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TABLE OF CONTENTS

1. Learning Outcomes

After studying this module, you shall be able to

- Understand the need for measuring a nation's income
- Learn how to measure a nation's gross domestic product
- Define gross domestic product
- Evaluate several aspects of gross domestic product
- Understand the meaning and significance of depreciation, net indirect taxes and net factor income from abroad
- Identify the circular flows of income and expenditure in an economy

2. Introduction

The extent of a nation's wealth has always been keenly followed by economic policy makers. In the 17th and 18th century the mercantilists measured the stock of nation's wealth by a stock of precious stones and metals. It was the Great Depression of 1930s that emphasized the need to design comprehensive measures of national output and income. The empirical measurement of a nation's aggregate economic activity and growth began with the work of Nobel Prize winning economists Simon Kuznets and Richard Stone in 1931 while working on U.S. national accounts. The national income accounting is based on defining certain aggregate measures like gross domestic product (GDP), gross national product (GNP), and other related measures like personal income, personal disposable income and then measuring them.

These measures enable us to study the growth of an economy and working of business cycles that may be of interest to policy makers and businessmen. It characterizes an economy providing insights into why and how some nations are able to enjoy higher standards of living than others. It also provides the basic ingredients for models used in macroeconomic theory. For instance, division of output into several components such as consumption, investment, government expenditure and net exports enables the study of aggregate demand.

The presence of accurate data enables testing theories as well as predicting future events and trends. The present module outlines several important concepts and issues involved in measuring the economic activity of a nation using the framework of national income accounting. The knowledge of these accounts is indeed an important first step in understanding the complex working of several sectors and their inter-relationships in a macro-economy. The business cycles and consequent economic conditions in an economy concern all of us through incomes, inflation, unemployment, foreign exchange or trade.

In this module, some concepts that are used to measure an economy's performance are explained. But before these are introduced, it is important to understand the concept of gross domestic product (GDP) in an economy.

3. Aggregate Output Measure: Gross Domestic Product (GDP)

The national income accounting involves computation of aggregate output measures such as Gross Domestic Product (GDP) and Gross National Product (GNP). The gross domestic product of a nation is an aggregate measure of all *currently producedfinal* goods and services evaluated at *market prices* within the nation's domestic territory during a specified period (generally, a quarter or year). Gross national product (GNP) is a similar measure but is based on contribution made to flow of goods and services by its residents only. India's GNP includes income earned abroad by Indians but excludes income earned by foreign residents in India. In other words, GNP is GDP plus net factor income from abroad. Certain aspects of the definition of GDP need special emphasis.

3.1 Final goods and services

Goods and services are classified into intermediate and final goods. Only the final goods and services (and not intermediate goods) are a part of GDP. It is important to distinguish between final and intermediate goods here. An intermediate good is one that is used in the production of other goods in the same period for any kind of processing and is then resold. A final good is when the product reaches the final stage of consumption. Whether the transaction is to be classified as intermediate of final depends on who buys and what is the purpose. Example, potatoes used for making a meal by a consumer is final good. However, if they are purchased by a firm to manufacture potato wafers, then it becomes an intermediate good. Intermediate goods are not added to GDP as their value is already included in the final good. Counting them again would result in double or multiple counting. For example, if both the value of potatoes used in making wafers and potato wafers are included in GDP or if both the value of steel used for producing car and car is included in GDP, this would exaggerate the GDP figures. While computing GDP, only final goods are included and their values added together. This leads to expenditure method of computing GDP. This will be explained in next module.

3.2 Value added at each stage of production

The value added method computes GDP by adding the value added in the economy. The value added is defined as value of total production less the value of intermediate inputs used in production. To avoid the problem of double-counting, value created at each stage may be added. Adding the value added at each stage will result in total value of the final product. For example, if we add the value added by wheat farmer, flour miller, bakery, wholesaler and retailer, we arrive at final value of bread sold. Suppose a loaf of bread is sold at Rs 20. For producing a loaf of bread, the cost of farmer is Rs 5. The miller and baker add value of Rs 4 each. The wholesaler and retailer earn Rs 4 and Rs 3 respectively. If we add value added at each stage (5+4+4+4+3) we get Rs 20, which is the final price of the bread. These values generated at each stage are distributed as factor incomes to the factor owners.

3.3 Currently produced goods

GDP includes only the currently produced goods in a particular period (quarter or year). Accordingly, transactions involving exchange of previously produced goods such as houses, automobiles etc. are not a part of current GDP as they have been included in the GDP of the year

in which they were produced. However, it should be kept in mind that the services of second hand dealers and brokers are a part of GDP as their service provides utility to both buyers and sellers in the current period. Due to this reason, exchange of assets such as shares and bonds do not result in addition to current production and hence are not included in GDP.

3.4. Goods at market prices

It would not be possible todirectly compare two entirely different kinds of products or services. However, GDP measure attempts to incorporate all these different kinds of goods and services produced in the economy. But it would be difficult to aggregate certain units of apples and certain number of haircuts. In order to make it feasible to include all these together, goods and services are evaluated at their market prices. For example, in a hypothetical economy that produces 10 Kilograms (Kg) of apples and 25 haircuts, it would be difficult to measure the total economic activity. However, if we multiply these quantities by their prices, the value of these final goods and services can be added together. Assuming that a Kg of apple costs Rs 20 and each haircut costs Rs 10 the total income can be computed as 10*20 + 25*10 =200 + 250 = Rs 450.

A problem of measuring at market value is that the goods that are not sold in the market fail to be included in GDP. The most important ones are services of housewives, all activities done at home such as child care, cooking, cleaning etc., produce from kitchen garden etc. though these are productive activities but are still ignored in calculation of GDP. In addition, the output from non-reported activities to avoid payment of tax or illegal activities such as gambling, prostitution, drugs etc. is not a part of GDP. These are discussed later on in this module.

4. Conceptual Issues

4.1 Stocks and Flows

It must be observed that some variables are measured at a point in time while others are measured over a period of time. For example, savings is measured over a period of time. Higher saving leads to greater wealth accumulation, which is measured at a point in time. The variables which are measured at a point of time are **stock** variables (such as wealth, assets, capital stock etc.) while those that are measured over a period of time are **flow** variables (such as GDP, income, expenditure etc.). In this context, it needs to be clarified that GDP attempts to measure economic activity undertaken in a particular year in an economy. It does not attempt to measure national wealth or stock of assets a nation possesses.

4.2 Market price and factor cost: Net indirect taxes

The GDP evaluated at market prices would diverge from the actual payments made to factors of production (i.e.GDP at factor cost) due to existence of indirect taxes and subsidies. The indirect taxes imposed on final goods and services increase the market price above the factor cost while subsidies reduce the market price. In order to derive the actual cost, which represents the true contribution of the factors net indirect taxes (i.e. indirect taxes minus subsidies) are subtracted from GDP at market price.

4.3 Gross and Net GDP: Depreciation

Depreciation or consumption of fixed capital is the capital that is used up or wears out during the production process. This capital consumption allowance is made because this used capital is no longer available for today's or tomorrow's production. To arrive at net GDP, therefore, depreciation is subtracted from gross GDP.

4.4 Domestic and national product: Net factor income from abroad

The net factor income from abroad (NFI) is the payment made by the rest of the world to domestic factors of production less income paid by domestic economy to foreign factors of production. Gross National Product (GNP) is obtained by adding NFI to GDP. The difference between GDP and GNP, i.e. NFI is not large for many countries like USA and India but large for countries like Ireland (large number of factories owned by foreign multinationals) and Mexico (large foreign debt).

To summarize,

GNP = GDP + NFI (1)

NDP = GDP – Depreciation(2)

National Income= NDP at factor cost= NDP at market price – Net indirect taxes (3)

4.5 Per Capita GDP

It is important to recognize that a higher national income of a country does not necessarily translate into higher standard of living for its citizens. A high national income could result into lower standard of living for citizens if population of the country is extremely high. In this case, one could say that the national pie is distributed between largernumber of people resulting in lower share for each individual. Therefore, the concept of per capita income becomes relevant as it takes it into account the size of population. GDP per capita is country's GDP divided by country's population. That is,

GDP per capita = GDP/Population

In a similar manner,

GNP per capita = GNP/Population

That is, per capita gross national product of a nation may be measured by dividing GNP with the country's population. The difference between GDP and GNP is more significant in relatively more open economies. Let us now discuss the distinction between open and closed economies.

4.6Open and Closed economy

The distinction between open and closed economy is quiet straight forward. An open economy is one that is having trade relations with other countries. A closed economy is one that does not trade with other nations. The latter is quite unrealistic as all modern economies are open though may impose various kinds of trade restrictions such as quotas, tariffs or quantitative restrictions. Nevertheless, the assumption of closed economy is often made in macroeconomic models for the sake of simplicity. Then to make the analysis more realistic open economies are considered. In the next section, the circular flow of income and expenditure is described based on the assumption of a closed economy.

5. Circular Flow of Income and Expenditure

By evaluating an individual's income a lot can be learnt about his standard of living. But, the expenditure statement of the individual is also likely to give us a good idea of that individual's standard of living. Just as both income and expenditure provide valuable information of an individual's living standards, a nation's standard can be judged using its aggregate income and expenditure.

The circular flow of income and expenditure is a pictorial representation indicating this equality. The circular flow demonstrates critical inter-linkages in an economy that arise in the process of interaction among economic agents. In a closed economy the agents are firms, households and the government. In a simple 2-sector model households and firms are the only two agents. Of course, the model can be made more realistic by enhancing the level of complexity and incorporating government, external and financial sector. However, the basic point can be put across more effectively using the 2-sector circular flow of income (Figure 1).

The figure presents the transactions that arise between household and firms in a closed economy.In such a model, production is carried out by firms. The firms produce various goods such as intermediate products, final goods, investment goods (machinery) and services. The intermediate and final goods have already been discussed. The investment goods are sold to firms while final consumption goods are sold to households. The factors of production (i.e., labor, land, capital, and entrepreneur) provide their services to produce these goods. These factors services are provided by households. The *real flow* of factor services from households to firms is depicted by R1 in the figure.

The firms' in turn make payments for their factor services (in the form of wages, rent, interest and distributed profits). These *nominal or monetary flows* from firms constitute the income of households, denoted by M1 in the figure. Further, the households use their incomes to buy final goods from firms. R2 represents this real flow of goods and services from firms to households. In turn the households make payments to the firms for final goods and services. M2 represents this nominal (or monetary) flow that captures firms' revenue from sales to households.

This captures the circular nature of interaction between economic agents and demonstrates the equality between income and expenditure at the aggregate level. (It is important to remember that unsold goods produced currently are treated as though they were sold to ensure this equality). By definition, GDP is a measure of aggregate economic activity which measures all of the final goods produced for consumption and investment. In this simple 2-sector model,

$$GDP = Y = C + I \quad (4)$$

where, C represents current consumption of households out of their current income (Y). Households save a part of their income which is S (so Y = C + S). To the extent households save or abstain from current consumption it enables the economy to produce goods for Investment (that creates productive capacity). So in a closed two sector economy S = I.

There are two important inferences that can be drawn from circular flow.First, income and output are essentially the same. In the process of producing output, income equivalent to the value of output is generated. Second, there is equivalence between income and expenditure. What firms' earn as revenue comes back to households as income and in turn is spent (aggregate expenditure) on buying goods and services from firms.

Adding the government sector to a 2-sector closed economy model explained above changes little of essence. The government may be a producer (public sector firms) anduses factor services (e.g., government employees) making factor payments to households. At the same time, it also purchases goods and services from firms (like other consumers). However, an important point to note is the government collects taxes from households and firms. This implies a part of households' incomes and firms' profits 'leak' out as taxes to the government. This *leakage* was absent in the 2-sector model above. The taxes are the government's income that is spent on goods and services. Thus, the identity in a closed economy with government would be

$$Y = C+I+G \quad (5)$$

and $$Y = C+S+T \quad (6)$$

(i.e. aggregate income is either consumed, saved or paid out in taxes).

Finally, let us consider an open economy. In such a case, economic agents have the freedom to buy good from the rest of the world (imports) and sell goods to them (exports). Imports are a leakage from the domestic economy as it is expenditure by domestic agents on output that is produced in a different economy (hence part of their GDP). Exports are an addition to the total expenditure on domestic goods. Hence, in an open economy we have

$$Y = C+I+G+X - M \quad (7)$$

Thus, in the expanded model with government and foreign sector,some monetary streams would add to the flow (injections) while others move out of the circular flow of income (leakages). The injections into the circular flow of income arise due to investment expenditure (I), government expenditure (G) and exports (X). The leakages from the circular flow of income arise due to savings (S), taxes (T) and imports (M). These leakages reduce the flow of income in circulation in the economy. Further, the equations below show how injections are always equal to leakages in an economy.

Equating, equations 5 and 6,

$$C+ I + G + X - M = C + S + T \quad (8)$$

$$I + G + X = S + T + M \quad (9)$$

6. Limitations of GDP as a measure of social welfare

Till date, GDP is the most comprehensive measure of nation's production capacity. The real GDP may be the best measure of evaluating an economy's production capacity. Better still, GDP per capita would account for both inflation and population stock of an economy. However, it has several limitations.

- GDP measures market value of all goods and services produced in an economy during a year. However, it does not give any significance to *composition* or kind of goods produced. If more of luxuries are produced in an economy it would indicate that the market caters to the demand of richer sections. This also indicates that there are wide inequalities of income and wealth in such an economy.

- It does not give any importance to *leisure*, which certainly could make a work-burdened individual better-off. As an individual grows richer, he is likely to allocate more hours to leisure rather than work. But, the measure of GDP fails to account for higher availability of leisure time resulting in much greater utility for its individuals.

- All activities performed at home are not a part of GDP. It is indeed strange that a mother taking care of her child leads to no addition to GDP while a nanny taking care of the same child adds to GDP of a nation. In this sense, GDP underestimates a lot of productive activity in the economy especially of women. This is not because housework is unproductive but because these activities are not sold in the market and hence it is difficult to assign value to them.

- The government in its pursuit of meeting the objective of social equity and welfare may sell the products at price much below their cost. For some goods such as defense, roads, public education there may not be any markets at all. In computation of GDP, these services are also underrepresented as due to lack of working of proper markets, *government services* are valued at their cost.

- Further, some economic activities add to environmental degradation adversely affecting the nation. These activities have resulted in global warming. In the computation of GDP no such calculation is done to subtract the cost imposed (on those not involved in these transactions) by this negative externality. It does not account for environmental damage caused in the process of increasing economic growth. Surprisingly, national income accounting considers depreciation of physical capital but does not consider the depletion of natural resources such as oil, fish, soil, forests, fertility etc. some of which are getting exhausted. The measure *Green GDP* accounting makes downward correction to GDP to take these social costs into account.

- In wake of rapid technological progress, there is a continuous change in the quality of existing goods (example, computers, smart phones, automobiles etc.). It is difficult to account for these changes in quality of various goods in GDP over time.

In sum, though there are several limitations associated with this measure of aggregating a nation's income, yet, it continues to remain the best and most widely used measure of welfare and standard of living.

7.Summary

- The empirical measurement of a nation's aggregate economic activity and growth began with the work of Nobel Prize winning economists Simon Kuznets and Richard Stone in 1931 while working on U.S. national accounts.
- The knowledge of national income accounts is indeed an important first step in understanding the complex working of several sectors and their inter-relationships in a macro-economy.
- The two aspects (income or output and expenditure) of GDP measures are reflected in circular flows of income and expenditure.
- There are leakages and injections taking place from circular flow of income.
- The gross domestic product (GDP) of a nation is an aggregate measure of all currently produced of final goods and services evaluated at market prices within the nation's domestic territory during a specified period.
- Intermediate goods are not added to GDP as their value is already included in the final good and only final goods are added to avoid multiple counting.
- To avoid the problem of double-counting, value created at each stage may be added. Adding the value added at each stage will result in total value of the final product.
- Using the income method GDP can be measured as the sum of incomes generated in an economy.
- The difference between GNP and GDP is Net Factor Income from abroad.
- An allowance for capital consumption during the year has to be made to reflect the usage and wear and tear of capital.
- To arrive at national Income at factor cost indirect taxes need to subtract while subsidies need to be added.
- Till date, GDP is the most comprehensive measure of nation's production capacity. However, it has several limitations as a measure of standard of living and welfare.