain at less than the full employment rate as long as there in insufficient spending in the economy. Keynes argued that this was precisely what was happening during the Great Depression.

Quick
Notes

Feel free to
note your
thought......
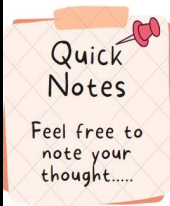
THE INVESTMENT MULTIPLIER

In our two-sector model, a change in aggregate demand may be caused by change in consumption expenditure or in business investment or in both. Since Consumption expenditure is a stable function of income, changes in income are primarily from changes in the autonomous components of aggregate demand, especially from changes in the unstable investment component. We shall now examine the effect of an increase in investment (upward shift in the investment schedule) causing an upward shift in the aggregate demand function.
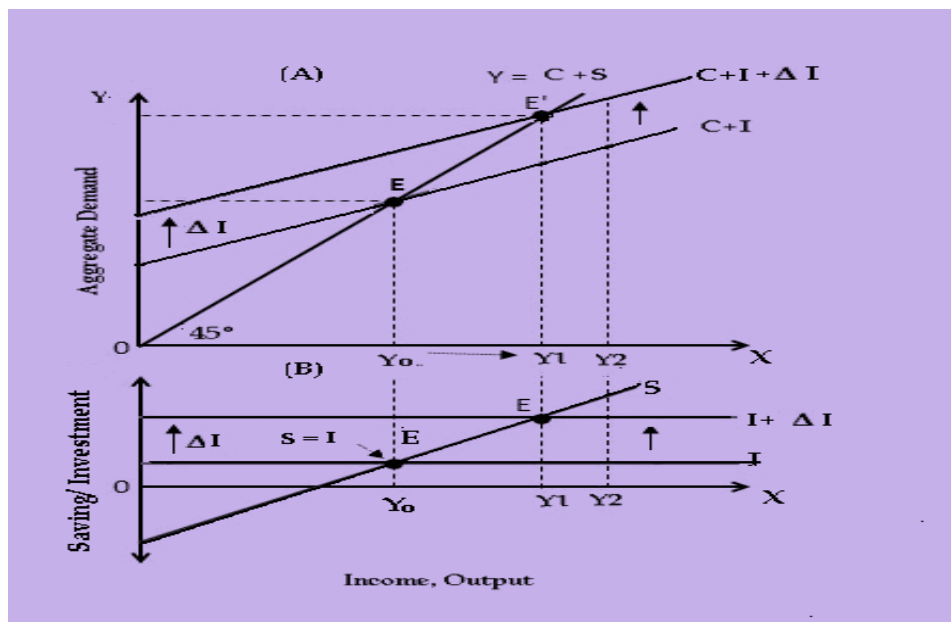
Effect of Changes in Autonomous Investment

In the figure, an increase in autonomous investment by ΔI shifts the aggregate demand schedule from C+I to C+I+ ΔI. correspondingly, the equilibrium shifts from E to E1 and the equilibrium income increases more than proportionately from Y_o to Y_1. Why and how does this happen? This occurs due to the operation of the investment multiplier.

The multiplier refers to the phenomenon whereby a change in an injection of expenditure will lead to a proportionately larger change (or multiple change) in the level of national income. Multiplier explains how many times the aggregate income increases as a result of an increase in investment. When the level of investment increases by an amount say ΔI, the equilibrium level of income will increase by some multiple amounts, ΔY. The ratio of ΔY to ΔI is called the investment multiplier, k.

$$k = \frac{\Delta Y}{\Delta I}$$

The size of the multiplier effect is given by $\Delta Y = k \Delta I$.
For example, if a change in investment of ` 2000 million causes a change in national income of ` 6000 million, then the multiplier is 6000/2000 =3. Thus multiplier indicates the change in national income for each rupee change in the desired investment. The value 3 in the above example tells us that for every ` 1

increase in desired investment expenditure, there will be ` 3 increase in equilibrium national income. Multiplier, therefore, expresses the relationship between an initial increment in investment and the resulting increase in aggregate income. Since the increase in national income (ΔY) is the result of increase in investment (ΔI), the multiplier is called 'investment multiplier.'

The process behind the multiplier can be compared to the 'ripple effect' of water. Let us assume that the initial disturbance comes from a change in autonomous investment (ΔI) of 500 units. The economy being in equilibrium, an upward shift in aggregate demand leads to an increase in national income which in a two sector economy will be, by definition, distributed as factor incomes. There will be an equal increase in disposable income. Firms experience increased demand and as a response, their output increases. Assuming that MPC is 0.80, consumption expenditure increases by 400, resulting in increase in production. The process does not stop here; it will generate a second-round of increase in income. The process further continues as an autonomous rise in investment leads to induced increases in consumer demand as income increases.

We find at the end that the increase in income per rupee increase in investment is:

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1-MPC} = \frac{1}{MPS}$$

From the above, we find that the marginal propensity to consume (MPC) is the determinant of the value of the multiplier and that there exists a direct relationship between MPC and the value of multiplier. Higher the MPC, more will be the value of the multiplier, and vice-versa. On the contrary, higher the MPS, lower will be the value of multiplier and vice-versa. The maximum value of multiplier is infinity when the value of MPC is 1 i.e the economy decides to consume the whole of its additional income. We conclude that the value of the multiplier is the reciprocal of MPS.

For example, if the value of MPC is 0.75, then the value of the multiplier is multiplier as per is:

$$\frac{1}{0.25} = 4$$

The multiplier concept is central to Keynes's theory because it explains how shifts in investment caused by changes in business expectations set off a process that causes not only investment but also consumption to vary. The multiplier shows how shocks to one sector are transmitted throughout the economy.

Increase in income due to increase in initial investment, does not go on endlessly. The process of income propagation slows down and ultimately comes to a halt. Causes responsible for the decline in income are called leakages. Income that is not spent on currently produced consumption goods and services may be regarded as having leaked out of income stream. If the increased income goes out of the cycle of consumption expenditure, there is a leakage from income stream which reduces the effect of multiplier. The more powerful these leakages are the smaller will be the value of multiplier. The leakages are caused due to:

1. progressive rates of taxation which result in no appreciable increase in consumption despite increase in income

2. high liquidity preference and idle saving or holding of cash balances and an equivalent fall in marginal propensity to consume

3. increased demand for consumer goods being met out of the existing stocks or through imports

4. additional income spent on purchasing existing wealth or purchase of government securities and shares from shareholders or bond holders

5. undistributed profits of corporations

6. part of increment in income used for payment of debts

7. case of full employment additional investment will only lead to inflation, and

8. scarcity of goods and services despite having high MPC

The MPC on which the multiplier effect of increase in income depends, is high in under developed countries; ironically the value of multiplier is low. Due to structural inadequacies, increase in consumption expenditure is not generally accompanied by increase in production. E.g. increased demand for industrial goods consequent on increased income does not lead to increase in their real output; rather prices tend to rise.

An important element of Keynesian models is that they relate to short-period equilibrium and contain no dynamic elements. There is nothing like Keynesian macro-economic dynamics. When a shock occurs, for example when there is a change in autonomous investment due to change in some variable, one equilibrium position can be compared with another as a matter of comparative statics. There is no link between one period and the next and no provision is made for an analysis of processes through time.

DETERMINATION OF EQUILIBRIUM INCOME: THREE SECTOR MODEL

Aggregate demand in the three sector model of closed economy (neglecting foreign trade) consists of three components namely, household consumption(C), desired business investment demand (I) and the Government sector's demand for goods and services (G). Thus in equilibrium, We have

$$Y = C+I+G$$

since there is no foreign sector, GDP and National income are equal. As prices are assumed to be fixed, all variables are real variables and all changes are in real terms. To help interpret these conditions, we turn to the flowchart below. Each of the variables in the model is a flow variable.

Circular Flow in a Three Sector Economy
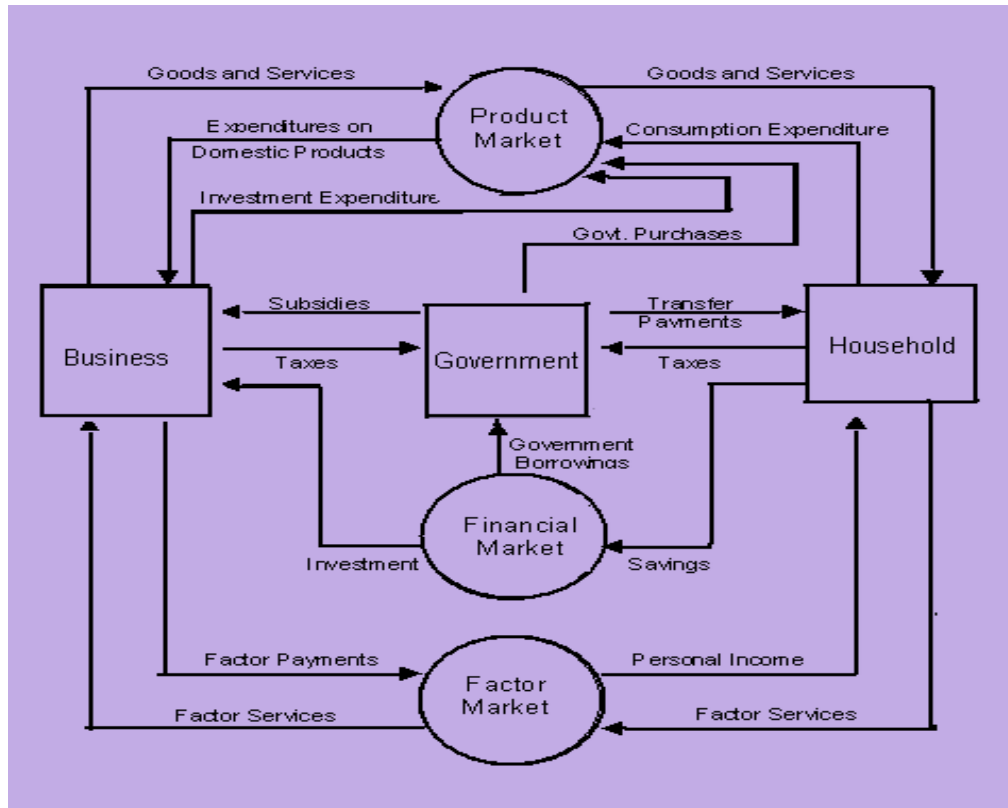
The functioning of the two sectors namely household and the business sector has been discussed by us in the two sector model. The three-sector, three-market circular flow model which accounts for government intervention highlights the role played by the government sector. From the above flow chart, we can find that the government sector adds the following key flows to the model:

i)   Taxes on households and business sector to fund government purchases
ii) Transfer payments to household sector and subsidy payments to the business sector
iii) Government purchases goods and services from business sector and factors of production from household sector, and
iv) Government borrowing in financial markets to finance the deficits occurring when taxes fall short of government purchases

However, unlike in the two sector model, the whole of national income does not return directly to the firms as demand for output. There are two flows out of the household sector in addition to consumption expenditure namely, saving flow and the flow of tax payments to the government. These are actually leakages. The saving leakage flows into financial markets, which means that the part of that is saved is held in the form of some financial asset (currency, bank deposits, bonds, equities, etc.). The tax flow goes to to the government sector. The leakages which occur in household sector do not necessarily mean that the total demand must fall short of output. There are additional demands for output on the part of the business sector itself for investment and from the government sector. In terms of the circular flow, these are injections. The investment injection is shown as a flow from financial markets to the business sector.

The purchasers of the investment goods, typically financed by borrowing, are actually the firms in the business sector themselves. Thus, the amount of investment in terms of money represents an equivalent flow of funds lent to the business sector.

The three-sector Keynesian model is commonly constructed assuming that government purchases are autonomous. This is not a realistic assumption, but it will simplify our analysis. Determination of income can be explained with the help of figure
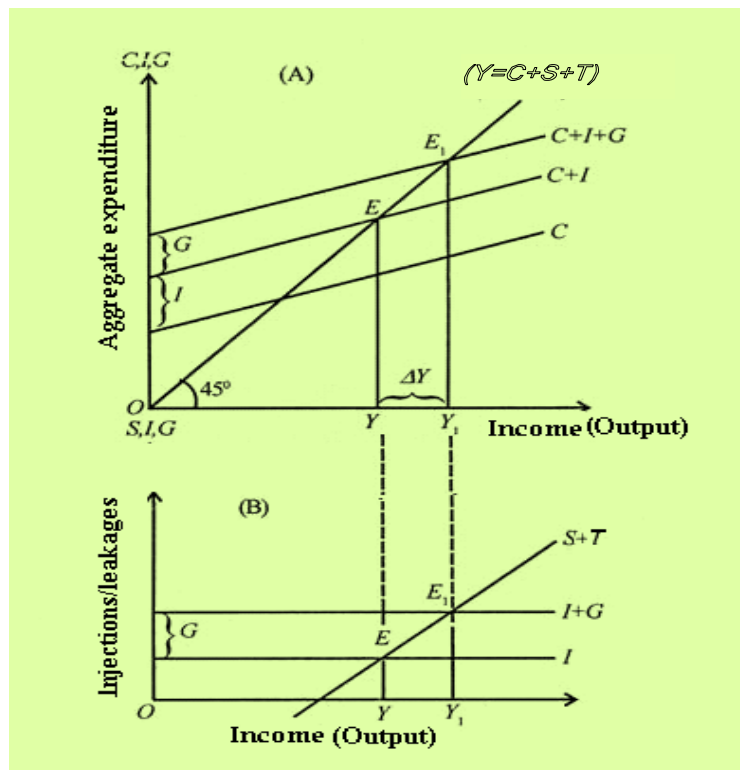
Determination of Equilibrium Income: Three Sector Model

The variables measured on the vertical axis are C, I and G. The autonomous expenditure components namely, investment and government spending do not directly depend on income and are exogenous variables determined by factors outside the model. You may observe that in panel B of the figure, the lines that plot these autonomous expenditure components are horizontal as their level does not depend on Y. Therefore, C + I + G schedule lies above the consumption function by a constant amount.

The line S + T in the graph plots the value of savings plus taxes. This schedule slopes upwards because saving varies positively with income. Just as government spending, level of tax receipts (T) is decided by policy makers.

The equilibrium level of income is shown at the point E 1 where the (C + l + G) schedule crosses the 45° line, and aggregate demand is therefore equal to income (Y). In equilibrium, it is also true that the (S + T) schedule intersects the (I + G) horizontal schedule.

We shall now see why other points on the graph are not points of equilibrium. Consider a level of income below Y. We find that it generates consumption as shown along the consumption function. When this level of consumption is added to the autonomous expenditures (I + G), aggregate demand exceeds income; the (C + I + G) schedule is above the 45° line. Equivalently at this point I + G is greater than S + T, as can be seen in panel B of the figure With demand outstripping production, desired investments will exceed actual investment and there will be an unintended inventory shortfall and therefore a tendency for output to rise. Conversely, at levels of income above Y1, output will exceed demand; people are not willing to buy all that is produced. Excess inventories will accumulate, leading businesses to reduce their future production. Employment will subsequently decline. Output will fall back to the equilibrium level. It is only at Y that output is equal to aggregate demand; there is no unintended inventory shortfall or accumulation and, consequently, no tendency for output to change. An important thing to note is that the change in total spending, followed by changes in output and employment, is what will restore equilibrium in the Keynesian model, not changes in prices.

DETERMINATION OF EQUILIBRIUM INCOME: FOUR SECTOR MODEL

The four sector model includes all four macroeconomic sectors, the household sector, the business sector, the government sector, and the foreign sector. The foreign sector includes households, businesses, and governments that reside in other countries. The following flowchart shows the circular flow in a four sector economy.
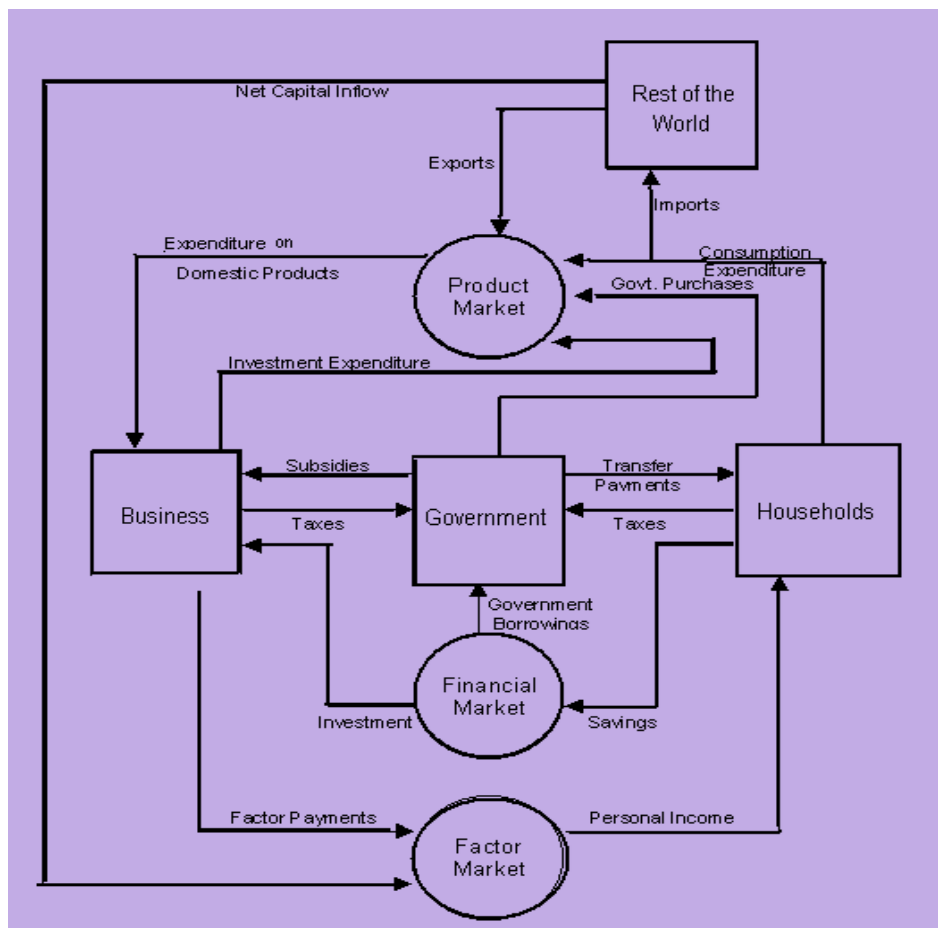
**Circular Flow in a Four Sector Economy**

In the four sector model, there are three additional flows namely; exports, imports and net capital inflow which is the difference between capital outflow and capital inflow. The C+I + G + (X-M) line indicates the total planned expenditure of consumers, investors, governments, and foreigners (net exports) at each income level.

In equilibrium, we have

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

The domestic economy trades goods with the foreign sector through exports and imports. Exports are the injections in the national income, while imports act as leakages or outflows of national income. Exports represent foreign demand for domestic output and therefore, are part of aggregate demand. Since imports are not demands for domestic goods, we must subtract them from aggregate demand. The demand for imports has an autonomous component and is assumed to depend on income. Imports depend upon marginal propensity to import which is the increase in import demand per unit increase in GDP. The demand for exports depends on foreign income and is therefore exogenously determined. Imports are subtracted from exports to derive net exports, which is the foreign sector's contribution to aggregate expenditures. With the help of figure, we shall explain income determination in the four sector model.

Determination of Equilibrium Income: Four Sector Model
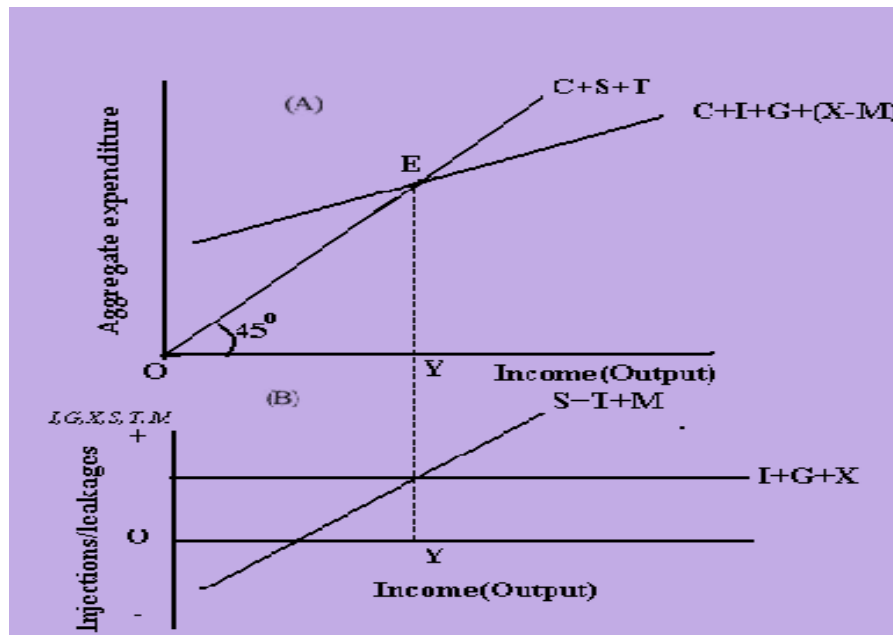

Equilibrium is identified as the intersection between the C + I + G + (X - M) line and the 45-degree line. The equilibrium income is Y. From panel B, we find that the leakages(S+T+M) are equal to injections (I+G+X) only at equilibrium level of income.

We have seen above that only net exports(X-M) are incorporated into the four sector model of income determination. We know that injections increase the level of income and leakages decrease it. Therefore, if net exports are positive (X > M), there is net injection and national income increases. Conversely, if X<M, there is net withdrawal and national income decreases. The figure depicts a case of X<M.

We find that when the foreign sector is included in the model (assuming M > X), the aggregate demand schedule C+I+G shifts downward with equilibrium point shifting from F to E. The inclusion of foreign sector (with M > X) causes a reduction in national income from Y0 to Y1. Nevertheless, when X > M, the aggregate demand schedule C+I+G shifts upward causing an increase in national income. Learners may infer diagrammatic expressions for possible changes in equilibrium income for X>M and X = M.

Effects on Income When Imports are Greater than Exports
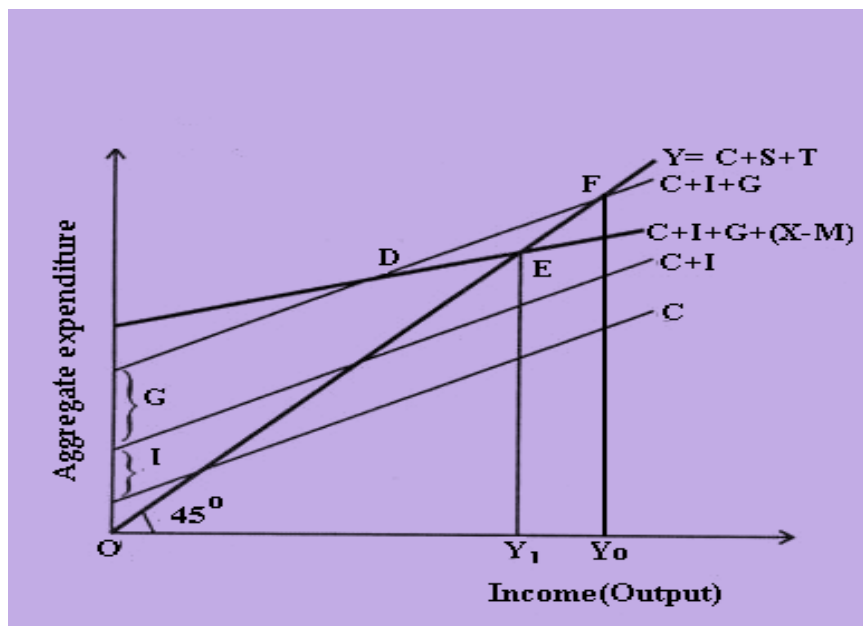
We have seen in section 2.5 above that equilibrium income is expressed as a product of two terms: $\Delta Y = k\Delta|$; i.e the level of autonomous investment expenditure and the investment multiplier. The autonomous expenditure multiplier in a four sector model includes the effects of foreign transactions and is stated as $\frac{1}{(1-b+y)}$ where v is the propensity to import which is greater than zero. You may recall that the multiplier in a closed economy is $\frac{1}{(1-b)}$

The greater the value of v, the lower will be the autonomous expenditure multiplier. The more open an economy is to foreign trade, (the higher v is) the smaller will be the response of income to aggregate demand shocks, such as changes in government spending or autonomous changes in investment demand. A change in autonomous expenditures— for example, a change in investment spending,—will have a direct effect on income and an induced effect on consumption with a further effect on income. The higher the value of v, larger the proportion of this induced effect on demand for foreign, not domestic, consumer goods. Consequently, the induced effect on demand for domestic goods and, hence on domestic income

will be smaller. The increase in imports per unit of income constitutes an additional leakage from the circular flow of (domestic) income at each round of the multiplier process and reduces the value of the autonomous expenditure multiplier.

An increase in demand for exports of a country is an increase in aggregate demand for domestically produced output and will increase equilibrium income just as an increase in government spending or an autonomous increase in investment. In summary, an increase in the demand for a country's exports has an expansionary effect on equilibrium income, whereas an autonomous increase in imports has a contractionary effect on equilibrium income. However, this should not be interpreted to mean that exports are good and imports harmful in their economic effects. Countries import goods that can be more efficiently produced abroad, and trade increases the overall efficiency of the worldwide allocation of resources. This forms the rationale for attempts to stimulate the domestic economy by promoting exports and restricting imports.

Quick Notes

Feel free to note your thought.....