CHAPTER

2

CIRCULAR FLOW OF INCOME AND NATIONAL INCOME ACCOUNTING

MEANING OF NATIONAL INCOME

The labour and capital of a country acting on its natural resources produce annually a certain amount of goods and services. This is called national income of the country. *National income of a country can be defined as the total market value of all final goods and services produced in the economy in a year*. Two things must be noted in regard to this meaning of national income. First, it measures the market value of annual output. In other words, national income is a *monetary measure*. This is because there is no other way of adding up the different sorts of goods and services except with their money prices. But in order to know accurately the changes in physical output, the figure for national income is adjusted for price changes. Secondly, for calculating national income accurately all goods and services produced in any given year must be counted only once, and not more than once. Most of the goods go through a series of production stages before reaching a market. As a result, parts or components of many goods are bought and sold many times. Hence, in order to avoid counting several times the parts of goods that are sold and resold, national income only includes the market value of all *final goods* and ignores the transactions involving *intermediate goods*.

The above way of explaining national income is only one way of interpreting it. In fact, the concept of national income has three interpretations. It represents a total value of production (as explained above), it represents a receipts total, and it represents an expenditure total. It is an obvious fact that every expenditure is at the same time a receipt. In other words, amount spent is equal to amount received. But if goods and services are valued at their market prices, we have three-fold identity, namely, that the value received equals the value paid equals the value of goods and services produced and sold.

To explain the above idea let us take an economy where there are only two agents: households and firms. Firms are required to produce goods. To produce them, they require services of factors of production. Factors of production are paid the rewards for their contribution to the production of goods. Thus incomes of these factors arise in the course of production. The sales value of net production must equal the sum total of payments made by the firms to the factors of production in the course of production. The sales value of net production must equal the sum total of payments made by the firms to the factors of production in the form of wages, rents, interest and profits. These incomes in turn become the sources of expenditure. Thus income flows from the firms to the households in exchange for productive services. This income again returns to the firms when expenditure is made by the households on the goods produced by the firms.

From above it follows that: *National Income = National Product = National Expenditure*. In other words, there are three measures of national income of a country. They are:

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(*a*) the sum of values of all final goods and services produced;

(*b*) the sum of all incomes, in cash and kind, accruing to factors of production in a year; and

(*c*) the sum of consumers' expenditure, net investment expenditure and government expenditure on goods and services.

Sum of all income, sum of values of all final production, and sum of all expenditures will be the same, but the significance of each arises from the fact that they reflect the three basic activities of the nation's economy, viz., production, distribution and expenditure.

CIRCULAR FLOW OF INCOME

The modern economy is a monetary economy. In the modern economy, money is used in the process of exchange. Money has facilitated the process of exchange and has removed the difficulties of the barter system. Thus money acts as a medium of exchange. The households supply the economic resources or factors to the productive firms and receive in return the payments in terms of money. In is thus clear that, in the monetary economy, there will be flows of money corresponding to the flows of economic resources and the flows of goods and services. But each money flow is in opposite direction to the real flow.

Circular Income Flow in a Two-Sector Economy

To begin with, to explain the circular flow of income and expenditure we assume that all incomes which households receive are spent on consumer goods and services and thus there is no savings by them. Similarly, we assume that there is no investment by business firms. Money flows of income and expenditure corresponding to the real flows in terms of goods, services and productive factors are shown in Figure 2.1. In the upper loop of this figure, the resources such as land, capital and entrepreneurial ability flow from households to business firms as indicated by the arrow mark. In opposite direction to this, money flows from business firms to the households as factor payments such as wages, rent, interest and profits. In the lower part of the figure, money flows from households to firms as consumption expenditure made by the households on the goods and services produced by the firms, while the flow of goods and services is in opposite direction from business firms to households. Thus we see that money flows from business firms to households as factor

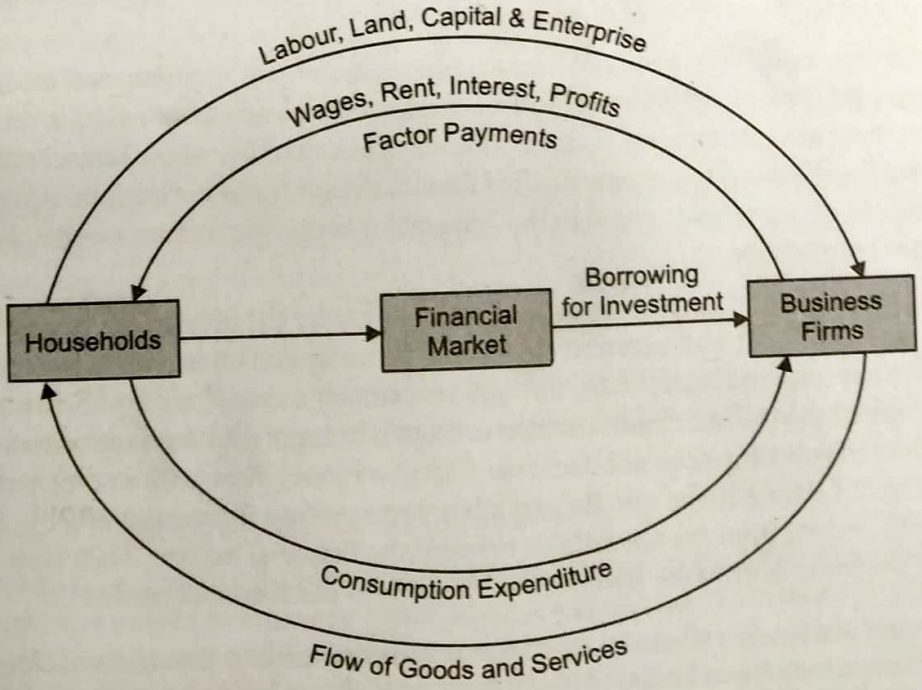

Fig. 2.1. *Circular Flow of Income in a Simple Two-Sector Economy*

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payments and then it flows from households to firms. Thus there is, in fact, *a circular flow of money or income*. This circular flow of money will continue indefinitely week by week and year by year. This is how the economy functions.

It may, however, be pointed out that this flow of money income will not always remain the same in volume. In other words, the flow of money income will not always continue at a constant level. In years of depression, the circular flow of money income will contract, *i.e.*, will become lesser in volume, and in years of prosperity it will expand, *i.e.*, will become greater in volume. This is so because the flow of money is a measure of national income and will, therefore, change with changes in the national income. In years of depression, when national income is low, the volume of the flow of money will be small and in years of prosperity when the level of national income is quite high, the flow of money will be large.

In order to make our analysis simple and to explain the central issues involved, we take many assumptions. In the first place, we assume that neither the households save from their incomes, nor the firms save from their profits. We further assume that the government does not play any part in the national economy. In other words, the government does not receive any money from the people by way of taxes, nor does the government spend any money on the goods and services produced by the firms or on the resources and services supplied by the households. Thirdly, we assume that the economy neither imports goods and services, nor exports anything. In other words, in our above analysis we have not taken into account the role of foreign trade. In fact we have explained above the flow of money that occurs in the functioning of a closed economy with no savings and no role of government.

Circular Money Flow with Saving and Investment

In our above analysis of the circular flow of money we have assumed that all income which the households receive, they spend it on consumer goods and services. As a result, circular flow of money spending and income remains undiminished. We will now explain if households save a part of their income, how their savings will affect money flows in the economy. When households save, their expenditure on goods and services will decline to that extent and as a result money flow to the business firms will contract. With reduced money receipts, firms will hire fewer workers (or lay off some workers) or reduce the factor payments they make to the suppliers of factors such as workers. This will lead to the fall in total incomes of the households. Thus, savings reduce the flow of money expenditure to the business firms and will cause a fall in economy's total income. *Economists therefore call savings a leakage from the money expenditure flow.*

But savings by households need not lead to reduced aggregate spending and income if they find their way back into flow of expenditure. In free market economies there exists a set of institutions such as banks, insurance companies, financial houses, stock markets where households deposit their savings. All these institutions together are called financial institutions or financial market. We assume that all the savings of households come in the financial market. We further assume that there are no inter-household borrowings.

It is business firms who borrow from the financial market for investment in capital goods such as machines, factories, tools and instruments, trucks. Firms spend on investment in order to expand their productive capacity in future. Thus, through investment expenditure by borrowing the savings of the households deposited in financial market are again brought into the expenditure stream and as a result total flow of spending does not decrease. Circular money flow with saving and investment is illustrated in Fig. 2.1 where in the middle part a box representing financial market is drawn. Money flow of savings is shown from the households towards the financial market. Then flow of investment expenditure is shown as borrowing by business firms from the financial market[1].

1. It may be noted that business firms also save when they do not distribute among shareholders all the profits made by them and keep the undistributed profits as reserves. We are ignoring them in our money flow analysis as firms themselves use their savings for buying machinery and making other investment expenditure.

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Condition for the Constancy of Circular Money Flow

Now the question arises: what is the condition for the flow of money income to continue at a steady level so that it makes possible the production and subsequent flow of a given volume of goods and services at constant prices? To explain this we have to introduce saving and investment in the analysis of circular flow of income. As mentioned above, saving a part of income means it is not spent on consumer goods and services. In other words, saving *is withdrawal of some money from the income flow*. On the other hand, investment means some money is spent on buying new capital goods to expand production capacity. In other words, *investment is injection of some money in circular flow of income*. For the circular flow of income to continue unabated, the withdrawal of money from the income stream by way of saving must equal injection of money by way of investment expenditure. Therefore, planned savings must be equal to planned investment if the constant money income flow in an economy is to be obtained. Now, what will happen if planned investment expenditure falls short of the planned savings? As a result of fall in planned investment expenditure, income, output and employment will fall and therefore the flow of money will contract. If the equality between planned savings and planned investment is disturbed by increase in savings, then the immediate effect will be that the stocks of goods lying in the shelves of the shops will increase (as some of the goods will not be sold due to the fall in consumption *i.e.,* increase in savings). Owing to the deficiency of demand for goods and the accumulation of stocks, retailers will place small orders with the wholesalers. Consequently, smaller amount of goods will be produced and therefore fewer capital goods like machinery will be needed with the result that fixed investment will tend to fall. Thus the ultimate effect of either the fall in planned investment or the increase in planned savings is the same, namely, the fall in income, output, employment and prices with the result that the flow of money will contract.

On the other hand, if the equality between planned savings and planned investment is disturbed by the increase in investment demand, the result will be increase in income, output and employment. Consequently, the flow of money income will expand.

It is thus clear from the above analysis that the *flow of money income will continue at a constant level only when the condition of equality between planned saving and investment is satisfied*. It was believed by classical economists that financial market provides a mechanism which coordinates the savings of households and the investment expenditure by the firms. Rate of interest, which is the price for the use of savings, is determined by saving and investment. If savings exceed investment expenditure, rate of interest falls so that, at a lower rate of interest, investment increases and both become equal. On the contrary, if investment expenditure is greater than savings, rate of interest will rise so that at a higher rate of interest savings increase and become equal to planned investment expenditure.

However, an eminent British economist, J.M. Keynes, refuted the above argument that changes in rate of interest will cause saving and investment to become equal. According to him, since in a free market capitalist economy investment is made by business enterprises and savings are mostly done by households and for different reasons, there is no guarantee that planned investment will be equal to planned savings and thus fluctuations in income, output and employment are inevitable. As a result, circular flow of income does not continue at a steady level in a free-enterprise capitalist economy unless certain corrective and preventive steps are taken by the government to maintain stability in the economy.

Saving-Investment Identity in National Income Accounts

Despite the fact that people who save are different from the business firms which primarily invest, in national income accounts savings are identical or always equal to investment in a simple two-sector economy having no roles of Government and foreign trade. This is a basic identity in national income accounts which needs to be carefully understood. Of course, in our above analysis of circular flow of income, we explained that planned investment by business firms can differ from savings by

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household. But in that analysis we referred to *planned* or *intended* investment and savings which often differ and affect the flow of national income. However, in national income accounts we are concerned with *actual saving* and *actual investment*. It is these actual or realised saving and investment that are identical in national income accounts. We can prove their identity in the following way.

In a simple economy which has neither government, nor foreign trade, the value of *output produced* which we denote by Y is equal to the value of *output sold*. Since the value of output sold in a simple two-sector economy is equal to the sum of consumption expenditure and investment expenditure, we have

$$Y \equiv C + I \qquad \ldots(i)$$

where Y = Value of aggregate output, C = Consumption expenditure and I = Investment expenditure.

A pertinent question which arises here is what happens to the unsold output. The unsold output leads to the *increase in the inventories of goods* and in national income accounting increase in inventories of goods is treated as a part of actual investment. This may be considered as the firms selling the goods to themselves to add to their inventories. Thus, gross national product (GNP) produced is used either for consumption or for investment.

Now, look at the gross national product or income in the simple economy from the viewpoint of its allocation between consumption and saving. Since national income (which is equal to GNP) can be either consumed or saved,[2]. we have

$$Y \equiv C + S \qquad \ldots(ii)$$

From the identities (*i*) and (*ii*) we get

$$C + I \equiv Y \equiv C + S \qquad \ldots(iii)$$

The left-hand side of the identity (*iii*), namely $C + I = Y$ shows the components of aggregate demand (that is, aggregate expenditure on goods and services produced) and the right-hand side of the identity (*iii*) namely $Y = C + S$ shows the allocation of national income to either consumption or saving. Thus, the identity (*iii*) shows that the value of output produced or sold is equal to the total income received. It is income received that is spent on goods and services produced.

Now subtracting the consumption (C) from both sides of the identity (*iii*) we have

$$I = S$$

Thus, in *our two-sector simple economy with neither government, nor foreign trade, investment is identically equal to saving.*

Circular Income Flow in a Three-Sector Economy with Government Sector

In our above analysis of money flow, we have ignored the existence of government for the sake of making our circular flow model simple. This is quite unrealistic because government absorbs a good part of the incomes earned by households. Government affects the economy in a number of ways. Here we will concentrate on its taxing, spending and borrowing roles. Government purchases goods and services just as households and firms do. Government expenditure takes many forms including spending on capital goods and infrastructure (highways, power, communication), on defence goods, and on education and public health and so on. These add to the money flows which are shown in Fig. 2.2 where a box representing Government has been drawn. It will be seen that government purchases of goods and services from firms and households are shown as flow of money spending on goods and services.

2. Note that decisions about saving are made both by households and business firms. In national income accounts they are generally put together and referred to as private sector savings.

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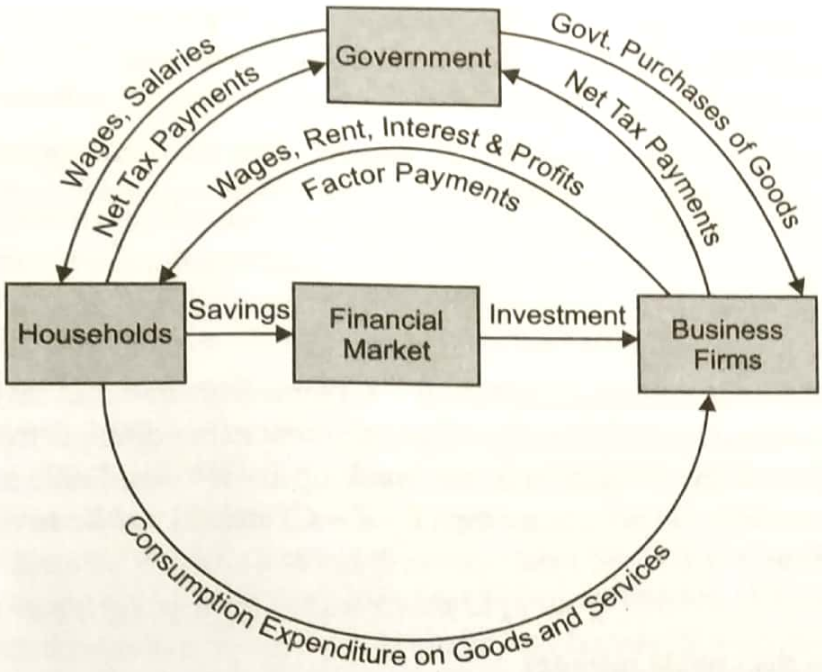

Fig. 2.2. *Circular Money Flow Model with Government*

Government expenditure may be financed through taxes, out of assets or by borrowing. The money flow from households and business firms to the government is labelled as tax payments in Fig. 2.2. This money flow includes all the tax payments made by households less transfer payments received from the Government. Transfer payments are treated as negative tax payments.

Another method of financing Government expenditure is borrowing from the financial market. This can be represented by the money flow from the financial market to the Government and is labelled as Government borrowing (To avoid confusion we have not drawn this money flow from financial market to the Government). Government borrowing increases the demand for credit which causes rate of interest to rise. The government borrowing through its effect on the rate of interest affects the behaviour of firms and households. Business firms consider the interest rate as cost of borrowing and the rise in the interest rate as a result of borrowing by the Government lowers private investment. However, households who view the rate of interest as return on savings feel encouraged to save more.

It follows from above that the inclusion of the Government sector significantly affects the overall [illegible] situation. Total expenditure flow in the economy is now the sum of consumption expenditure [illegible] (denoted by G). Thus

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will borrow from the financial market. For this purpose, the private investment (I) by business firms must be less than the savings (S) of the households. Thus Government borrowing reduces private investment in the economy. In other words, Government borrowing *crowds out* private investment.

Another important conclusion that can be drawn from national income account identity incorporating Government expenditure relates to the condition for equilibrium in the financial market. National income identity with government expenditure is

$$Y = C + I + G \qquad \ldots(vi)$$

or

$$Y - C - G = I$$

In the expression (vi), the left hand side ($Y - C - G$) represents national saving or simply saving (S). Note that in this National Income Identity all government expenditure is treated as consumption expenditure. To understand the identity (vi), we break up its left-hand side representing national saving into two parts, namely, (1) *private saving* ($Y - T - C$) and (2) *public saving* (*i.e.* saving of the government ($T - G$). Thus

$$S = (Y - T - C) + (T - G) = Y - C - G$$

(Note that $Y - T$ is disposable income)

If the economy is to remain in a steady state, the *flows into* the financial market (*i.e.,* private saving and public saving) must balance the *flows out of* the financial market. Thus, for the economy to remain in a steady state

$$Y - T - C + (T - G) = I$$

That is, for the economy to remain in a steady state, the sum of private saving and public saving must equal investment.

Money Flows in the Four-Sector Open Economy : Adding Foreign Sector

We now turn to explain the money flows that are generated in an open economy, that is, economy which have trade relations with foreign countries. Thus, the inclusion of the foreign sector will reveal to us the interaction of the domestic economy with foreign countries. Foreigners interact with the domestic firms and households through exports and imports of goods and services as well as through borrowing and lending operations through financial market. Goods and services produced within the domestic territory which are sold to the foreigners are called exports.

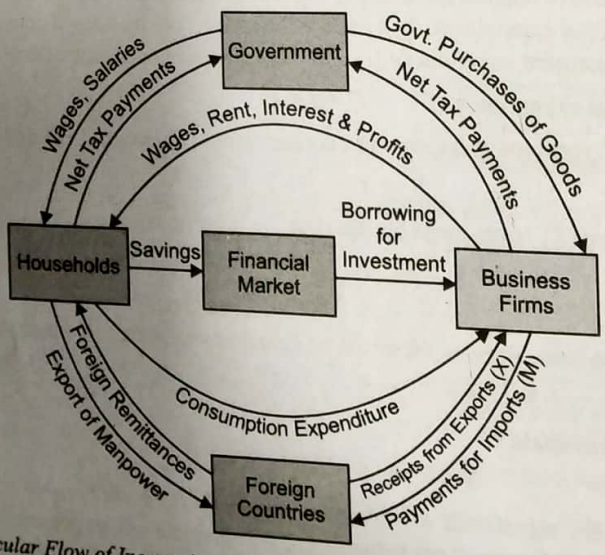

Fig. 2.3. *Circular Flow of Income in an Open Economy with Government and Foreign Sector*

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On the other hand, purchases of foreign-made goods and services by domestic households are called imports. Figure 2.3 illustrates additional money flows that occur in the open economy when exports and imports also exist in the economy. In our analysis, we assume it is only the business firms of the domestic economy that interact with foreign countries and therefore export and import goods and services. A flow of money spending on imports has been shown to be occurring from the domestic business firms to the foreign countries (*i.e.*, rest of the world) . On the contrary, flow of money expenditure on exports of a domestic economy has been shown to be taking place from foreign countries to the business firms of the domestic economy. If exports are equal to the imports, then there exists a balance of trade. Generally, exports and imports are not equal to each other. If value of exports exceeds the value of imports, *trade surplus* occurs. On the other hand, if value of imports exceeds value of exports of a country, *trade deficit* occurs.

In the open economy there is interaction between countries not only through exports and imports of goods and services but also through borrowing and lending funds or what is also called financial market. These days financial markets around the world have become well integrated. When there is a trade surplus in the economy, that is, when exports (X) exceed imports (M), *net capital outflow* will take place. By net capital outflow we mean foreigners will borrow from domestic savers to finance their purchases of our exports. In this way as a result of net capital outflow domestic savers will lend to foreigners, that is, acquire foreign financial assets.

On the contrary, in case of import surplus, that is, when imports are greater than exports, trade deficit will occur. Therefore, in case of trade deficit, domestic consumer households and business firms will borrow from abroad to finance their excess of imports over exports. This means there will be capital inflow in our economy. As a result, foreigners will acquire domestic financial assets.

Saving-Investment Identity in the Open Economy

From the circular flows that occur in the open economy the national income must be measured by aggregate expenditure that includes net of exports, that is, $X–M$ where X represents exports and M represents imports. Imports must be subtracted from the total expenditure made by foreigners on our domestically produced goods and services exported to them to get the value of net exports. Thus, in the open economy

$$\text{National Income} = C + I + G + NX$$

where NX represents net exports, $X–M$.

Since national income can be either consumed, saved or paid as taxes to the Government we have

$$C + I + G + NX = C + S + T$$

Since C is common on both sides of the above equation we have

$$I + G + NX = S + T \qquad \ldots(vi)$$

The above equation (vi) shows that in the open economy sum of private investment (I), Government expenditure (G) and net exports (NX) is equal to the sum of savings and tax revenue.

Relation of Aggregate Domestic Output and Expenditure with Trade Balance. The national income account identity of the open economy can be used further to show how aggregate domestic output (Y) and aggregate expenditure ($C + I + G$) and net exports (*i.e.*, trade balance) are related. Rearranging the national income of the open economy ($Y = C + I + G + NX$), we have

$$NX = Y – (C + I + G)$$

where $C + I + G$ is aggregate domestic expenditure. Thus

Net Exports = National Domestic Product (Y) *– Aggregate Domestic Expenditure*

From above it follows that in an open economy aggregate domestic expenditure need not be equal to the aggregate domestic output of goods and services (*i.e.*, Y). If aggregate domestic output (Y)

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exceeds aggregate domestic expenditure ($C+I+G$), there is export-surplus and we export the excess of domestic output, that is, net exports (NX) are positive ($NX > 0$). On the other hand, if domestic output is less than domestic expenditure, we import this shortfall (*i.e.*, $NX < 0$).

Foreign Capital Flows and Trade Balance. As in the case of a closed economy, goods market are intimately related to the financial market in the open economy. To show this, let us rearrange the national income accounts identity ($Y = C + I + G + NX$) of the open economy.

$$Y - C - G = I + NX \qquad \ldots(vii)$$

The left-hand side of the above equation (*i.e.*, $Y - C - G$) represents national saving (S). Note that all Government expenditure is here treated as consumption expenditure. Thus, it follows from above that

$$S = I + NX$$

or

$$S - I = NX \qquad \ldots(viii)$$

The national income identity of expression (*viii*) shows that the *economy's net exports (NX) must always be equal to the difference between saving and investment. The net exports are also called trade balance because it shows the difference between exports and imports of an economy*. The trade balance (NX) may be positive or negative. If exports exceed imports, trade balance (NX) is positive and if exports fall short of imports, the trade balance (NX) is negative.

But the important result that follows from national income identity of the open economy relates to the link between *international capital flows* and the *goods market*. If $S - I$ in (*viii*) is positive, that is, if the economy's national saving exceeds domestic investment, it will be lending the excess funds to foreigners, that is, there will be *net capital outflow* from the economy. On the other hand, if $S - I$ is negative, that is, if domestic investment exceeds domestic saving, the economy will be borrowing from abroad to finance the excess investment. That is, there will be *net capital inflow* into the economy to finance higher capital formation in the economy.

It follows from above that net capital flows ($S - I$) always equal the trade balance or to current account balance which is the broader term that includes *invisibles* (that is, exports and imports of services) also.

NATIONAL INCOME AND NATIONAL PRODUCT

The sum of all incomes of the people of a country is called national income. This national income is greatly related to the national product. In fact in a two-sector economy without the Government and its imposition of indirect taxes and grant of subsidies and also assuming no depreciation national income and national product are one and the same thing. The incomes which different people of the society get are obtained by them for their contribution of labour, land, capital and entrepreneurial services to the national production. Hence the income which the labourers get are wages for the productive services which labourers lend to the various firms which undertake the work of production. Similarly, the owners of land get income as rent because of their contribution of land to the productive firms; the capitalists get interest for lending their money capital to the entrepreneurs for undertaking any work of production or business. The entrepreneurs get profits for starting and organising the work of production and bearing risk and uncertainty involved in it. It is thus clear that the different individuals of a country obtain their income either as wages of their labour, or as interest on their money capital, or as rent for their land, or as profits for their enterprise. The sum of incomes obtained as wages, rent, interest and profits is the national income of the country.

Various households obtain their income from the productive firms or businesses which utilise their labour, land, capital and other services for the production of goods and services. The incomes earned by the various households and individuals from the work of production are in fact costs of

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ween national income (or national income at factor cost) and net national product (national income market prices) arises from the fact that *indirect taxes* and *subsidies* cause market prices of output be different from the factor incomes resulting from it. Suppose for instance, a metre of mill cloth d for ₹ 200 includes ₹ 25 on account of the excise and the sales tax. In this case while the market ce of the cloth is ₹ 200 a metre, the factors engaged in its production and distribution would eive ₹ 175 a metre. The value of cloth at factor cost would thus be equal to its value at market ce less the indirect taxes on it. On the other hand, a subsidy causes the market price to be less than factor cost. Suppose handloom cloth is subsidised at the rate of ₹ 10 per metre and it sells at ₹ 90 metre. Then while the consumer pays ₹ 90 per metre, the factors engaged in the production and tribution of such cloth will receive ₹ 100 per metre (₹ 90 + 10 = ₹ 100). The value of handloom th at factor cost would thus be equal to its market price plus the subsidies paid on it. It follows, refore, that the national income (or national income at factor cost) is equal to net national product us indirect taxes plus subsidies.

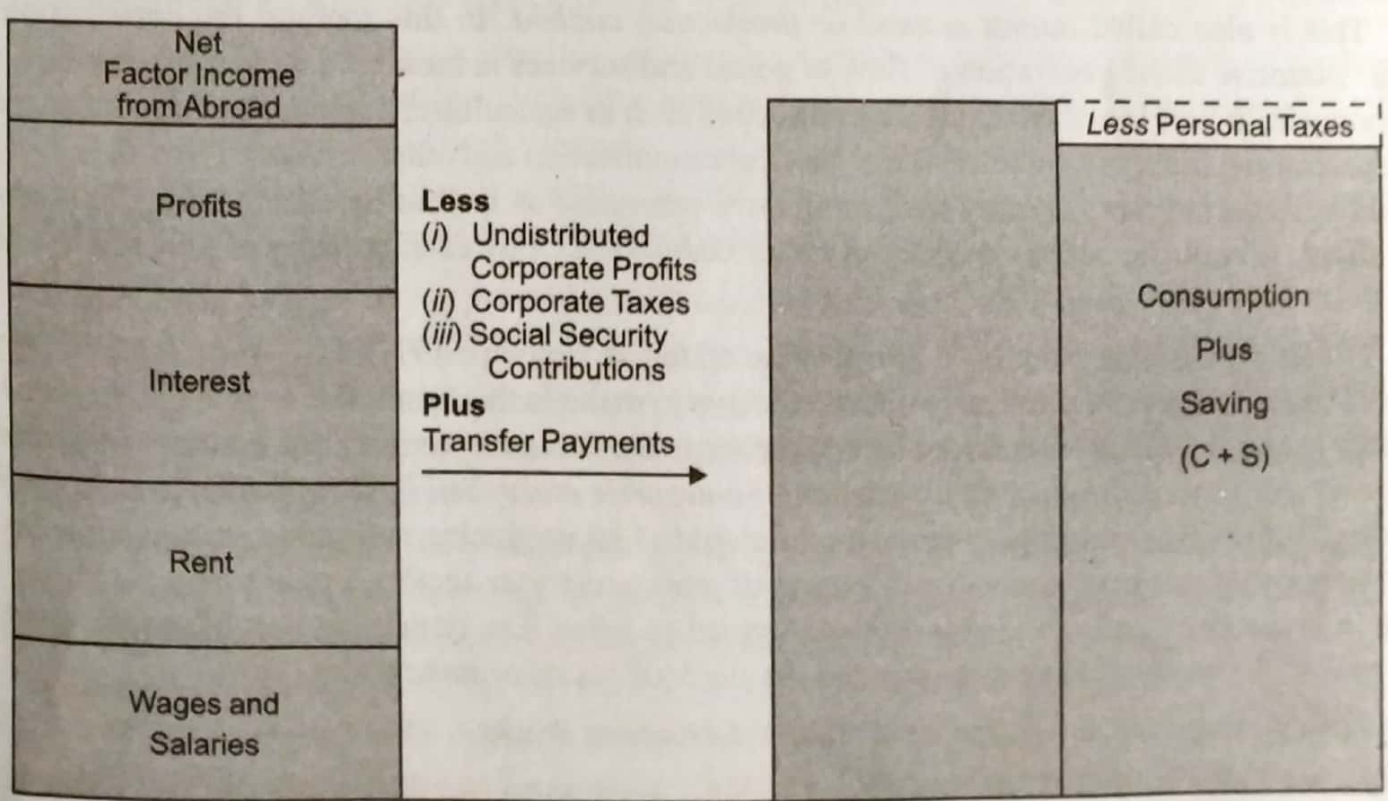
$$\left.\begin{array}{c}\text{National Income}\\ \text{or}\\ \text{National Income at}\\ \text{Factor Cost}\end{array}\right\} = \text{Net National Product (National Income at Market Prices)} - \text{Indirect Taxes} + \text{Subsidies}$$

Net of indirect taxes and subsidies is called Net Indirect Taxes. Therefore,

National Income = Net National Product – Net Indirect Taxes

rsonal Income (PI)

Personal Income is the sum of all incomes actually received by all individuals or households ring a given year. National income, that is, total incomes earned and personal income, that is, total omes received must be different because some incomes which are earned such as social security



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contributions, corporate income taxes and undistributed corporate profits are not actually received by households, and conversely, some incomes which are received like transfer payments are not currently earned (examples of transfer payments are old-age pensions, unemployment compensation, relief payments, interest payments on the public debt, etc.). Obviously, in moving from national income as an indicator of income earned to personal income as an indicator of income actually received, we must subtract from national income those three types of income which are earned but not received and add those incomes which are received but currently not earned. Therefore,

Personal Income = National Income – Social Security Contributions – Corporate Income Taxes – Undistributed Corporate Profits + Transfer Payments.

Personal Disposable Income (PDI)

Even whole of the incomes which are actually received by the people are not available to them for consumption. This is because governments levy some personal taxes such as income tax, personal property taxes. Therefore, after a part of personal income is paid to government in the form of *personal taxes* like income tax, personal property taxes, etc., what remains of personal income is called *personal disposable income*. Therefore,

Personal Disposable Income (PDI) = Personal Income – Personal Taxes.

Personal Disposable Income can either be consumed or saved. Hence,

Personal Disposable Income = Consumption + Saving.

How do we get personal income and personal disposable income from national income is illustrated in Figure 2.5.

MEASUREMENT OF NATIONAL INCOME

Since factor *incomes* arise from the production of goods and services, and since incomes are spent on goods and services produced, three alternative methods of measuring national income are possible.

1. Value Added Method

This is also called *output method or production method*. In this method the contribution of each enterprise to the generation of flow of goods and services is measured. Under this method, the economy is divided into different industrial sectors such as agriculture, fishing, mining, construction, manufacturing, trade and commerce, transport, communication and other services. Then, the net value added at factor cost (NVA_{FC}) by each productive enterprise as well as by each industry or sector is estimated. Measuring net value added at factor cost (NVA_{FC}) by each industry requires first to find out the value of output.

Let us explain how we arrive at net value added at factor cost (NVA_{FC}) from value of output step by step. An important estimate which we have to make in this method is to find out the value of various goods and services produced by enterprises in the domestic territory of a country. *The quantity of goods and services produced by a particular enterprise multiplied by their market prices is called value of output*. By summing up the value of output of all producing enterprises in a given industry or a sector we can obtain the value of output of that industry or sector. A major part of output of a firm or enterprise is sold in the market and termed as *sales*. The remaining part of output which is *not sold* in the accounting year is added to the stock of goods or inventories. Thus.

Value of output of an enterprise = Sales + Change in Stocks

Gross Value Added at Market Prices (GVA_{MP}). Gross value added measures the contribution to the value of output of a product produced during a year. As mentioned above, value of output is estimated by multiplying the quantity of output with the market prices. Therefore, gross value added at market prices by a production unit is obtained by deducting the value of intermediate consumption

(that is, the value of intermediate go
market prices) produced. Thus.

Gross value added at market pr

A firm disposes of its value adde
depreciation provision for consump
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(that is, the value of intermediate goods such as raw materials used from the value of output (at market prices) produced. Thus.

Gross value added at market prices (GVA_{MP}) = *Value of Output – Intermediate Consumption*

A firm disposes of its value added at market prices (GVA_{MP}) among the three items : (1) making depreciation provision for consumption of fixed capital during the year, (2) making payments of indirect taxes such as excise duties, sales tax, import duty to the government, and (3) making factor payments such as wages, interest and profits to the factors of production whose services have been used for the production of a good.

Net Value Added at Market Prices (NVA_{MP}). When from gross value added at market prices we deduct depreciation on account of consumption of fixed capital during the production process of a good during the year, we get Net Value Added at market prices (NVA_{MP}). Thus

$NVA_{MP} = GVA_{MP}$ – Consumption of Fixed Capital *i.e.* Depreciation

Thus net value added is net of depreciation or consumption of fixed capital.

Net Value Added at Factor Cost (NVA_{FC}). When adjustment is made in net value added at market prices (NVA_{MP}) for the payment of net indirect taxes, (that is, indirect taxes such as sales tax, excise duty, customs duties to the government minus subsidies received from the government) we get Net Value Added at Factor Cost (NVA_{FC}) This is because after the subtraction of depreciation amount and net indirect taxes what remains is used for making payments to factors of production such as wages to labour, interest on capital borrowed, rent for land and building hired from others and profits and dividends to entrepreneur. In other words, NVA_{FC} measures the value of factor cost a firm has to incur.

Summing up the net values added at factor cost (NVA_{FC}) by all productive enterprises of an industry or sector gives us the net value added at factor cost of each industry or sector. We then add up net values added at factor cost by all industries or sectors to get *net domestic product at factor cost* (NDP_{FC}). Lastly, to the net domestic product we add the *net factor income from abroad* to get *net national product at factor cost* (NNP_{FC}) which is also called national income. Thus,

NI or $NNP_{FC} = NDP_{FC}$ + Net factor income from abroad

This method of calculating national income can be used where there exists a census of production for the year. In many countries, the data of production of only important industries are known. Hence this method is employed along with other methods to arrive at the national income. The one great advantage of this method is that it reveals the relative importance of the different sectors of the economy by showing their respective contributions to the national income.

Precautions. The following precautions should be taken while measuring national income of a country through value added method:

1. *Imputed rent values* of self-occupied houses should be included in the value of output. Though these payments are not made to others, their values can be easily estimated from prevailing values in the market.
2. Sale and purchase of *second-hand goods* should not be included in measuring value of output of a year because their values were counted in the year of output of the year of their production. Of course, commission or brokerage earned in their sale and purchase has to be included because this is a new service rendered in the current year.
3. *Value of production for self-consumption* are to be counted while measuring national income. ...ction for self-consumption should be valued at the prevailing market ... correctly

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5. Value of intermediate goods *must not* be counted while measuring value added because this will amount to double counting.

2. Income Method

This method approaches national income from distribution side. In other words, this method measures national income at the phase of distribution and appears as income paid and/or received by individuals of the country. Thus, under this method, *national income is obtained by summing up of the incomes of all individuals of a country*. Individuals earn incomes by contributing their own services and the services of their property such as land and capital to the national production. Therefore, national income is calculated by adding up the rent of land, wages and salaries of employees, interest on capital, profits of entrepreneurs (including undistributed corporate profits) and incomes of self-employed people. This method of estimating national income has the great advantage of indicating the distribution of national income among different income groups such as landlords, owners of capital, workers, entrepreneurs. Measurement of national income through income method involves the following main steps:

1. Like the value added method, the first step in income method is also to *identify* the productive enterprises and then *classify* them into various industrial sectors such as agriculture, fishing, forestry, manufacturing, transport, trade and commerce, banking, etc.

2. The second step is to classify *the factor payments*. The factor payments are classified into the following groups:

1. *Compensation to employees* which includes wages and salaries, employers' contribution to social security schemes.
2. *Rent and also royalty*, if any.
3. *Interest*.
4. *Profits*: Profits are divided into three sub-groups:
   (*i*) Dividends
   (*ii*) Undistributed profits
   (*iii*) Corporate income tax
5. *Mixed income of the self-employed*: In India, as in other developing countries, there is fifth category of factor income which is termed as *mixed income of self-employed*. In India a good number of people are engaged in household industries, in family farms and other unorganised enterprises. Because of self-employment nature of the business it is difficult to separate wages for the work done by the self-employed from the surplus or profits made by them. Therefore, the incomes earned by them are mix of wages, rent, interest and profit and are, therefore, called *mixed income of the self-employed*.

3. The third step is to *measure factor payments*. Income paid out by each enterprise can be estimated by gathering information about the number of units of each factor employed and the income paid out to each unit of every factor. Price paid out to each factor multiplied by the number of units of each factor employed would give us the factor's income.

4. The *adding up of factor payments* by all enterprises belonging to an industrial sector would give us the incomes paid out to various factors by a *particular* industrial sector.

5. By summing up the incomes paid out by *all industrial sectors* we will obtain domestic factor income which is also called net domestic product at factor cost (NDP_{FC}).

6. Finally, by adding net factor income earned from abroad to domestic factor income or NDP_{FC} we get net national product at factor cost (NNP_{FC}) which is also called *national income*.

Income approach to measurement of national income is shown through bar diagrams in Figure 2.6.

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			Net Indirect Taxes
	Net Factor Income from Abroad	Consumption of Fixed Capital	Consumption of Fixed capital
Dividends	Profile	Dividends	Profits
Undistributed Profits		Undistributed Profits	
Corporate Income Tax		Corporate Income Tax	
Interest	Interest	Interest	Interest
Rent	Rent	Rest	Rent
Mixed Income of Self-employed	Mixed Income of Self-employed	Mixed income of Self-employed	Mixed Income of Self-employed
Compensation to Employees	Compensation to Employees	Compensation to Employees	Compensation to Employees

$NDPF_{FC} \longrightarrow NNP_{FC} \longrightarrow GDP_{FC} \longrightarrow GDP_{MP}$

Fig. 2.6. *Income Approach to National Income*

Compensation to Employees

From the above items of income categories compensation to employees requires further explanation. Compensation to employees by the producers is the sum of wages and salaries, paid both in cash and kind, and contribution to social security schemes of the employees made by the employers. Thus, it has the following components:

Wages and Salaries: These include all payments made by the employers to their employees, both in cash and kind, for the services they render to their employers.

Wages and Salaries Payable in Cash. They include the following:

(1) Wages and salaries received in cash by the employees from their employers.

(2) Payments received by the employees for overtime work done by them.

(3) Travelling allowance received by the employees for going to and coming home from their work places.

(4) Bonuses, if any, receivable by the workers.

(5) Dearness allowance paid to the employees to neutralise the rise in cost of living.

(6) Vacation allowance and sick leave allowance.

(7) Leave travelling allowance (LTC).

(8) Commission provided, if any, to the sales staff on the sales.

Wages and Salaries in Kind. These are the remunerations in kind received in the form of goods and services by the employees for their use by themselves or by the members of their households. The following are some important types of remuneration received in kind.

(1) Housing accommodation provided free of cost.

(2) Free meals and drinks (such as tea, coffee, cold drinks) provided free to the employees when they are on duty.

(3) Uniforms and special clothing, if any, received free of cost by the employer.

(4) The free services of [illegible]

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(5) Free provision of goods and services which are produced by the enterprises themselves. Free travelling by the staff of railways or airlines, free coal to the workers working in coal mines fall in this category.

(6) Creches provided by the employers for the children of their employees.

(7) Value of interest on the free-interest loans given by the employers to their employees or value of concessions in interest on loans given on concessional rates of interest by the employers to their employees.

(8) Value of recreation and sport facilities provided by the employers to their employees and the members of their households.

Employers' contributions to social security schemes. Employers' contribution relating to the social security schemes of their employees such as life insurance, casualty insurance, contributory provident fund (CPF), pension schemes are also a part of the compensation to employees.

In addition to the above, in India's national income accounting, salaries and allowances paid to members of Parliament and State Legislatures, pay and allowances to the President of India, State Governors, ministers of Central and State Cabinets are also treated as compensation to employees.

Precautions. While estimating national income through income method the following precautions should be taken:

1. *Transfer payments* are not included in estimating national income through this method.

2. *Imputed rent* of self-occupied houses are included in national income as these houses provide services to those who occupy them and its value can be easily estimated from the market value data.

3. *illegal money* such as *hawala money, money earned through smuggling* etc. are not included as they cannot be easily estimated.

4. *Windfall gains* such as prizes won, lotteries are also not included.

5. Corporate profit tax (that is, tax on income of the companies) should not be separately included as it has already been included as a part of profits.

6. *Death duties, gift tax, wealth tax, tax on lotteries*, etc., are paid from past savings or wealth and not from current income. Therefore, they should not be treated as a part of national income of a year.

7. The receipts from the *sale of second-hand goods* should not be treated as a part of national income. This is because the sale of second-hand goods does not create new flows of goods and services in the current year.

8. Income equal to the *value of production used for self-consumption* should be estimated and included in the measure of national income.

Expenditure Method

Expenditure method arrives at national income by adding up all expenditures made on goods and services during a year. Income can be spent either on consumer goods or capital goods. Again, expenditure can be made by private individuals and households or by government and business enterprises. Further, people of foreign countries spend on the goods and services which a country exports to them. Similarly, people of a country spend on imports of goods and services from other countries. We add up the following types of expenditure by households, government and by productive enterprises to obtain national income:

1. Expenditure on consumer goods and services by individuals and households. This is called *final private consumption expenditure*, and is denoted by C.
2. Government's expenditure on goods and services to satisfy collective wants. This is called *government's final consumption expenditure*, and is denoted by G.

3. The expenditure by productive en is called *gross domestic capital fo* I or GDCF. Gross domestic capit
   (*i*) Gross fixed capital formatic
   (*ii*) Addition to the stocks or in
4. The expenditure made by foreig countries which are called expo expenditure by people, enterpri and services from other countri imports) or (*X*—*M*).

Thus, we add up the above four typ product at market prices (GDP_{MP}). Thu

GDP_{MP} = Private final consumptio + Gross domestic capital formation +

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On deducting consumption of fi market prices (GDP_{MP}) we get net do

In this method, we then subtrac at net domestic product at factor cos

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Private Final Consumption Expenditure	F C
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Fig. 2.7. *Ex*

Lastly, we add 'net factor (NNP_{FC}), which is called natior

$NNP_{FC} = GDP_{MP}$ – Consur Abroad.

Expenditure approach to r

(**Note:** To any concept of the c National Product)

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3. The expenditure by productive enterprises on capital goods and inventories or stocks. This is called *gross domestic capital formation*, or gross domestic investment and is denoted by I or GDCF. Gross domestic capital formation is divided into two parts:
   (*i*) Gross fixed capital formation
   (*ii*) Addition to the stocks or inventories of goods
4. The expenditure made by foreigners on goods and services of a country exported to other countries which are called exports and are denoted by *X*. We deduct from exports (*X*) the expenditure by people, enterprises and government of a country on imports (*M*) of goods and services from other countries. That is, we have to estimate net exports (that is, exports–imports) or (*X*—*M*).

Thus, we add up the above four types of expenditure to get final expenditure on gross domestic product at market prices (GDP_{MP}). Thus,

GDP_{MP} = Private final consumption expenditure + Government's final consumption expenditure + Gross domestic capital formation + Exports – Imports or

$$GDP_{MP} = C + G + I + (X - M)$$
$$= C + G + I + Xn$$

On deducting consumption of fixed capital (*i.e.*, depreciation) from gross domestic product at market prices (GDP_{MP}) we get net domestic product at market prices (NDP_{MP}).

In this method, we then subtract net indirect taxes (that is, indirect taxes – subsidies) to arrive at net domestic product at factor cost (NDP_{FC}),

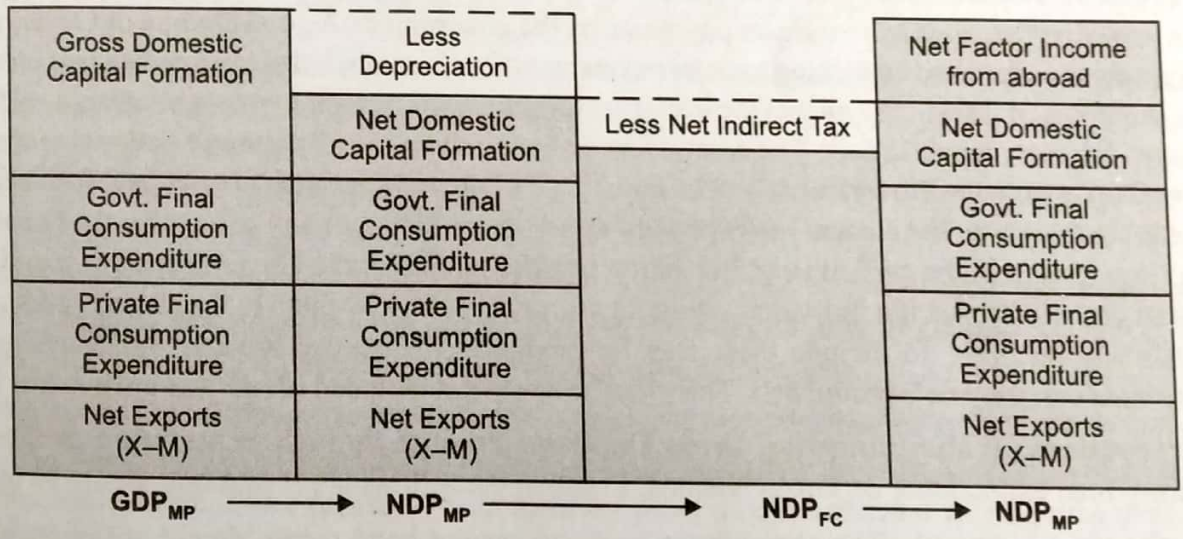

Fig. 2.7. *Expenditure Approach to National Income Concepts*

Lastly, we add 'net factor income from abroad' to obtain net national product at factor cost (NNP_{FC}), which is called national income. Thus,

NNP_{FC} = GDP_{MP} – Consumption of Fixed capital - Net Indirect taxes + Net Factor Income from Abroad.

Expenditure approach to national income is shown through bar diagram in Fig. 2.7.

(**Note:** To any concept of the domestic product, if we add '*Net Income from Abroad*' we will get corresponding National Product)

Government's expenditure on goods and services need explanation in some detail.

Government's Final Consumption Expenditure on Goods and Services

The general government provides services such as defence, law and order, public health, education, cultural services, etc., to satisfy collective wants of its citizens. The government purchases various

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goods and services from others for providing its services to the people and incurs cost on the
This cost of goods and services purchased by the government to provide its services to the people
satisfy collective wants is called intermediate consumption. Further, the government employs seve
persons, such as soldiers, policemen, other official clerks, secretaries in various departments a
pays them wages and salaries. Thus, compensation to employees (that is wages, salaries, etc.), bo
in cash and in kind, is another type of cost incurred by the Government. Since government genera
does not sell its services and instead provides them free of cost or sells them at a price much low
than production cost, the value of services provided by the government are valued at their cost
the government. The cost is the sum of (1) expenditure on intermediate consumption incurred b
Government and (2) compensation to employees (wages and salaries etc.).

However, the government also sells some goods and services, though at nominal prices, suc
as hospital fees, tuition fees charged from the students in Government institutions. In order to fin
out the cost of government services, proceeds from sales of some goods and services, if any, by th
government must be deducted.

Thus, the Government's final consumption expenditure on goods and services includes th
following items:

1. Compensation to employees
2. Intermediate consumption expenditure by the General Government which refers to purchase of goods and services by the Government *less* sales of some goods by it.
3. Consumption of fixed capital.

Transfer Payments by the Government. Government expenditure on goods and service needs to be distinguished from transfer payments by the government. A good amount of Governmen expenditure is undertaken on making transfer payments which is not included in gross national product Main examples of transfer payments are social security benefits, unemployment allowance, old-age pensions, interest on public debt. The reason for excluding them in estimation of national income is that in sharp contrast to Government purchases of goods and services, they are not paid in exchange for the *contribution to the current production of goods* or rendering of any service by the recipients to the Government in the current year. In making transfer payments the Government just transfers a part of its revenue to specific individuals without any contribution by them to the current production of goods and services. To include these transfer payments in national income would amount to overestimate current year's production. Therefore, they are not included in national income of a year.

Precautions. While estimating Gross Domestic Product through expenditure method or measuring final expenditure on Gross National Product, the following precautions should be taken:

1. *Second-hand goods*: The expenditure made on second-hand goods should not be included because this does not contribute to the current year production of goods and services.

2. *Purchase of shares and bonds*. Expenditure on purchase of old shares and bonds from other people and from business enterprises should not be included while estimating Gross Domestic Product through expenditure method. This is because bonds and shares are mere financial claims and do not represent expenditure on currently produced goods and services.

3. *Expenditure on transfer payments* by government such as unemployment benefits, old-age pension should also not be included because no goods or productive services are produced in exchange by the recipients of these payments.

4. *Expenditure on intermediate goods* such as fertilisers and seeds by the farmers and wool, cotton and yarn by manufacturers of garments should also be excluded. This is because we have to avoid double counting. Therefore, for estimating Gross Domestic Product we have to include only *expenditure on final goods and services*.

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For obtaining the value of *real GNP* for the current year 2013-14 we multiply the outputs of final goods produced in the current year (2013-14) by the prices of the base year (1999-2000), and record the estimates in column 6. Summing up the values of four final goods evaluated at base-year prices we get the total estimate of ₹ 39,98,240 which is the real GNP (or gross national income at constant prices) for the current year (2006-07).

It may be noted that real GNP and nominal GNP for the base year will be the same.

It will be noticed from Table 1 that for the current year 2013-14, whereas the value of nominal GNP is equal to ₹ 55,04,200, the real GNP is only ₹ 39,98,240. This is because market prices have risen between the base year (1999-2000) and the current year (2006-07).

The calculation of real GNP helps us to know whether the availability of real goods and services in the economy has increased over time. *Besides, by calculating the percentge change of real GNP in a year enables us to measure rate of economic growth in a year*. Further, it is real GNP that is often used for making comparisons of international standards of living and rates of economic growth of various countries.

Finally, with the help of nominal GNP and real GNP we can measure rate of inflation that has taken place over time. This measure of rate of inflation is known as **GNP deflator**. This is calculated as follows :

$$\text{GNP Deflator} = \frac{\text{Nominal GNP of a year}}{\text{Real GNP of the year}} \times 100$$

LIMITATIONS OF GDP CONCEPT AS A MEASURE OF SOCIAL WELFARE

National income, or GNP, as explained in the last chapter, measures the value of aggregate output of goods and services produced in a year. Since goods and services satisfy the wants of the people, national income or GNP has often been used as a measure of satisfaction or economic welfare of the people. The greater the magnitude of national income, the greater the level of economic welfare. Besides, economic progress or what is now generally called economic growth has been measured in terms of increase in national income (that is, increase in GNP or NNP) in terms of total or per capita income. In recent years doubts have been expressed about the validity of national income or gross national product (GNP) as a measure and index of economic welfare.

It has been asserted by several modern economists that national income as it is usually defined is not a satisfactory measure of economic welfare. According to them, in order to obtain a true measure of economic welfare, some adjustments both in the form of additions and subtractions have to be made in the aggregate of national income. National income, as it is usually conceived and measured, includes some things that do not increase welfare of the people. Therefore, such things ought to be excluded in order to get a true measure of economic welfare. This true measure of economic welfare is now often called "*Net Economic Welfare*" or simply *NEW*. On the other hand, the usual concept of national income excludes some goods and services which increase satisfaction of the people and therefore ought to be included in any good index of Net Economic Welfare.

As regards the things that ought to be added to obtain the index of Net Economic Welfare (NEW), the first important thing is the *value of satisfaction that people derive from leisure*. The usual concept of national income (or GNP) does not attach any significance to the amount of leisure people enjoy. However, the individuals derive satisfaction not only from the consumption of goods and services but also from leisure they have. Therefore, for constructing any index of net economic welfare, the value of leisure which the people enjoy must also be included. For example, if the average working hours are reduced, this is likely to reduce national production or national income but may raise welfare of the people by enabling them to enjoy more leisure.

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The other important items that ought to be added to obtain a true measure of welfare are *non-marketed personal services* (that is, the personal services which are not sold and purchased the market) which also greatly raise the satisfaction and welfare of the people. For instance, services rendered by the housewives to the family members greatly add to their welfare but they are not recorded in national income accounting. Likewise, personal services rendered by the individuals to themselves such as gardening, painting one's own house significantly raise their welfare but do not get registered in the national income or GNP. Hence in order to get any true index of economic welfare, the value of non-market activities such as personal services which increase welfare ought to be incorporated.

As regards the items that have to be deducted from the national income, mention may be made of those harmful effects which result from increase in output. As is well known, the production of modern industries pollutes the environment such as polluting air, water and calmness which significantly reduce welfare of the people. Though modern industrialization has greatly increased national income of the countries but by causing *air pollution, water pollution and noise* has tended to reduce the welfare of the people. Therefore, for preparing a measure of net welfare, negative values ought to be assigned to the *environment pollution* that results from the production of goods and services. The various forms of pollution of environment have often been referred to as *costs of economic growth* which, like other costs, have to be deducted to obtain the index of net economic welfare.

Apart from environment pollution, certain other deductions on account of wasteful and non-productive expenditure such as Government expenditure on police and law courts so as to maintain law and order and on defence to protect the country from external aggression. These have been called "*regrettable costs*", because economists consider them regrettable necessities expenditure on which does not lead to increase in welfare of the people. Hence expenditure on them should be excluded from GNP to arrive at the measure of net economic welfare.

To sum up, the relation between national income (GNP) and Net Economic Welfare (NEW) can be represented as follows:

Real GNP

– Depreciation

+ Value of leisure

+ Value of non-market activities (*i.e.*, services of housewives and personal services)

– Environment pollution

– Regrettable costs

= Net Economic Welfare

But it is worth mentioning that even the measure of Net Economic Welfare (NEW) as defined above does not truly indicate the welfare enjoyed by the people. There are other things which play a significant role in determining welfare of a nation and which do not get registered in national income or in Net Economic Welfare. Thus, *composition of national output* as between wage goods and luxuries and also the *distribution of goods between individuals* determine welfare to a great extent. If with the increase in total national income and per capita income the rich are getting richer and the poor getting poorer, then this growth in national income and per capita income cannot be said to promote welfare. Professor Hicks rightly remarks, "*The national income only measures the total volume of goods and services at the disposal of the community during the year; it can tell us nothing, for example, about the way in which the national income is divided up between rich and poor.*"[4]

Further national income and per capita income are also not true measures of welfare because they do not consider the composition of output. A country's national income and per capita income may

4. J.R. Hicks, *The Social Framework.*

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be very high but the well-being of the people may be very low because the national output consists of a larger quantity of war material. This is a very important factor because it is a well known fact that various countries are spending quite a large part of national budgets on the manufacture of war materials and the greater the expenditure on the defence forces, the smaller will be the actual well-being of the people, given the size of national and per capita income.

Similarly, the well-being of the people also depends upon the relative proportions of wage-goods (necessities) and luxuries in the composition of national product. It may be noted that in a country if luxuries are being produced in relatively greater quantities than the wage-goods, then in that case while the few rich will be rolling in luxuries, the poor will be deprived of even sufficient quantities of necessities of life. Likewise, national and per capita income do not accurately reflect improvements in the quality of products. This is a shortcoming because improvements in the quality of products affect the economic welfare of the people as much as the increase in quantities of goods.

Lastly, the increase in national income does not truly indicate the increase in welfare of the people because it does not take into account *how the national income is being produced and how the increase in it has been brought about*. If increase in national income has been brought about by making workers work longer hours which impair their health and efficiency, then this increase in national income will not promote welfare but will adversely affect it. Similarly, if the increase in national income has been obtained by introducing labour-saving machinery throwing out a large number of workers out of employment, this growth in national income increases unemployment and therefore cannot lead to the increase in social welfare.

THE CONCEPT OF GREEN GNP

We have explained above the limitations of GDP or GNP as a measure of welfare. In recent years the economists have realised that in national income accounting two aspects or costs of producing GDP need to be incorporated in estimating GDP or national income so that it should truly reflect welfare of the people. These real costs are of two types. First, *when producing GDP firms pollute the air and water which adversely affects the welfare of the people.* Thus, it has been found that while producing goods the firms pollute the river water by dumping their wastes in local rivers. Similarly, the factories in the urban areas using oil and coal emit smoke and gas that pollute the air which harms those who live in the surrounding area. Therefore, ***in estimating real GDP or national income the costs of pollution of air and water by the firms in the production process of goods must be subtracted to arrive at what has been called green GDP* or green *GNP***.

Another important aspect of producing GDP which requires adjustment for calculating green GDP is **depletion of natural resources** such as oil, forests, coal and natural gas. Conventional national income accounting does not take into account the depletion of natural resources. For example, when oil drilling machines pump out oil from an underground field, it leads to the depletion of the non-renewable resources but no deduction is made to account for the *depletion of oil reserves* in national income accounting. In fact, the depletion of natural resources should be treated as a type of *negative inventory investment* which if accounted for in national income accounting would tend to lower the GDP estimates, other things remaining the same. Likewise, measuring the true cost of timber from cutting trees of the forests which causes not only destruction of forests—a natural resource—but also soil erosion. The damage caused by cutting trees and thereby destroying forests and causing soil erosion be assessed and accordingly proper deduction be made on this count in estimation of real GDP. In this connection the loss due to destruction of forests can be better understood from the damage and devastation caused by floods and landslides in May 2013 in Uttarakhand in India which was the result of cutting of trees in the forests nearby the rivers passing through them. It follows from above that "*ideal accounting system, the economic costs of environment degradation would be subtracted*

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in the calculation of a firm's contribution to output and all activities that improve the environment because they provide real economic benefits to the people be added to output."[5]

In this regard some western economists have pointed out that some developing countries in their attempt to speed up economic growth and raising their GDP as rapidly as possible have overexploited the natural resources and caused a good deal of environment pollution and natural resources degradation, they therefore suggest that costs of environment pollution and natural resources degradation are incorporated in their estimates of growth of GDP and their growth policies need to be modified. However, in our view this is not entirely correct to blame the developing countries who want higher GDP growth rate to reduce poverty in their countries. As a matter of fact, it is the developed countries who in the past for achieving rapid industrial growth have contributed a lot to the emission of harmful gases such as carbon dioxide that have significantly contributed to the global warming affecting the welfare of the people of developing countries. As a matter of fact, they should not only provide financial assistance to the developing countries for the harm done to the global environment in their growth process in the past but also transfer technology that ensures protection of environment from the growth processes in poor developing countries.

However, apart from what the developed countries say, it needs to be emphasized that India needs **green growth**, that is, growth in green GDP so as to ensure environment sustainability and thereby to promote the welfare not only of the current generation but also of future generations. India's quest for growth with the objective to pull out millions of its people from poverty is a necessary and legitimate pursuit. But so is the pursuit of clean and safe environment and conservation of natural resources. No growth process can afford to neglect the environmental consequences of economic activity, or allow unsustainable depletion and deterioration of natural resources. For the last over one decade (2003-14) India is the second fastest growing economy in the world, next only to China. The growth cannot take place without additional energy. The Indian economy heavily depends on coal and hydropower to meet its energy needs and the growth of each of these energy sources involves the issue of protection of environment and depletion of its natural resources. Therefore, the pursuit of our growth objective has to be reconciled with the objective of protection of environment. Unfortunately, the experience of growth in many countries and our own experience suggests that environmental pollution and unsustainable depletion and deterioration of natural resources occur due to laxity in environment monitoring. This has to be avoided in the future to achieve clean and sustainable growth. Therefore, we have to explore the sources and practices that use less of the polluting agents and more of clean sources of energy such as solar energy and nuclear energy. A good start has already been made in India in both these alternative sources of energy.

It growth of green GDP is adopting the pursued, then the growth will promote welfare of the people and protect them from health hazards. For such growth to occur, environmental and ecological consequences of growth activities must be taken into account. The current estimates of growth based on GDP and national income as conventionally measured do not reflect a true and genuine growth in the sense of green and sustainable growth. Kenneth Arrow and Parthadas Gupta find India's growth rate to be 2.5 to 3 per cent lower than the reported average of 7.6 per cent achieved in the last 11 years (2003-14). Therefore, we conclude that a green economy will make growth more inclusive and sustainable. Neglecting the ecological consequences of growth adversely affects the welfare of the people in the long run.

SOME EXAMPLES OF NATIONAL INCOME CALCULATION

We solve below some numerical problems of calculation of national income by three methods, namely, expenditure method, income method and value added method.

5. Andrew B. Abel, Ben S. Bernanke and Dean Croushore, *Macroeconomics*, 7th edition, Pearson, 2011, p. 29.

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Problem 1. *Calculate (1) GDP at market prices and (2) national income from the following information.*

	₹
Personal consumption expenditure	***6,500***
Indirect taxes less subsidies	***150***
State government consumption and investment expenditure	***500***
Central government consumption and investment expenditure	***2,000***
Change in business inventories	***100***
Gross private domestic fixed investment	***1,200***
Exports	***900***
Net factor payments to rest of the world	***– 100***
Imports	***1,200***
Depreciation	***200***

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Solution.

(*i*) GDP_{MP} = (Private Consumption Expenditure + Gross private investment (both fixed and inventories) + Govt. Expenditure (both State and Central) + Net exports (X–M))

= 6500 + (1200 + 100) + (500 + 2000) + (900 – 1200)

= 6500 + 1300 + 2500 – 300

= 10,000

(*ii*) *National Income*. National income is net national product at factor cost (NNP_{FC}). Therefore, to find out *net* domestic product at factor cost we have to deduct depreciation and net indirect taxes from GDP_{MP} and to get *national* income we have to deduct net factor payments to the rest of the world. Thus

NI or NNP_{FC} = GDP_{MP} – Depreciation – net Indirect taxes (*i.e.*, indirect taxes less subsidies) – net factor payments to the rest of the world.

NI = 10,000 – 200 – 150 – 100

= 9550

Problem 2. *Calculate the national income and personal disposable income from the following information :*

GDP_{MP}	***6,000***
Receipts of factor income from the rest of the world	***150***
Payments of factor income to the rest of the world	***225***
Depreciation	***800***
Indirect taxes minus subsidies	***700***
Corporate Profits	***1,200***
Dividend	***600***
Transfer payments to persons	***1,300***
Personal Taxes	***1,500***

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Solution.

(i) National Income is Net National Product at factor cost

NI or NNP_{FC} = GDP_{MP} – Depreciation – Net Indirect taxes + Net Factor income from abroad

= 6000 – 800 – 700 + (150 – 225)

= 6000 – 1500 – 75

= 6000 – 1575

= 4425

(ii) Personal Disposable income = National Income – Retained Corporate Profits + Transfer Payments to Persons – Personal taxes

PDI = 4425 – (1200 – 600) + 1300 – 1500

= 4425 – 600 + 1300 – 1500

= 3625

(**Note:** Retained corporate profits equals corporate profits minus dividends paid to shareholders)

Problem 3. *Calculate (1) Net Domestic Product at Market Prices and (2) National Income from the following data of all the enterprises in an economy.*

	₹ in Crore
(i) Subsidies	***10***
(ii) Sales	***1000***
(iii) Closing stock	***100***
(iv) Indirect taxes	***50***
(v) Intermediate consumption	***300***
(vi) Opening stock	***200***
(vii) Consumption of fixed capital	***150***
(viii) Net factor income from abroad	***10***

Solution.

NDP_{MP} and National Income be obtained through *value added method*. Net Domestic Product at Market Prices is the sum of net value added by all enterprises in the economy.

Value of output = Sales + Change in stock

= 1000 + (Closing Stock – Opening Stock)

= 1000 + (100 – 200)

= 900 crore

Net value added (NVA) at market prices (NDP_{MP}) = Value of output–Intermediate Consumption – Consumption of fixed capital

= 900 – 300 – 150

= 450 crore

National Income (NNP_{FC}) = NDP_{FC} Net Indirect taxes + Net factor income from abroad

= 450 – (50 – 10) + 10

= 450 – 40 + 10

= 420 crore

Problem 4. *On the basis of the following data about the economy which consists of only two firms, find out:*

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(*a*) *Value added by firms A and B.*

(*b*) *Gross Domestic Product at market prices and factor cost*

	₹ *in Crore*
(i) Sales by firm A	***200***
(ii) Purchases from B by firm A	***80***
(iii) Purchases from A by firm B	***120***
(iv) Sales by firm B	***400***
(v) Closing stock of firm A	***40***
(vi) Closing stock of firm B	***70***
(vii) Opening stock of firm A	***50***
(viii) Opening stock of firm B	***90***
(ix) Indirect taxes paid by both firms	***60***

Solution.

Firms	Output	Intermediate cost	Value added
Firm A:	Sale = 200 Change in stock = 40 – 50 = –10 Total Value of Output = 200 – 10 = 190	Purchases From B = 80	190 – 80 = 110
Firm B:	Sales = 400 Change in stock = 70 – 90 = –20 Total Value of Output = 400 + (–20) = 380	Purchases From A = 120	380 – 120 = 260

Gross domestic product at market prices (GDP_{MP}) = ΣGVA = 110 + 260 = 370 crore

GDP_{MP} is sum total of GVA_{MP} of all firms

Gross domestic product at factor cost (GDP_{FC}) = GDP_{MP} – Net Indirect taxes

= 370 – 60

= 310 crore

Problem 5. *Calculate Gross Domestic Product at Market Prices and Net National Product at Factor Cost and Gross Domestic Product at Factor Cost from the following data:*

	₹ *in Crore*
(i) Net indirect taxes	***38***
(ii) Consumption of fixed capital	***34***
(iii) Net factor income from abroad	***(–) 3***
(iv) Rent	***100***
(v) Profits	***125***
(vi) Interest	***20***
(vii) Mixed Income of self-employed	***120***
(viii) Wages and salaries	***170***
(ix) Employers' contribution to social security schemes	***30***

Solution.

Note that (*viii*) wages and salaries and (*ix*) Employer's contribution to social security schemes together constitute compensation to employees

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Net national product at factor cost (NNP_{FC}) = Wages and salaries + Employers' contributio to social security schemes + Rent + Profit + Interest + Mixed Income of Self employed. Net factor income from abroad

$$= 170 + 30 + 100 + 125 + 20 + 120 - 3$$
$$= 562 \text{ crore}$$

GDP_{MP} = NNP_{FC} + Net Indirect taxes + Consumption of fixe capital – Net factor income from abroad

$$= 562 + 38 + 34 - (-3)$$
$$= 562 + 38 + 34 + 3$$
$$= 637 \text{ crore}$$

GDP_{FC} = GDP_{MP} – Net Indirect Taxes

$$= 637 - 38 = 599 \text{ crore}$$

Problem 6. *Calculate gross domestic product at market prices (GDP_{MP}), gross domestic produ at factor cost (GDP_{FC}) and net national product at factor cost (NNP_{FC}) from the following data:*

	₹ *in Crore*
(i) Private final consumption expenditure	***290***
(ii) Government's final consumption expenditure	***50***
(iii) Subsidies	***20***
(iv) Gross domestic fixed capital formation	***105***
(v) Indirect taxes	***70***
(vi) Depreciation (i.e., Consumption of Fixed Capital)	***45***
(vii) Net factor income from abroad	***(–) 5***
(viii) Net addition to stock	***15***
(ix) Net exports	***(–) 5***

Solution :

Gross domestic product at market prices (GDP_{MP}) = Private final consumption expenditur + Government's final consumptio expenditure + Gross domestic fixed capit formation + Change in stock + Net export

$$= 290 + 50 + (105 + 15) + (-5)$$
$$= 290 + 50 + 105 + 15 - 5$$
$$= 455 \text{ crore}$$

GDP_{FC} = GDP_{MP} – Net Indirect Taxes

$$= 455 - (\text{Indirect Taxes} - \text{Subsidies})$$
$$= 455 - (70 - 20) = 405 \text{ crore}$$

NNP_{MP} = GDP_{MP} – Depreciation

$$= 455 - 45$$
$$= 410 \text{ crore}$$

NDP_{FC} = NDP_{MP} – Indirect taxes + Subsides

$$= 410 - 70 + 20$$
$$= 360 \text{ crore}$$

NNP_{FC} = NDP_{FC} + Net factor income from abroa

$$= 360 + (-5)$$
$$= 360 - 5 = 355 \text{ crore}$$

QU

1. Explain the circular flow o
2. Describe the circular flow firms. What determines th
3. What is meant by saving a free market economy ?
4. Despite the fact that motiv in national income accou
5. How does the addition o income? If Government's
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10. How will circular incor transactions?
11. In an open economy, ex Government expenditu
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20. Define *'national inco*
21. Distinguish between Product at Factor Cos
22. What is meant by *'val* method.
23. Explain the following
    (*i*) Net value added
    (*ii*) Net factor incor
    (*iii*) Transfer Payme
24. Distinguish between economic growth of

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QUESTIONS FOR REVIEW

1. Explain the circular flow of income in an economy. What does it measure ?
2. Describe the circular flow of income in a two-sector economy with households and business firms. What determines the magnitude of circular flow of income and expenditure ?
3. What is meant by saving and investment ? How do they affect circular flow of income in a free market economy ?
4. Despite the fact that motives to save are different from the motives of businessmen to invest, in national income accounts savings are always equal to investment.
5. How does the addition of Government in a two-sector economy affect circular flow of income? If Government's budget is deficit, how will it affect circular flow of income ?
6. Show with a circular income flow model of a two-sector economy that national product equals national income.
7. In a three-sector economy with firms, households and Government show with a circular income flow model that the sum of private investment and Government expenditure equals the sum of saving and taxes.
8. What is meant by withdrawals and injections ? How do they affect the size of circular flow of income and expenditure in an economy ?
9. If investment by business firms falls short of savings, how will it affect the circular flow of income ?
10. How will circular income flow in an economy be affected if a country has foreign trade transactions?
11. In an open economy, explain with a circular income flow model that the sum of investment, Government expenditure and net exports must equal the sum of savings and taxes.
12. How are aggregate domestic output and expenditure related to trade balance ?
13. Explain saving-investment identity in an open economy.
14. Show that the difference between saving and investment of an economy always equals trade balance.
15. Explain how foreign capital flows are related to domestic saving and investment.
16. Define gross domestic product. Are value of exports and imports included in it?
17. Distinguish between final goods and intermediate goods. Why are intermediate goods not included in gross domestic product of a country?
18. What are the components of gross domestic product? Explain them briefly.
19. Distinguish between gross national product (GNP) and gross domestic product (GDP). In this connection explain 'net factor income from abroad'.
20. Define *'national income'*. How is it different from gross domestic product (GDP)? Explain.
21. Distinguish between Net Domestic Product at Market Prices (NDP_{MP}) and Net Domestic Product at Factor Cost (NDP_{FC}).
22. What is meant by *'value added'*? Explain how national income is measured by value added method.
23. Explain the following terms:
    (*i*) Net value added
    (*ii*) Net factor income from abroad
    (*iii*) Transfer Payments by the Government
24. Distinguish between *nominal* GDP and *Real* GDP. Which concept is used for measuring economic growth of a country?

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25. Explain how national income is measured through expenditure method. What type expenditure are included in measuring national income of a country?

26. Explain 'income method' of measuring national income. Which of the following terms be included while calculating national income of a country through income method?

(*i*) Transfer Payments by the government to individuals in a year
(*ii*) Imputed rent of self-occupied houses
(*iii*) Hawala money
(*iv*) Windfall gains
(*v*) The receipts from the sale of second-hand goods.

27. Is gross domestic product (GDP) a true indicator of welfare of the society? Explain.

28. What is meant by *net economic welfare?* How is it derived or obtained from the estim of GNP?

29. On the basis of the following data about an economy which consists of only two firms, out:

(*a*) Value added by Firms A and B.
(*b*) Gross domestic product at market prices.

	₹ *in Crore*
(i) Exports by Firm A	***40***
(ii) Imports by Firm A	***100***
(iii) Sales to households by Firm A	***180***
(iv) Sales to Firm B by Firm A	***80***
(v) Sales to Firm A by Firm B	***60***
(vi) Sales to households by Firm B	***120***

(**Hint.** Note that value of exports by firm A will be a part of value of output, whereas imp by it will be a part of intermediate cost of production.)

(**Ans.** GDP_{MP} = 240 cr

30. From the following data calculate Gross National Product and Net National Produ market prices by (*i*) income method, and (*ii*) expenditure method.

	₹ *in Crore*
(i) Mixed income of self-employed	***400***
(ii) Compensation to employees	***500***
(iii) Private final consumption expenditure	***900***
(iv) Net factor income from abroad	***(–)20***
(v) Net direct taxes	***100***
(vi) Consumption of fixed capital	***120***
(vii) Net domestic capital formation	***280***
(viii) Net Exports	***(–)30***
(ix) Profits	***350***
(x) Rent	***100***
(xi) Government final consumption expenditure	***300***

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