Economics General
Name of the Course: Introductory Macroeconomics
[For Semester-II]

Unit-1: Introduction to Macroeconomics and National Income Accounting

The study of economics is traditionally divided into two fields-micro and macro. Microeconomics deals with the behavior of disaggregated individual decision makers such as a single consumer or a saver or a single production unit(firm) or an industry(collection of firms producing similar or closely related products).Macroeconomics ,on the other hand, takes as its subject the economic activity of the entire nation as an indivisible unit. The analysis, in contrast with microeconomics, is very aggregative in nature. Some of the most important macroeconomic variables are national income, national investment, the overall state of employment in the economy, budgetary policy of the government.

Macroeconomists try to understand how an economy operates and, on the basis of that understanding, suggest policies that may be adopted to improve the performance of the economy. To understand and improve the economic performance of an economy is not possible without a proper quantification of the values of the major macroeconomic variables. This is not an easy task, given the highly aggregative nature of the concepts involved. The standard technique developed by economists and statisticians for the purpose of measuring the performance of a modern economy are collectively known as methods of national income accounting.

National Income

National income means the value of goods and services produced by a country during a financial year. Thus, it is the net result of all economic activities of any country during a period of one year and is valued in terms of money. National income is an uncertain term and is often used interchangeably with the national dividend, national output, and national expenditure. We can understand this concept by understanding the national income definition.

NATIONAL INCOME ACCOUNTING

Gross Domestic Product (GDP): The Gross Domestic Product is the most comprehensive measure of a country's output in a given period. It is the value at current market prices of all final goods and services produced within the domestic territory of a country in the current year. These goods and services are valued at the prevailing market prices of those goods and services. Goods are tangible while services are not. Performances of actors and singers, activities of lawyers, doctors and bankers are examples of services.

Gross National Product (GNP): GNP is the value of final goods and services produced in the current period by domestically-owned factors of production at home or abroad. The difference with GDP arises because some production within the domestic economy is done by factors owned by foreigners. For instance, the salary of an American consultant in IBM's office in Bangalore or the profit repatriated from India by the same company belongs to the GNP of the USA. It is a part of India's GDP, but not her GNP. Similarly, the earnings of an Indian national working in a bank in Dhaka contribute to Bangladesh's GDP and India's GNP. Return on capital invested in foreign countries by Indians or remittance sent by Indian workers is a part of India's factor earning from abroad.

Thus, GNP = GDP + (Income earned by domestically owned factors abroad) –
(Income earned at home by foreign owned factors)

> **GNP = GDP + Net factor earning from abroad**

*Depreciation

In the course of production the fixed capital (plants and machinery) undergoes routine wear and tear which signifies the extent of consumption of fixed capital. Additionally, over time the machinery tends to becomes outdated or obsolete, even if perfect in the working condition. To avoid over estimating the national product, we create a provision for this wear and tear or depreciation as well as the routine obsolescence. Hence, if we have a gross estimate of the national product, subtracting the depreciation would give us the net national product.

Formally,

> ➢ **NNP = GNP - Depreciation**
> ➢ **NDP = GDP - Depreciation**

Net Domestic Product (NDP): NDP is the value of net output of the economy during the year. Some of the country's capital equipment wears out or becomes obsolete each year during the production process. The value of this capital consumption or depreciation is some percentage of gross investment which is deducted from GDP. Thus

NDP = GDP - Depreciation

Net National Product (NNP): NNP is the value of final goods and services produced in the current period by domestically-owned factors of production at home or abroad after allowing for the depreciation of fixed capital during any particular year. Thus, NNP is the deduction of the consumption of fixed capital or the depreciation allowance from GNP.

NNP = GNP - Depreciation

Net Domestic Product at Market Price and at Factor Cost

Gross Domestic Product is evaluated at market prices which diverge from the true cost of production, based on payments to factors of production, due to the presence of indirect taxes and subsidies. Suppose that the factor cost of one unit of output(including profit) is Rs.10.If there is a tax of Rs.2 per unit ,on the commodity or service ,the tax-inclusive market price will be Rs.12(=10+2).Thus market price is higher than factor cost by the amount of indirect taxes. If instead of a tax, there was a subsidy of Rs.2 per unit, the producer could sell at Rs.8 (=10-2) and still incur loss, then the market price is lower than the cost price by the amount of the subsidy. Thus indirect taxes push market price above unit cost of production and subsidies do the opposite. In other words the net indirect taxes (= Indirect tax - Subsidies) create a wedge between the valuation of gross domestic product at market price and at factor cost. So to obtain the value of aggregate output at factor cost (actual payment to factors for their productive service – which is the true measure of their contribution to GDP), indirect taxes are deducted and subsidies added on.

> **GDP at Factor Cost = GDP at Market Price - (Indirect Taxes - Subsidies)**
> **= GDP at Market Price - Net indirect tax**

Nominal and Real GDP

The value of GDP for a country changes from time to time. The same goes for prices of goods and services that keep fluctuating from time to time. If prices change, then there may be difficulties in comparing GDPs. If we measure the GDP of a country in two consecutive years and see that the figure for GDP of the latter year is twice that of the previous year, we may conclude that the volume of production of the country has doubled. But it is possible that only prices of all goods and services have doubled between the two years whereas the production has remained constant. Therefore, in order to compare the GDP figures of different countries or to compare the GDP figures of the same country at different points of time, we cannot rely on GDPs evaluated at current market prices. For comparison we take the help of real GDP. Real GDP is calculated in a way such that the goods and services are evaluated at some constant set of prices (or constant prices). Since these prices remain fixed, if the Real GDP changes we can be sure that it is the volume of production which is undergoing changes. Nominal GDP, on the other hand, is simply the value of GDP at the current prevailing prices.

Nominal GDP measures the value of output at the prices prevailing at the time of production, while **real GDP** measures the output produced in any one period at the prices of some base year. The growth rate of the economy is usually taken to be the rate at which real GDP is increasing. Table 1 illustrates the concepts. The current year is 2010 and the base year is 2004.

Table 1

	Current Quantities	**Current Year(2010) prices**	**Base Year(2004) prices**
Apple	8	6	4
Orange	4	3	7
Pen	10	2	5

Current or Nominal GDP = 8x6+4x3+10x2=**80**
Real GDP = 8x4+4x7+10x5=**110**

1. Product Method:

National income is measured by the output method by calculating the total value of goods and services produced in the country during the year. The money value of goods and services produced in an economy in an accounting year is called Gross National Product (GNP).To obtain national income of a country, we aggregate the money value of all final goods and services produced in a country in a year. The figure that we obtain is called GNP.

We cannot really add up the physical quantities of all goods and services produced in a year. It is meaningless to compute the sum of 10 Indica cars, 4- 70 liters of kerosene oil, 50 meters of cloth. Thus, we have to transform these physical quantities into money values by multiplying the quantity of each goods produced by the price per unit of each good. That is price per car x 10 cars + price per liter x 70 liters of kerosene +... When this is done we get money value of all goods.

In the product method multiple counting of the same product may arise if we take the total value of each and every product separately. To avoid this multiple counting two methods are available.

(i) Value Added Method
(ii) Final Product Method

(i) Value Added Method: In the value added method we take the values added at each stage of production and add them up. The value added by a productive unit is the difference between the total value of its output of the year and the value of all raw materials that have been drawn from the production of the year and have been used up. The value of raw materials drawn from the accumulated stocks is not deducted and the value of raw materials drawn from the current production but not used up in the year is also not deducted. Thus, value added = firm's revenue – costs of intermediate goods. In brief, value added is the increase in the value of goods as a result of the production process.

(ii) Final Product Method: In the final product method all products are divided into two categories-intermediate product and final product. If a product produced in a year is employed and used up in the same year as an input, it is called intermediate product. All other uses of a product are final product, i.e. final product means that the product is ready for its designated ultimate use. **.** To avoid the problem of multiple counting only final goods are to be taken into account but intermediate goods are not to be used to compute national product. Thus, the final product method to national income sum up the total money value of all final goods and services produced.

Example:

Suppose farmers produce Rs. 60 worth of wheat. The farms then sell the wheat to flour mills. The flour mills produce flour, which they sell to bakeries for Rs.100. The bakeries produce bread, which they sell for Rs. 150 to retailers (grocers). The grocers sell the bread to consumers for Rs.180. Table 2.1 illustrates the process.

Table 2: Value Added in Production:

Stages of Production	Value of Output (Rs.) (1)	Value of Input (Rs.) (2)	Value Added (Rs.) (3) = (1) – (2)
1. Wheat	60	0	60
2. Flour	100	60	40
3. Bread	150	100	50
4. Sale by retail grocers	180	150	30
Total	**490**	**310**	**180**

If we add the value of output (goods and services) at each stage of production, we arrive at a value of Rs. 490. The figure overestimates the value of output because of double counting. The flour, for instance, was made for Rs. 60 worth of wheat that we had already counted. In fact, then, the flour producers added only Rs. 40 to the production process.

In a like manner, the Rs. 150 worth of bread sold by the bakeries contains Rs.100 worth of flour which we had already counted in the output of flour mills. This means that the bakeries added only Rs.50 of production. In other words, value added (that is, the difference between output value and input value) by the flour producers is Rs. 40 and by the bakeries Rs. 50.

The wheat bought by the flour mills and the flour bought by the bakeries are called intermediate products. These are outputs of one firm or industry but are used as inputs by other firms or industries. The bread sold by the retail groceries is a final product. If all these value added to intermediate stages of production are summed up, the value of bread then becomes Rs. 180 only. The value added is just equal to the value of final bread, i.e. bread sold by the retail groceries. GNP is, thus, measured by calculating the value added at every stage of production. GNP = sum of value added of all firms.

2. Income Method:

The GDP of an economy in a given year can also be measured by adding incomes earned by all factors of production within the geographical boundary of the economy for their factor services. The factor services include land, labour, capital and entrepreneurs. These factor services received the income against their services. The factors income distributed as follow:

Factors of Production	Factors Income
1.Land	1. Rent
2.Labour	2.Wages or Salaries
3.Capital	3.Interest
4. Entrepreneurs	4. Profit

To show this we have to break up the Value Added of a firm into its income components. To bring out the interrelationship between the Value Added of a firm and the total factor income that originates within it, we have to start with the concept of profit of a firm. The profit of a firm from its production in a given year is defined by the difference between total revenue and total production cost in the same year. The total production cost of the output of a firm in a given year consists of wage, rent and interest payment(i.e. Primary Cost)made to household by the firm for the factor services purchased from them for the production of the given year plus cost of intermediate inputs used by the firm in the production of the given year. Here we start with the concept of value added of a firm.

Value Added of a firm = Total Revenue – Costs of Intermediate Inputs

Profit of a firm = Total Revenue – Total cost

Total cost = Costs of Intermediate Inputs + Primary Cost

Thus,   Profit = Total Revenue – Total cost

  = Total Revenue - (Costs of Intermediate Inputs + Primary Cost)

  = (Total Revenue - Costs of Intermediate Inputs) - Primary Cost

  = Value Added - (Rent + Interest + Wage)

So, Value Added= Profit + Rent + Interest + Wage

This means that GDP is taken to be the total income earned by all factors of production within the geographical boundary of the economy in the given year. For each production unit value

added is the excess of revenue over cost of intermediate inputs. This surplus gets distributed as payment to factors employed by the firms within economy. Therefore, if we sum up value added of all the production units, the value of aggregate factor income will give us GDP at factor cost of the economy in the given year. This is the income method of estimating GDP.

To measure GNP we must take into account the following facts to make an accurate estimate of national income.

1. Transfer Payments:
In the first place, national income accountants consider only those incomes that arise from the current production of final goods and services. Thus, some incomes are excluded. The principal exclusion is transfer payments that include income earned by beggar unemployment allowance, retirement pensions, flood or drought relief, etc. Transfer payments are the payments for which no direct service is rendered by the beneficiaries. As these payments involve no exchange of goods and services and only incomes are redistributed from one pocket to another, these transfer payments are not included in GNP.

2. Capital Gains and Windfall Gain:
Capital gains arising out of asset transactions are excluded from GNP. If the sale price of a house exceeds its purchase price, a situation of capital gains emerges. Such gains are coincidental. Any such gain may lead to a rise in national income as there is no economic production. Similarly, any windfall incomes (i.e., incomes from lottery, word puzzle) are not included in GNP.

3. Immeasurable activities:
Many activities are often excluded from the national income on account of simply problems of measurement. These are activities usually which are not sold in the market, such as time spent in household work, even though part of the productive set of activities carried out in an economy. In addition there are several other activities which are included in the national income but have associated costs which remain excluded from the national income. For instance, the production of bricks in the kiln might be included as part of the production in the national income, but what about the pollution it causes? The cost of environmental degradation is a depletion of sorts, and yet remains excluded from getting captured in any of the variants of national income. Although there are several reasons to incorporate the productive activities of unpaid domestic work and costs of environmental degradation, they remain excluded because of practical difficulties of measurement. Of course, efforts are being made by different countries to incorporate some of these activities in their estimates.

3. Expenditure Method:

According to the expenditure method, the gross domestic product (GDP) is the sum total of all final expenditure on various goods and services within domestic territory of the country, during a year. In fact, this approach is another way of calculating the value of final goods of the economy. This approach considers where those goods go. There are four possibilities some final goods are consumed by individuals, some are used by firms, some are purchased by government and some of them go abroad.

In a two-sector economy consisting of consuming sector and producing sector, total expenditure is divided into consumption spending (symbolised by C) and investment spending (symbolised by I). 'C' includes expenditure on all types of goods (both durable and non-durable) and services produced and sold. 'I' is defined as the expenditure on newly produced capital goods acquired for the purpose of providing services in the future. It includes investment in fixed capital formation, stock building and residential housing. Again, investment may be gross or net. Net investment is obtained by subtracting depreciation expenditure or capital consumption allowance from gross investments. Thus,

GDP = C + I

If we now consider a three-sector economy (i.e., closed economy) that includes governmental sector then GNP from the expenditure side becomes

GDP = C + I + G

'G' consists of expenditures on goods and services provided by the government. However, not all government expenditures are included in GDP accounts. Expenditure on government transfer payments (e.g., unemployment benefit, welfare grants, interest on national debt, etc.) is excluded.

The fourth category of expenditure in a four-sector economy, i.e., open economy, arises from international trade. Here we will now include export (symbolised by X) and exclude imports (symbolised by M). Market value of all exportable goods should be included in national income. But market value of all imported final goods and services are to be subtracted from the GDP figure. This is because that national income figure of any country must not reflect the contribution of foreign nationals. Thus, in an open economy,

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

This equation may be called an identity. By definition, thus, GDP equals consumption plus investment, plus government expenditures plus net exports.

CIRCULAR FLOW OF INCOME

In this model, the economy is assumed to be a closed economy and consists of only two sectors, i.e., the household and the firms. There is only one way in which the households may dispose off their earnings – by spending their entire income on the goods and services produced by the domestic firms. The other channels of disposing their income are closed: we have assumed that the households do not save, they do not pay taxes to the government – since there is no government, and neither do they buy imported goods since there is no external trade in this simple the goods and services which they assisted in producing. The aggregate consumption by the households of the economy is equal to the aggregate expenditure on goods and services produced by the firms in the economy. The entire income of the economy, therefore, comes back to the producers in the form of sales revenue. There is no leakage from the system – there is no difference between the amount that the firms had distributed in the form of factor payments (which is the sum total of remunerations earned by the four factors of production) and the aggregate consumption expenditure that they receive as sales revenue.

In the next period the firms will once again produce goods and services and pay remunerations to the factors of production. These remunerations will once again be used to buy the goods and services. Hence year after year we can imagine the aggregate income of the economy going through the two sectors, firms and households, in a circular way. This is represented in figure. When the income is being spent on the goods and services produced by the firms, it takes the form of aggregate expenditure received by the firms. Since the value of expenditure must be equal to the value of goods and services, we can equivalently measure the aggregate income by "calculating the aggregate value of goods and services produced by the firms". When the aggregate revenue received by the firms is paid out to the factors of production it takes the form of aggregate income.

The Circular-Flow Diagram
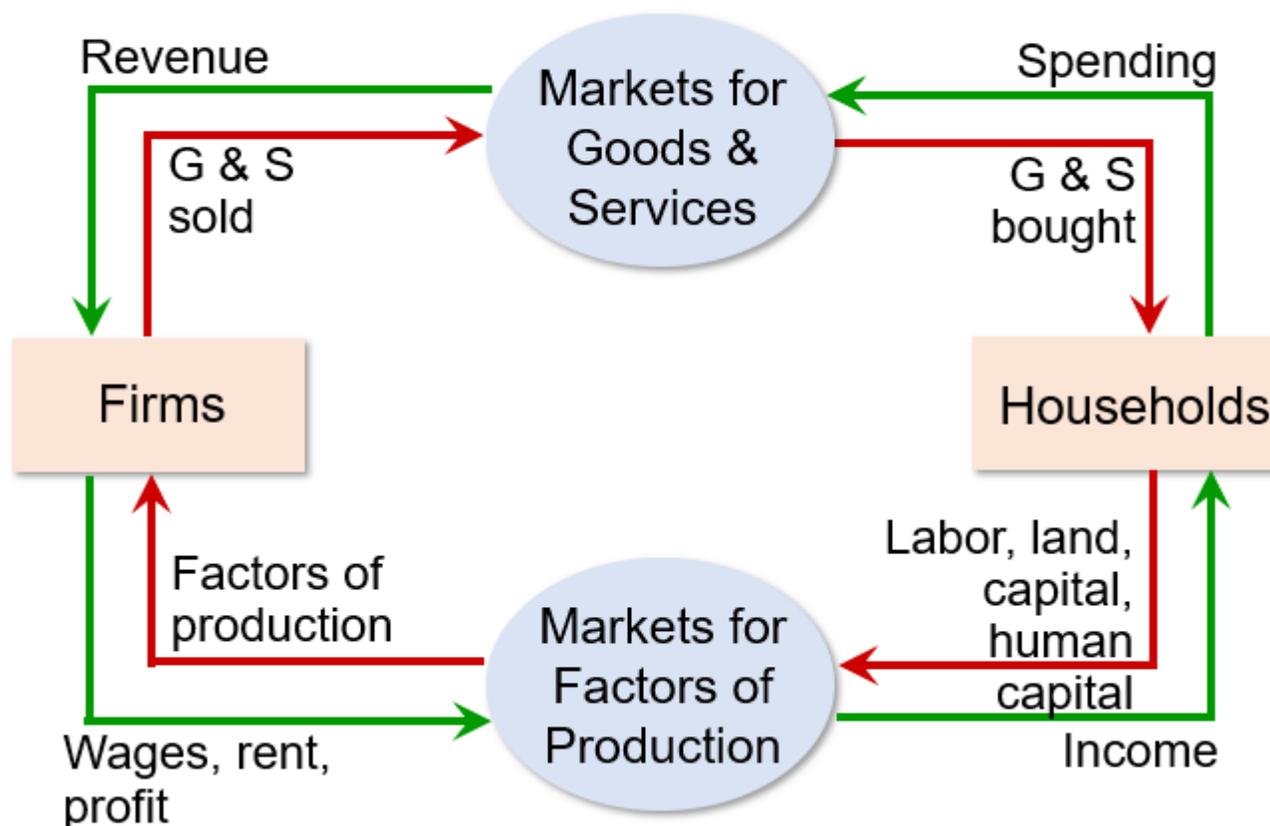
In the above figure, the uppermost arrow, going from the households to the firms, represents the spending the households undertake to buy goods and services produced by the firms. The second arrow going from the firms to the households is the counterpart of the arrow above. It stands for the goods and services which are flowing from the firms to the households. In other words, this flow is what the households are getting from the firms, for which they are making the expenditures. In short, the two arrows on the top represent the goods and services market – the arrow above represents the flow of payments for the goods and services, the arrow below represents the flow of goods and services. The two arrows at the bottom of the diagram similarly represent the factors of production market. The lower most arrow going from the households to the firms symbolizes the services that the households are rendering to the firms. Using these services the firms are manufacturing the output. The arrow above this, going from the firms to the households, represents the payments made by the firms to the households for the services provided by the latter.

Since the same amount of money, representing the aggregate value of goods and services is moving in a circular way, if we want to estimate the aggregate value of goods and services produced during a year we can measure the annual value of the flows at any of the dotted lines

indicated in the diagram. We can measure the uppermost flow by measuring the aggregate value of spending that the firms receive for the final goods and services which they produce. This method will be called the expenditure method. The upper flow from firm to household measures the aggregate value of final goods and services produced by all the firms; it will be called product method. The lower flow from firm to household measures the sum total of all factor payments will be called income method. Here aggregate spending of the economy must be equal to the aggregate income earned by the factors of production since the same flow is being measured at two different points.