

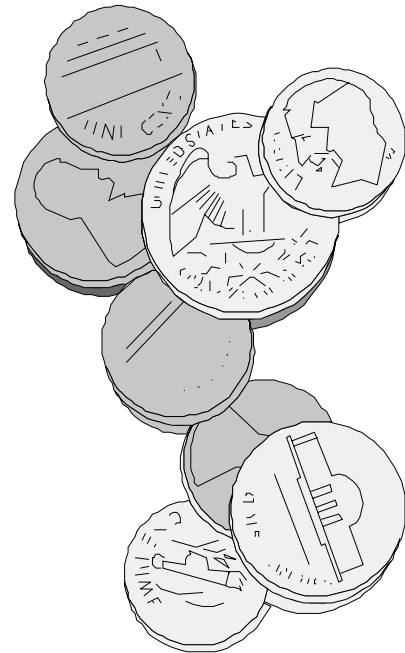
## Chapter 4

# Measurement of National Income

### INTRODUCTION

As noted in Chapter 1, macroeconomics is the study of the economy as a whole. National income is the single most important macro variable that represents the 'economy as a whole'. The level of national income determines the level of all other macroeconomic variables—aggregate consumption, savings and investment, employment and the price level. Therefore, a systematic and reliable estimate of national income is indispensable for the study of economy as a whole. In this chapter, we give a brief account of the importance of national income estimates, the various concepts and the methods of measuring national income.

Although, the practice of estimating national income had started long ago, it remained confined to estimating the value of aggregate output. The various concept of national income and practice of 'national income accounting', also known as 'social accounting', was developed and adopted by Simon Kuznets<sup>1</sup> of Harvard University in 1941, and he was awarded Nobel Prize for this work. In fact, making a detailed estimate of national income was thought to be necessary after the publication of Keynes' *The General Theory* in 1936. The analytical framework that Keynes had adopted in his



<sup>1</sup>. For details see, Simon Kuznets, *National Income and Its Composition* (New York, National Bureau of Economic Research, 1941). This book is treated to be a path-breaking work on measurement of national income.

macroeconomic analysis required detailed accounting of various components of the national income, including aggregate demand and aggregate supply, aggregate consumption expenditure (private and public), aggregate savings and investment, total exports and imports, net balance of foreign transactions, etc. National income accounting or the 'social accounting' is, in fact, a detailed accounting of total national product resulting from different kinds of economic activities, classified under different sectors and industries, and also the intersectoral flows of goods and services. It also takes into account the net effect of inflows and outflows of goods and services to and from foreign countries.

The *importance of national income accounting* lies in the fact that the performance and behaviour of an economy are studied on the basis of the performance of its macroeconomic variables including national income (estimated as Gross National Product or Gross Domestic Product), aggregate consumption, aggregate savings and investment, total labour employment, general price level, total supply of money and total demand for money, and balance of payments (*BOP*). Incidentally, of these aggregates, national income is the 'most macro' of all macroeconomic variables. All other macro variables are either the components of or are the result of, national income (*GDP/GNP*). For instance, the level of employment depends on the level of *GDP*, aggregate consumption expenditure and aggregate savings and investment are the components of *GDP*, and their level depends on the level of *GDP*. Given the money supply, the general level of price depends on the *GDP*, and so on.

National income is the most important variable from both the *theoretical* and the *practical* points of view. At the *theoretical* level, a major part of macroeconomic theories seeks to explain the determination of national income, the interrelationship and interaction between its various components, and growth of, and fluctuation in, national income. From the *practical point* of view, a country's national income data is used for (i) measuring the standard of living and economic welfare of its people, (ii) formulation of economic policies for the management of the economy, and (iii) making international comparisons about the status of the economy.

Besides, a major part of macroeconomic theories deals with the performance and behaviour of *GDP* or *GNP*. Given the importance of *GDP/GNP*, one needs to have a clear understanding of the national income concepts and their measurement.

#### 4.1 SOME CONCEPTS RELATED TO NATIONAL INCOME

In general sense of the term, 'national income' refers to the aggregate money value of all final goods and services resulting from the economic activities of the people of a country over a period of one year. Going by definition, it appears that measuring national income is an easy task. However, making a reliable measure of national income is an extremely complex and difficult task. Measuring national income involves many conceptual problems. Besides, the term 'national income' is used in a variety of senses depending on (i) what is productive and what is a non-productive activity, (ii) within the productive activities, what is economic and what is non-economic production, (iii) what is to be included in, and what should be excluded from, the national income concept, and (iv) what method, or methods, are to be used to measure national income. Therefore, prior to discussing the methods of measuring national income, it is essential to have clarity regarding the various concepts used in its measurement.

### 4.1.1 Economic and Non-Economic Production

All productive activities of human beings create goods and/or services, but all goods and services produced by human activities are not included in national income accounting. For the purpose of national income accounting, production of goods and services by human beings are classified under two categories: (i) economic production, and (ii) non-economic production. Let us understand the differences between the two.

**Economic Production** In economic-sense, *economic production* refers to the production of those goods and services which are meant for sale and have market value, and those goods and services which are produced and provided jointly to the people by the government and public organisations, for which people pay indirectly through tax payment. Thus, economic production includes both *marketable* and *non-marketable* production. Goods and services produced by farmers, firms, factories, shops, hoteliers, tailors, lawyers, medical practitioners, etc., fall in the category of *marketable production*. And, goods and services produced and supplied by the government, public institutions, social organisations, NGOs, social service clubs, charitable societies, etc., fall in the category of *non-marketable production*. The Government provides administrative services, law and order, judiciary services, national defence, educational and medical services, etc. These services (except medical and educational services) cannot be provided individually, and they do not have a market and market price. But, all these services use national resources—land and labour—which have an economic cost, and they add to the production capacity, and to the welfare of the society. Production of all such goods and services falls in the category of Economic Production. It must, however, be noted that *all marketable production is economic production but all economic production is not marketable*. But all the goods and services of this category are included in national income accounting.

**Non-Economic Production** Non-economic production includes the production of goods and services that are not meant to be sold, nor is there any market for them, nor do they have a market price. To this category belong mainly the following services:

- (i) Services rendered to self, e.g., exercising, eating, shaving, washing one's own clothes, and entertainments, hobbies, cooking for self, etc.
- (ii) Services provided to the family members, e.g., housewives cooking for the family and looking after the household, parents teaching their own children, mothers rearing the children, providing nursery help, doctors treating their own family members, gardening in one's own house campus, etc.
- (iii) Services provided by the neighbours to each other, e.g., helping each other on festival and marriage occasions, etc.

Although these services contribute to human welfare, as any economic good, and can be valued at an imputable rate, these services are not included in the measurement of the national income as these cannot be marketed.

### 4.1.2 Intermediate and Final Products

In national income accounting, the goods and services produced in a country are classified as *intermediate* and *final products*. National income includes the value of only final products—be it a

good or service. Therefore, it is vital to make a distinction between intermediate and final products. Let us first understand the distinction between *intermediate* and *final goods*. The case of *services* will be discussed later.

**Intermediate and Final Goods** In the process of production, certain goods, called *material inputs*, pass from one stage to another, with their form changing, till the product reaches its final stage. Such products are called *intermediate products*. Thus, the goods that flow from one stage to another in the process of production of a good, with their form changing, are called *intermediate products*. The goods that reach the final stage of production and flow to their ultimate consumers/users are called *final products*. Practically, a product sold by one firm to another for resale, or for further processing or value addition, in the process of production is called *intermediate product*, and a product that is sold finally to the consumer or to the investor is *final product*.

**Final goods** are classified under two categories: (i) final consumer goods, and (ii) final producer goods or capital goods. *Final consumer goods* are those that flow to the ultimate consumers. *Final capital goods* (machinery, plant and equipments) are those that are finally used by the firms in the process of production. Final capital goods are also called as '*Investment goods*'.

The distinction between intermediate and final products, in case of consumer goods, can be clarified further with an example. Let us consider the production of sandwiches. Initially the sandwich was in the form of wheat. In the process of sandwich production, wheat flows from the farmers to flour mills, from flours mill to bakeries, and from bakeries to restaurants, where bread is converted into sandwiches – the final product – which are sold finally to the consumers. Note that in the process of sandwich production, wheat flows from one stage to another but its form keeps on changing – from wheat to wheat-flour, from wheat-flour to bread, from bread to sandwich, the final product. In this case, wheat, wheat flour and bread are *intermediate products* and sandwich is the *final product*.

The need for distinction between the intermediate and final products arises because of the problem of **double counting**, i.e., the value of the same product counted more than once in national income accounting. In our example of sandwich production, wheat is converted into flour, wheat-flour is converted into bread, and bread into sandwich. At each stage of production, the products—wheat, flour, bread and sandwich—are priced differently. Wheat price is included in the price of flour, in the price of bread, and in the price of sandwiches. Therefore, if the total value of all these products—wheat, wheat-flour, bread and sandwich—is taken into account in national income counting, wheat price would be counted *four times*. This is called **double counting**, even though it is counted four times. Double counting leads to overestimation of the national income.

Consider the example of the production of cotton shirts. If one traces back the process of shirt production, one finds that the shirt was initially in the form of cotton. In shirt production, cotton flows from cotton growers to threading mill, from threading mill to cotton textile mill, from cotton textile mill to shirt manufacturing company. The product keeps changing its form—from cotton to cotton thread, to cotton cloth, to shirts. Each of these products has a different price. If the product is treated as the final product at each stage of production, then the cotton price will be counted four times in this case also. This double or fourfold counting of cotton value would lead to overestimation of the national income. Therefore, avoiding *double counting* is a necessary condition for estimating national income correctly.

**Intermediate and Final Services** Whether the service provided by the private firms, like courier, mobile phone, and transport services, and by the government or government departments is an intermediate product or a final product is a rather ticklish issue. The classification of services under the intermediate and final product categories depends on the purpose of their use. For example, services provided by the government, like transport, postal, water, communication, etc., at a cost are used for both production and consumption purposes. When used for production purpose, these services are treated as *intermediate products* and when used for private consumption, they are treated as *final products*. For example, the part of railway services used for transporting production materials are treated as intermediate service product, and that used for travelling from one place to another for personal purposes is treated as final service product. Similarly, postal services provided to business firms are intermediate products and those provided to households are treated as final products. Bus services are regarded as final products as they are used for commuting from one point to another. However, there is a difference of opinion among the economists on the issue of treatment of services as intermediate and final products. It all depends on the practice adopted by the authority assigned the task of estimating national income.

#### 4.1.3 Transfer Payments

Transfer payments are the payments made by people to the people, and by people to the government, without corresponding transfer of goods and services or addition to the total output. In other words, transfer payment refers to the flow of money without a reverse flow of goods or services. For example, when a person gifts some money to a relative or friend, or he/she donates an amount to a poor person or to a charitable organisation, without receiving anything in return, it is a **transfer payment**. When people pay taxes to the government and government pays old-age pension to the people, these are treated as *transfer payments* in national income accounting.

It is important to note here that *transfer payments* are not taken into account while counting the national income because such payments do not result in any addition to the total production nor do they add any additional value to the society.

However, the concept of *transfer payment* at times becomes disputable. To use Beckerman's example<sup>2</sup>, when a father pays some money to his son as pocket money, it is transfer payment. But, if the son cleans his father's car in return, the question arises 'should father's payment to the son be treated as a transfer payment or as a payment in return for son's service. In such cases, an arbitrary approach is adopted or a value judgment is used. Therefore, practice varies from country to country. " ... the dividing line between what is and what is not productive activity is arbitrary in any system of national accounts, including the system adopted by nearly all Western countries."<sup>3</sup>

#### 4.1.4 Consumer and Producer Goods

All *final products*, as discussed above, can be classified under two categories: (i) consumer goods, and (ii) producer goods, or capital goods. The goods and services that are consumed by the people to directly satisfy their needs and yield utility to the consumer are **consumer goods**. For example,

<sup>2</sup> Wilfred Beckerman, *An Introduction to National Income Analysis* (Universal Book Stall, New Delhi, 1993), pp. 7-8.

<sup>3</sup> Beckerman, *op. cit.*, p.8.

food, clothes, house, personal cars, household goods, petrol, books, etc., consumed or used by the people of a country are all *consumer goods*. Also, the total annual expenditure by the government on staff salary, education, health care and law and order represent government consumption expenditure, and thus, the services created are consumer goods.

As regards the *producer goods*, they are the category of final products which are not used for their own sake or as consumer goods but are used for enhancing the production capacity of the national economy with the purpose of increasing the flow of income in the future. Such goods are also called *capital goods*. Capital goods are the man-made means of production, including machinery, tools and equipments; corporate office, educational, hospital and factory buildings, roads, railways, airports and airplanes, etc. All such final products are *producer goods*.

## 4.2 NATIONAL INCOME MEASURES

Different kinds of national income measures are used in national income analysis and in income policy formulations. Also, different concepts of national income are used in economic analysis depending on (i) what is and what is not included in the national income estimates, and (ii) what method is used for estimating the national income. In this section, we describe briefly the main concepts and measures of national income.

### 4.2.1 Gross Domestic Product (GDP)

The Gross Domestic Product (GDP) can be defined as the sum of market value of all *final goods and services* produced in a country during a specific period of time, generally one year. It is important to note here that in estimating *GDP*, the income earned by the foreigners in the country are *included* and the income earned by residents abroad and remitted to the home country are excluded. In simple words, *GDP* includes income earned by the foreigners in the country and excludes income earned abroad by the residents.

The market value of domestic product is obtained at both *constant* and *current prices*. Accordingly, *GDP* is known as '*GDP at constant prices*' and '*GDP at current prices*', respectively.'

Measuring *GDP* as 'the market value of all final goods and services' is beset with a number of problems:

- (i) determining what is 'final' and what is not, to avoid the problem of double counting,
- (ii) evaluation of non-marketed goods and services, e.g., farm products produced and consumed by farmers themselves and rental value of owner-occupied houses, etc.,
- (iii) accounting for incomes from illegal activities and professions, e.g., smuggling, production and sale of prohibited goods, like narcotics and arms, etc.,
- (iv) unsold stocks and inventories, and
- (v) distortion of prices due to indirect taxes.

In practice, these problems are resolved by the national income estimating agency. For instance, in India, the Central Statistical Organisation (CSO) finds ways and means to account for these problems.

Alternatively, the *GDP* can also be defined and measured as the *sum of all factor payments* (wages, interest, rent, profit and depreciation). It is then called '*GDP at factor cost*.'



### 4.2.2 Gross National Product (GNP)

The Gross National Product (*GNP*) is another measure of national income which often figures in macroeconomic analysis and policy formulations. The concept of *GNP* is similar to that of *GDP* with a significant difference, of course. *The concept of GNP includes the income of the resident nationals which they receive abroad, and excludes the incomes generated locally but accruing to the non-nationals.* In case of *GDP*, however, it is just the otherway round. *The GDP includes the incomes locally earned by the non-nationals and excludes the incomes received by the resident nationals from abroad.* A comparative definition of *GNP* and *GDP* is given below.

*GNP* = Market value of domestically produced goods and services

plus incomes earned by the residents of a country in foreign countries

minus incomes earned by the foreigners in the country.

*GDP* = Market value of goods and services produced by the residents in the country

plus incomes earned in the country by the foreigners

minus incomes received by residents of a country from abroad.

### 4.2.3 Net National Product (NNP)

Net National Product (*NNP*) is another concept of national income often used in macroeconomic analyses. The concept of *NNP* is closely related to the concept of *GNP*. The concept of *GNP* includes the output of both final consumer and capital goods. However, a part of capital goods is used up or consumed in the process of production of these goods. This is called *depreciation* or *capital consumption*. While *GNP* is gross of depreciation, *NNP* is net of depreciation. *NNP* is obtained by subtracting depreciation from *GNP*. That is,

$$NNP = GNP - \text{Depreciation or capital consumption}$$

The *NNP* is the measure of national income which is available for consumption and net investment to the society. The *NNP* is, in fact, the actual measure of national income. The *NNP* divided by the population of the country gives the per capita income.

### 4.2.4 Personal Incomes (PI)

*Personal income (PI) can be defined as the sum of all kinds of incomes received by the individuals from all sources of incomes.* Personal income includes wages and salaries, fees and commission, bonus, fringe benefits, dividends, interest earnings and earnings from self-employment. It also includes transfer incomes like pensions, family allowances, unemployment allowances, sickness allowances, old age benefits and social security benefits. Personal income also includes the incomes earned through illegal means, e.g., bribe, smuggling, cheating, theft, prostitution, at least for the taxation purpose.

**Personal Income and NNP** It is important to note here that the sum of personal incomes is not exactly the same as *NNP*. The reason is that *NNP* excludes certain items included in personal incomes and it includes some other items not included in personal incomes. *NNP* does not include many items of personal income, for example, transfer payments like social security benefits, pensions, old age allowances, and such other benefits. And, it includes undistributed profits of private companies, surpluses of public undertakings, and rentals of the public properties. However, *NNP* can be measured by making some additions to *PI*.

$$NNP = PI + UDP + SPU + RPP$$

(where  $UDP$  = undistributed company profits;  $SPU$  = surplus of public undertakings;  $RPP$  = rentals of public properties and  $PI$  excludes items not included in  $NNP$ ).

#### 4.2.5 Some Other Income Concepts

There are some other income concepts in addition to the national income concepts discussed above, which are used in the analysis of national income. Two of such important income concepts are briefly discussed below.

**1. Disposable Income** In wider sense of the term, *disposable income* refers to personal income of the income earners against which they do not have any legally enforceable payment obligations. Legally enforceable payment obligations include such payment obligations as income tax, payment due against government loans, and fines and penalties imposed by legal authorities. In specific terms, however, disposable income can be defined as follows.

$$\text{Disposable income} = \text{Personal income} - (\text{personal income tax} + \text{fees} + \text{fines})$$

**2. Private Income** Broadly speaking, all personal incomes are private incomes. However, the term *private income* is used in contrast to *public income*. For the purpose of national income accounting,  $NNP$  is generally divided into two parts: (i) private income, and (ii) public income. Public income is that part of  $NNP$  which accrues to the public sector, including administrative units of the government and the government commercial undertakings. Thus, income accruing to the public sector is called *public income*. In contrast, incomes accruing to the individuals, including private sector earnings, transfer payments and undistributed profits of private companies are called *personal income*. By definition,

$$\text{Total Private Income} = \text{Net Domestic Product} - \text{Public Income}$$

#### National Income Concepts Summarised

1.  $GNP$  = Market value of final goods and services (including both consumer and capital)
  - plus incomes earned by the national residents in foreign countries
  - minus incomes earned locally but accruing to foreigners
2.  $GDP$  = Market value of goods and services produced by the residents in the country
  - plus incomes earned locally by foreigners
  - minus incomes received by the nationals from abroad.
3.  $NNP$  =  $GNP$  – Depreciation (or Capital Consumption)
4.  $PI$  =  $NNP$  – (Undistributed Company Profits + Surplus of Public Undertakings + Rentals of Public Property)
5. Disposable income ( $Y_d$ ) =  $PI$  – Personal Taxes

#### Some Accounting Relationships

1.  $GNP$  at factor cost *plus net* indirect taxes *less* depreciation =  $GNP$  at market price
2.  $GNP$  (at market price) *less* depreciation =  $NNP$  at market price
3.  $NNP$  at market price *less* indirect taxes *add* subsidies =  $NNP$  at factor cost



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4. *NNP* at factor cost *less/add* domestic income accruing to non-residents = *NDP* at factor cost
5. *NDP* at factor cost *less* surplus of public undertakings
  - less* rentals/profits of statutory corporations
  - less* profit tax
  - less* income accruing to non-residents
  - add* interest on national debt
  - add* transfer payments
 = Personal income
6. Personal income *less* direct taxes, fees, fines, etc.  
= Disposable income

4.3 NOMINAL AND REAL GNP<sup>4</sup>

The *GNP*, and also *GDP*, are estimated at both current and constant prices. The *GNP* estimated at current prices is called **nominal GNP** and *GNP* estimated at constant prices in a chosen year (called 'base year') is called **real income**. Similarly *GDP* estimated at current prices and constant prices is called **nominal GDP** and **real GDP**, respectively.

The need for estimating *GNP* (or *GDP*) at constant prices arises because *GNP* at the current prices produces a misleading picture of economic performance when prices are continuously rising or decreasing. In a country having a high rate of inflation, the nominal *GNP* produces an inflated estimate of the national income and creates false sense of richness or economic growth. *GNP* valued at current prices shows rise in *GNP* even under the following conditions.

- (i) *Actual production is decreasing but prices are rising.* For example, production of food-grains had declined in India by 4.2 percent in 1991-92 compared to 1990-91 and food-grain prices had increased by 20.7 percent. Food-grains production valued at current prices showed increase in foodgrains supply whereas it had actually declined.
- (ii) *Actual production remains constant and prices are rising.* For instance, India's industrial production had remained almost constant (increasing at an insignificant rate of 0.6 percent) between 1990-91 and 1991-92, whereas industrial prices had risen in this period by 12.6 percent. This showed a rise in the industrial production at current prices.

The kind of misleading picture of an economy that *GNP* estimated at current prices creates can be seen in Table 4.1. This table presents India's *GNP* and its annual growth rates estimated at both current and constant prices for the period from 1999-2000 to 2007-08 (QE). The *GNP* data given in Table 4.1 shows the difference between the nominal and real *GNP* of India. More obvious is the discrepancy between the annual growth in the nominal and real *GNP*. The table shows clearly that nominal *GNP* presents an inflated measure of India's *GNP*.

In order to avoid this kind of misleading estimates of national income, *GNP* is also estimated at constant prices of a chosen base year. The *GNP* estimated at constant prices of the base year is called **real GNP**: it gives national income estimates free from distortion caused by inflation or

<sup>4</sup> It is the *GNP*, not the *GDP*, which is available to the people of a country for consumption and investment. Therefore, our discussion on 'nominal' and 'real' income concepts is based on *GNP*. However, the analyses carried out in this section applies exactly to *GDP* also.

**Table 4.1** India's Nominal and Real GNP: 1999-2000 to 2007-08 (At Factor Cost: New Series at 1999-2000 prices)

Year	GNP (Billion Rs)		Annual Growth Rate (%)		GDP	
	Nominal*	Real	Nominal	Real	Real Billion Rs	Growth Rate (%)
1999-00	177109	177109	10.6	6.4	178653	6.4
2000-01	190228	184176	7.4	4.0	186430	4.4
2001-02	207766	195194	9.2	6.0	197261	5.8
2002-03	224473	202948	8.0	4.0	204829	3.8
2003-04	251992	220491	12.3	8.6	222276	8.5
2004-05	285533	236689	13.3	7.3	238877	7.5
2005-06	325627	259544	14.0	9.6	261610	9.5
2006-07	374961	284986	15.2	9.8	287112	9.7
2007-08 (Q)	429705	311486	14.6	9.3	312972	9.0

Source: Government of India, Ministry of Finance, *Economic Survey* – 2008-2009,

Appendix – Statistical Tables 1.1, 1.2 and Table 4.10 (p.68)

\*At current prices; Q = Quick Estimates

deflation. However, estimating *GNP* at the prices of the base year is not an easy task. The economists use a simple adjustment factor called *GNP Deflator* or *National Income Deflator* to eliminate the effect of rising prices on the *GNP* and to work out real *GNP* at the base year prices. Let us now see how '*GNP deflator*' is worked out and applied to estimate the real *GNP*.

#### 4.3.1 The GNP Deflator and its Application

The *GNP deflator* is essentially an adjustment factor used to convert nominal *GNP* into real *GNP*. The *GNP deflator* is the ratio of price index number (*PIN*) of a chosen year to the price index number (*PIN*) of the base year. The *PIN* of the base year = 100. The chosen year is the year whose real *GNP* is to be estimated. The method of working out *GNP deflator* is given below.

$$\text{GNP Deflator} = \frac{\text{PIN of the chosen Year}}{100}$$

The formula for converting nominal *GNP* of a year into real *GNP* may be written as follows.

$$\text{Real GNP} = \frac{\text{Nominal GNP}}{\text{GNP Deflator}}$$

or

$$\text{Real GNP} = \frac{\text{Nominal GNP}}{\text{PIN}_{\text{cy}}/100}$$

(where  $\text{PIN}_{\text{cy}}$  is the price index number of the chosen year).

For application of *GNP deflator* concept, let us consider an example. Suppose nominal *GNP* of a country, i.e., *GNP* estimated at current prices, in year 2000 is given at Rs 500 billion and Price Index Number (*PIN*) is given as base year 2000 = 100. Now let the nominal *GNP* increase to Rs 600 billion in year 2005 and *PIN* rises to 110. Given this data, *GNP deflator* for the country can be obtained as follows.

$$GNP \text{ Deflator} = \frac{PIN_{2005}}{100} = \frac{110}{100} = 1.10$$

Given the *GNP Deflator* at 1.10, the *Real GNP* for the year 2005 can be worked out as follows.

$$Real \ GNP = \frac{Rs \ 600 \text{ bill.}}{1.10} = Rs \ 545.45 \text{ billion}$$

Note that *Nominal GNP* increases from Rs 500 billion to Rs 600 billion, i.e., by 20 percent over a period of five years or at an annual average rate of 4 percent. Since *PIN* increases from 100 to 110, i.e., by 10 percent over a period of 5 years, *real GNP* increases at a lower rate, i.e., at 9.1 percent or at an annual average rate of 1.8 percent.

### 4.3.2 GNP Implicit Deflator

Another variant of *GNP deflator* is *GNP implicit deflator*, also called *implicit price deflator*. It is the ratio of nominal *GNP* to real *GNP*, i.e.,

$$GNP \text{ Implicit Deflator} = \frac{\text{Nominal } GNP}{\text{Real } GNP}$$

The *GNP implicit deflator* can be used for the following purposes:

- (i) to construct price index number, and
- (ii) to measure the rate of change in prices, i.e., to measure the rate of inflation or deflation.

For instance, in our example, the nominal *GNP* in year 2005 is Rs 500 billion and the real *GNP* is Rs 545.45 billion. In that case,

$$GNP \text{ Implicit Deflator} = \frac{Rs \ 600.00 \text{ billion}}{Rs \ 545.45 \text{ billion}} = 1.10$$

The *GNP Implicit Deflator* multiplied by 100 give the **Price Index Number** (*PIN*) for the year 2005. That is,

$$\begin{aligned} PIN_{2005} &= GNP \text{ Implicit Deflator} \times 100 \\ &= 1.10 \times 100 = 110 \end{aligned}$$

Thus, 110 is the price index number for the year 2005. The same procedure can be adopted to calculate *PIN* for other years.

Once *PINs* for different years are calculated, the same can be used to calculate the rate of change in price, i.e., the rate of inflation or deflation. For example, the rate of inflation between the year 2000 and 2005 can be worked out as follows.

$$\begin{aligned} \text{Rate of Inflation} &= \frac{PIN_{2005} - PIN_{2000}}{PIN_{2000}} \times 100 \\ &= \frac{110 - 100}{100} \times 100 = 10 \text{ percent} \end{aligned}$$

This means that inflation over a period of 5 years was 10 percent or at an annual average rate of 2 percent.

## 4.4 METHODS OF MEASURING NATIONAL INCOME

Given the important uses of national income estimates, estimating national income is an indispensable task of the government. However, estimating national income is an extremely complicated and gigantic task. The reason is that the process of income generation in a modern economy is extremely complex and, therefore, collecting necessary data on sources and levels of income is beset with conceptual and data availability problems. The economists have, however, devised different methods of estimating national income. The basic approach in measuring national income is to measure the two kinds of flows generated by the economic activities of the residents of the country. As we know from the circular flows of income, the income generating process creates two kinds of flows:

- (a) Product flows, and
- (b) Money flows.

The money flows can be looked upon from two angles.

- (i) Money flows as factor payments, and
- (ii) Money flows as payments for goods and services.

Given the product flows and two ways of money flows, the economists have devised *three methods of measuring national income*.

- (i) Net Product Method or the Value Added Method,
- (ii) Factor Income Method, and
- (iii) Expenditure Method.

Any of the three methods can be adopted to measure *Gross Domestic Product (GDP)* of the country provided required data is fully available. Where a single method cannot be adopted due to nonavailability of required data, or due to conceptual problems as to what should be and what should not be included in national income accounting, a combination of the three methods is used to measure *GDP*.

All these methods are, in fact, used to measure the gross domestic product (*GDP*). The estimated *GDP* is then adjusted for net income from abroad to arrive at *GNP*. The three methods of measuring *GDP* based on three approaches are briefly described here. The treatment of net income from abroad is discussed in the following section. The three stages of estimating *GDP* are described here briefly.

### 4.4.1 Net Product Method—The Value Added Method

The *net product method* is also called the *value added method*. This method consists of three stages: “(i) estimating the gross value of domestic output in the various branches of production; (ii) determining the cost of material and services used and also the depreciation of physical assets; and (iii) deducting these costs and depreciation from gross value to obtain the net value of domestic output...”<sup>5</sup>

**Measuring Gross Value** For measuring gross value of domestic product, output is classified under various categories. The classification of products varies from country to country depending

<sup>5</sup> Paul Studenski, *The Income of Nations—Part Two: Theory and Methods*, (New York University Press, 1958).

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on (i) the nature of domestic industries, (ii) their significance in aggregate economic activities, and (iii) the availability of requisite data. For example, seventy-one divisions and sub-divisions were sometime ago used in the US to classify the national output; in Netherlands the classification ranges from a dozen to a score; and only half-a-dozen classifications were used in Russia. According to the CSO publications, twentyone sub-categories of products are currently used in India.

After classifying the output in appropriate categories, the gross value of output of each category is computed by any of the following two alternative methods: (i) by multiplying the output of each category or sector by their respective market prices and adding them together, (ii) by collecting the data on gross sales and inventories from the records of the companies and adding them up. If there are gaps in data, necessary adjustments in estimates are made therefore through interpolations.

**Estimating Cost of Production** The next step in estimating the net national product is to estimate the intermediate cost of production including depreciation. Estimating cost of production is often a complicated and difficult task because of non-availability of necessary cost data. Much more difficult is the task of estimating depreciation as it involves both conceptual and statistical problems. For this reason, many countries adopt factor income method for estimating their national income.

However, countries adopting net product method find some ways and means to compute the deductible costs. The costs are computed either in absolute terms (where input data are adequately available) or as an overall input-output ratio. For estimating depreciation, the general practice is to adopt the practice followed by the business firms in general. Conventionally, however, depreciation is estimated as some percentage of original cost of capital, permissible under the taxation laws. In some countries, it is estimated as some percentage of total output rather than as percentage of cost of capital. Once depreciation is estimated by a suitable method, it is deducted from the estimated *sectoral gross output* to arrive at net sectoral product, i.e., sectoral *NNP*. The *NNP* of different sectors of the economy are then added together to arrive at the aggregate *NNP*.

**Value Added Method** The product method, described above, can be understood better through the *value added method* of estimating national income. In the net product method, a serious problem is often confronted, i.e., the problem of **double counting**. Value added method is used to avoid *double counting*, i.e., counting the value of a commodity more than once. To understand the problem of double counting, recall the definition of national income (*GDP*). National income is defined as the money value of all *final* goods and services produced in a given period of time. The problem of double counting arises because of the conceptual and practical problem of defining what product is final and what is considered intermediate product. In the process of production, some material products pass from one stage to another. But, at each stage of production, it is transformed into a final product. However, the same final product is used as material input at the next stage in the production process of another commodity. Therefore, the value of the same product is likely to be counted twice, or more than twice, in estimating national income. For example, wheat is the final product for the farmer, Kisan Chaudhary. But wheat is an input (raw material) for a flour mill, say, Shakti Bhog Atta. Wheat flour is the final product for Shakti Bhog Atta company. But wheat flour is used by the bread manufacturer, Britannia Bread Company, as raw material. For Britannia, bread is the final product. But bread is an input for sandwich-maker, the Tasty Food Restaurant. Now, if all these products—wheat, wheat flour, bread and sandwich—are treated as final products, then the

value of wheat will be counted at four stages—wheat production, flour production, bread production and sandwich production. This is called *double counting* in national accounting jargon. Double counting results in overestimation of national income. Therefore, in order to avoid the problem of double counting, a method called *value added method* is used to estimate the national income.

The method of calculating *value added* to a product (wheat flour) can be illustrated as follows. Suppose Shaktibhog Flour Mill buys one quintal wheat for Rs 1000 and sells the flour to bread manufacturing company, Britannia, at Rs 1500. This means that Shaktibhog has added a value of Rs 500 to the wheat. Let us suppose that value addition includes the cost components as given below.

Value Addition by Flour Mill (per quintal)

Cost of wheat (intermediate input)	Rs	1000
Transportation cost	Rs	50
Labour Charge	Rs	150
Electricity charge	Rs	100
Storage cost	Rs	50
Depreciation	Rs	50
Profit margin	Rs	100
Sale price	Rs	1500
Less cost of wheat (raw material)	Rs	1000
Value added	Rs	500

For the purpose of estimating national income, the valuation process related to the final product, sandwich, is illustrated below.

Method of Measuring Value Added

(Rs per quintal)

Product	Value of Inputs	Value of Final Output	Gross Value Added (3-2)
1	2	3	4
Wheat	Nil	1000	1000
Flour	1000	1500	500
Bread	1500	2000	500
Sandwich	2000	3000	1000
Total	4500	7500	3000

As the table shows, the gross value added in case of sandwich production turns out to be Rs 3000 per quintal. This per quintal value multiplied by total production of sandwiches gives the total value of the final product, the sandwiches.



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This method avoids counting value of wheat, a material input, more than once. The same method of value added is followed for each enterprise producing goods and services within the territory of a country. For the purpose of estimating value added, the following steps are generally followed.

- (i) Identifying the production units and classifying them under different industrial activities.
- (ii) Estimating net value added by each production unit in each industrial sector.
- (iii) Adding up the total value added of each final product to arrive at *GDP*.

#### 4.4.2 Factor Income Method

The factor income method is also known as *factor share method*. In this method, the national income is treated to be equal to all the “incomes accruing to the basic factors of production used in producing the national products.” The factors of production are traditionally categorised as land, labour, capital and organisation. Accordingly, the national income is treated as the sum of factor payments, *viz.*, rent, wages, interest, and profits, respectively, plus depreciation. Thus,

$$\text{National Income (GDP)} = \text{Rent} + \text{Wages} + \text{Interest} + \text{Profit} + \text{Depreciation}$$

In a modern economy, however, it is conceptually very difficult to distinguish between earnings from land and capital and between the earnings of ordinary labour and entrepreneurial efforts. For the purpose of estimating national income, therefore, factors of production are broadly grouped as labour and capital. Accordingly, the national income is supposed to originate from two primary factors—labour and capital. In some productive activities however, labour and capital are jointly supplied by the same person and it is very difficult to separate the labour and capital income contents from the total earning of the supplier. Such incomes are, therefore, termed as *mixed incomes*. Thus, the national income is considered to be comprised of three components : (i) labour incomes, (ii) capital incomes, and (iii) mixed incomes. These factor incomes have some specific connotation discussed below.

**Labour Incomes** Labour incomes include: (a) wages and salaries (including commission, bonus and social security payments) paid to the residents of the country; (b) supplementary labour incomes including employer’s contribution to social security and employee’s welfare funds and direct pension payments to retired employees<sup>6</sup>; and (c) supplementary labour incomes *paid in kind*, for example, free-of-cost health care, education, food, clothing, accommodation, and servant facility, called perks.

Transfer payments like old-age pensions, service grants, compensation to war-affected people, etc. are not included in labour incomes and labour incomes from incidental jobs, gratuities, tips, and so forth are ignored for lack of data.

**Capital Incomes** According to Studenski<sup>7</sup>, capital incomes include: (a) dividends excluding inter-corporate dividends, (b) undistributed before-tax profits of corporations, (c) interest on bonds, mortgages and saving deposits (but not on war bonds and consumer credits), (d) interest earned

<sup>6</sup>. Conventionally, pension to the retired employees is considered to be a ‘transfer payment’ and is excluded from labour income and the national income accounting. In the US, however, this item is included in national income. For details, see Studenski, *op. cit.*, pp. 11 and 118–20.

<sup>7</sup>. Paul Studenski, *op. cit.*, pp. 118–20.

by insurance companies and credited to the insurance policy reserves, (e) net interest paid out by commercial banks, (f) net rents from land and building, including imputed net rents on the owner occupied dwellings, (g) royalties, and (h) profit of the government enterprises.

The data for the first two items are obtained mostly from the books of accounts submitted by the corporations to the tax authorities for tax assessment purpose. Incidentally, the definition of profit used for national accounting purposes differs from one used by the tax authorities. Some adjustment in data, that is, some additions and some deductions, are made in the assessment of profits in regard to (i) the excessive allowance of depreciation, if any, made by the tax authorities, (ii) elimination of capital gains and losses because these items do not reflect the change in the current output; and (iii) elimination of under- or over-valuation of inventories on book values.

**Mixed Incomes** Mixed incomes include earnings from: (a) farming enterprises, (b) sole proprietorship (not included under profit and capital incomes), (c) other professions, including legal and medical practice, consultancy services, trading and transportation, and (d) mixed incomes of those who earn their living from various sources, including wages, rent on own property, interest on own capital and so forth.

All the three kinds of incomes, *viz.*, labour incomes, capital incomes, and mixed, are added together to obtain the estimate of the national income by factor-income method.

#### 4.4.3 Expenditure Method

The expenditure method, also known as the *final product method*, measures national income at the final expenditure stage. In order to estimate the aggregate expenditure, any of the following two methods may be followed.

- (i) *Income Disposal Method*. Under this method, all the money expenditures at market prices are added up together to obtain the total final expenditure.
- (ii) *Product Disposal Method*. Under this method the value of the products finally disposed of are computed and added together. This gives a measure of the total final expenditure and, hence, a measure of the national income by expenditure method.

Under the *first method*, the items of expenditure that are taken into account are: (i) private consumption expenditure, (ii) direct tax payments, (iii) payments made to the non-profit institutions and charitable institutions like schools, hospitals, orphanage, etc., and (iv) private savings (or investments). Under the *product disposal method*, the following items of expenditure are included (i) private consumer goods and services, (ii) private investment goods, (iii) public goods and services, and (iv) net investment abroad.

The product disposal methods is far more extensively used compared to the first method because the data required by the second method can be collected with greater ease and accuracy.

### 4.5 TREATMENT OF NET INCOME FROM ABROAD

As mentioned above, the three methods of estimating notional income give the measure of *GDP* pertaining to a closed economy. In reality, however, most modern economies are, 'open economies' in the sense that they have trade relations and other economic transactions with the rest of the world. In the process, some countries make net gains and some net losses. The net gains and losses

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are, in fact, additions to or deductions from the national income stream. Therefore, in estimating the national income, net incomes from abroad are added to *GDP* and net losses are subtracted from *GDP* to arrive at the national income figure of an open economy. It is important to note here that *GDP* adjusted for net income from abroad is called Gross National Income (*GNI*).

In practice, all the exports of merchandise and of services like shipping, insurance, banking, tourism and gifts are added to the national income. All the imports of goods and services like shipping, insurance, banking, tourism and gifts are subtracted from the national income. The final outcome of these adjustment is a measure of the national income.

#### 4.6 DOUBLE ENTRY SYSTEM OF ACCOUNTING

Another method which is often used in national income accounting is *double entry of book keeping system*. National income accounting is a systematic recording of all economic transactions carried out by different sections of the society and the resulting output. Economic transactions involve at least two ‘transactors’: one who pays and the one who receives. Note that in the process of earning and spending, each person works as a payer as well as a receiver. He receives money when he sells a product or service and he pays money when he buys a product or service. So each person can be allocated an account containing two sides – credit and debit. What a person receives is recorded on the ‘credit’ side and what he pays is recorded on the ‘debit’ side of the account. Thus, a double entry accounting system is one in which both receipts and payments are recorded—receipts on credit side and payments on debit side of the account.

Another aspect of the double entry accounting system is that the account of a person need not balance. A person may spend less than what he receives. Then he or she has a saving. His/her savings are recorded on the debit side to balance the account. That is, account of each person is always in balance, as it is done in double entry book-keeping system of business accounting. Similarly, if a person spends more than what he/she receives, he/she has a debit balance. His/her debit is recorded on the debit side as borrowings and his/her account is balanced. In overall accounting, the sum of savings is equal to the sum of borrowings.

In double entry accounting system many types of accounts can be imagined and operated. Accounts may be based on individual transactors or on the basis of sectoral transactions—consumption and investment. In national income accounting system, the main types of transactions and their accounting include the following.

- (i) Private Consumption,
- (ii) Government consumption,
- (iii) Investment (savings converted into capital),
- (iv) Government taxes and spending,
- (v) Inventories, and
- (vi) Net of foreign transactions (exports and imports).

These sectoral transactions can be shown as the circular flows of incomes and can be converted into equations. For instance, refer to the circular flows of income in two-sector model in Ch. 2. From the two-sector model of circular flows of incomes, the following equations can be derived.

$$Y = C + I = C + S$$

where  $Y$  = national income;  $C$  = consumption expenditure by households;  $I$  = capital spending by firms; and  $S$  = savings by households.

In the three-sector model, the national income equation is given as follows.

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

where  $G$  = government spending, and  $T$  = tax revenue of the government.

In four-sector model of circular flows, the equation takes the following form.

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

where  $X$  = exports and  $M$  = imports.

We have described above the method of estimating national income used in India. Let us now look at India's national income estimates and trends.

## 4.7 MEASUREMENT OF NATIONAL INCOME IN INDIA

Before we discuss the method of measuring national income in India, let us have a brief look at the history of measurement of national income in the country.

### 4.7.1 History of National Income Measurement in India

The history of measurement of national income in India can be divided under two phases: (i) pre-independence phase, and (ii) post-independence phase. In the **pre-independence phase**, the first attempt ever to measure national income of India was made by Dadabhai Naoroji<sup>8</sup> in 1867-68. Subsequently, several attempts were made by the economists and government officials to estimate India's national income<sup>9</sup>. Most of these estimates had their own methodological and data limitations and, therefore, had doubtful reliability. The first systematic attempt to estimate India's national income was made by Prof. V.K.R.V. Rao for the year 1925-29 and again for the year 1931-32. The estimate of national income made by Prof. Rao is considered to be superior in many respects. By 1949, some other agencies had also estimated India's national income. But all these estimates had serious limitations.

In the **post-independence phase**, the first official estimate of India's national income was made in 1949 by the Ministry of Commerce, Government of India. For the purpose of devising a comprehensive method of data generation and measuring national income, a National Income Commission (*NIC*) was set up in 1949 with P.C. Mahalanobis as Chairman, and D. R. Gadgil and V.K.R.V. Rao as its members. The *NIC* made the first official estimate of the national income for the year 1948-49, and then for the year 1951-52. The methodology developed by the *NIC* was followed till 1967. Since 1967, however, the task of estimating national income has been assigned to the Central Statistical Organisation (*CSO*). The *CSO* had adopted *NIC*'s methodology till 1967. Thereafter, *CSO* devised an improved methodology and procedure which could be possible due to

<sup>8</sup>. In his book *Poverty and Un-British Rule in India* published in 1867-68.

<sup>9</sup>. Some widely referred names include Atkinson (1875 and 1895), Major Baring (1881), Digby, W. (1898-99), C. N. Vakil and S.K. Mujumdar (1891-94 and 1911-14), Curzon (1901), Home, E. A. (1911), K. T. Shah and K.J. Khambata (1900-1914 and 1921-22), Findlay Shirras (1911 and 1921), V. K. R.V. Rao (1925-29) and *Commerce Journal* (1938-39, 1942-43 and 1947-48).

availability of more comprehensive data. The methodology developed and used by the CSO, which is still followed, is described below.

#### 4.7.2 Methodology

An economy comprises of a variety of economic activities resulting in different sources and nature of income. For systematic and reliable accounting of national income, it is essential to classify different types of economic activities and sources of income. It provides conceptual clarity and comprehensiveness to national income estimation. Therefore, the sources and types of national income are classified under different categories. The purpose of classifying different sources and types of economic activities under different sectors is to make national income accounting systematic and analysis of national income data easy and comprehensive. The groups so formed are generally called 'sectors' of the economy. This is called *sectoral accounting of national income*.

For sectoral classification of economic activities, transactors falling under different sectors are classified on the basis of (i) nature of economic activity, also called functional classification, and (ii) the use of the national income. The basis of classification is chosen in accordance with the purpose and method chosen for estimating national income. In mixed economies, economy is often classified as (i) private sector, and (ii) public sector.

**(i) Sectoral Classification of Economy** For the purpose of estimating national income, the CSO uses the following sectoral classification of economy.

- (i) **Primary sector**, including agriculture and allied activities, forestry, fishing, mining and quarrying;
- (ii) **Secondary sector**, including manufacturing industries, and
- (iii) **Tertiary sector or service sector**, including banking, insurance, transport and communication, trade and commerce.

Depending on the purpose and data availability, these broad sectors of the economy are sub-classified under their sub-categories. For the purpose of estimating national income, the broad sectors are further divided under sub-sectors as given below.

##### I. Primary sector

- 1. Agriculture,
- 2. Forestry and logging,
- 3. Fishing,
- 4. Mining and Quarrying.

##### II. Secondary sector

- 1. Manufacturing,
- 2. Registered manufacturing,
- 3. Unregistered manufacturing,
- 4. Construction,
- 5. Electricity, water and gas supply.

### III. Tertiary sector

- A. Transport, Trade and Communication
  - 1. Transport, storage and communication
  - 2. Railways,
  - 3. Other means of transport,
  - 4. Communication,
  - 5. Trade, hotels and restaurants.
- B. Finance and Real Estate
  - 1. Banking and insurance
  - 2. Real estate for residential and business purposes
- C. Community and Personal Services
  - 1. Public administration and defence
  - 2. Other services.

**(ii) Methods of Measuring National Income** It may be noted at the outset that, given the nature of the Indian economy and the paucity of reliable data, it is not possible to use any single method, or to estimate the national income by using each method separately. For example, income method cannot be used for the agricultural sector because of unavailability of reliable data, and income of household enterprises cannot be estimated by the expenditure method. Therefore, a combination of different methods, especially of *value added method* and *income method*, is used for estimating national income.

Given the sectoral and sub-sectoral classification of the economy, let us now look at the methods adopted by the CSO for estimating income of the different sectors.

**Production method**, what is also called **net output method or value added method**, is used to estimate income or domestic product of the following production sectors.

- 1. Agricultural and allied services,
- 2. Forestry and logging,
- 3. Fishing,
- 4. Mining and Quarrying,
- 5. Registered manufacturing.

**Income method** is used for estimating domestic income of the following sectors.

- 1. Unregistered manufacturing,
- 2. Gas, electricity and water supply,
- 3. Banking and insurance,
- 4. Transportation, communication and storage,
- 5. Real estate, ownership of dwellings and business services,
- 6. Trade, hotels and restaurants,
- 7. Public administration and defence,
- 8. Other services.



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For the sake of comparison of estimates and to check their reliability, CSO estimates national income also on the basis *expenditure method*. Under the *expenditure method* of estimating national income, sectoral division of the economy is based on the use pattern of the national income. In India, the sectoral accounting of *GDP*, based on the expenditure method, follows the following classification of the national income given below.

1. *Private final consumption expenditure* including expenditure on (a) durable goods, (b) semi-durable goods, (c) non-durable goods, and (d) services.
2. *Government final consumption expenditure*
3. *Gross fixed capital formation* including construction, machinery and equipments,
4. *Change in stocks*, and
5. *Net export of goods and services*.

What kind of sectoral division of economic activities is made depends on the uses of income and the method chosen for the purpose of estimating national income. Often all the three methods are chosen for the sake of completeness and comparison.

Incidentally, a combination of *expenditure method* and *commodity-flow approach* is adopted for estimating income generated in the *construction sector*.

**(iii) Methods of Measuring National Income Aggregates** Estimating national income – more appropriately gross national product (*GNP*) – is not the end of the story. Once *GNP* of the country is estimated, it provides the basis of measuring other national income aggregates. The process of generating macroeconomic aggregates other than *GNP* is shown below in tabular form.

National Products and Related Aggregates

Items	Amount (Rs)	G. Total (Rs)
1. Gross National Product (at factor cost)		–
Plus Indirect Taxes	–	
Less Subsidies	–	
= Gross National Product at market price		–
2. Gross National Product at market price		–
Less Consumption of fixed capital	–	
= Net National Product at market price		–
3. Net National Product at market price		–
Less Net Factor Income from abroad	–	
= Net Domestic Product at market price		–
4. Net Domestic Product at market price		–
Less Indirect Taxes	–	
Add Subsidies	–	
= Net Domestic product at factor cost		–

5. Net Domestic Product at factor cost		–
Less Income from properties and departmental Administrative enterprises	–	
Less Savings of non-departmental enterprises	–	
= Private Sector Domestic Product		–
6. Private Sector Domestic Product		–
Add National Debt Interest	–	
Add (or deduct) Net factor Income from abroad	–	
Add Transfers from Administrative Departments	–	
Add Other Net Transfers from the rest of the world	–	
= Private Income		–
7. Private Income		–
Less Private Corporate Savings net of retained earnings of foreign companies	–	
Less Corporate Income Tax	–	
= Personal Income		–
8. Personal Income		–
Less Direct Taxes paid by Households	–	
Less Miscellaneous Payments to government departments (fees, fines, penalties, etc.)	–	
= Personal Disposable Income		–

### 4.7.3 Estimates of India's National Income

Having described the method of measuring national income used in India, we present in this section the actual estimates of some major aspects of India's national income and its growth rate. The national income estimates are presented here in terms of absolute numbers and growth rates. Let us first look at the estimates of national income in absolute numbers.

Table 4.2 presents estimates of India's *GNP*, *NNP* and per capita income, all at factor cost at current and constant prices of 1999-2000. National figures are shown first for Plan-end years till 2000 and in annual years. As Table 4.2 shows, *GNP*, *NNP* and per capita income in India have been increasing almost continuously over the last 55 years, as estimated at current and constant prices of 1999-2000. In fact, national income of India increased at a higher rate, and almost continuously, after economic liberalisation in 1990-91. However, the income growth accelerated over the past decade. National income data given in Table 4.2 gives a long-term view.

### 4.7.4 Growth Rates

A better view of the performance of the economy can be had by looking at plan-wise annual average growth of *GNP*, *NNP* and per capita *NNP*. The plan-wise annual average growth rate of *GNP*, *NNP* and per capita *NNP* are given in Table 4.3 at both current and constant prices.

Certain important conclusions can be drawn from the data given in Table 4.3. *First*, as the table shows, India's *GNP*, *NNP* and per capita *NNP* have registered positive growth rates – low and high – throughout the Plan period, except in 1979-80 when *GNP* registered a *negative* growth rate of 5.0 percent, *NNP* a negative growth rate of 6.0 percent and per capita *NNP* a *negative* growth of 8.2 percent.

**72** Macroeconomics: Theory and Policy**Table 4.2** Estimates of India's GNP, NNP and Per Capita Income at Factor Cost

Year	Gross National Product (Rs in Crore)		Net National Product (Rs in Crore)		Per Capita NNP (Rs)	
	At Current prices	At 1999-00 prices	At Current prices	At 1999-00 prices	At Current prices	At 1999-00 prices
1950-51	9678	223899	9153	204924	225	5708
1955-56	10508	268105	10027	254412	255	6474
1960-61	16440	328373	15593	309045	359	7121
1965-66	25883	375098	24479	350374	505	7224
1970-71	42697	470254	40135	437719	742	8091
1975-76	76816	548232	70736	504138	1165	8305
1980-81	132865	641919	121129	583548	1784	8594
1985-86	252998	809521	227703	733029	3016	9709
1990-91	507487	1067694	456409	967773	5440	11535
1995-96	1069805	1380321	958679	1243724	10331	13402
1999-00	1771094	1771094	1589632	1589672	15881	15881
2000-01	1902284	1841755	1700467	1647903	16688	16172
2001-02	2077658	1951935	1849360	1743466	17782	16764
2002-03	2244725	2029482	1994248	1805830	18885	17101
2003-04	2519921	2204913	2239939	1963544	20895	18317
2004-05	2855331	2366886	2526408	2104520	23199	19325
2005-06	3256269	2595441	2875958	2308015	26003	20868
2006-07	3749607	2849856	3112569	2533450	29524	22580
2007-08 (Q)	4297047	3114864	3787596	2764795	33283	24295

Q = Quick Estimates

Source: Central Statistical Organisation, Data reproduced in *Economic Survey-2008-09*, GOI, MOF, Economic Division, Statistical Appendix, Table 1.1.

*Second*, the growth rate of India's national income was the lowest (2.8 percent) during the Third Plan period (1961-66) and its growth rate was the highest in the Tenth Plan period (2002-05). During this period, per capita income at constant prices of 1999-00 prices had increased at 6.1 percent which was the highest ever.

*Third*, a comparison of income growth rates at current and constant prices shows that *GNP*, *NNP* and per capita *NNP* at current prices have grown at a much higher rate than at constant prices. It means that Indian economy has been constantly under the pressure of inflation—sometimes low and sometimes high.

**4.7.5 Recent Growth in India's National Income**

It is useful to have a look at the growth in India's national income in the recent past. This gives an idea of the likely growth in Indian economy. The growth rates of India's *GNP*, *NNP* and per capita *NNP* are given in Table 4.4.

**Table 4.3** Annual Growth Rate of India's GNP, NNP and Per Capita NNP (At Factor Cost)

(Percent)

Plan	GNP		NNP		Per Capita NNP	
	At current prices	At 1999-00 prices	At current prices	At 1999-00 prices	At current prices	At 1999-00 prices
First Plan (1951-56)	1.8	3.7	2.0	4.4	0.2	2.6
Second Plan (1956-61)	8.8	4.0	8.7	3.8	6.5	1.7
Third Plan (1961-66)	9.6	2.8	9.6	2.6	7.2	0.4
3 Annual Plans (1966-69)	12.3	3.9	12.3	3.9	9.9	1.6
Fourth Plan (1969-74)	11.1	3.4	10.8	3.1	8.3	0.8
Fifth Plan (1974-79)	10.7	5.0	10.3	4.9	7.9	2.6
Annual Plan (1979-80)	9.4	-5.0	8.3	-6.0	5.7	-8.2
Sixth Plan (1980-85)	15.4	5.4	15.2	5.4	12.8	3.1
Seventh Plan (1985-90)	14.1	5.5	13.8	5.5	11.4	3.3
2 Annual Plans (1990-92)	15.7	3.2	15.6	3.1	13.3	1.0
Eighth Plan (1992-97)	16.4	6.6	16.5	6.7	14.2	4.5
Ninth Plan (1997-2002)	10.8	5.5	10.6	5.3	8.5	3.3
Tenth Plan (2002-07)	12.6	7.8	12.5	7.8	10.8	6.1

Source: *Economic Survey-2008-09*, GOI, MOF, Economic Division, Statistical Appendix, Table 1.2.

As can be seen in Table 4.4, growth rate of India's real *GNP* has almost continuously increased over the last 6 years from 4.0 percent per annum in 2000-01 to 9.7 percent in 2006-07 (based on quick estimates). A similar trend can be observed in case of *NNP* growth rate. More significantly, per capita real income too has increased almost continuously, though rates have been varying. However, over the period from 2003-04 to 2007-08 (Q), the growth rate of real per capita income has registered an unprecedented increase at about 9 percent. However, due to global recession, it is predicted that India's *GDP* is likely to grow at about 7.0 percent in 2008-09.

**74** Macroeconomics: Theory and Policy**Table 4.4** Annual Growth Rate (%) of India's *GNP*, *NNP* and Per Capita *NNP* – 2000-01 to 2007-08 (All at Factor Cost)

Year	Gross National Product		Net National Product		Per Capita NNP	
	At Current price	At 1999-00 prices	At Current prices	At 1999-00 prices	At Current prices	At 1999-00 prices
2000-01	7.4	4.0	7.0	3.7	5.1	1.8
2001-02	9.2	6.0	8.8	5.8	6.6	3.7
2002-03	8.0	4.0	7.8	3.6	6.2	2.0
2003-04	12.3	8.6	12.3	8.7	10.6	7.1
2004-05	13.4	7.5	12.9	7.3	11.1	5.6
2005-06	14.3	9.6	13.8	9.6	12.1	7.9
2006-07	15.2	9.8	15.2	9.8	13.5	8.2
2007-08 Q	14.8	9.3	14.3	9.1	12.5	7.6

P = Provisional Estimates      Q = Quick Estimates

Source: *Economic Survey-2008-09*, GOI, MOF, Economic Division, Statistical Appendix, Table 1.2.

## SUGGESTED READINGS

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- Beckerman, W., *An Introduction to National Income Analysis* (London, English Language Book Society, 1968), Ch 2.
- Eady, H.C., Peacock, A. T. and Ronald, A. C., *National Income and Social Accounting* (London, Hutchinson University Library, 1967).
- Ruggles, R. and Ruggles, N., *National Income Accounts and Income Analysis* (NY, McGraw-Hill, 1956), Chs. 1, 2 and 12.
- Studensky, P., *The Income of Nations, Part II, Theory and Methodology*, (Delhi, Khosla & Co.), Chs. 11 and 17-20.

## QUESTIONS FOR REVIEW

- Distinguish between economic and non-economic production in national income accounting. Why is non-economic production excluded from national income estimates?
- Distinguish between:
  - GNP* and *GDP*
  - NNP* and *NDP*
  - Nominal *GNP* and Real *GNP*.
- Explain the difference between final products and intermediates. How does the inclusion of intermediates affect the measure of national income?
- What are the methods of measuring national income? What conceptual problems are confronted in estimating national income?