



Knowledge Series : Measuring GDP
March 2009

**Opportunity favours
the prepared mind.**

DSP BLACKROCK
INVESTMENT MANAGERS



What is GDP?

- Gross Domestic Product (GDP) is one of the measures of economic growth for a country's economy
- It is measured in terms of the monetary value of all goods and services produced within the borders of a country during a year.
- GDP (for any year) can be defined in three ways, all of which are conceptually identical
 1. It is equal to the sum of the value added at every stage of production (any intermediate stages) by all the industries within a country, plus taxes less subsidies on products
 2. It is equal to the total expenditures for all final goods and services produced within the country
 3. It is equal to the sum of the income generated by production in the country

GDP refers to the final value of all goods and services produced in an economy

How is the GDP of an Economy Measured?

- There are three official methods to measure GDP
 1. Output Method
 2. Income Method
 3. Expenditure Method
- Output of goods and services leads to income for those who are producing, as well as expenditure for those who are consuming the items. Hence, the value of GDP measured by any of the three methods is exactly the same. (However, this is not always the case due to discrepancies, errors and omissions in counting)

Measurement of GDP using any of the three methods yields the same value

Calculation of GDP: Output Method

GDP = Monetary (market) Value of all goods and services produced during an year

- Nominal GDP (or GDP calculated ignoring effects of inflation) leads to incorrect measurement. Hence, an adjustment for inflation is required against the current market value, to arrive at the 'real' GDP
- For eg:
 - Year 1: 10 units of 'X' produced at Rs 10 each, Total Value= Rs 100
 - Year 2: 9 units of 'X' produced at Rs 12 each, Total Value= Rs 108
 - Increment in total value of output at market value = $(108-100)/100$, or 8% ↑
 - Increment in total value of output at constant price= $((9 \text{ units} \times \text{Rs } 10 \text{ each}) - 100)/100$, or 10% ↓
 - Price rise (from Rs 10 to Rs 12) due to inflation makes it seem as if output has increased by 8%, whereas in reality it decreased by 10%
- Taxes distort (↑) the cost of production, hence they need to be subtracted from the cost
- Subsidies also distort (↓) the cost of production, hence they need to be added back to the cost
- **Value of GDP measured at actual cost without taxes or subsidies is called GDP at factor cost**
- It is important to avoid 'double counting'- counting the value of the same good twice. For eg, if value of steel is counted as raw material cost, it should be deducted from value of cars that use steel as an input

$$\text{Final GDP} = \text{GDP}_{\text{Constant Prices}} - \text{Taxes} + \text{Subsidies}$$

Calculation of GDP: Expenditure Method

GDP = Sum of expenditure from all firms and individuals on consumption of any goods or services

- Output of goods and services that have a value in terms of money results in expenditure for the consumer. GDP can hence be derived by measuring the overall expenditure in the market
- $C + I + G + (X-M)$

- C Private consumption from households (for eg: goods and services such as food, clothes, laundry etc)
- I Investment from firms to increase productive capacity (for eg: purchasing machines, office buildings etc)
This also includes unsold goods in the inventory of firms
- G Spending from Government (for eg: to build hospitals, schools, infrastructure etc)
- (X-M) Spending from foreign consumers on goods and services produced within our country. This is calculated by measuring net exports (subtracting the value of imports from the value of exports of goods and services)

- This method works on the presumption that all the goods and services that the country is producing is consumed amongst these four groups of people. So if one adds up the total expenses by each of these groups, the total GDP can be measured

Final GDP = Private Consumption + Firms' investments + Govt. Spending + Net Exports

Calculation of GDP: Income Method

GDP = Sum of income of all firms and individuals engaged in production of any goods or services

- Economy is broadly divided into two groups of people
 - Those who contribute their labor
 - Those who contribute their capital
- Cost of production leads to income for both these groups of people. (for eg: a mechanic for cars earns a monthly salary, the shareholders of the car company earn money from dividends, owners of the manufacturing premises earn lease rent and so forth)
- If we add income of all firms and individuals engaged in the production of any goods and services within the premises of a country, we can measure the GDP at Factor Cost (which does not reflect the impact of taxes or subsidies)
- Taxes distort (↓) the income from production, hence they need to be added back into the income
- Subsidies also distort (↑) the income from production, hence they need to be subtracted from the income

$$\text{Final GDP} = \text{GDP}_{\text{Factor Cost}} + \text{Taxes} - \text{Subsidies}$$

What is GNP?

- Gross National Product (GNP) is one of the measures of national income for a given country's economy
- It represents the income earned by the nationals of a country, irrespective of their physical residence
- While GDP is the total value of goods and services produced in the country, GNP also takes into account the value of goods and services offered by Indian companies outside the boundaries of the country
- Adding the income of a country's nationals from abroad and subtracting the income of foreign nationals in that country results in 'Net Income from Abroad'
- Hence $GNP = GDP \pm \text{Net Income from Abroad}$
 - If Net Income from Abroad is +ve, then $GNP > GDP$ (When profits earned by nationals of country 'X' are higher than the profits earned by foreign nationals residing in country 'X')
 - If Net Income from Abroad is -ve, then $GDP > GNP$
 - Value of a product sold in country 'X' produced by a firm from country 'Y' is included in GDP of country 'X', however, profits earned in the sale of the product (even if in country 'X') are included in GNP of country 'Y'

$$GNP = GDP \pm \text{Net Income from Abroad}$$

What is NNP?

- Net National Product (NNP) represents income after taking into account any future needs
- It is calculated by making adjustments in GNP for depreciation
- **NNP = GNP - Depreciation (of plant and machinery)**
- Depreciation represents the reduction in value of plant and machinery over a period of time. Every unit of a product which is produced today reduces the power of a machine to produce the same quantity of the product in the future

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



Thank You