



OOkul - Foundation to Apex

# Full Course on Indian Economy

For UPSC/PCS & SSC exams

## National Income Accounting

Short Notes

### INDIAN Economy

Overtakes Britain And Has Become  
World's Fifth-Largest  
Economy

mentored by:



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One of the pioneers of the subject we call in economics today, Adam Smith, named his most influential work - An Enquiry into the Nature and Cause of the Wealth of Nations.

**What generates the economic wealth of a nation?**

**What makes countries rich or poor?**

It is not that countries which are endowed with a bounty of natural wealth - minerals or forests or the most fertile lands - are naturally the richest countries.

In fact, the resource rich Africa and Latin America have some of the poorest countries in the world, whereas many prosperous countries have scarcely any natural wealth.

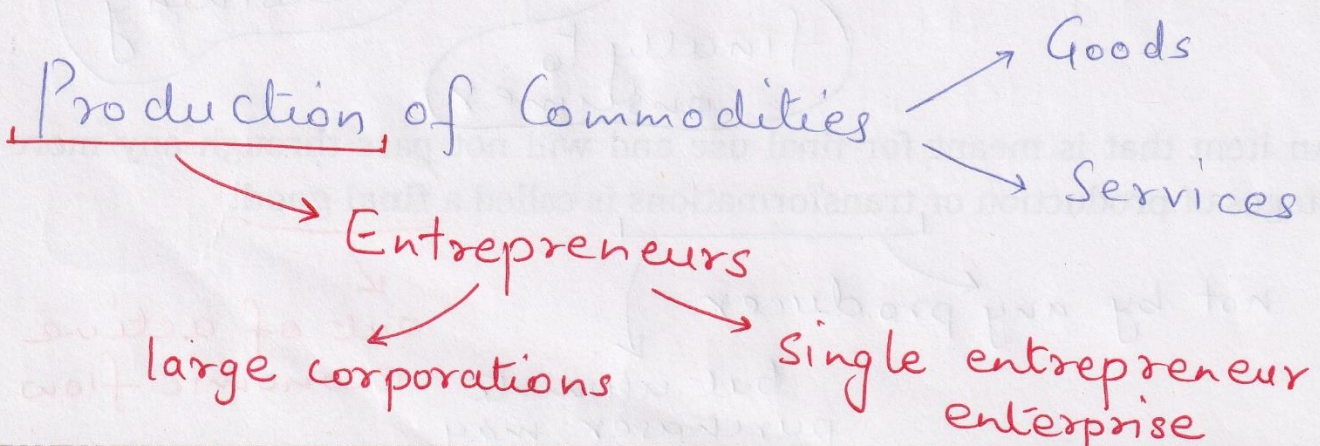
There was a time when possession of natural resources was the most important consideration but even then, the resource had to be transformed through a production process.

The economic wealth, or well-being, of a country thus does not necessarily depend on the mere possession of resources; the point is how these resources are used in generating a flow of production and how, as a consequence, income and wealth are generated from that process.

**How does this flow of production arise?**

People combine their energies with natural and manmade environment within a certain social and technological structure to generate a flow of production.

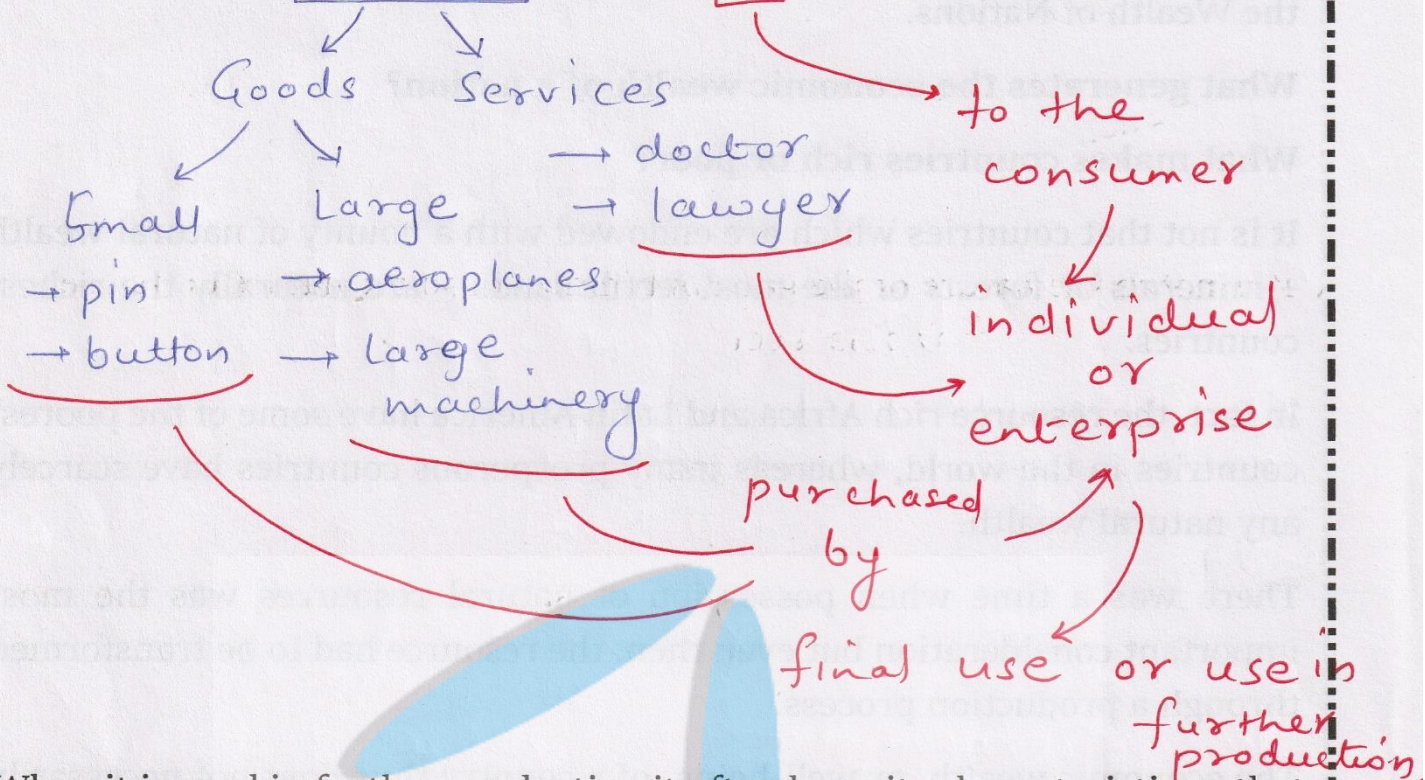
Flow of production arises from



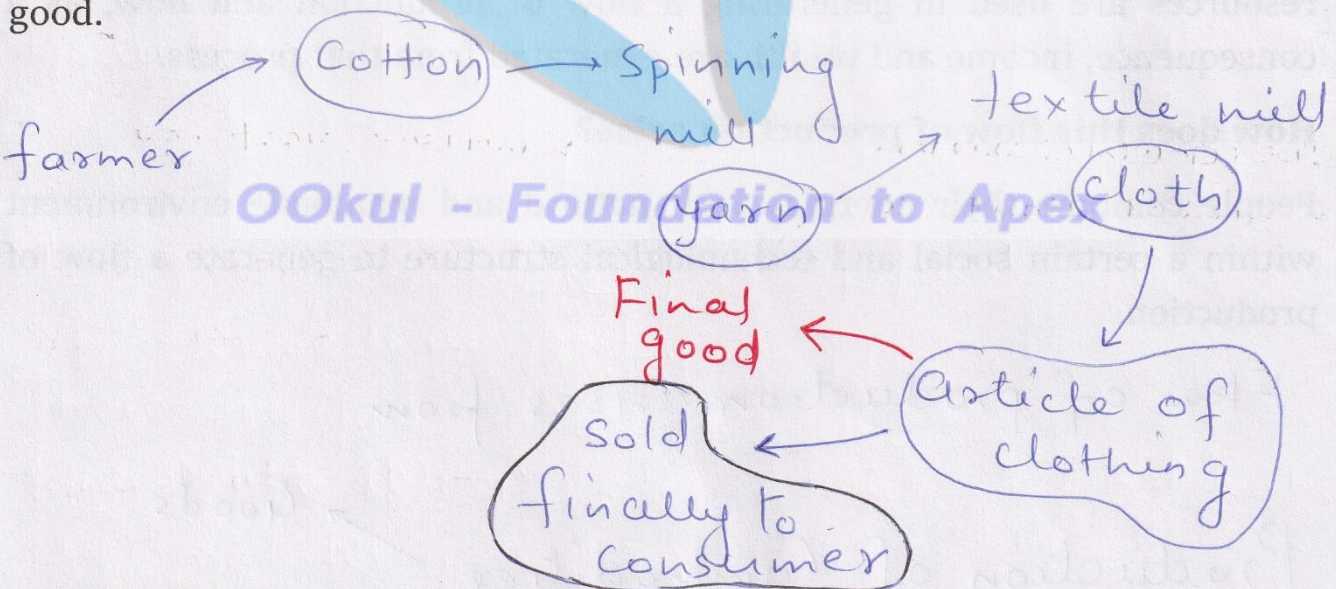
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### But what happens to these commodities after being produced?

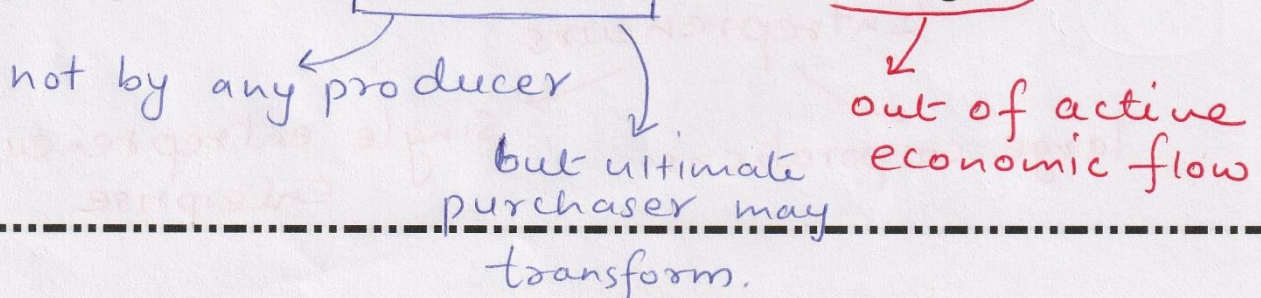
Each producer of commodities intends to sell her output.



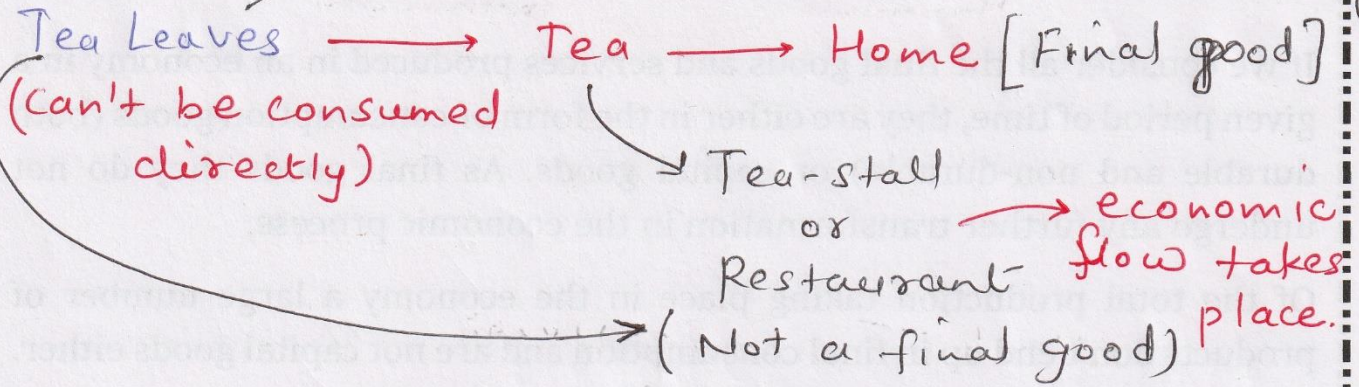
When it is used in further production it often loses its characteristic as that specific good and is transformed through a productive process into another good.



An item that is meant for final use and will not pass through any more stages of production or transformations is called a final good.



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It is not in the nature of the good but in the economic nature of its use that a good becomes a final good.

### Types of Final Goods

Consumption Goods

→ consumed when purchased by their ultimate consumers.  
Ex. food, clothing.

Capital Goods

→ goods of durable character which are used in production process.  
Ex. tools, Machines

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non durable

→ They make of other commodity production, feasible but they themselves don't get transformed.

There are few consumption goods like television set, automobiles which are more durable.

Consumer durables.

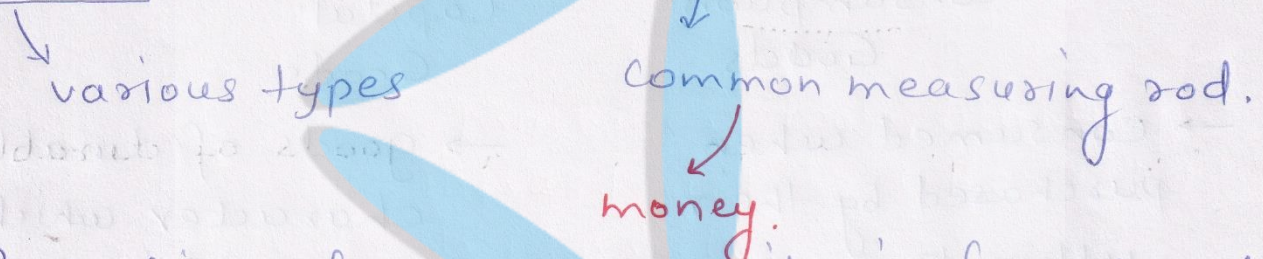
If we consider all the final goods and services produced in an economy in a given period of time, they are either in the form of consumption goods (both durable and non-durable) or capital goods. As final goods they do not undergo any further transformation in the economic process.

Of the total production taking place in the economy a large number of products don't end up in final consumption and are not capital goods either. Such goods may be used by other producers as material inputs.

Ex, steel sheets used for making automobiles  
copper used for making utensils.

**Intermediate Goods** used as raw materials or inputs for production.

To have a comprehensive idea of the total flow of production in the economy, we need to have a quantitative measure of the aggregate level of final goods produced in the economy.

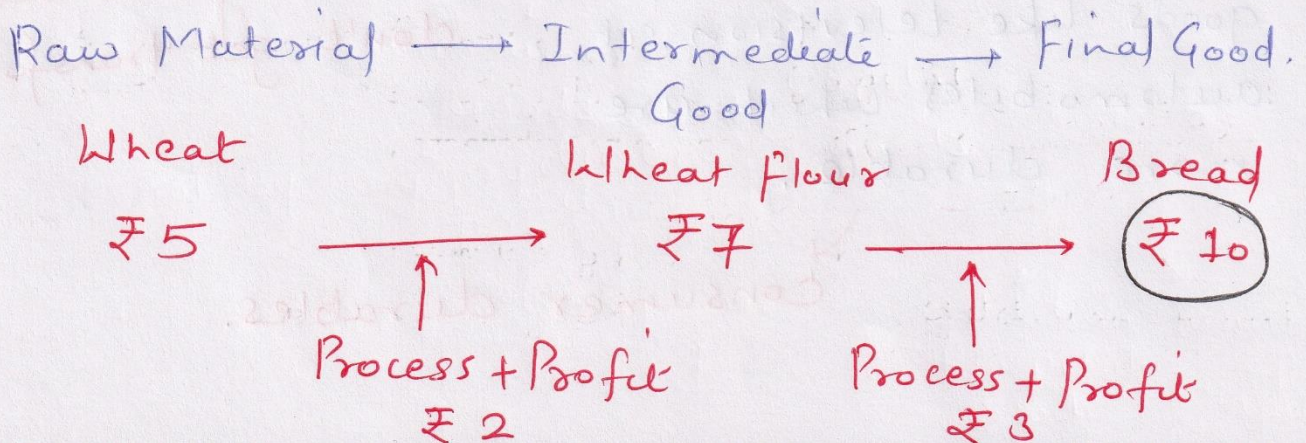


Production of each commodity is for sale only.

The sum total of the monetary value of these diverse commodities gives us a measure of final output.

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Measurement must only be of final goods & not of intermediate goods.



## Concepts of *stocks* and *flows*

Income, or output, or profits are concepts that make sense only when a time period is specified. These are called flows because they occur in a period of time.

Capital goods or consumer durables once produced do not wear out or get consumed in a delineated time period. These are called stocks.

***Flows are defined over a period of time whereas Stocks are defined at a particular point of time.***

### Concept of Gross and Net

Part of the final output that comprises of capital goods constitutes gross investment of an economy.

machines, tools, buildings,  
infrastructure like roads,  
bridges etc.

All the capital goods produced in a year do not constitute an addition to the capital stock already existing.

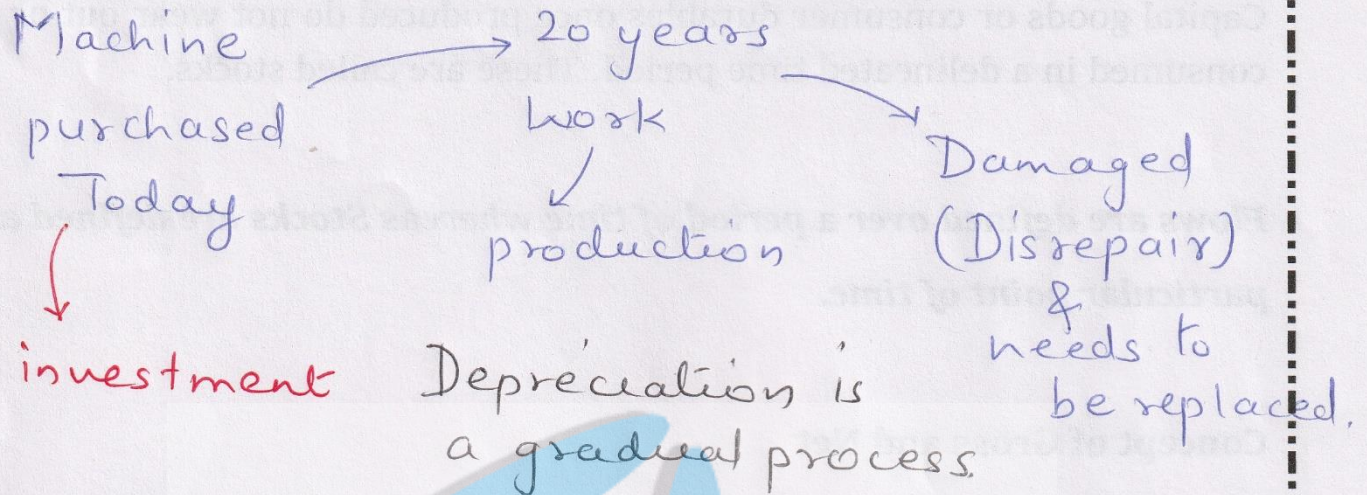
A significant part of current output of capital goods goes in maintaining or replacing part of the existing stock of capital goods. This is because the already existing capital stock suffers wear and tear and needs maintenance and replacement.

A part of the capital goods produced this year goes for replacement of existing capital goods and is not an addition to the stock of capital goods already existing and its value needs to be subtracted from gross investment for arriving at the measure for net investment.

This deletion, which is made from the value of gross investment in order to accommodate regular wear and tear of capital, is called **depreciation**.

New addition to capital stock in an economy is measured by net investment or new capital formation.

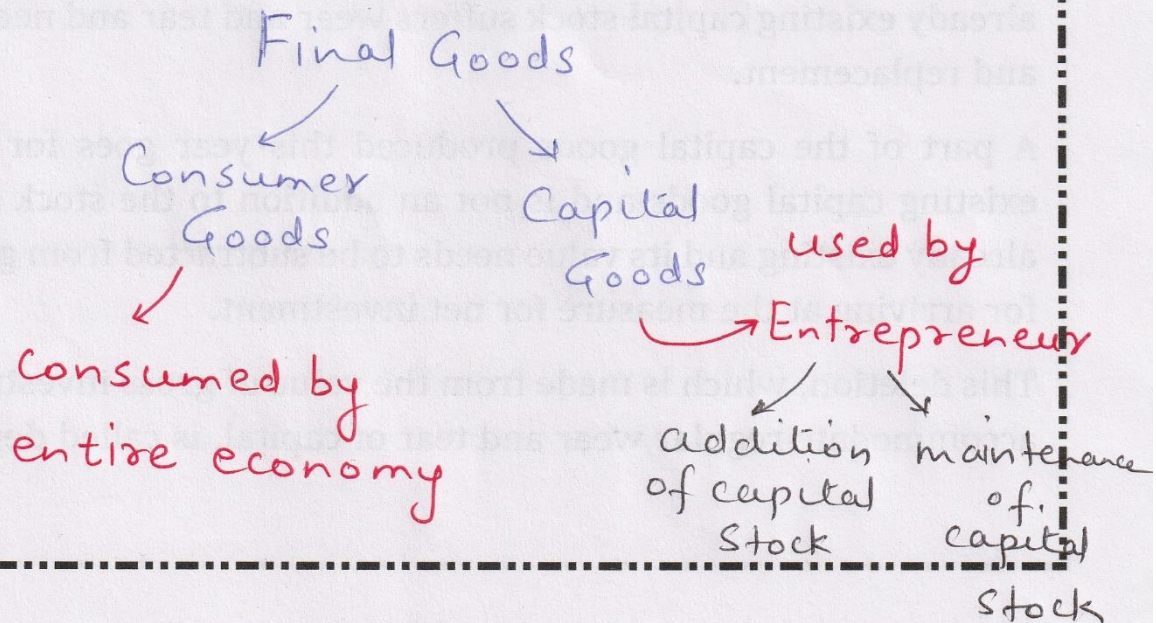
$$\text{Net Investment} = \text{Gross Investment} - \text{Depreciation}$$



Depreciation is thus an annual allowance for wear and tear of a capital good.

In other words, it is the cost of the good divided by number of years of its useful life.

Depreciation does not take into account unexpected or sudden destruction or disuse of capital as can happen with accidents, natural calamities or other such extraneous circumstances.



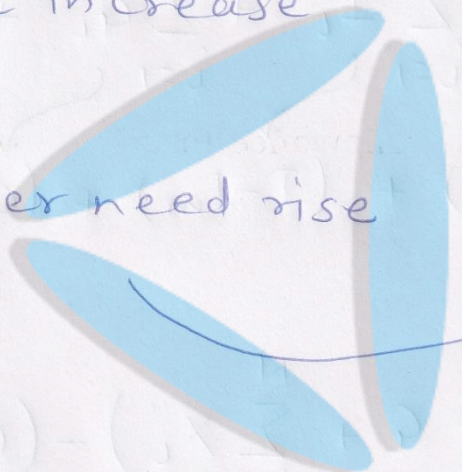
# Self Sustenance & Expanding Nature of Economy

Consumer  
↓  
Demand  
↓  
depend on Income

Income increase  
↓  
Consumer need rise

Factor Income increases

More capital good is required to produce max consumer goods  
more stock is required to satisfy this need



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Capital goods increase in any year in comparison to previous year

Factor Income will rise

Higher stock is required

Consumer need or demand will rise

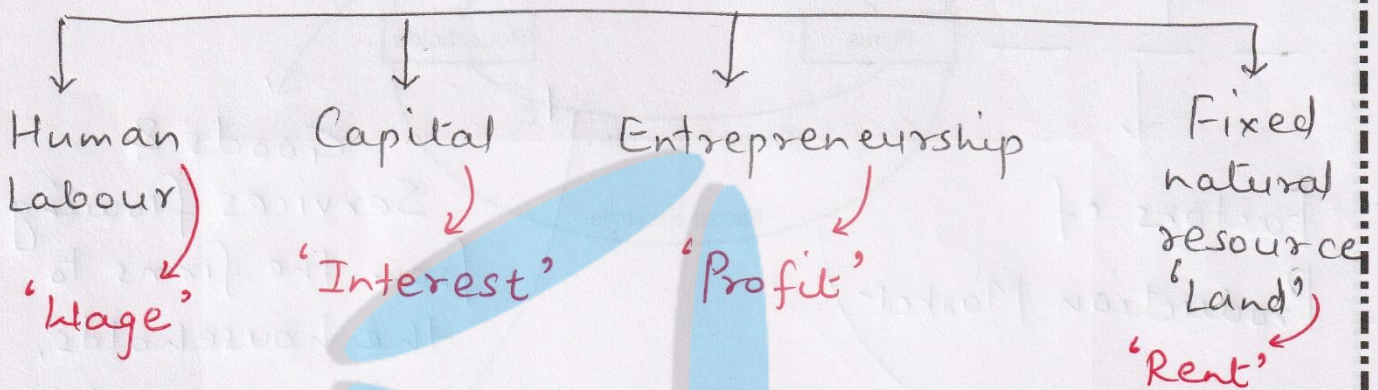


## CIRCULAR FLOW OF INCOME

Let us have a rough idea of how a simple economy – without a government, external trade or any savings – may function.

The households receive their payments from the firms for productive activities they perform for the latter.

Contributions during production of Goods & Services



In this simplified economy, there is only one way in which the households may dispose off their earnings – by spending their entire income on the goods and services produced by the domestic firms.

~~Savings~~      ~~Pay Taxes~~      ~~Imported Goods purchase~~

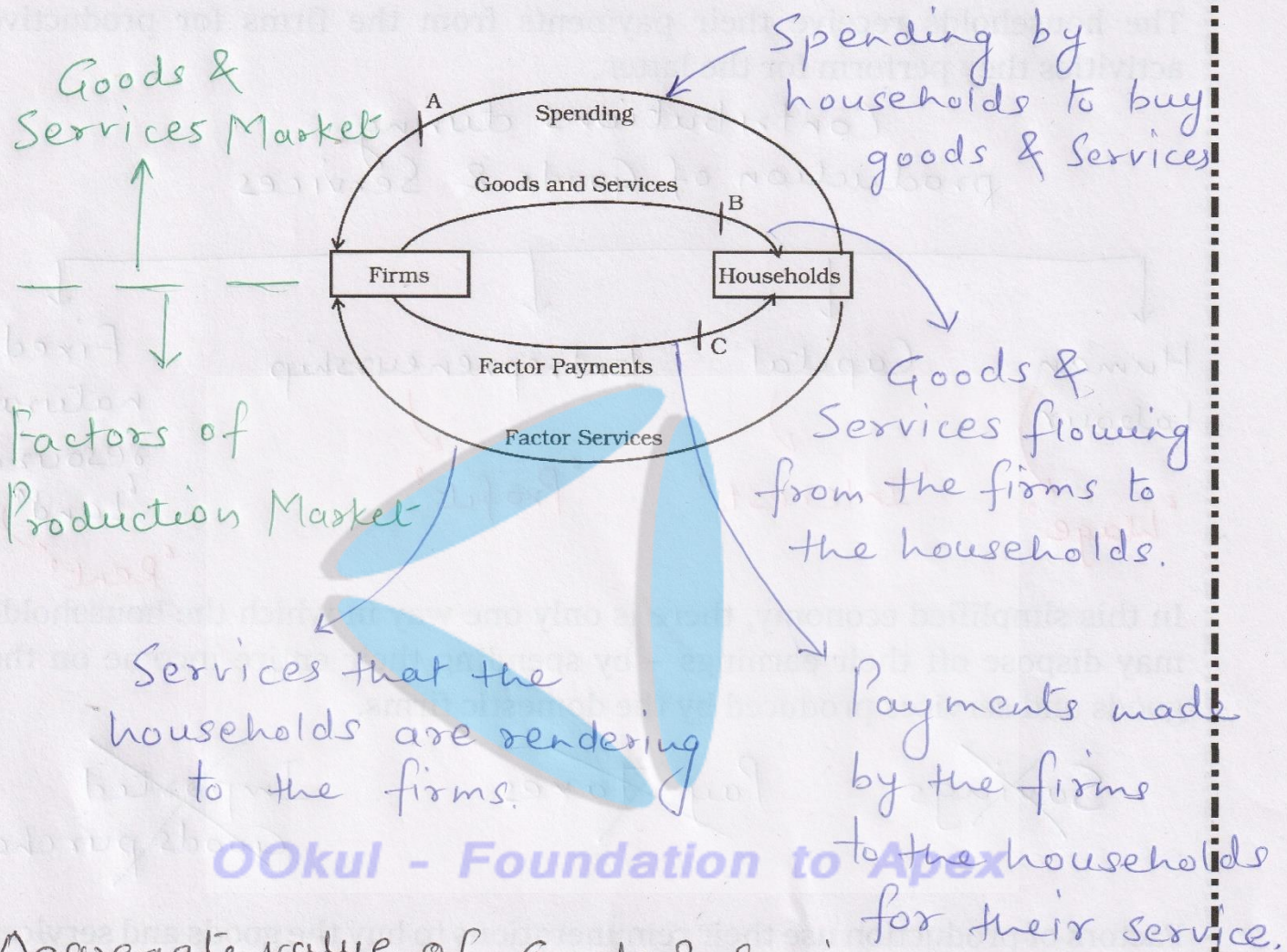
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Factors of production use their remunerations to buy the goods and services which they assisted in producing.

The aggregate consumption by the households of the economy is equal to the aggregate expenditure on goods and services produced by the firms in the economy.

The entire income of the economy, therefore, comes back to the producers in the form of sales revenue.

There is no leakage from the system – there is no difference between the amount that the firms had distributed in the form of factor payments (which is the sum total of remunerations earned by the four factors of production) and the aggregate consumption expenditure that they receive as sales revenue.



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Aggregate value of Goods & Services can be measured at 3 points.

A → Expenditure Method

B → Product Method

C → Income Method



The term that is used to denote the net contribution made by a firm is called its value added.

The raw materials that a firm buys from another firm which are completely used up in the process of production are called 'intermediate goods'.

Therefore the value added of a firm is, value of production of the firm - value of intermediate goods used by the firm.

The value added of a firm is distributed among its four factors of production, namely, labour, capital, entrepreneurship and land. Therefore wages, interest, profits and rents paid out by the firm must add up to the value added of the firm.

Value added is a flow variable.

If we include depreciation in value added then the measure of value added that we obtain is called **Gross Value Added**.

If we deduct the value of depreciation from gross value added we obtain **Net Value Added**.

While calculating the value added we are taking the value of production of firm. But a firm may be unable to sell all of its produce.

In such a case it will have some unsold stock at the end of the year.

Conversely, it may so happen that a firm had some initial unsold stock to begin with. During the year that follows it has produced very little. But it has met the demand in the market by selling from the stock it had at the beginning of the year.

In economics, the stock of unsold finished goods, or semi-finished goods, or raw materials which a firm carries from one year to the next is called inventory.

Inventory is a stock variable.

A)

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It may have a value at the beginning of the year; it may have a higher value at the end of the year. In such a case inventories have increased (or accumulated).

If the value of inventories is less at the end of the year compared to the beginning of the year, inventories have decreased (decumulated).

Suppose, at the beginning of an year,  
Firm had an unsold stock worth of ₹ 100.

Production during the year = ₹ 1000.

Sale of products during the year = ₹ 800

$$\text{Production} - \text{Sales} = ₹ 1000 - ₹ 800 \\ = ₹ 200$$

→ Change  
in inventory

Inventory at the end of the year =

$$₹ 100 + ₹ 200 =$$

Inventory at  
the beginning  
of year

Change  
in inventory  
₹ 300

Change in inventories may be planned or unplanned.

In case of an unexpected fall in sales, the firm will have unsold stock of goods which it had not anticipated. Hence there will be unplanned accumulation of inventories.

In the opposite case where there is unexpected rise in the sales there will be unplanned decumulation of inventories.

Inventory at the start of year = 100 shirts

Expected Sale during the year = 1000 shirts

So, production during the year = 1000 shirts

(expecting to keep an inventory of 100 shirts at the end of the year).

1.

Actual Sale = 600 shirts [Unexpectedly Low]

Unsold Shirts =  $1000 - 600 = 400$  shirts.

Inventory at the end of year =  $100 + 400 = 500$ .

↓  
unplanned accumulation

2.

Actual Sale = 1050 shirts [Unexpectedly high]

Inventory at the end of year = 50

↓  
unplanned decumulation.

**Planned accumulation or decumulation of inventories.**

Starting of an year = 100 shirts

At the end of year, we want to raise this to 200 shirts.

↳ planned accumulation

Expected sale = 1000 shirts = Actual sale

Production = 1100 shirts.

Production - Sales = 1100 - 1000 = 100

Inventory at End = 100 + 100 = 200. ✓ as planned

If we plan to decrease inventory at the end of the year, then we accordingly reduce our production.

Gross value added of firm,  $i$  ( $GVA_i$ ) = Gross value of the output produced by the firm  $i$  ( $Q_i$ ) - Value of intermediate goods used by the firm ( $Z_i$ )

$GVA_i$  = Value of sales by the firm ( $V_i$ ) + Value of change in inventories ( $A_i$ ) - Value of intermediate goods used by the firm ( $Z_i$ )

Net value added of the firm  $i$  =  $GVA_i$  - Depreciation of the firm  $i$  ( $D_i$ )

If we sum the gross value added of all the firms of the economy in a year, we get a measure of the value of aggregate amount of goods and services produced by the economy in a year.

Such an estimate is called **Gross Domestic Product (GDP)**. Thus GDP = Sum total of gross value added of all the firms in the economy.

We have N no. of firms having GVA as  
 $GVA_1, GVA_2, \dots, GVA_N$

$$\begin{aligned} GDP &= GVA_1 + GVA_2 + \dots + GVA_N \\ &= \sum_{i=1}^N GVA_i \end{aligned}$$

$$NVA_s = NVA_1, NVA_2, NVA_3, \dots, NVA_N$$

$$\begin{aligned} NDP &= NVA_1 + NVA_2 + \dots + NVA_N \\ &= \sum_{i=1}^N NVA_i \end{aligned}$$

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

$$\sum_{i=1}^N NVA_i = \sum_{i=1}^N GVA_i - \sum_{i=1}^N D_i$$

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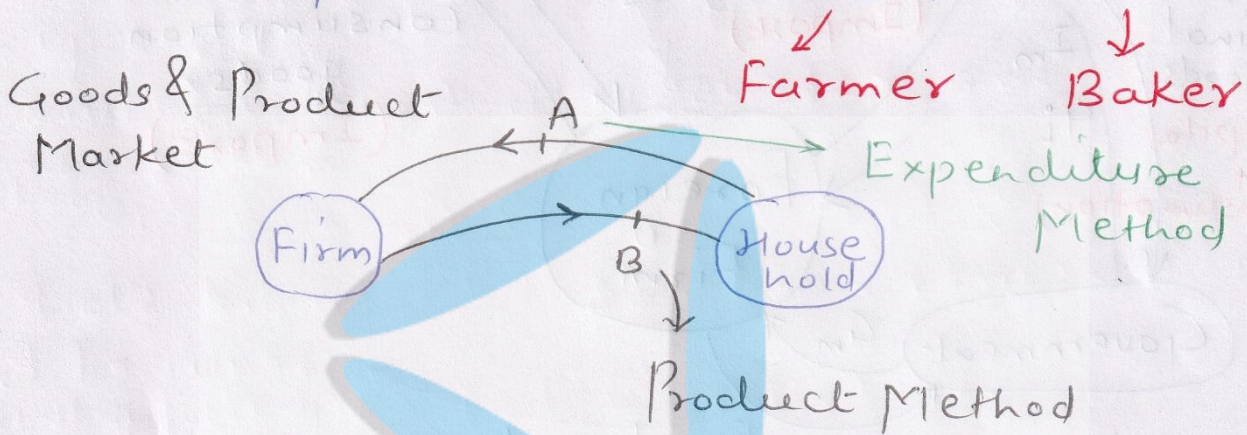
## Expenditure Method

An alternative way to calculate the GDP is by looking at the demand side of the products. This method is referred to as the expenditure method.

Final expenditure is to be taken into account.

In farmer-baker example,

$$\text{Final expenditure} = ₹ 50 + ₹ 200$$



Types of Goods : Consumption goods + Capital goods

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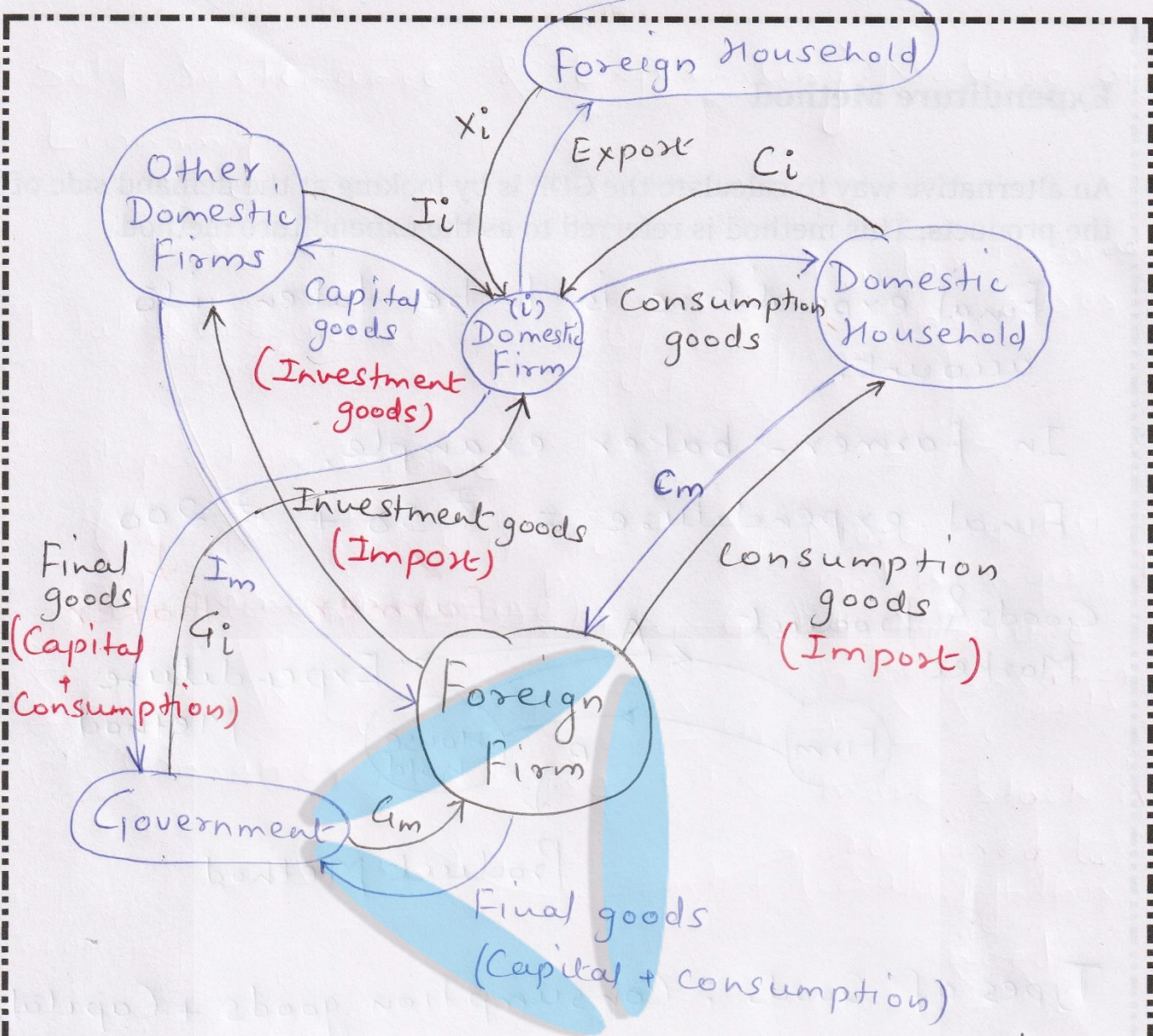
Entities involved: Producer Firm, Other domestic firms,

Domestic Households, Government,

Foreign Firm, Foreign Household.

Import

Export.



Consumption Goods, Total expenditure,  $C = \sum_{i=1}^N C_i + C_m$   
 (Domestic Household)  
 $\Rightarrow \sum_{i=1}^N C_i = C - C_m$

Investment Goods, Total expenditure,  $I = \sum_{i=1}^N I_i + I_m$   
 (Other Domestic Firms)  
 $\Rightarrow \sum_{i=1}^N I_i = I - I_m$

Government, Total expenditure,  $G = \sum_{i=1}^N G_i + G_m$   
 (Capital Goods + Consumption Goods)  
 $\Rightarrow \sum_{i=1}^N G_i = G - G_m$

Export Goods, Total Expenditure =  $X_i$   
 (Foreign Household)

Total Revenue received by  $i$ th firm,  
 → GDP of  $i$ th firm

$$RV_i = C_i + I_i + G_i + X_i$$

$$RV_i = (C - C_m) + (I - I_m) + (G - G_m) + X_i$$

$$\sum_{i=1}^N RV_i = \sum_{i=1}^N C_i + \sum_{i=1}^N I_i + \sum_{i=1}^N G_i + \sum_{i=1}^N X_i$$

→ GDP of economy

$$= (C - C_m) + (I - I_m) + (G - G_m) + \sum_{i=1}^N X_i$$

$$= (C + I + G + \sum_{i=1}^N X_i) - (C_m + I_m + G_m)$$

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$$GDP = [C + I + G + \sum_{i=1}^N X_i] - M$$

GDP as per Expenditure Method.

M → Aggregate Import Expenditure

## Income Method

The sum of final expenditures in the economy must be equal to the incomes received by all the factors of production taken together.

The revenues earned by all the firms put together must be distributed among the factors of production as salaries, wages, profits, interest earnings and rents.

Let there be  $M$  number of households in the economy.

Let  $W_i$  be the wages and salaries received by the  $i$ -th household in a particular year.

Similarly,  $P_i$ ,  $In_i$ ,  $R_i$  be the gross profits, interest payments and rents received by the  $i$ -th household in a particular year.

$$GDP = \sum_{i=1}^M W_i + \sum_{i=1}^M P_i + \sum_{i=1}^M In_i + \sum_{i=1}^M R_i$$

$\swarrow$                        $\swarrow$                        $\swarrow$                        $\swarrow$   
 $W$     +     $P$     +     $In$     +     $R$

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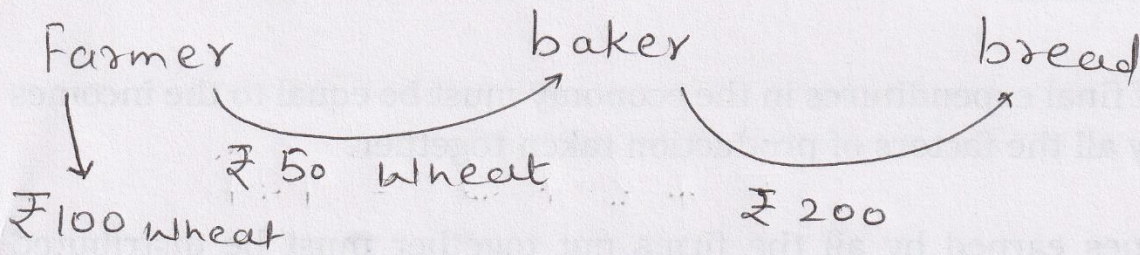
Comparing Product or Value Added Method,  
Expenditure Method & Income Method

$$GDP = \sum_{i=1}^N GVA_i = C + I + G + X - M =$$

$$W + P + In + R$$

(21)

In the farmer-baker example.



VA method

$$VA \text{ by farmer} = ₹100$$

$$VA \text{ by baker} = ₹200 - ₹50 = ₹150$$

$$GDP = ₹100 + ₹150 = ₹250$$

Expenditure Method

$$\text{Revenue earned by farmer} = ₹50$$

$$\text{Revenue " " baker} = ₹200$$

$$GDP = \text{Sum of revenues} = ₹50 + ₹200 = ₹250$$

Income Method [by factors of Production]

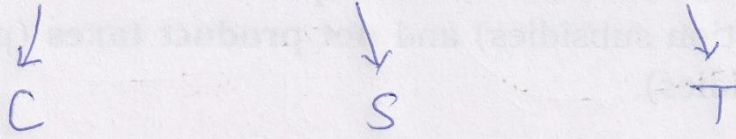
$$\text{Income earned by farmer} = ₹50$$

$$\text{" " " baker} = ₹200$$

$$GDP = ₹50 + ₹200 = ₹250$$

There are three major ways through which households can dispose off their earnings.

Either they consume it, or they save it or they pay taxes with it.



$$GDP = C + S + T$$

Comparing

$$C + I + G + X - M = C + S + T$$

$$I + G + X - M = S + T$$

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

$G - T$  measures by what amount government expenditure exceeds the tax revenue earned by it. This is referred to as **BUDGET DEFICIT**.

$M - X$  measures the excess of import expenditure over the export revenue earned by the economy. This is referred to as **TRADE DEFICIT**.

If there is no govt., no foreign trade then

$$G = T = X = M = 0,$$

$$I = S$$

## Factor Cost, Basic Prices and Market Prices

- The distinction between factor cost, basic prices and market prices is based on the distinction between **net production taxes** (production taxes less production subsidies) and **net product taxes** (product taxes less product subsidies).
- Production taxes and subsidies are paid or received in relation to production and are independent of the volume of production such as land revenues, stamp and registration fee.
- Product taxes and subsidies, on the other hand, are paid or received per unit or product, e.g., excise tax, service tax, export and import duties etc.

Factor cost includes only the payment to factors of production, it does not include any tax.

In order to arrive at the market prices, we have to add to the factor cost the total indirect taxes less total subsidies.

The basic prices lie in between: they include the production taxes (less production subsidies) but not product taxes (less product subsidies).

Therefore, in order to arrive at market prices we have to add product taxes (less product subsidies) to the basic prices.

GVA at factor costs + Net production taxes = GVA at basic prices

GVA at basic prices + Net product taxes = GVA at market prices

## Concept of National Product

Gross Domestic Product measures the aggregate production of final goods and services taking place within the domestic economy during a year.

But the whole of it may not accrue to the citizens of the country. For example, a citizen of India working in Saudi Arabia may be earning her wage and it will be included in the Saudi Arabian GDP. But legally speaking, she is an Indian.

Is there a way to take into account the earnings made by Indians abroad or by the factors of production owned by Indians?

When we try to do this, in order to maintain symmetry, we must deduct the earnings of the foreigners who are working within our domestic economy, or the payments to the factors of production owned by the foreigners.

For example, the profits earned by the Korean-owned Hyundai car factory will have to be subtracted from the GDP of India.

The macroeconomic variable which takes into account such additions and subtractions is known as **Gross National Product (GNP)**.

$$\text{GNP} = \text{GDP} +$$

Factor income earned by the domestic factors of production employed in the rest of the world

-

Factor income earned by the factors of production of the rest of the world employed in the domestic economy

Hence,  $\text{GNP} = \text{GDP} + \text{Net factor income from abroad}$

A part of the capital gets consumed during the year due to wear and tear. This wear and tear is called depreciation.



Depreciation does not become part of anybody's income. If we deduct depreciation from GNP the measure of aggregate income that we obtain is called Net National Product (NNP).

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

Through the expression given above, we get the value of NNP evaluated at market prices.

But market price includes indirect taxes.

When indirect taxes are imposed on goods and services, their prices go up. Indirect taxes accrue to the government.

We have to deduct them from NNP evaluated at market prices in order to calculate that part of NNP which actually accrues to the factors of production.

Similarly, there may be subsidies granted by the government on the prices of some commodities (in India petrol is heavily taxed by the government, whereas cooking gas is subsidised).

So we need to add subsidies to the NNP evaluated at market prices.

The measure that we obtain by doing so is called Net National Product at factor cost or National Income.

$$\text{NNP at factor cost} = \text{NNP at market price} - \text{Indirect Taxes} + \text{Subsidies}$$

↓  
National Income

$$\text{Net Indirect Taxes} = \text{Indirect Taxes} - \text{Subsidies}$$

$$\text{NNP at factor cost} = \text{NNP at market price} - \text{Net Indirect Taxes}$$

Out of NI, which is earned by the firms and government enterprises, a part of profit is not distributed among the factors of production. This is called Undistributed Profits (UP).

We have to deduct UP from NI to arrive at PI, since UP does not accrue to the households.

Similarly, Corporate Tax, which is imposed on the earnings made by the firms, will also have to be deducted from the NI, since it does not accrue to the households.

On the other hand, the households do receive interest payments from private firms or the government on past loans advanced by them.

And households may have to pay interests to the firms and the government as well, in case they had borrowed money from either.

So, we have to deduct the net interests paid by the households to the firms and government.

The households receive transfer payments from government and firms (pensions, scholarship, prizes, for example) which have to be added to calculate the Personal Income of the households.

**Personal Income (PI) = NI - Undistributed profits - Net interest payments made by households - Corporate tax + Transfer payments to the households from the government and firms.**

However, even PI is not the income over which the households have complete say.

They have to pay taxes from PI.

If we deduct the Personal Tax Payments (income tax, for example) and Non-tax Payments (such as fines) from PI, we obtain what is known as the **Personal Disposable Income**.

Personal Disposable Income (PDI) = PI - Personal tax payments - Non-tax payments.

Personal Disposable Income is the part of the aggregate income which belongs to the households.

They may decide to consume a part of it, and save the rest.

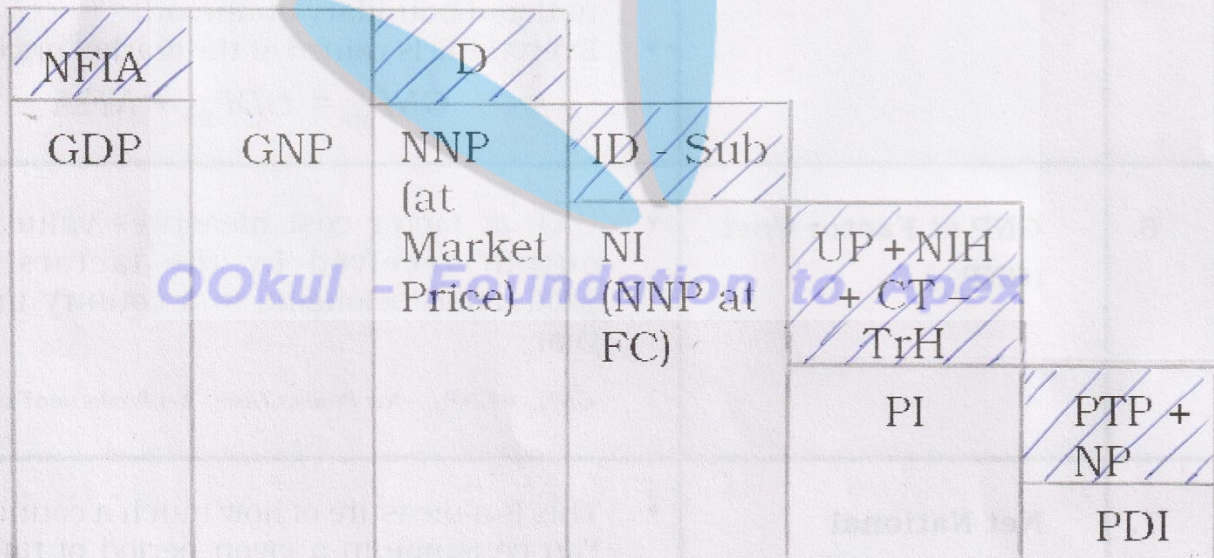
1.	<b>Gross Domestic Product at Market Prices (<math>GDP_{MP}</math>)</b>	<ul style="list-style-type: none"> <li>• GDP is the market value of all final goods and services produced within a domestic territory of a country measured in a year.</li> <li>• All production done by the national residents or the non-residents in a country gets included, regardless of whether that production is owned by a local company or a foreign entity.</li> <li>• Everything is valued at market prices.</li> </ul> $GDP_{MP} = C + I + G + X - M$
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2.	<b>GDP at Factor Cost (<math>GDP_{FC}</math>)</b>	<ul style="list-style-type: none"> <li>• GDP at factor cost is gross domestic product at market prices, less net product taxes.</li> <li>• Market prices are the prices as paid by the consumers. Market prices also include product taxes and subsidies. The term factor cost refers to the prices of products as received by the producers. Thus, factor cost is equal to market prices, minus net indirect taxes. GDP at factor cost measures money value of output produced by the firms within the domestic boundaries of a country in a year.</li> </ul> $GDP_{FC} = GDP_{MP} - NIT$
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3.	<b>Net Domestic Product at Market Prices (NDP<sub>MP</sub>)</b>	<ul style="list-style-type: none"> <li>This measure allows policy-makers to estimate how much the country has to spend just to maintain their current GDP. If the country is not able to replace the capital stock lost through depreciation, then GDP will fall.</li> </ul> $NDP_{MP} = GDP_{MP} - Dep.$
4.	<b>NDP at Factor Cost (NDP<sub>FC</sub>)</b>	<ul style="list-style-type: none"> <li>NDP at factor cost is the income earned by the factors in the form of wages, profits, rent, interest, etc., within the domestic territory of a country.</li> </ul> $NDP_{FC} = NDP_{MP} - Net\ Product\ Taxes - Net\ Production\ Taxes$

5.	<b>Gross National Product at Market Prices (GNP<sub>MP</sub>)</b>	<ul style="list-style-type: none"> <li>GNP<sub>MP</sub> is the value of all the final goods and services that are produced by the normal residents of India and is measured at the market prices. In a year.</li> <li>GNP refers to all the economic output produced by a nation's normal residents, whether they are located within the national boundary or abroad.</li> <li>Everything is valued at the market prices.</li> </ul> $GNP_{MP} = GDP_{MP} + NFIA$
6.	<b>GNP at Factor Cost (GNP<sub>FC</sub>)</b>	<ul style="list-style-type: none"> <li>GNP at factor cost measures value of output received by the factors of production belonging to a country in a year.</li> </ul> $GNP_{FC} = GNP_{MP} - Net\ Product\ Taxes - Net\ Production\ Taxes$
7.	<b>Net National Product at Market Prices (NNP<sub>MP</sub>)</b>	<ul style="list-style-type: none"> <li>This is a measure of how much a country can consume in a given period of time. NNP measures output regardless of where that production has taken place (in domestic territory or abroad).</li> </ul> $NNP_{MP} = GNP_{MP} - Depreciation$ $NNP_{MP} = NDP_{MP} + NFIA$

8.	<p><b>NNP at Factor Cost</b> (<math>NNP_{FC}</math>)</p> <p>Or</p> <p><b>National Income</b> (NI)</p>	<ul style="list-style-type: none"> <li>• NNP at factor cost is the sum of income earned by all factors in the production in the form of wages, profits, rent and interest, etc., belonging to a country during a year.</li> <li>• It is the National Product and is not bound by production in the national boundaries. It is the net domestic factor income added with the net factor income from abroad.</li> </ul> <p><math>NI = NNP_{MP} - \text{Net Product Taxes} - \text{Net Production Taxes}</math> <math>= NDP_{FC} + NFIA = NNP_{FC}</math></p>
9.	<b>GVA at Market Prices</b>	• GDP at market prices
10.	<b>GVA at basic prices</b>	• $GVA_{MP} - \text{Net Product Taxes}$
11.	<b>GVA at factor cost</b>	• GVA at basic prices - Net Production Taxes



Diagrammatic representation of the subcategories of aggregate income.

*NFIA: Net Factor Income from Abroad, D: Depreciation, ID: Indirect Taxes, Sub: Subsidies, UP: Undistributed Profits, NIH: Net Interest Payments by Households, CT: Corporate Taxes, TrH: Transfer Payments received by Households, PTP: Personal Tax Payments, NP: Non-Tax Payments.*

## NOMINAL AND REAL GDP

If we measure the GDP of a country in two consecutive years and see that the figure for GDP of the latter year is twice that of the previous year, we may conclude that the volume of production of the country has doubled.

But it is possible that only prices of all goods and services have doubled between the two years whereas the production has remained constant.

Therefore, in order to compare the GDP figures (and other macroeconomic variables) of different countries or to compare the GDP figures of the same country at different points of time, we cannot rely on GDPs evaluated at current market prices.

For comparison we take the help of real GDP.

Real GDP is calculated in a way such that the goods and services are evaluated at some constant set of prices (or constant prices).

Since these prices remain fixed, if the Real GDP changes, we can be sure that it is the volume of production which is undergoing changes.

Nominal GDP, on the other hand, is simply the value of GDP at the current prevailing prices.

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Suppose a country produces only Bread.

In year 2010, production = 100 units, price per unit = ₹ 10.

GDP at current price =  $100 \times 10 = ₹ 1000$ .

In year 2011, production = 110 units, price per unit = ₹ 15.

Nominal GDP of 2011 =  $110 \times 15 = ₹ 1650$ .

Real GDP of 2011 at price of 2010 =  $110 \times 10 = ₹ 1100$

The ratio of nominal GDP to real GDP gives us an idea of how the prices have moved from the base year (the year whose prices are being used to calculate the real GDP) to the current year.

In the calculation of real and nominal GDP of the current year, the volume of production is fixed.

Therefore, if these measures differ it is only due to change in the price level between the base year and the current year.

The ratio of nominal to real GDP is a well-known index of prices. This is called GDP Deflator.

$$GDP = \text{Nominal GDP} \rightarrow \text{current year price}$$

$$gdp = \text{Real GDP} \rightarrow \text{Base year price}$$

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} = \frac{GDP}{gdp}$$

In percentage terms,  $\frac{GDP}{gdp} \times 100$

In previous example,  $\text{GDP Deflator} = \frac{1650}{1100} = 1.5 \text{ or } 150\%$

Price of bread produced in 2011 is 1.5 times or 150% higher than price of bread produced in 2010.

## Consumer and Wholesale Price Index

There is another way to measure change of prices in an economy which is known as the Consumer Price Index (CPI).

This is the index of prices of a given basket of commodities which are bought by the representative consumer.

CPI is generally expressed in percentage terms.

We have two years under consideration - one is the base year, the other is the current year.

We calculate the cost of purchase of a given basket of commodities in the base year.

We also calculate the cost of purchase of the same basket in the current year.

Then we express the latter as a percentage of the former. This gives us the Consumer Price Index of the current year vis-a-vis the base year.

Suppose a representative consumer buys 90kg of wheat & 10 pieces of cloth in a year.

Suppose in 2010, prices were, wheat = ₹10/kg  
cloth = ₹100/piece

Consumer spends in 2010 =  $90 \times 10 + 10 \times 100$   
= ₹1900 → Base year price

In 2011, prices were, wheat = ₹15/kg  
cloth = ₹120/piece

Consumer spends in 2011 =  $90 \times 15 + 10 \times 120$   
= ₹2550 → current year price

$$CPI = \frac{2550}{1900} = 134.21\%$$



Many commodities have two sets of prices.

One is the retail price which the consumer actually pays. The other is the wholesale price, the price at which goods are traded in bulk.

These two may differ in value because of the margin kept by traders.

Goods which are traded in bulk (such as raw materials or semi-finished goods) are not purchased by ordinary consumers.

Like CPI, the index for wholesale prices is called Wholesale Price Index (WPI).

In countries like USA it is referred to as Producer Price Index (PPI).

CPI (and analogously WPI) may differ from GDP deflator because

- The goods purchased by consumers do not represent all the goods which are produced in a country. GDP deflator takes into account all such goods and services.
- CPI includes prices of goods consumed by the representative consumers, hence it includes prices of imported goods. GDP deflator does not include prices of imported goods.
- The weights are constant in CPI – but they differ according to production level of each good in GDP deflator.

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