

National Income Accounting

● National income

National income refers to the market value of all final goods and services resulting from the productive activities by the residents of the nation during the accounting year.

$$NI = x_1 p_1 + x_2 p_2 + x_3 p_3 + \dots + x_k p_k + \dots$$

Intermediate vs. final goods

- Intermediate goods (goods used for further production)
- Final goods (goods that flow for ultimate consumption)

Caution: The value of intermediate goods is not considered in computing national income since it leads to the **problem of double counting**.

Final Goods and Services

In calculating GDP, we can sum up the value added at each stage of production or we can take the value of final sales. We do not use the value of total sales in an economy to measure how much output has been produced.

**TABLE: Value Added in the Production of a Gallon of Gasoline
(Hypothetical Numbers)**

Stage Of Production	Value Of Sales	Value Added
(1) Oil drilling	\$3.00	\$3.00
(2) Refining	3.30	0.30
(3) Shipping	3.60	0.30
(4) Retail sale	4.00	0.40
Total value added		<u>\$4.00</u>

Measures of National Income

Gross National Product (GNP)

- GNP belongs to the nation, and thus, it must be produced by its owned factors of production only.
- If an Indian professor takes up a four month Visiting Professorship in a US University, her income in USA is the part of India's GNP and similarly the profit that a MNC makes in India, is a part of US GNP and not that of India's.

Gross Domestic Product (GDP)

- GDP is the total market value of a country's output. It is the market value of all final goods and services produced within a given period of time by factors of production located Within political boundaries of nation:

Further Clarification on GDP-1/2

- Ships and aircrafts owned and operated by the residents between two or more countries. For Instance, Indian ships moving between UK and Pakistan regularly or passenger planes operated by Air India between Russia and Japan are parts of domestic territory of India.
- Fishing vessels, oil and natural gas rigs and floating platforms operated by the residents of a country in the international waters or engaged in extraction in areas where the country has exclusive rights of operation. For example, fishing boats operated by Indian fishermen in the international waters of the Indian Ocean will be considered as a part of domestic territory of India.

Further Clarification on GDP- 2/2

- Embassies, consulates and military establishments of the country located abroad. To illustrate, Indian embassies in Russia, America and other countries will form parts of domestic territory of India. Similarly, embassies of other countries like Japan, Russia, America located in India are parts of domestic territories of their own countries and not of India.

What domestic territory does not include:

- Territorial enclaves (like embassies) used/administered by foreign governments.
- International organisations which are physically located within geographical boundaries of a country. Their offices form part of international territory.
- **Normal residents of India include:**
 - Citizens (and institutions) of India,
 - Citizens of other countries (i.e., non-citizens) who normally reside in India for more than a year and whose centre of economic interest lies in India,
 - Citizens of India working in (a) international bodies like I.M.F., (b) foreign bodies like banks, enterprises operating in India and (c) foreign embassies located in India.

Gross Domestic Product (GDP)

$GDP = GNP - \text{Net Factor Income from Abroad (NIA)}$

- NIA= Income earned by residents in foreign countries— Income earned by foreigners in India

‘Net Income from Abroad’

- Net income is the difference between the income earned from abroad by normal residents of a country and the factor income earned by non-residents (foreigners) in the domestic territory of that country.
- The normal residents of a country earn factor income not only within the domestic territory of a country but outside it also.
- Income from outside can be earned mainly in two ways, namely (1) income from work and (2) income from property and
 - **NIA**=factor income earned from abroad by residents - factor income of non residents in domestic territory
- **Components of net factor income from abroad:**
 - (1) net compensation of employees
 - (2) net income from property and entrepreneurship (Rent, Interest, Profit)
 - (3) net retained earning of resident companies abroad

Net National Product (NNP)

NNP is equal to: Gross national Product (GNP) less Allowances for Capital Consumption.

Capital Consumption Allowances: are the total or aggregate costs of the wear and tear or depreciation of the capital stock i.e., machinery, tools, plants, roads, power grids, buildings, bus fleet, trains, railways etc within an economy usually within a given year. Another name for the CCAs is the depreciation of capital stock or its depreciation costs.

$$\text{NNP} = \text{GNP} - \text{Depreciation}$$

Net Domestic Product (NDP)

- *NDP*, or *Net Domestic Product*, unlike GDP, takes account of capital depreciations, capital goods or part of capital goods that have been consumed over the year in forms of housing, vehicle, machinery deterioration and so forth.

$$\text{NDP} = \text{GDP} - \text{Depreciation}$$

- NDP is more accurate in measuring economic output.
- The reason we use GDP rather than NDP: The capital depreciation is too difficult to spot from capital goods investments.

Gross National Products at Market price and Factor cost

- GNP at Market Price (GNP_{MP})
- GNP at Factor Cost (GNP_{FC})
 - GNP_{MP} = Market value of all domestically produced goods and services + incomes earned by the residents of a country in foreign countries - incomes earned by the foreigners in the country.
 - GNP_{FC} = GNP at factor cost is the net of indirect taxes, but includes the subsidies as it values the goods at the prices paid by the end users.

$$\text{GNP}_{\text{FC}} = \text{GNP}_{\text{MP}} + \text{Subsidies (S)} - \text{Indirect Taxes (IT)}$$

$$\text{GNP}_{\text{MP}} = \text{GNP}_{\text{FC}} - \text{Subsidies (S)} + \text{Indirect Taxes (IT)}$$

Note here that Factor costs are really the costs of all the factors of production such as labor, capital, energy, raw materials like steel etc that are used to produce a given quantity of output in an economy.

Gross Domestic Products at Market price and Factor cost

- **GDP at Market Price (GDP_{MP})**
- **GDP at Factor Cost(GDP_{FC})**

$$GDP_{FC} = GDP_{MP} + \text{Subsidies (S)} - \text{Indirect Taxes (IT)}$$

$$GDP_{MP} = GDP_{FC} - \text{Subsidies (S)} + \text{Indirect Taxes (IT)}$$

Worked Out Example

National income and related aggregates

Item no.	National income aggregate	Value as on March 2004-05
1	GNP at market price	31,03,498
1.1	Indirect taxes	3,66,643
1.2	Subsidies	89,126
2.	GNP at factor cost (1-1.1+1.2)	
2.1	Net factor income earned abroad	- 17,916
3.	GDP at factor cost (2-2.1)	
3.1	Capital consumption	2,94,758
4.	NNP at factor cost (2-3.1)	
5.	NDP at factor cost (3-3.1)	
6	NNP at market price(1-3.1)	

Worked Out Example

You have following information (Rs. Crore)

Indirect Taxes	2,47,528
Subsidies	55,383
Net factor Income from Abroad	-17,414
Capital Consumption/Depreciation	1,98,447
GDP at Factor Cost	18,95,843

Calculate:

- (i) *GNP at Factor Cost*,
- (ii) *GNP at Market Price*
- (iii) *NNP at Factor Cost*
- (iv) *NDP at Factor Cost*

Solution

- $\text{GDP}_{\text{MP}} = \text{GDP}_{\text{FC}} - S + \text{IT} = 18,95,843 - 55,383 + 2,47,528 = 20,87,988$
- $\text{GNP}_{\text{MP}} = \text{GDP}_{\text{MP}} + \text{NIA} = 20,87,988 + (-17,414) = 20,70,574$
- $\text{GNP}_{\text{FC}} = \text{GNP}_{\text{MP}} + S - \text{IT} = 20,70,574 + 55,383 - 2,47,528 = 18,78,429$
- $\text{NNP}_{\text{FC}} = \text{GNP}_{\text{FC}} - D = 18,78,429 - 1,98,447 = 16,79,982$
- $\text{NDP}_{\text{FC}} = \text{GDP}_{\text{FC}} - D = 18,95,843 - 1,98,447 = 16,97,396$

Private, Personal and Disposable income

- **Private income:**

Private income= NNP_{FC} – Income from property and entrepreneurship accruing to government administration departments (railways, posts and telegraph departments) – Savings of non-department enterprises (public sector units) + National Debt Interest + Transfers from Government Administrative Departments + Other Net Transfers from abroad

Personal Income

It is the sum of all incomes actually received by all individuals or households during a given period.

PI = Private income—corporate tax — undistributed corporate profits

Personal Disposable income

Disposable Income for individuals is the part of total earnings deprived of all taxes paid and profit reserved for companies, which is the amount available for spending or saving.

PDI = PI - Personal Taxes- Miscellaneous Payments to government departments (fees, fines, penalties, etc.)

Worked Out Example

National income and related aggregates

Item no.	National income aggregate	March 2004-05
1.	NDP at factor cost	8000
2	Net factor income earned abroad	200
3	NNP at factor cost (1+2)	
4.	Undistributed profits	1000
5.	Corporate tax	500
6.	Interest received by households	1500
7.	Interest paid by households	1200
8.	Transfer income	300
9.	Personal tax	500
10.	Private income (3+(6-7)+8)	
11.	Personal income (10-5-4)	
12.	Personal Disposable income (11-9)	

Methods for Measuring Income

- **Production approach**

- $GDP_{MP} = P_1 Q_1 + P_2 Q_2 + \dots + P_n Q_n$

- **Income approach**

- $NDP_{FC} = \text{Wages} + \text{Rent} + \text{Interest} + \text{Profits} + \text{Misc. Income of self employed} = W + R + I + P$
 - $\text{Profits} = \text{Dividends} + \text{Retained Earnings} + \text{Corporate tax}$

- **Expenditure approach**

- $GDP_{MP} = \text{Consumption Expenditure} + \text{Government expenditure} + \text{Gross private domestic investment} + \text{Exports} - \text{Imports}$

OR

$$C + G + I + X - M$$

Production approach

Sector	1990-91 (in crores)	2004-05
PRIMARY	33.5	22.1
1) Agriculture	28.3	17.6
2) Forestry & Fishing	2.7	1.9
3) Mining & Quarrying	2.5	2.6
SECONDARY	26.9	24.7
4) Manufacturing	18.7	15.8
5) Electricity, gas and water	2.2	2.6
6) Construction	6.0	6.1
TERTIARY	39.7	53.3
7) Trade, hotels and restaurant	13.0	16.2
8) Transport	7.1	8.5
9) Banking and insurance	4.4	5.8
10) Real estate, dwellings	3.7	8.5
11) Public adm. And defense	5.7	6.1
12) Other services	5.8	8.2
GDP at Market price	33.5+26.9+39.7	22.1+24.7+53.3

Calculating GDP

The Expenditure Approach

There are four main categories of expenditure:

- Personal consumption expenditures (C): household spending on consumer goods
- Gross private domestic investment (I): spending by firms and households on new capital, that is, plant, equipment, inventory, and residential structures, and change in business inventories
- Government consumption and gross investment (G)
- Net exports ($EX - IM$): net spending by the rest of the world, or exports (EX) minus imports (IM)

Calculating GDP

The Expenditure Approach

TABLE Components of U.S. GDP, 2007: The Expenditure Approach

	Billions Of Dollars		
<i>Personal consumption expenditures (C)</i>	9,734.2		
<i>Gross private domestic investment (I)</i>	2,125.4		
<i>Government consumption and gross investment (G)</i>	2,689.8		
<i>Net exports (EX – IM)</i>	-708.0		
Exports (EX)		1,643.0	
Imports (IM)		2,351.0	
<i>Gross domestic product</i>	13,841.3		

$$\text{GDP}_{\text{mp}} = C + I + G + (X - M)$$

Find NDP at factor cost from the following data. (amount in crs.)

(i) Gross domestic fixed investment	10000
(ii) Inventory investment	5000
(iii) Depreciation	2000
(iv) Indirect taxes	1000
(v) Subsidies	2000
(vi) Private Consumption expenditure	9000
(vii) Government Consumption exp.	11000
(viii) Net Exports	1200

Where Does eBay Get Counted?

So do any of eBay's services count as part of GDP? eBay's business is to provide a marketplace for exchange. In doing so, it uses labor and capital and creates value. In return for creating this value, eBay charges fees to the sellers that use its site. The value of these fees do enter into GDP. So while the old knickknacks that people sell on eBay do not contribute to current GDP, the cost of finding an interested buyer for those old goods does indeed get counted.



Income approach

Calculate Domestic and National income using the following data

Items	Amount in crs.
Wages	10000
Rent	5000
Interest	400
Dividend	3000
Mixed income	400
Undistributed profits	200
Social Security contributions	400
Corporate Profit tax	400
Net factor income from abroad	1000

(a) Domestic income= Wages+ Rent+ Interest+ Dividend+
Mixed income + Undistributed profits+ Social Security
Profits+ Corporate profit tax= 19800

(b) National income=(a)+ NFIA= 20800

Nominal GDP (NGDP)

- So far GDP measured in current prices we pay for goods and services
- Nominal GDP: GDP measured in current prices
- However it is not a good measure of aggregate output over time
- Because it does not strip out pace of rising prices

NGDP: Example

Year	Price (\$/slice)	Quantity	NGDP
2014	\$1	100	$\$1 \times 100 = \100
2015	\$1.1	100	$\$1.1 \times 100 = \110

- Assume there is only one good – pizza
- NGDP has increased by \$10 even though production was same
- But what has happened here is a rise in price level (inflation)

Real GDP (RGDP)

- To account for inflation we would consider RGDP
- RGDP: Nominal GDP adjusted for inflation
- It is calculated using prices of a selected base-year
- Assume two time periods: 1990 and 1995
- If 1990 were chosen as base-year then
- $RGDP_{1995} = Quantity_{1995} * Price_{1990}$

RGDP: Example

Year	Price of Balls	Quantity of Balls	Price of Burgers	Quantity of Burgers	NGDP
2009	\$1	100	\$2	50	$\$1 \times 100 + \$2 \times 50 = \$200$
2010	\$2	150	\$3	100	$\$2 \times 150 + \$3 \times 100 = \$600$
2011	\$3	200	\$4	150	$\$3 \times 200 + \$4 \times 150 = \$1,200$

- To calculate RGDP, first choose a base-year
- Assume 2009 as base-year

Year	RGDP
2009	$\$1 \times 100 + \$2 \times 50 = \$200$
2010	$\text{\textcolor{red}{\$1}} \times 150 + \text{\textcolor{red}{\$2}} \times 100 = \$350$
2011	$\text{\textcolor{red}{\$1}} \times 200 + \text{\textcolor{red}{\$2}} \times 150 = \$500$

GDP Deflator

- GDP Deflator: Implicit index of price-level for a year
- $\text{GDP Deflator} = (\text{NGDP}/\text{RGDP}) * 100$

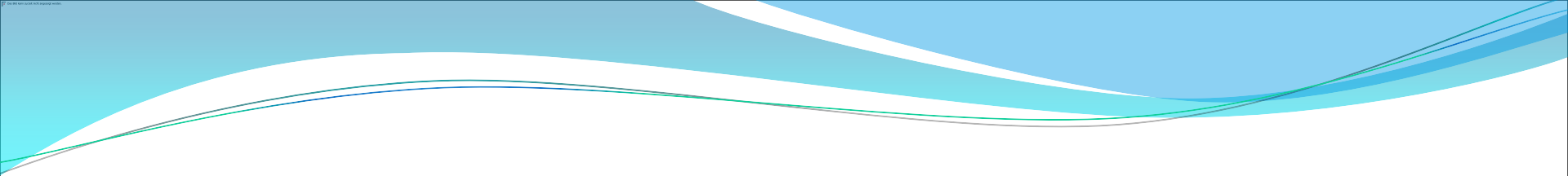
Year	NGDP	RGDP	GDP Deflator
2009	\$200	\$200	$(\$200/\$200) * 100 = 100$
2010	\$600	\$350	$(\$600/\$350) * 100 = 171$
2011	\$1,200	\$500	$(\$1200/\$500) * 100 = 240$

Calculating inflation/deflation from GDP Deflator

- GDP Deflator: Implicit index of price-level for a year
- $\text{GDP Deflator} = (\text{NGDP}/\text{RGDP}) * 100$

Year	GDP Deflator	Inflation/deflation
2009	100	-
2010	171	$[(171-100)/100] * 100 = 71\%$
2011	240	$[(240-171)/171] * 100 = 40\%$

- Prices in 2010 compared to base-year (2009) has increased by 71%
- Prices in 2011 compared to 2010 has increased by 40%

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- Chapter 21, Case et al.
 - Chapter 4, Dwivedi

Items to be included

- Government or private expenditure on defense and Security
- Free services by the government
- EPF
- Rent received by Indian residents on buildings rented out to foreign embassies
- Profits earned by a branch of an Indian bank in London
- Dividends received by an Indian resident from his investment in a foreign firm
- Wages received by the India employees

Items not to be included

- Gifts and grants
- Services of housewives
- Expenses on electricity for commercial use
- Purchase of vegetables by restaurant