School of Social Sciences
Indira Gandhi National Open University

BECC-133
PRINCIPLES OF MACROECONOMICS-I

"शिक्षा मानव को बन्धनों से मुक्त करती है और आज के युग में तो यह लोकतंत्र की भावना का आधार भी है। जन्म तथा अन्य कारणों से उत्पन्न जाति एवं वर्तमान विषमताओं को दूर करते हुए मनुष्य को इन सबसे ऊपर उठाती है।"

– इन्दिरा गांधी

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"Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances."

– Indira Gandhi

BECC-133

PRINCIPLES OF MACROECONOMICS - I

School of Social Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068

BECC-133: PRINCIPLES OF MACROECONOMICS-I

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COURSE INTRODUCTION

Macroeconomics is a branch of economics that deals with the behaviour of aggregate variables such as output, income, money supply, saving, investment, exports and imports at the economy level. We need to study macroeconomics, separately from microeconomics, as the behaviour of the aggregates could be more complex than that of the components. Larger issues such as economic growth, inflation, unemployment, public debt and balance of payments could be studied only at the macroeconomic level. Thus macroeconomics helps us in three aspects, viz., (i) understanding the relationship among aggregate economic variables, (ii) evaluating the performance of the economy, and (iii) formulation of economic policy.

You will study macroeconomics through a set of two courses, viz., BECC 133: Principles of Macroeconomics – I, and BECC 134: Principles of Macroeconomics – II. The present course, first one of the set, is divided into four blocks.

Block 1 titled, **Issues in Macroeconomics and National Income Accounting**, begins with a unit on basic issues of macroeconomics and explains certain concepts frequently used in macroeconomics. The objective of the Unit is to provide an overview and generate some curiosity among learners. In subsequent two Units, it deals with the concept of circular flow of income and measurement of national income.

Block 2 titled, **Determination of GDP**, begins with a brief idea on the Classical and Keynesian systems. It highlights the contrast between both the schools of thought. Subsequently it deals with the Keynesian model of income determination in a two-sector framework.

Block 3 titled, **National Income Determination for an Open Economy with Government**, extends the Keynesian model to include government and external sectors, and describes its implications. It brings out the effect of changes in government expenditure and taxes. Subsequently, it discusses the various international flows in an economy and the effect of exports and imports on determination of equilibrium output.

Block 4 titled, **Money in a Modern Economy**, deals with the definition and functions of money, and measures of money supply. The second unit discusses the relationship between money supply and price level, in the framework of quantity theory of money. The last Unit of the course highlights the instruments of monetary policy in an economy.

UNIT 1 ISSUES AND CONCEPTS*

Structure

1.0 Objectives
1.1 Introduction
1.2 Why Study Macroeconomics?
1.3 Certain Concepts
    1.3.1 Stocks and Flows
    1.3.2 Short-Run and Long-Run
    1.3.3 Economic Models
    1.3.4 Growth Rate
1.4 Production Possibility Curve
1.5 Importance of Economic Growth
1.6 Inflation and Unemployment
1.7 Business Cycle
1.8 Let Us Sum Up
1.9 Answers/Hints to Check Your Progress Exercises

1.0 OBJECTIVES

After going through this unit you should be in a position to

- distinguish between microeconomics and macroeconomics;
- appreciate the importance of macroeconomics;
- explain the concept of production possibility curve; and
- provide an overview of issues such as inflation, unemployment and business cycle.

1.1 INTRODUCTION

By now you are familiar with the term microeconomics, which deals with issues pertaining to economic agents such as households and firms. In the case of households, we deal with the issue of utility maximization subject to budget constraint. Similarly, in the case of firms, we deal with the issue of profit maximization (or its dual, cost minimization) subject to a resource constraint. Such issues related to maximization of utility by a household, and minimization

* Prof. Kaustuva Barik, School of Social Sciences, Indira Gandhi National Open University.

of cost (or maximization of profit) by a firm are the subject matter of microeconomics. Through various diagrams you learnt how households make choices, what constraints they face, and how they reach their optimum levels of consumption. The optimization problem before a household can be explained through diagrams and can be solved by mathematical methods, particularly linear algebra. A similar treatment is made for analysis of the behavior of firms, where firms optimize their production level given the prices of inputs and resources available to them. Naturally a question comes to mind, "Does the same optimization problem applies to countries also?" The answer is yes; countries have certain objective functions, and they also face constraints. The objective function for a country could be maximization of growth in gross domestic product (GDP), minimization of poverty among households, maintaining a stable price level, reduction of inequality in distribution of income among individuals, and so on. In order to analyse these issues we need a different framework that is macroeconomics.

Macroeconomics is the branch of economics that studies the behavior of the economy as a whole. Thus it deals with aggregate variables such as national income, national consumption, national saving, national investment, exports, imports, etc. As you will come to know in later Units of this course, many of these variables are not simply the aggregation over microeconomic units.

1.2 WHY STUDY MACROECONOMICS?

In the early twentieth century, there was no such branch of economics as macroeconomics. According to Krugman and Wells, the term macroeconomics was coined by Ragnar Frisch in 1933. Theoretical developments in macroeconomics came into prominence with the publication of the book, 'General Theory of Interest, Employment and Money' by J M Keynes in 1936.

As mentioned earlier, macroeconomics concerns with the study of aggregate behavior in an economy. The need for a special branch of macroeconomics arises because what holds for the individual units may not hold good for the economy as a whole. For example, suppose a firm employs labour for production of output (say, cement). It can hire as many workers it requires at the ongoing wage rate. Thus increase in demand for labour by a single firm does not have any impact on the wage rate. However, if all firms increase their demand for labour (say due to economic boom and optimism in the country), there will be a shortage of labour and increase in wage rate. Further, the number of workers available for work in the country is limited; thus demand for labour beyond this limit will increase wage rate only, not the supply of labour.

Let us consider another example – saving by a household and total saving of the country. As you all will agree with me, saving by an individual is a virtue – we

should not consume all our income and save certain part of it for the future. In fact, if a person saves more, (s) he will receive interest on her savings, and her future income level will increase. There is a flip side to this issue however. Whenever a person saves certain part of income, her/his consumption expenditure decreases by a similar amount. Consequently, her/his demand for goods and services on which the amount could have been spent (say, clothing) is decreased. Thus the sales of the trader from whom (s)he would have bought the clothing get reduced. As a result, the income (profits) of the trader gets reduced. If the income of the trader is reduced, the amount of money the trader would have spent on purchase of goods and services gets reduced. The ripple effect continues.

We should not forget however that when we consume, we generate demand for goods and services. Such demand for goods and services leads to production activities and creation of employment in the country. If there is no demand for goods and services, there will be no production, no employment and no income generation in the country. Thus it is in the interest of the country that there is a steady growth in household consumption. In view of the above, it is often said that saving is a private virtue but a social vice! This problem is termed as the *paradox of thrift*.

Often the difference between microeconomics and macroeconomics is explained by giving the example of trees and forest. There are varieties of trees in the forest and each one could be different. Microeconomics is like studying the trees in a forest – their species, dimensions, growth, age, etc. Macroeconomics is like studying the forest – its area, density, composition, and overall ecosystem. We cannot ignore the forest for the trees – macro aspects as important as the micro aspects. While microeconomics is useful for analyzing the behavior of firms and households, macroeconomics is helpful in policy formulation and policy evaluation. Issues such as economic growth, inflation, employment, national debt, balance of payments, business cycles, etc. are very important for an economy. These issues are part of macroeconomics and need to be analysed at the macro level.

Check Your Progress 1

1. Distinguish between microeconomics and macroeconomics.

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2. Explain why macroeconomics is important.

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1.3 CERTAIN CONCEPTS

We present certain concepts frequently used in macroeconomics.

1.3.1 Stocks and Flows

A stock is measured at a point of time. For example, the capital stock of a country includes machines, equipment, and buildings. It refers to the part of national wealth that is reproducible (i.e., man-made); it consists of resources that help in production of goods and services. The stock of capital can be measured at a particular date. Money supply, labour force and external debt are some other examples of stock.

Flows are measured over an interval of time; thus it is a rate. In microeconomics, as you would have observed, the output of a firm can be measured on per day or per month basis. Otherwise, production without a time dimension is ambiguous. Similarly, if I say that my income is Rs. 10000, it is ambiguous – is it for a day, for a week, or for a month? In macroeconomics, the same logic applies. The gross domestic product (GDP) of a country, for example, is a flow. It represents the value of final goods and services produced over a year. Income, expenditure, saving, investment, consumption, profits, borrowings, etc. are examples of flows. Stock gets accumulated over time through change in stock. The change in capital stock is given by investment. Mathematically, stock can be seen as integration of a flow variable over a period of time.

1.3.2 Short-Run and Long-Run

You should be familiar with the concepts of short run and long run in microeconomics – in the short run certain factors of production are fixed. For a firm capital and technology are assumed to be fixed in the short run; they can be varied in the long run only. Thus in the long run, there are no constraints for a firm and the firm can maximize its output when all factors of production are variable.

In macroeconomics the usage of the terms short run and long are somewhat different from that in microeconomics. In macroeconomics, we assume certain variables to be sticky in the short run, particularly price level and wage rate. As we will see in later Units, the classical economists assumed prices and wages

to be fully flexible in the sense that they instantaneously adjust to changes in aggregate demand and aggregate supply and a new equilibrium is reached. According to Keynes these variables are sticky and they need time to adjust to their desired level. Thus prices and wages reach their equilibrium levels in the long run, not in the short run. Since policy makers are concerned with the short run also, they need to take into account rigidities in prices and wages in policy formulation.

The flow of capital input across various sectors of the economy takes time; it takes place in the long run, not in the short run. The movement of capital across countries is another variable which adjusts to its equilibrium level in the long run. The impact of such flows is spread over a period of time.

1.3.3 Economic Models

In economics we often use the term 'model'. It refers to a simplified version of reality. It allows us to understand, analyse and predict economic behavior. An economic model can be for a microeconomic agent such as household or firm. In macroeconomics, it represents the behavior of the economy as a whole.

In macroeconomic models we identify relevant macroeconomic variables (such as income, output, expenditure, investment, saving, exports, etc.) and establish relationship among them. The relationships among these variables may be expressed through diagrams or mathematical equations. There could be macroeconomic models without mathematical expressions, but these may not be precise.

An economic model is based on certain assumptions. These assumptions are required so that minute details are ignored and essential elements are included. Let me illustrate the point through an example. In the case of a firm, we assume that there are two factors of production, viz., capital and labour. We club all types of labour into a homogeneous category – we do not distinguish between a manager and a worker in the field! Similarly, while describing an indifference curve we overlook the type of households – the behavior of a rich household would be different from that of a poor household; or the behavior of a household in a rural area would be different from that of a household in an urban area. We ignore such details because our objective is to analyse the behavior of households to changes in prices and income. If our objective is to identify the changes in consumption pattern across households, we would require a different model and consider such differences.

In the Keynesian model, to take an example from macroeconomics, we consider aggregate variables such as total consumption, total investment, government expenditure, and net exports. We determine equilibrium level of output for the economy as whole. We ignore the behavior of households and firms.

Several growth models (such as Harrod-Domar model or Solow model) assume that the economy consists of just one sector – there is an aggregate production function, which gives the relationship between aggregate output (that is, total output) with aggregate inputs (that is, total capital and total labour). It may sound unrealistic, but the objective of these growth models is to analyse the equilibrium conditions for economic growth, saving ratio and population growth. These models ignore the details but the broad conclusions drawn are helpful in policy formulation. A question such as, 'why growth rate differs across countries?' can be addressed through these growth models.

1.3.4 Growth Rate

We use growth rate frequently in our day to day dealings. I am concerned with the rate at which my salary increased over the year, the rate of interest I get on my savings, and the rate of inflation which affect my purchasing power. At a broader level I may be interested in the rate at which India's population is growing or GDP is growing. The calculation of growth rate is the same in all the above cases. Annual growth rate of a variable is calculated as

$$\text{Growth rate} = \frac{\text{Value in current year} - \text{Value in previous year}}{\text{Value in previous year}} \times 100$$

Let us find out the growth rate of GDP

$$\text{Growth rate of GDP} = \frac{\text{GDP of current year} - \text{GDP of previous year}}{\text{GDP of previous year}} \times 100$$

We find that the GDP of India in financial year 2018-19 was Rs.190.10 lakh crore at *current prices* while it was Rs. 170. 95 lakh crore at current prices in 2017-18. If we put these values in the above equation we obtain $\frac{190.10 - 170.95}{170.95} \times 100 = 11.20$ per cent. Thus the growth rate of GDP we calculate above is 11.20 per cent for the year 2018-19! As we see from official data and newspaper reports, the growth rate of GDP of India during 2018-19 is not this high; it is much lower. The error we commit is that we consider GDP at *current prices* which include increase in output and increase in prices. Our objective, however, is to obtain an estimate of the increase in output during the financial year 2018-19. We need to neutralise the effect of price rise – for this we consider the GDP at *constant prices*. In India, GDP at constant prices, as of 2019, is given at the *base year* 2011-12. The GDP of India in constant prices for the year 2018-19 is Rs. 140.78 lakh crore compared to Rs. 131.80 crore in 2017-18 (the base year considered is 2011-12; thus these values are in 2011-12 prices). If we put these values in the above equation we find real GDP growth rate in 2018-19 = $\frac{140.78 - 131.80}{131.80} \times 100 = 6.81$ per cent.

1.4 PRODUCTION POSSIBILITY CURVE

As mentioned earlier, achieving higher economic growth is one of the objectives of economic policy of most countries. Economic growth of a country however cannot be higher than certain limit. This limit depends on the availability of inputs such as land, labour, capital, raw material, energy and technical knowhow. Availability of certain resources is also limited. Even for countries where natural resources are available in abundance, financial resources required for exploitation of natural resources may be in short supply. Every year we are glued to the television set during the government budget presentation; because it informs us about the policy and thrust areas of the government. The budget indicates how much money will be spent on various sectors of the economy.

It is important because the resources allotted on various heads of expenditure are limited. In general, we notice that there are several constraints before a country – there may not be sufficient budget for carrying out the activities, there may be shortages in supply of certain strategic raw materials, there could be a long gestation period between initiation of a project and its completion, and so on.

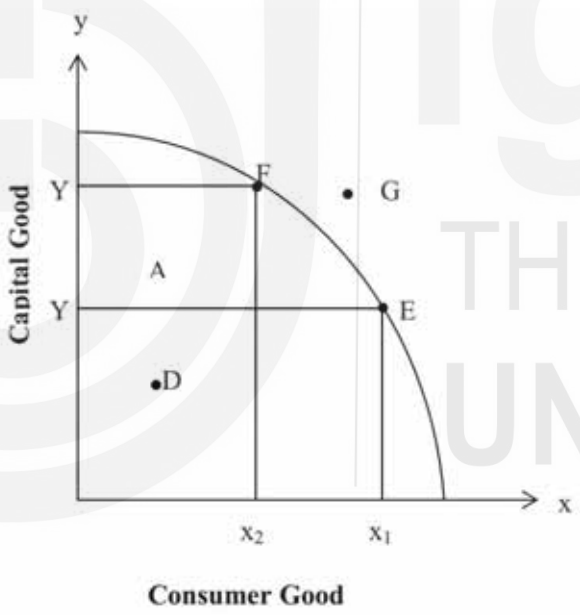

Fig. 1.1: Production Possibility Curve

You should note that the PPC shows the potential GDP of a country. What actually is being produced in the country may be different. For example, when production takes place on the PPC (see points E and F in Fig. 1.1), all resources are being utilized efficiently. If production takes place at a point inside the PPC (see points A and D), certain resources are under-utilised. A point outside the PPC, such as G in Fig. 1.1, is not attainable. If the country is operating at a point inside the PPC, then there is an 'output gap' as given below.

Output Gap = Potential Output – Actual Output

Potential GDP can grow overtime by two methods: technological progress and accumulation of more resources. In such cases the PPC shifts outwards to the right. In case the PPC shifts sufficiently outward, point G (which was not attainable earlier) could be achieved. When a country's PPC shifts outward, the country observes economic growth.

Check Your Progress 2

1. Distinguish between the following concepts: (i) stock and flows; (ii) short run and long run.

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2. Explain the concept of production possibility curve through a diagram.

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1.5 IMPORTANCE OF ECONOMIC GROWTH

As mentioned above, growth rate of an economy is given by the growth rate of its real GDP. Maximisation of growth rate is one of the objectives of most countries. You might have noticed that growth rate differs across countries – while countries like China have witnessed more than 10 per cent per annum growth rate for decades, there are many African countries where growth has been is negligible.

Very high economic growth of Japan is said to be a miracle during the post World War period. In the past 20 years, however, there has been severe economic crisis in Japan – highly fluctuating economic growth, declining population size, and very high public debt. Argentina, a Latin American country, was richer than many countries such as Australia, Canada and France during the early twentieth century. Argentina is endowed with vast natural resources, particularly in the areas of agriculture and energy. In 1913 Argentina's per capita income was $3797 compared to $3452 of France and $3134 of Germany. According to International Monetary Fund (IMF), in 2019, the per capita income of Argentina

is $9887 while that of France and Germany are $41760 and $46563 respectively. It indicates that per capita incomes of France and Germany have increased much faster over the past century than that of Argentina. Economists ascribe this relative stagnation in growth rate of Argentina to several factors including political instability, lack of technological progress, adherence to the development strategy of import-substitution (instead of export promotion), and high inflation. In another example, we compare the per capita incomes of China and India; two major emerging economies of the world. Per capita GDP of India and China was almost at the same level till 1990 (in US Dollar terms, GDP per capita of India was $367 in 1990 compared to $318 of China). In the subsequent period, however, growth rate of China was much higher than that of India. In 2018, per capita GDP of India was about 20 per cent that of China (India's per capita GDP, in US Dollar terms in 2018, was $2010 compared to China's $9770). If we compare the per capita income of India and China in purchasing power parity (PPP) terms for the year 2018, however, India's per capita GDP was $7762 compared to $18236 of China (about 43 per cent). We can make such comparisons across countries and analyse the reasons for such differences in growth by undertaking macroeconomic analysis.

You should be aware of the 'rule of 70'. It indicates the number of years it takes to double your money. If you save Rs. 1000 in a bank and the rate of interest is 1 per cent per annum, your saving will take 70 years to double, i.e., to be Rs. 2000. If the rate of interest is 7 per cent, it takes only 10 years to double. The formula is

$$\text{Number of years to double the amount} = \frac{70}{\text{rate of inerest}}.$$

The same rule can be applied to GDP and per capita GDP of a country. If per capita GDP of a country is growing at the rate of 5 per cent, it takes 14 years (that is, $\frac{70}{5}$=14) for the country to double its per capita GDP. If growth rate in per capita GDP is 10 per cent per annum, it will double in 7 years. Let us compare between two countries, A and B, which have the same per capita GDP, say Rs. 1000. Let us assume that per capita GDP of country A is growing at 5 per cent per annum while that of country B is growing at 10 per cent per annum. If we consider a time span of 28 years, per capita GDP of country A will be Rs. 4000 after 28 years that of country B will be Rs. 8000! You can imagine how much difference a higher growth rate can bring to per capita GDP in the long run. Economic growth is important because it leads to increase in income of people, which in turn leads to higher consumption and saving. Second, there is increase in tax revenue of the government due to higher income and output. Third, increase in GDP leads to fall in unemployment, as more workers get employed. Fourth, increased government expenditure leads to improved public services.

You should note that economic development is different from economic growth. While economic growth indicates increase in GDP, economic development is a much broader concept.

Economic development includes improvement in basic facilities such as health, education, electricity, drinking water, absence of poverty, etc. Such improvement is possible if there is economic growth.

1.6 INFLATION AND UNEMPLOYMENT

We come across the terms inflation and unemployment often in newspapers and in our everyday conversation. Increase in either of these variables creates miseries in people's life and much concern for the policy makers. Inflation is defined as a persistent rise in the general level of prices. If price level goes up today but falls tomorrow then it may not imply inflation, but only short-term fluctuations in prices. The term 'general price level' is also important since, over a period of time, prices of some commodities may have gone up while that of some others may have actually fallen. As a result, on the whole, the average of these prices may remain constant or even go down. Similarly if the price of a group of commodities, which constitute a small fraction of the total value of output of the economy, would go up, then again it might not be inflationary as such. That is, the effect of rise in prices of such commodities might be too small so as to affect the average price level of all the commodities.

Thus we see that inflation is a macroeconomic phenomenon and is not concerned with the rise in the price of a particular commodity, or, a small group of commodities. When there is inflation, the purchasing power of people declines. Inflation has differential impact on various sections of society. While salaried groups (persons having fixed monthly income) are hit adversely, producers and traders stand to gain during periods of inflation. Very high inflation (often called hyper-inflation) puts everyone's budget in disorder.

Unemployment is another social evil. In economics when we refer to the term unemployment, we mean involuntary unemployment, that is, a person is looking for work but not able to find a job. A person who is not looking for a job cannot be considered as unemployed.
There are periods when we quit a job and look for another. At any point of time, certain fraction of workers is between jobs – such unemployment is transitory.

However, there are time periods when unemployment rate is quite high. Unemployment is bad on two counts, viz., (i) it results in loss of income for the unemployed, and (ii) there is wastage of valuable human resources.

It is generally observed that there is a trade-off between inflation and unemployment, at least in the short run. If the government wants to decrease the

rate of unemployment, the economy has to tolerate a higher rate of inflation. Similarly, if the government wants to control inflation, the rate of unemployment may increase.

There is considerable debate on the relationship between inflation and unemployment; and there is much difference among economists on the relationship between the two.

1.7 BUSINESS CYCLE

There are ups and downs in economic activities for any country – while growth rate is high in certain periods, it is low in other periods. It is generally observed that there are alternating phases of high and low growth rates. Such phases of growth are called business cycles.

There are four phases of a business cycle: expansion, recession, depression, and recovery. The duration of a business cycle can vary from two years to twelve years. Business cycles are *synchronic*. Depression or contraction occurs simultaneously in most industries or sectors of the economy. Recession passes from one industry to another and chain reaction continues till the whole economy is in the grip of recession. Similarly, prosperity spreads through various linkages of input-output relations or demand relations between industries or sectors. Business cycles can be distinguished from other fluctuations as they are usually *larger, longer,* and *widely diffused*.

In business cycles we observe that several inter-related variables move together. Fluctuations occur simultaneously in the level of output as well as employment, investment, consumption, rate of interest, price level, etc. The immediate impact of recession or expansion is on the inventories of goods. When recession sets in, inventories start accumulating beyond the desired level. In response, producers cut down on the level of production of goods. In contrast, when recovery starts, aggregate demand picks up and inventories go below the desired level. It encourages business houses to place more orders for goods which boosts production and stimulates investment. Business cycle is international in character; once started in one country, it spreads to other countries through contagion effect. The downslide in financial markets, for example, in one country spreads rapidly to other countries as financial markets are linked globally through capital flows. Further, recession in one country, say the United States (US), can spread to other countries as the imports of the US will decline. Countries which are major exporters to the US will witness a decline in their exports and may witness recession.

The adverse impact of the Great Depression (1929-34) is well documented. It resulted in widespread unemployment, poverty and misery among a large section

of society in many countries. In recent years, during 2007-09 (often it is referred to as the Great Recession) most countries witnessed a phase of severe recession. The world has overcome the adverse impact of the economic crisis of 2007-09 to some extent, but its memories are still fresh.

Check Your Progress 3

1. Explain why economic growth is important for a country.

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2. Distinguish between economic growth and economic development.

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3. Explain the concept of business cycle.

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1.8 LET US SUM UP

In this unit we distinguished between microeconomics and macroeconomics. Macroeconomics considers broader and aggregative aspects of the economy. It is helpful in policy formulation and policy evaluation.

We discussed how growth rate can be calculated. In addition, we described the importance of economic growth. Distinction between concepts such as stock and flows, and short-run and long run are presented in the Unit.

Brief ideas on certain concepts such as inflation, unemployment and business cycle, which we come across in our everyday life, are also given in the Unit.

1.9 ANSWERS/ HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Go through Section 1.2 and answer.
2. Go through Section 1.2 and answer.

Check Your Progress 2

1. (i) Stocks are measured at a point of time while flows are measured per unit of time. Go through Section 1.2 for further details.

   (ii) In the short run certain factors are fixed while in the long run all factors are variable. Go through Section 1.2 for further details.

2. Production possibility curve depicts the potential output of an economy. Explain Fig. 1.1 for your answer.

Check Your Progress 3

1. Go through Section 1.5 and answer.
2. Economic growth means the growth in the GDP of a country. Economic development is a multi-dimensional concept. In addition to per capita income, it includes various socio-economic variables. Go through Section 1.5 for further details.
3. Go through Section 1.7 and answer.

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UNIT 2 NATIONAL INCOME ACCOUNTING*

Structure

2.0 Objectives

2.1 Introduction

2.2 Circular Flow of Income

- 2.2.1 Types of Circular Flows
- 2.2.2 Circular Flow of Income in the Two-Sector Model
- 2.2.3 Circular Flow of Income with Financial Market
- 2.2.4 Injections and Leakages
- 2.2.5 Circular Flow of Income in the Three-Sector Model
- 2.2.6 Circular Flow of Income in the Four-Sector Model

2.3 National Income and Related Concepts

2.4 Measurement of Related Aggregates

- 2.4.1 Private Income
- 2.4.2 Personal Income
- 2.4.3 Disposable Income

2.5 Let Us Sum Up

2.6 Answers/ Hints of Check Your Progress Exercises

2.0 OBJECTIVES

After going through this unit you will be able to

- assess the relationship between different sectors of an economy;
- explain how national income of an economy is measured; and
- identify the various components of macroeconomic aggregates.

2.1 INTRODUCTION

National income accounting (NIA) is a book-keeping system that a country uses to measure the level of its economic activity in a particular time period. It records data on expenditure and income of various stake holders of economy, viz., households, firms, government, and external sector of an economy. Although it cannot measure the economic activity accurately, it provides useful insight on the functioning of an economy, and on mediums/ channels of the generation of income and spending. By combining all the information from NIA, we can obtain the per capita income, and growth over a period of time of an economy. The performance of an economy is represented through indicators such as gross

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domestic product (GDP), gross national product (GNP), and gross national income (GNI) which we will discuss in this unit. We will also discuss the other associated aggregates of an economy.

2.2 CIRCULAR FLOW OF INCOME

Circular flow of income refers to continuous circular movement of goods and services between major sectors; e.g., Households, Firms (or Business) Sector, Government Sector, and External Sector (also called 'Rest of the World'). It is circular in nature because it moves in a circle coming back to the starting point. Whenever national output is produced, it generates equivalent amount of claims of that output in the form of national income. Circular flow of income refers to flow of money income, or flow of goods and services, across various sectors of an economy.

2.2.1 Types of Circular Flows

There are two types of circular flows: (i) Real Flow or Product Flow, and (ii) Income flow or Money flow.

1. **Real Flow or Product Flow**

   Real flows refer to flows of goods and services. These are called real flows because they consist of actual goods and service. It is also called as output flow.

2. **Income Flow or Money Flow**

   Money flow refers to flows of money in the form factor payments and consumption expenditure. The monetary flow occurs because it is through money that various transactions are conducted, bringing flows of money from one sector to another. The flow of factor services generates 'money flow' in the form of factor payments, which take the form of 'income flow'. The expenditure on goods and service takes the form of 'expenditure flow'. Both income and expenditure flows are displayed in a circular manner in opposite directions. In this framework, the economy is divided in to four sectors, viz., i) household sector, ii) business sector, iii) government sector, and iv) external sector.

2.2.2 Circular Flow of Income in the Two-Sector Economy

To begin with, let us assume that the economy consists of only two-sectors, viz., i) households, and ii) firms. In this simplified economy, there is neither government intervention, nor external trade.

The households spend their entire income, i.e., no saving done by the household sector. Fig. 2.1 shows the circular flows of expenditure and income in a two-sector model.

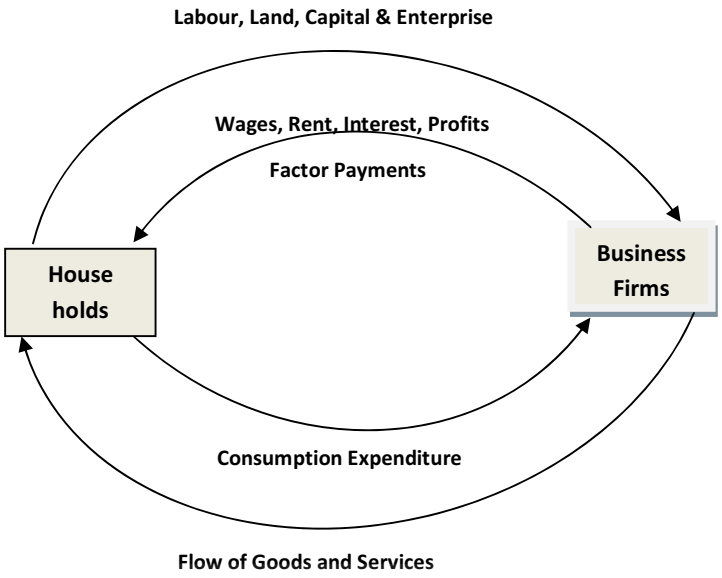

Fig. 2.1: Circular Flow of Income in a Two-Sector Economy

The upper half of the figure shows the factor market and the lower half presents the commodity/ product market. The outer two arrows (clock wise) indicate real flows and the inner two arrows (anti-clock wise) reflect monetary flows. We can visualize each sector as a buyer and as a seller. The business firms hire factor services from households, who are owners of factors of production (viz., land, labour, capital and enterprise) for producing goods and services. The business firms pay the factors of production remuneration (or compensation) in the form of money for rendering the productive services. The compensation to a factor of production or their income, viz., rent, wage, interest and profit for land, labour, capital and enterprise respectively are generated in the production process. Thus money income flows from firm sector to the households. With this money, the households purchase goods and services from the firms or business sector to satisfy their wants. Thus the same money flows back from households to the firm sector (remember the assumption that there is no saving by the households – they spend all their income). Thus the entire income of the economy comes back to the firms in the form of 'sales revenue'. Thus we can say that, 'one sector's expenditure is the other sector's income'.

2.2.3 Circular Flow of Income with Financial Market

In the two-sector model, we assume that all income received by the households are spent on goods and services. But, in real life, households save part of their income and receive interest on it. The firms borrow from households for investment purposes. Financial institutions are intermediaries between savers and investors (here, households and firms). Financial market collects household saving and passes it on to the business sector as investment (see Fig. 2.2). Savings constitute leakages from the circular flow of money and investment becomes injection in circular flow.

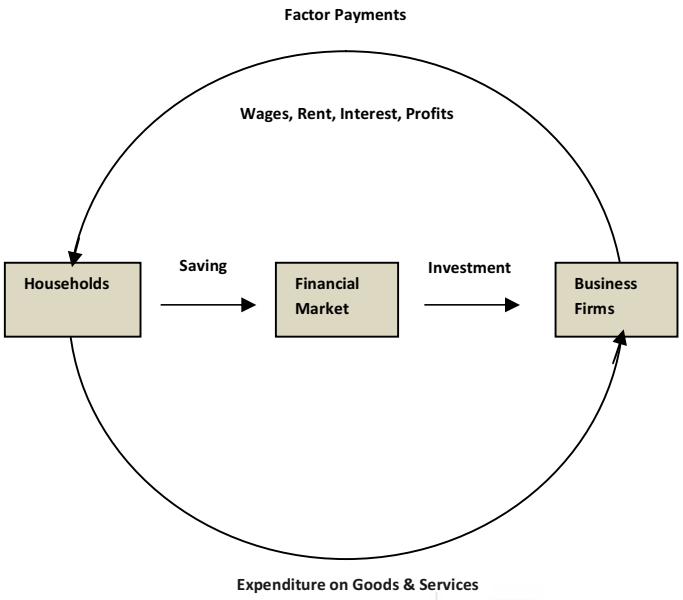

Fig. 2.2: Circular Flow of Income in a Two-Sector Economy with Capital Market

2.2.4 Leakages and Injections

Leakages are the amount *withdrawn* from the flow of income. It could be in the form of saving by households, tax payments, or spending on imports. On the other hand, injections are the amount *added* to the flow of income. Injections to the circular flow could be in the form of investment, government spending, subsidy, or export. Leakages are also called 'withdrawals' while injections are called 'additions'.

2.2.5 Circular Flow of Income in the Three-Sector Economy

When the government sector (i.e., the third sector of the economy) is added to the two-sector model, we obtain the three-sector model. In this model, fiscal operations (taxes, government expenditure and 'transfer payments') are added. These variables have different effects on the income and expenditure flows.

Taxes are leakages from the circular flow as they reduce 'personal disposable income' and hence consumption expenditure and saving. Government spends on capital goods, infrastructure (e.g., highways, power, etc.), railways, defence, education, public health, etc. for economic development. Therefore, government expenditure is an injection in the circular flow as it creates demand in the form of purchases of factor services from the households, and goods from the business sector. Further, transfer payments (e.g., pension, unemployment allowance, subsidy, etc.) are injections in the circular flow (as it creates demand in household sector). The circular flows of income and expenditure have been shown in Fig. 2.3.

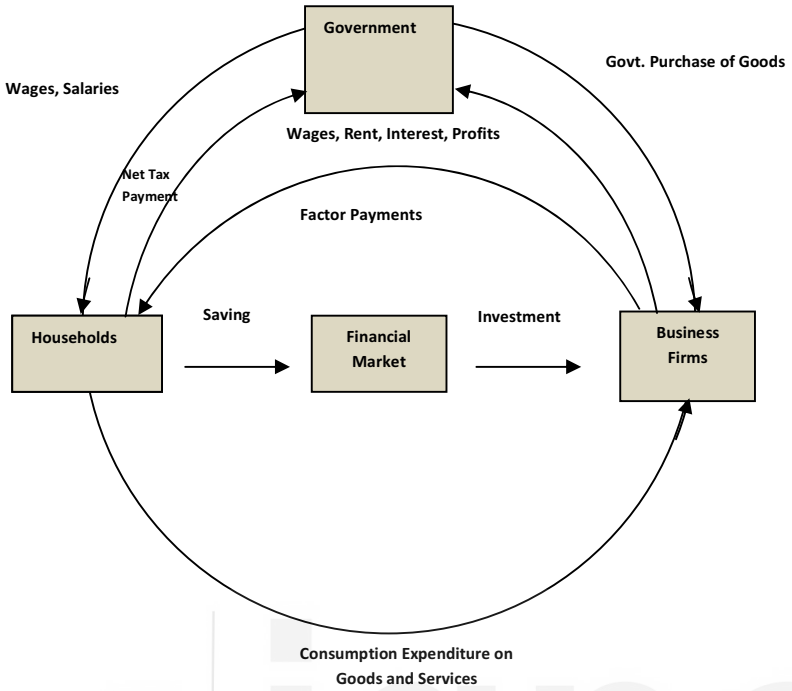

Fig. 2.3: Circular Flow of Income and Expenditure in Three-Sector Model

In Fig. 2.3 we find that only money flows among households, firms and government. Government purchases goods and services from firms and households, which is as shown in the upper part of Fig. 2.3. Government expenditure is mainly financed by taxes or borrowings. The second money flow shows all tax payments made by households and business firms. Households pay direct taxes to the government, while firm's earnings are taxed in the form of corporation tax. Few indirect taxes are levied by government on firms, but ultimately borne by the households. These money flows include all the tax payments made by households and firms less transfer payments. Government also saves and borrows from financial sector like households and business sector (in order to avoid confusion, we have not shown in Fig. 2.3, the money flow from financial market to the Government).

If there is surplus in the budget which is a rare phenomenon, then there will be net leakages from the circular flow of income to the extent of the surplus and money will flow from the government to the capital market. If surplus is not spending by the government then the circular flow will contract/decline. Deficit in budget is the normal phenomenon, which is generally covered by loans and hence, there will be flow of money from the capital market to the government. Thus, deficit budget implies injection into the economy resulting in expansion of circular flow. If government maintains balanced budget; i.e., the amount of money taken out of the circular flow as taxes will be exactly replaced through government expenditure.

2.2.6 Circular Flow of Income in the Four-Sector Model

If we do not include the external sector or Rest of World in the circular flow of income, the model will remain incomplete. The domestic economy is connected with the Rest of World through international trade (imports and exports) and financial flows. In Fig. 2.4 we show how money flows in an open economy when foreign trade exists.

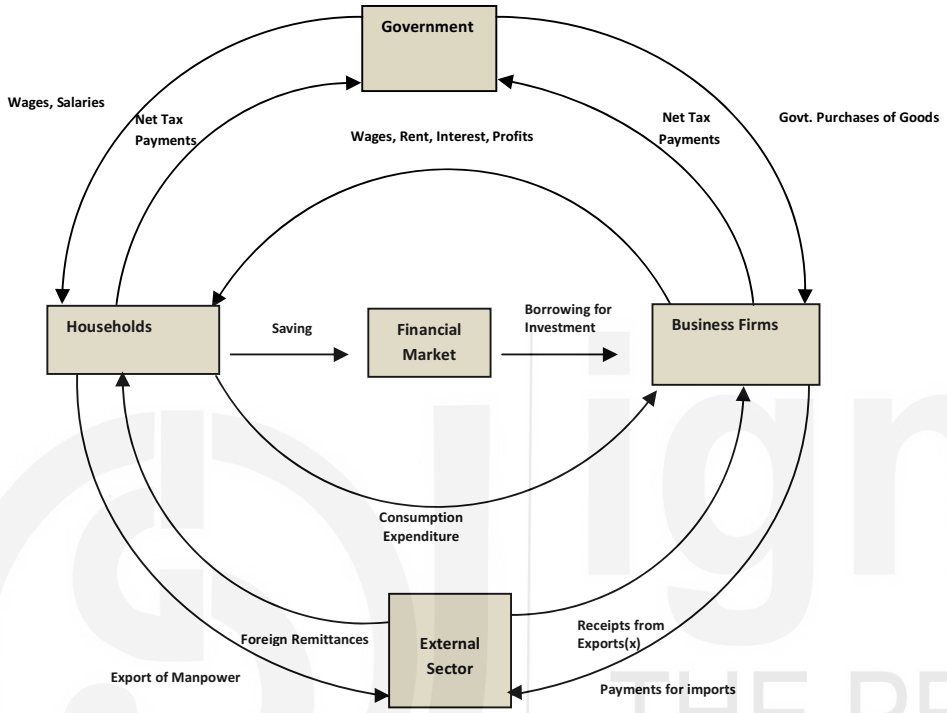

Fig. 2.4: Circular Flow of Income in an Open Economy

The lower part of the figure shows the circular flow of money in respect of foreign trade. Export of goods and services bring money into the country in the form of receipts from export (injections). On the other hand, imports cause outflow (leakages) of money from the flow.

There exists a balance of trade, if exports and imports are equal. Normally, exports are not equal to imports. Trade surplus occurs, if value of exports exceeds the value of imports. On the contrary, if value of exports is less than value of imports then trade deficit arises. In an open economy, countries also interact with each other through borrowing and lending funds (financial market). These days, financial markets around the world have become well integrated.

When exports (X) exceed imports (M), there is a trade surplus in the economy, and hence, net capital inflow will take place. Net capital inflow means foreign nationals will borrow from domestic savers to finance their purchases of domestic exports. Therefore, domestic savers will lend to foreign nationals and acquire external financial assets. Hence, the circular flow of income goes up (injections) by the amount of surplus.

On the other hand, if there is export deficit or import surplus (i.e., when imports are greater than exports), the country has unfavourable 'balance of trade' (trade deficit). Hence, households and business firms will borrow from the Rest of the World. Hence, foreign nationals will acquire domestic financial assets. In such cases, the circular flow of income goes down (leakages) by the amount of deficit.

Check Your Progress 1

1) What do you mean by circular flow of income?

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2) Differentiate between Money Flow and Real Flow.

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3) Explain how circular flow of income takes place in the two-sector model.

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4) Explain the difference between leakages and injections.

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5) What are the various effects of inclusion of the government sector in circular flow of income?

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6) Discuss the effect of adverse and favourable balance of trade on the circular flow?

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2.3 NATIONAL INCOME AND RELATED AGGREGATES

As the name suggests, national income can be defined as the income of a nation during a period of time. It denotes a country's purchasing power. It is defined as the total money value of all final goods and services produced by the normal residents of the economy in a year. It includes both producer and consumer goods whether for self-consumption or for exchange. It does not include intermediate goods and non-economic goods. There are different concepts of macroeconomic aggregates. Each concept is having specific meaning, method of measurement and use. These are:

1. Gross Domestic Product at Market Price (GDP_{MP})
2. Gross National Product at Market Price (GNP_{MP})
3. Net National Product at Market Price (NNP_{MP})
4. Net Domestic Product at Market Price (NDP_{MP})
5. Gross Domestic Product at Factor Cost (GDP_{FC})
6. Gross National Product at Factor Cost (GNP_{FC})
7. Net National Product at Factor Cost(NNP_{FC})
8. Gross Domestic Product at Basic Price

GDP is the sum of the value of all goods and services produced within the boundaries of a country. For example, India's GDP includes goods and services produced by the resident Indians and foreign nationals inside India, but it does not include goods and services produced by Indians residing abroad. We further elaborate on the concepts mentioned above.

1. Gross Domestic Product at Market Prices (GDP_{MP})

GDP is the sum of the value of all goods and services produced within the boundaries of a country, plus taxes but minus subsidies on imports. GDP is a flow concept, i.e., flow of goods and services produced during a year.

It does not include previous year production. While calculating GDP, income earned through illegal activities is excluded. Further, transfer payments, capital gains and financial transactions are also excluded from GDP.

GDP_{MP} can be expressed as
GDP_{MP} = Money value of final goods and services produced by national residents + Income earned locally by foreign nationals – Income received by nationals residing abroad.

2. Gross National Product at Market Price (GNP_{MP})

GNP_{MP} is defined as the value of all final goods and services produced in an economy by its own domestic factors of production, which may be employed within the economy and abroad in a financial year. The difference between GNP_{MP} and GDP_{MP} is the 'Net Factor Income from abroad'. Net Factor Income from abroad (NFIA) is the difference between the aggregate amount that a country's citizens earn aboard and the aggregate amount that foreign nationals earn in home economy. Thus,

GNP_{MP} = Money value of Final goods and services + Income earned by National residents in Foreign Countries – Income earned locally but accruing to foreign nationals.

Or,

$GNP_{MP} = GDP_{MP} + NFIA$

If the NFIA is positive, i.e., income earned by national residents are more than foreign nationals earning in that country, then GNP > GDP. On the other hand, if the NFIA is negative, i.e., income earned by national residents are less than foreign nationals earning in that country, then GNP < GDP.

3. Net National Product at Market Price (NNP_{MP})

NNP_{MP} is the total money value of all the final goods and services excluding depreciation, which is the consumption of fixed capital Thus,

$NNP_{MP} = GNP_{MP}$ – Depreciation

Or,

$NNP_{MP} = GDP_{MP}$ – Depreciation +NFIA
The difference between NNP and GNP is Depreciation, i.e.,
Depreciation = $NNP_{MP} – GNP_{MP}$

4. Net Domestic Product at Market Price (NDP_{MP})

NDP_{MP} is defined as the market value of all final goods and services produced in the domestic territory of a country by its normal residents and non-residents during financial year less deprecation.

Thus,

$NDP_{MP} = GDP_{MP} – Depreciation$
$NDP_{MP} = NNP_{MP} – NFIA$

5. Net Domestic Product at Factor Cost (NDP_{FC})

NDP_{FC} is defined as the sum of all domestic income earned. In other words, it is total factor incomes earned by all the factor of production. It can also be calculated by subtracting Net Indirect Taxes (NIT) in NDP_{MP}. The NIT is equal to indirect taxes minus Subsidies. The NDP_{FC} can be calculated as:

NDP_{FC} = Compensation of Employees + Operating Surplus + Mixed Income

Or,

$NDP_{FC} = NDP_{MP}$ – Net Indirect Taxes

Or

$NDP_{FC} = NDP_{MP}$ – Indirect Taxes + Subsidies

6. Gross Domestic Product at Factor Cost (GDP_{FC})

It is the sum of net value added by all the producers in the domestic territory of a country during financial year. It can also be calculated by subtracting Net Indirect Taxes (NIT) in GDP_{MP}. Symbolically,

$GDP_{FC} = GDP_{MP}$ – NIT

Or,

$GDP_{FC} = GDP_{MP}$ – Indirect Taxes + Subsidies

Or,

$GDP_{FC} = NDP_{FC}$ + Depreciation
= Compensation to Employees + Operating Surplus + Mixed Income

7. Gross National Product at Factor Cost (GNP_{FC})

It is defined as value of all final goods and services measured at factor cost produced in an economy by normal residents of a country in a financial year.

$GNP_{FC} = GDP_{FC}$ + NFIA
$GNP_{FC} = GDP_{MP}$ – Indirect Taxes + Subsidies

8. Gross Domestic Product at Basic Prices

GDP is the sum of the value of all goods and services produced within the boundaries of a country, minus taxes and subsidies on imports.

Notes:

I) Difference between Gross and Net is 'Depreciation'

Net = Gross – Depreciation
Gross = Net + Depreciation

II) Difference between National and Domestic is Net Factor Payment from Abroad (NFP)

NFP = factor Payment from Abroad by Normal Residents – Factor Payment to Non Residents within Domestic Territory of a country.
National = Domestic + NFP

III) Difference between Market Price and Factor Cost is Net Indirect Taxes

Net Indirect taxes = Indirect Taxes – Subsidies
Market Price = factor Cost + Net Indirect Taxes
Factor Cost = Market Price – Net Indirect Taxes

IV) National Income = $\mathbf{NNP_{FC}}$

V) Net Domestic Income = $\mathbf{NDP_{FC}}$

Example 2.1: Calculate GNP at factor cost and GNP at market price with the help of the following data.

		(Rs. Crore)
1)	Compensation of employees	26,142
2)	Operating Surplus	12,031
3)	Mixed income of self-employed	28,620
4)	Consumption of fixed capital	4,486
5)	Indirect Taxes	9,703
6)	Subsidies	1,350

Solution:

GNP_{FC} = Compensation of employees + Operating Surplus + Mixed Income + Consumption of Fixed Capital

= 26142 crore + 12031 crore + 28620 crore + 4486 crore
= Rs. 71,279 crore

$GNP_{MP} = GNP_{FC}$ + Indirect Taxes – Subsidies
= 71279 + 9703 – 1350
= Rs. 79632 crore.

Example 2.2: Calculate (a) Net Indirect Taxes, and (b) Net Domestic Product at Factor Cost from the following data.

Items	(Rs. crore)
(i) Net national product at market price	1,400
(ii) Net factor income from abroad	(–) 20
(iii) Gross national product at factor cost	1,300
(iv) Consumption of fixed capital	100
(v) National debt interest	18

Solution:

(a) Net Indirect Taxes = Net national product at market price – Net national product at factor cost (Gross national product at factor cost – Consumption of fixed capital)

NIT = 1,400 – (1,300 – 100)
= 1,400 –1,300 +100
=Rs. 200 crore

(b) Net Domestic Product at Factor Cost = Gross national product at factor cost – Consumption of fixed capital – Net factor income from abroad

NDP_{FC} =1,300 – 100 – (–) 20
=1,300 – 100 + 20 = Rs.1,220 crore

Example 2.3: Calculate NNP_{FC}, GNP_{MP}, GNP_{FC}, and NDP_{MP} from the following data.

	Value in Rs. Crore
NDP_{FC}	1,33,151
Depreciation	11,242
Net indirect taxes	19,183
Net income from aboard	(–) 681

Solution:

NNP_{FC} = NDP_{FC} + Net income from abroad
= 1,33,151 + (–) 681 = 1,32,470

NNP_{MP} = NNP_{FC} + Net indirect taxes
= 1,32,470 + 19,183 = 1,51,653

GNP_{MP} = NNP_{MP} + Depreciation
= 1,51,653 + 11,242 = 1,62,895

GDP_{MP} = GNP_{MP} – net income from abroad
=1,62,895 – (-681) = 1,63,576

GDP_{FC} = GDP_{MP} – Net indirect taxes
= 1,63,576 – 19,183 = 1,44,393

GNP_{FC} = GDP_{FC} + Net income from aboard
= 1,44,393 + (–681) = 1,43,712

NDP_{MP} = GDP_{MP} – Depreciation
= 1,63,576 – 11,242 = 1,52,334

2.4 MEASUREMENT OF RELATED AGGREGATES

NDP_{FC} or Domestic factor income can be generated in two-sectors: i) Private Sector, and ii) Public or Government Sector. The NDP_{FC} accruing to private sector is that part of NDP_{FC} which is in the form of compensation of employees, operating surplus and mixed income of self employed. The NDP_{FC} accruing to private sector is given by:

NDP_{FC} accruing to private sector = NDP_{FC} – Income accrued to government departmental undertaking – saving of non-departmental undertakings

Income from domestic product accruing to government sector has two components:

i) Income from property and entrepreneurship of government

ii) Savings of non-departmental enterprises.

2.4.1 Private Income

Private income is the total of the income of the factors from all the sources and current transfers from the government and the rest of the world accruing to private sector. It can be the income from all the sources i.e., factor incomes and transfer income received by the private sector. It also includes net factor income from abroad and interest on national debt (interest paid by the government on the loans). Hence, private income includes all types of income (earned and unearned).

Private Income = NDP_{FC} accruing to private sector + NFIA + Net Transfer payments from government + Net Current Transfer Payments from Rest of World + Interest on National Debt

2.4.2 Personal Income

Personal income is the sum of all kinds of incomes received by the individuals from all sources in the form of current transfer payments and factor incomes in a year. It includes factor income and transfer income. It does not include corporate profit tax and retained earnings.

Personal Income = Private Income – Corporation tax – Undistributed Profits + Transfer payments.

2.4.3 Personal Disposable Income or Disposable Income

Disposable income is defined as income after taxes i.e., income remaining with individuals after deduction of all taxes (Direct taxes, fees fines etc) levied against their income and property.

Disposable income = Personal Income – Direct Taxes – Miscellaneous receipts of the government administrative department (fees, fines, etc.).

Example 2.4: Calculate Personal Income and Private Income from the following data.

Items	Rs. Crore
Retained earnings of private corporation	10
Miscellaneous receipts of government administration departments	50
Personal disposable income	180
Personal tax	30
Corporate profit tax	10

Solution:

Personal Income = personal disposable income + personal taxes + Misc. receipts of govt. dept.

= 180 + 30 + 50 = Rs. 260 crore

Private Income = Personal Income + Retained earnings of private corporation + corporate profit tax

= 260 + 10 + 10 = Rs. 280 crore.

Example 2.5: Calculate a) Personal Income, and b) Personal Disposable Income from the data given below.

Items	Rs. Crore
1. Private income	2000
2. Net retained earnings of private enterprises	600
3. Direct taxes paid by households	200
4. Corporation tax	350
5. National debt interest	250

Solution:

a) Personal Income = Private Income – Net retained earnings of private interest enterprises – corporation tax

= 2000 – 600 – 350 = Rs. 1050 crore

b) Private Disposable Income = Personal income + Retained earnings of private corporation + corporate profit tax

= 1050 – 200 = Rs. 850 crore.

Example 2.6: Calculate Net National Disposable Income from the following data.

Items	Rs. Crore
i) Gross Domestic Product at Market Price	2000
ii) Net Current Transfers to Rest of the World	(–)200
iii) Net indirect taxes	150
iv) Net Factor Income to Abroad	60
v) National Debt Interest	70
vi) Consumption of fixed capital	200
vii) Current Transfers from Government	150

Solution:

Net National Disposable Income (NNDI) = GDP_{MP} – Net factor Income Abroad – Consumption of fixed capital – Net Current Transfers to Rest of the World

NNDI = 2000 – 60 – 200 – (–200)
= Rs. 1940 crore

Example 2.7: Calculate Gross National Disposable Income from the following data.

Items	(in Rs. crore)
(i) National income	2,000
(ii) Net factor income from abroad	(–)50
(iii) Consumption of fixed capital	200
(iv) Net current transfers from rest of the world	150
(v) Net indirect taxes	250

Solution:

Gross National Disposable Income (GNDI) = National income + Consumption of fixed capital + Net current transfers from rest of the world + Net indirect taxes

GNDI = 2000 crore + 200 crore + 150 crore + 250 crore

= Rs.2600 crore

Gross national disposable income = Rs.2600 crore.

Example 2.8: Find out National Disposable Income from the following data.

Items	**(in Rs. crore)**
(i) Current transfers from government administrated departments	215
(ii) Saving of non-departmental enterprises	7
(iii) Net national product at factor cost	325
(iv) Net factor income from abroad	12
(v) Net current transfers from rest of the world	12
(vi) Indirect taxes	35
(vii) Subsidies	10

Solution:

National Disposable Income = Net national product at factor cost + Net current transfers from rest of the world + Net indirect taxes (Indirect tax – Subsidies)

NDI = 325 crore +12 crore + (35 crore –10 crore)
=325 crore +12 crore +25 crore
=362 crore

Check Your Progress 2

1) Explain the term National Income.

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2) Can GDP be greater than GNP?

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3) Explain the difference between personal income and private income.

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4) Explain the difference between personal income and disposable income.

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2.5 LET US SUM UP

In this Unit we provided the framework of national income accounting for an economy. The economy operates mainly through the household sector, firm sector, government sector and the rest of world. The national income accounting records the transactions or the flows of income and expenses between these sectors. The functioning of an economy can be understood by using these recorded data, which are also used to measures various aggregates such as GDP, GNP and GNI.

2.6 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. It refers to the flow of money income or the flow of goods and services across different sectors of an economy.
2. Refer to sub-section 2.2.1.
3. Refer to sub-section 2.2.2.
4. Refer to sub-section 2.2.4.
5. Positive effect: increases circular flow with expenditure and transfer payments. Negative effect: decreases circular flow by levying taxes.
6. Unfavorable trade: leakages and favorable: injections.

Check Your Progress 2

1. The sum of output produced in the economy.
2. Yes; if NFIA is negative.
3. Use diagram 2.1 and Refer to sub-sections 2.4.1 and 2.4.2
4. Use diagram 2.1 and Refer to sub-sections 2.4.2 and 2.4.3

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UNIT 3 MEASURING ECONOMIC PERFORMANCE*

Structure

3.0 Objectives

3.1 Introduction

3.2 Methods of Measuring National Income

- 3.2.1 Expenditure Method
- 3.2.2 Income Method
- 3.2.3 Value Added Method

3.3 Measures of Aggregates: Saving and Wealth

3.4 Real and Nominal GDP

3.5 Limitations of GDP

3.6 Balance of Payments

- 3.6.1 Current Account
- 3.6.2 Capital Account

3.7 Let Us Sum Up

3.8 Answers/ Hints to Check Your Progress Exercises

3.0 OBJECTIVES

After going through this unit you will be able to

- explain various methods of measurement of national income;
- differentiate between saving and wealth;
- distinguish between real income and nominal income; and
- explain the concept of balance of payments of an economy.

3.1 INTRODUCTION

In the previous Unit we discussed various concepts of national income accounting. In this Unit we discuss the methods of measuring national income. Measurement of national income is carried out in an accounting framework, in the sense that there is an economic activity attached to each and every item included in the national income. Thus national income is a flow and it is measured for a particular period of time, usually a year. In recent times, some of the aggregates, such as gross domestic product (GDP) are measured on a quarterly basis. National income is measured in terms of

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1. the amount of spending by purchasing final output by the economic agents (the expenditure approach)
2. the incomes received by the factors of production (the income approach)
3. the amount of final output produced (the product approach)

The three methods give three different angles of looking at the economic activity but they give identical measure of the current economic activity in an economy.

3.2 METHODS OF MEASURING NATIONAL INCOME

As pointed out above, there are three methods of measuring national income. We describe each method in detail below.

3.2.1 Expenditure Method

The amount of economic activity occurring during a given period of time can be measured in terms of the amount of spending on final goods and services. You should note that expenditure on goods purchased for re-selling (i.e., intermediate goods) is not included in this method. According to this method, final expenditure on GDP at market prices is considered to represent the economic activity. Under this method, the components of GDP are the private consumption expenditure (C), private investment expenditure (I), government expenditure (G), and net foreign expenditure or net export (NX). Hence, in this method, expenditure incurred by various sectors, viz., household, business, government, and rest of the world are added together to get final expenditure of the economy.

According to this method, GDP at market prices (Y) is the aggregate of all the final expenditure in an economy during a financial year which is presented by the following Income-Expenditure Identity:

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

The procedure of obtaining various macroeconomic aggregates from GDP is discussed in Unit 2. We elaborate on the components of GDP below.

1. **Consumption**
   Consumption expenditure is incurred by the household sector. It includes expenditure incurred on goods and services sold to the final users during the financial year. It captures both durable goods like car, furniture etc., non-durable goods like food, fuel, etc. and services like banking, healthcare, etc.

2. **Investment**
   Investment expenditure is incurred by business firms in inputs for production of goods and services. It includes business fixed investment, residential investment, and inventory investment (or, change in stock).

3. **Government Expenditure**
   It includes expenditure incurred by local, state and central level governments. Government pays salaries to their employees, spends on social security benefits like medical benefits, unemployment allowance, etc.

4. **Net Exports**
   Net exports are defined as exports minus imports. Exports can be seen as spending by foreigners on domestically produced goods and services whereas imports are spending on foreign goods and services by domestic residents. When value of exports is greater than value of imports, net exports are positive and vice versa.

Precautions involved in the Expenditure Method

1. To avoid the problem of 'double counting', only the value of final goods and services are included in the national income.
2. The sale and purchase of second hand goods are not included in national income. Because these goods have already been included in national income at the time they were produced. But commission and brokerage paid to facilitate the sale of such goods is a fresh activity and should be included.
3. Imputed value of owner-occupied houses is included.
4. Value of own-account production of fixed assets by enterprises, household and government are included.

Example 3.1: Calculate GDP from the following data.

Items	Value (in Rs. crore)
1. Personal consumption expenditure	45000
2. Govt. consumption expenditure	5000
3. Gross domestic fixed investment	5000
4. Increase in inventories	1000
5. Exports of goods and services	6000
6. Imports of goods of services	7000
7. Net Indirect Taxes	3500
8. Depreciation	4500

Solution:

GDP = 1 + 2 + 3 + 4 + 5 – 6
= 45000 + 5000 + 5000+ 1000 + 6000 – 7000
= Rs. 55,000 crore.

3.2.2 Income Method

The value of product is equal to the payments made to the factors of production. In general, there are four factors of production, viz., land, labour, capital and entrepreneurship which are compensated through rent, wages, interest and profit, respectively. According to this method, national income is measured in terms of

payments made to all factors of production. Hence, based on the this approach, the GDP at market prices is the sums of the compensation of employees, gross operating surplus, mixed income and net indirect taxes, which is taxes on production and imports less subsidies on production. The income-side approach shows how various factors contribute to the GDP in the production process.

1. **Compensation of Employees**: This comprises wages, salaries, employee benefits such as employers' contribution to pension plans, social security, etc. It is the total remuneration, in cash or in kind, paid by an employer to an employee for the labour during the accounting period. It is composed of wages and salaries (in cash and in kind), and employers' social contributions.

2. **Gross Operating Surplus**: It is net business income during the production process from property and enterprises in the form of rent, interest, royalty and profit. Profit includes dividends, corporate taxes and retained earnings. The Central Statistical Office (CSO) defines operating surplus as "the value of gross output less the sum of intermediate consumption, compensation of employees (including labour income of self-employed), consumption of fixed capital and net indirect taxes." Thus,

   Gross Operating Surplus = Rent +Interest + Royalty + Profit
   = Value of Gross Output at Market Price – Intermediate Consumption
   – Compensation of Employees – consumption of Fixed Capital – Net Indirect Taxes

3. **Income of Self Employed**: This is the remuneration for the work carried out by the owner or by owner's family of an unincorporated enterprise, which is also called 'mixed income'. Income of a proprietor (owners of capital, land, and skills) earn mixed income in the form of mix of capital income, labour income and profits. The income of this group is referred to as mixed income because it is not clear what proportion of their income is equivalent to wage or profit. Mixed income is different from the operating surplus in the sense that the former is available to the self employed, while the latter accrues to corporate and semi-corporate enterprises.

4. **Taxes on production and imports less subsidies on production**: The former consist of compulsory, non-refundable payments to or from general government or institutions in India, in respect of the production or import of goods and services, the employment of labour, and the ownership or use of land, buildings or other assets used in production. The latter consist of all the subsidies except those subsidies on products which resident producer units may receive as a consequence of engaging in the production process.

5. **Precautions involved in the Income Method:** To estimate correct national income by income method the following precautions have to be taken.

   1. Transfer payments are not included.

2. Windfall gains, such as income from lotteries, are not part of national income.
3. Income earned from illegal activities (such as theft, smuggling, etc.) are excluded.
4. The income earned through sale and purchase of second hand goods is not included in national income. But commission and brokerage paid to facilitate the sale of such goods should be included.
5. Since wealth tax, estate duties, gift tax are paid out of current income, these are excluded from national income.
6. Imputed rent of self occupied houses is included.
7. Value of production for self consumption is included.

Check Your Progress 1

1. Outline the steps involved in the estimation of national income by expenditure method.

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2. Explain how expenditure method is different from the income method in estimation of national income.

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3.2.3 Value Added Method

This method is also known as 'Output Method' or 'Product Method'. It measures the contribution made by each producing enterprise in the production process in the domestic territory of the economy in a financial year. The method measures economic activity by adding the market values of goods and services produced, excluding any goods and services used up in the intermediate production stages. Under this method, we aggregate the value added by the various sectors of production of goods and services to get GDP_{MP}. Each firm's value added is 'the value of its output minus the value of the intermediate goods it purchased from other firms'. In other words, it is the addition of value in final product to the intermediate goods at different stages of production.

You should note that

Gross Value added = Gross output – Intermediate Consumption

and,

Net Value Added = Gross Output – Intermediate Consumption – Depreciation.

Further,

Net Value added at FC = NVA_{FC} = Gross Output – Intermediate Consumption – Depreciation – Net Indirect Taxes.

By adding 'net factor income from aboard' to domestic income (NVA_{FC}), we obtain

Net National Product (NNP_{FC}). Thus, National Income or NNP_{FC} = Gross Output – Intermediate Consumption – Depreciation – Net Indirect Taxes + Net Factor Income from Aboard

The Value Added method measures national income in different stages. The main advantage of the value added method is that it avoids the problem of 'double counting'.

National income estimated by the above three methods, viz., income method, expenditure method, and value added method are identical. Thus, National Income ≡ National Product ≡ National Expenditure (where the symbol ≡ denotes identical).

Estimation of Value Added

The term value added refers to the addition of value by a production unit to intermediate inputs used in production. Value added is the difference between the value of output and the cost of intermediate inputs.

Lets us illustrate the concept of value added with an example. Suppose a textile firm purchased raw materials worth Rs. 40000 and hired labour worth Rs. 10000 to manufacture clothes. The intermediate inputs purchased is Rs. 50000. The textile firm sold its output (clothes) for Rs. 55000. Thus, the value added by the textile firm is Rs. 5000.

Precautions involved in the Product Method

For correct computation of national income by income method, following precautions need to be taken.

1. Only factor incomes which are earned by rendering productive services are included. All the transfer incomes are excluded.
2. Income earned from illegal sources (such as smuggling, theft, etc.) should be excluded.
3. The income earned through sale and purchase of second hand goods should not be included in national income. But commission and brokerage paid to facilitate the sale of such goods should be included.

4. Imputed rent of self occupied building should be included. It does not make any difference whether a house is rented or self-occupied.
5. Value of production for self consumption should be included. For example, a farmer retains part of his produce for self consumption. It does not enter the market, but it contributes to output.
6. Household work by family members (say cooking of food by a home maker) are not included in national income. On the other hand, the same food, if cooked by a domestic help (who is paid for doing the work) is included in GDP.

Example 3.2: Calculate NDP_{FC} from the following data.

Items	In Rupees crore
Purchase of raw material	300
Depreciation	120
Sales	2000
Excise Tax	200
Opening Stock	150
Intermediate Consumption	480
Closing Stock	100

Solution:

Value of Output = sales + changes in stock

Change in stock = closing stock – opening stock

= 100 – 150= –50

Therefore, Value of Output = 2000 + (–50) = Rs.1950 crore

Gross value added = Value of output – Intermediate Consumption

= 1950 – 480 = Rs.1470 crore

NDP_{FC} = Gross Value Added – Net Indirect Taxes

= 1470 – 200 = Rs.1270 crore

Example 3.3: A firm makes and sells jam using fruit it buys from another firm for 80,000 rupees. The firm pays its workers 50,000 rupees; pays 20,000 rupees in taxes and has profits of 40,000 rupees. What is its value added?

Solution:

Fruits bought from other firms	80,000
Wages paid to workers	50,000
Taxes paid	20,000
Profit	40,000

Profit = Sales revenue – wages paid – Taxes – Intermediate Consumption

40,000 = Sales Revenue – 50,000 – 20,000 – 80,000

Sales revenue = 40000 + 50000 + 20000 + 80000

= Rs. 1,90,000

Value Added = Sales – Intermediate Consumption

= 190000 – 80000 = Rs. 110000

Hence, Value Added = Rs. 1,10,000 crore

Check Your Progress 2

1. Explain the problem of double counting in measuring national income.

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2. What are the precautions taken while calculating national income by Value Added method?

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3.3 MEASURES OF AGGREGATE SAVING AND WEALTH

Saving and wealth are closely related with each other; but they are not the same. Saving is that part of income which is not spent. In other words, saving is the current income minus its spending on current needs.

When we divide total saving of a country by its national income then we obtain saving ratio. On the other hand, wealth is calculated as asset minus liability. Saving is a flow concept (measured per unit of time) whereas wealth is a stock concept (measured at a point of time).

Saving takes the form of an accumulation of assets or a reduction in liabilities; therefore, saving is the addition to wealth. The following are the three important measures of saving:

1. **Private Saving** (S_{pvt}): It is the saving by the private sector. Private saving is the private disposable income minus consumption. Symbolically,

   S_{pvt} = Private Disposable Income – Consumption

   = (Y + NFIA – T + TR +INT) – C

   where,

   Y = GDP

NFIA = Net factor income from aboard
T = Taxes
TR = Transfer earnings received from government
INT = Interest income

Private Saving Ratio = Private Saving / Private Disposable Income

2. **Government Saving ($S_{govt.}$)**: It is net government or budget surplus. It is government income minus government purchases of goods and services, i.e.,

   S_{govt} = Government Income – Government Purchases of Goods and Services
   $S_{govt} = (T – TR – INT) – G$
   where,
   T = Tax
   TR = Transfer payments
   INT = Interest payments
   G = Government Purchases of Goods and Services

3. **National Saving** (S): National saving is the saving of the economy as a whole. It is the sum of private saving and government saving.

$$S = S_{pvt} + S_{govt.}$$
$$S = [Y + NFIA – T + TR + INT – C] + [T –TR – INT – G]$$
$$= Y + NFIA – C – G$$
$$= GNP – C – G$$

The above equation shows that national savings is equal to GNP *minus* current needs of private and government sectors.

We know that,

GNP or $Y = C + I + G + NX$
Substituting the value of Y in national saving equation, we get

$$S = [C + I + G + NX] + NFIA – C – G$$
$$S = I + NX + NFIA$$
$$S = I + CA$$

where CA = NX + NFIA, i.e., current account balance.

Also,
$S = S_{pvt} + S_{govt.}$
And $S_{pvt} = S – S_{govt.}$
$= I + CA – S_{govt.}$ (where $S = I + CA$)

Hence, private saving can be used in three ways, as given below.

1. To fund new capital investment (I)
2. To provide the money to finance government budget deficit ($S_{govt.}$)
3. To acquire assets from or to lend to foreigners.

3.4 REAL AND NOMINAL GDP

Nominal variables are valued at their current market price and real variables are nominal variables adjusted for inflation or deflation; valued at some base year. The base year or constant year should be carefully selected. A change in nominal variable reflects the combined effects of changes in quantities and changes in prices whereas real variable provides correct picture of a variable change or change in quantity.

Nominal GDP: It is also termed as 'monetary national income'. It is defined as the value of goods and services at current year prices. It is a poor indicator of measuring economic growth. It is obtained by multiplying goods and services produced in a current year with the current year prices.

Real GDP: It is also termed as GDP at constant prices. It measures the actual growth of the economy. It is obtained by multiplying goods and services produced in a current year with the base year prices. Increase in real GDP means over time indicates improvement in performance of the economy. It reflects changes in quantities.

$$\text{GDP at constant price} = \frac{\text{GDPatcurrentprices}}{\text{priceindexforcurrentyear}} \times \text{base year price index}$$

where, base year = Price index of base year is always taken to be 100

Example 3.4: Convert nominal GDP into real GDP in the following cases.

i) GDP at current year prices is Rs. 2,50,000 and price index for the current year is Rs. 250

ii) GDP at current year prices is Rs. 4,00,000 and current year price index is Rs. 400

Solution:

i) GDP at constant prices = $\frac{2,50,000}{250} \times 100$ = Rs. 1,00,000

ii) GDP at constant prices = $\frac{4,00,000}{400} \times 100$ = Rs. 1,00,000

3.4.1 Price Indexes

A price index is a measure of the average level of price for particular goods and services, relative to base year prices. In other words, it is a measure of the current price level relative to base year.

There are mainly two types of price indexes, viz.,

1. GDP Deflator
2. Consumer Price Index (CPI)

GDP Deflator

The GDP deflator measures the average level of prices of goods and services that are included in GDP. It can be used to convert nominal GDP to real GDP. It eliminates the effect of price increases and determines the real change in physical output. It is the ratio of nominal GDP in a given year to real GDP In other words, it is a price index with changing basket. Symbolically,

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

Example 3.5: If nominal GDP is Rs. 21,100 crore and real GDP is Rs. 20,000 crore, calculate the GDP Deflator.

Solution:

$$\text{GDP Deflator} = \frac{21,1000}{20,000} \times 100 = 105.5$$

We can convert the nominal GDP into Real GDP by using GDP deflator, i.e.,

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

Consumer Price Index (CPI)

Consumer Price Index (CPI) measures prices of buying fixed basket of consumer goods and services. The basket have fixed list of goods and services like food, clothing, fuel and housing. CPI is calculated on monthly bases. While, GDP deflator is a price index with changing basket.CPI is calculated by dividing of current cost of the basket of consumer items by the cost of the same basket of items in the base period. CPI is the single index which can be used to measure prices of various goods and services prevailing in an economy.

$$\text{CPI} = \frac{\text{Price of basket in current year}}{\text{Price of basket in base year}} \times 100$$

Inflation Rate

The inflation rate is the rate at which the general level of prices increases per period. Price indices can be used to measure inflation rate. It is measured as the percentage change in any of the price indices during a time period. It is calculated as follows:

$$\text{Inflation rate} = \frac{P_2 - P_1}{P_1} \times 100$$

where P_1 is the value of the price index in the previous period and P_2 is the value of the price index in the current period.

If GDP deflator rises from 100 in the previous period to 112 in the current period then inflation rate is calculated as:

$$\text{Inflation Rate} = \frac{112 - 100}{100} \times 100 = 12\ \%.$$

3.5 LIMITATIONS OF GDP

GDP is a useful measure of economic progress but not economic welfare. But there are certain limitations of GDP as a measure of economic progress. The main limitations are as follows:

1. Composition of GDP: If GDP increases because of increase in production of war products (e.g., tanks, bombs, weapons, etc.) then there may not be an improvement in economic welfare.
2. Population effects are ignored: A country may have high national income but the country may have a large population. Thus per capita income is more representative of economic progress compared to GDP.
3. Large contribution by few: The country may have very steep inequality. The GDP may be high, but it may be contributed by very few.

   Therefore, if a small section of the population owns a large share in the GDP leaving a smaller percentage of GDP to be shared by a greater number of people, economic growth will not reach the poorest sections of an economy.
4. GDP ignores quality of environment: There may be increase in output with an increase in environmental degradation. Having higher GDP does not mean that people have better quality of life if water, air etc. are more polluted.
5. Only Legal products are included: GDP includes goods and services produced and sold in legal markets. It also ignores certain productive activities that does not have market transaction.

For example, services of a home maker, caring for her children and other family members, are excluded from GDP.

In view above, GDP may not be an adequate index of social and economic welfare. GDP and welfare may not be positively related. In many cases, an increase in GDP does not bring about corresponding increase in economic welfare.

Check Your Progress 3

1. What are the components of saving?

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2. Explain the difference between Real and Nominal GDP.

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3.6 BALANCE OF PAYMENTS: NATIONAL INCOME ACCOUNTING FOR OPEN ECONOMY

The Balance of Payments (BoP) of a country records all economic transactions between the residents of the country and the rest of world in a particular period of time, usually over a year or a quarter of a year. The BOP is a summary of all monetary transactions between a country and rest of the world, which are made by individuals, firms and government bodies. Thus, the BoP records all external visible and non-visible transactions.

The BOP is an account of (i) what residents of a country receives from rest of the world in a particular period on account of sale of goods and services and other invisible items, (ii) capital transfers from other countries, (iii) what these residents have paid to the other countries on account of purchases of all these items, and (iv) transfers of capital from the domestic residents to rest of the world.

These transactions have both credit entry and debit entries. It records the payments for the country's exports and imports of goods, services and financial capital, and financial transfers. All the receipts from 'rest of the world' are recorded as credit, while all the payments made to 'rest of the world' are recorded as debit. You should note that 'the BoP account is always balanced' as it is maintained by 'double entry book keeping system'.

The *sources of funds* for a country, viz., exports or the receipts of loans and investments, are entered as credit items, while *uses of funds*, viz., imports or investment in foreign countries, are entered as debit items. The BoP account comprises two parts, viz., current account and capital account.

3.6.1 Current Account

The current account of BOP includes all transactions related to exchange of goods and services and unilateral transfers. It deals with payment of currently produced goods and services. Hence, balance of current account can be

estimated as the sum total of balance of trade, balance of services and balance of unilateral transfers.

Let us discuss about the items in the Current Account.

1. **Balance of Trade**: It includes export and import of visible goods only. Therefore, it is also known as visible trade. Difference between export and import gives trade balance.

2. **Balance of Services:** It includes all 'invisible transactions' such as services (travel, insurance, banking, news agency services, etc.), aid, transfers, etc.

3. **Unilateral Transfers:** These transactions are done by one country to another without purchases of goods and services, e.g., aid, gifts, etc.

3.6.2 Capital Account

It records all the transactions which cause a change in the assets or liability of a country. It includes all capital transfers such as loans and investment, commercial borrowings between the one country and rest of the world.

It includes the following:

1. **Foreign Investment:** Foreign investment is of two types, viz.,

   a. **Foreign Direct Investment (FDI):** It means purchase of assets by foreign nationals or institutions and at the same time acquiring control of it, e.g., acquisition of a firm in one country by a firm in another country.

   b. **Portfolio Investment:** it is the acquisition of an asset that does not give the purchaser control over assets, e.g., purchase of shares or bonds in foreign country.

2. **Loans:** It includes short term credit, long term loans (external assistance), and external commercial borrowings (ECB).

3. **Banking Capital:** It includes foreign currency deposits by foreign nationals.

The overall BOP is obtained by adding current account balance and capital account balance. A country may have deficit in the current account. Such deficit is compensated by surplus in capital account or depletion of foreign exchange reserve of the country. Similarly, surplus in the current account is compensated by deficit in capital account or accumulation of foreign exchange reserve. Thus, in accounting sense, BoP always balances.

Check Your Progress 4

1. What are the items included in the current account of BOP?

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2. Explain the difference between balance of trade and balance of payments.

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3.7 LET US SUM UP

In this unit we learnt that there are mainly three methods of measuring national income, viz., income method, expenditure method, and output or value-added method. In income method, sum total of all factor incomes is taken into consideration for measurement of national income. Expenditure method deals with expenditure on final goods and services produced during a period. In the value-added method, we find the sum of total value added by all the sectors of an economy. Value of national income is identical whether it is calculated by income method or expenditure method or value added method.

We also discussed that saving is the part of income which is not consumed at the present time; rather it is kept aside for future consumption. There are three important measures of saving: private saving, government saving, and national saving. For the measurement of the economic performance, we prefer real GDP instead of the nominal GDP, as the former controls for the increase in prices.

Subsequently we discussed BOP, which is a systematic record of all economic transactions that takes place between one country and rest of the world. There are two components of BOP, current account and capital account. Current account deals with export and imports of all goods and services between the nations, whereas capital account shows inflow and outflow of capital.

3.8 Answers/ Hints of Check Your Progress Exercises

Check Your Progress 1

1. Refer to Sub-Section 3.2.1 and answer.

2. Income method accounts the factor income of the factors of the production whereas expenditure method deals with expenditure made on final goods and services. Refer to Sub-Sections 3.2.1 and 3.2.2.

Check Your Progress 2

1. Problem of double counting arises when a transaction is counted more than once. Refer to Sub-Section 3.2.3.
2. Refer to Sub-Section 3.2.3 under the heading **Precautions**.

Check Your Progress 3

1. Three measures of saving are public saving, private saving, and national saving. Refer to Section 3.3.
2. Real GDP is based on constant prices or base year prices whereas nominal GDP is based on current prices. Refer to Section 3.4.

Check Your Progress 4

1. The current account of BOP includes balance of trade, balance of services, and unilateral payments. Refer to Sub-Section 3.6.1.
2. Balance of trade includes the trade of visible goods whereas BOP includes both visible and invisible items. Refer to Section 3.6.