Lesson 1: Aggregate Output and Income

Gross Domestic Product (GDP)

Aggregate output refers to the total value of all the goods and services produced in an economy over a period of time.

Aggregate income refers to the total value of all payments earned by the suppliers of factors of production in an economy over a period of time. Since the value of output produced in the economy flows through to the factors of production, aggregate output and aggregate income are equal. Aggregate income is composed of:

- Employee compensation including wages and benefits.
- Rent for the use of property.
- Interest earned on funds loaned out.
- Profits earned by businesses.

Aggregate expenditure refers to the total amount spent on the goods and services produced in the domestic economy over a period of time.

Aggregate output, aggregate income and aggregate expenditure basically represent different ways of breaking down the same quantity.

Gross Domestic Product (GDP)

GDP may be defined in two ways:

Output definition: GDP is the market value of all final goods and services produced within an economy over a period of time.
Income definition: GDP is the aggregate income earned by all households, companies, and the government in an economy over a period of time.

GDP may be calculated in the following ways:

Expenditure approach: Total amount spent on goods and services produced in the economy.
Income approach: Total amount earned by households and companies in the economy.

For the economy as a whole, total income must equal total expenditure, so GDP can be calculated using either of these approaches.

Gross Domestic Product (GDP)

In order to ensure consistency in the method used to calculate GDP in different countries, the following criteria are applied:

Only goods and services produced *during* the measurement period are included.

- Transfer payments from the government to individuals are excluded.
- Income from capital gains is excluded.

Only goods and services whose value can be determined by being sold in the market are included.

- The value of labor used in activities that are not sold in the market is excluded.
- By-products of production processes which have no explicit market value are not included.
- Activities in the underground economy are not included.
- Barter transactions are not included.

Only the value of *final* goods and services is included in the calculation of GDP.

- The value of intermediate goods is excluded because the entire value added during the production process is reflected in the selling price of the final good produced.

The reliability of official GDP data varies considerably across countries because:

- There are are estimates involved in the calculation of GDP.
- Underground economies vary in size.
- Some countries have poor data collection practices.
- Some countries use unreliable statistical methods.

Example: Value of Final Output

A farmer sells wheat to a miller for $0.30. The miller grinds the wheat into flour and sells it to a baker for $0.85. The baker makes bread and sells it to a retailer for $1.45, who sells it on to the final customer for $2. What is the value of the contribution of all these economic agents to the GDP of the economy?

Gross Domestic Product (GDP)

Nominal GDP refers to the value of goods and services included in GDP measured at **current prices**.

- Nominal GDP includes the effects of inflation.

Real GDP removes the effect of changes in the price level on GDP by measuring GDP at base-year prices.

Example: Nominal and Real GDP

An analyst gathered the following information regarding the production of cars in an economy:

	2007	2008	2009
No. of cars manufactured	500,000	500,000	520,000
Average market price ($)	20,500	22,140	23,247

What is the contribution of the automobile industry towards nominal and real GDP in each of the three years? Comment on your answers.

Gross Domestic Product (GDP)

GDP Deflator

The GDP deflator broadly measures the aggregate change in prices across the overall economy. Changes in the GDP deflator provide a useful measure of inflation.

Example: GDP Deflator

Given the values of real and nominal GDP in Example 2, calculate the GDP deflator for each of the three years.

Gross Domestic Product (GDP)

The Components of GDP

Based on the expenditure approach, GDP may be calculated as:

$$GDP = C + I + G + (X - M)$$

C = Consumer spending on final goods and services
I = Gross private domestic investment
G = Government spending on final goods and services
X = Exports
M = Imports

Gross Domestic Product (GDP)

Expenditure Approach

Under the expenditure approach, GDP at market prices may be calculated as:

GDP = Consumer spending on goods and services
+ Business gross fixed investment
+ Change in inventories
+ Government spending on goods and services
+ Government gross fixed investment
+ Exports – Imports
+ Statistical discrepancy

Gross Domestic Product (GDP)

Income Approach

Under the income approach, GDP at market prices may be calculated as:

GDP = National income + Capital consumption allowance + Statistical discrepancy

National income equals the sum of incomes received by all factors of production used to generate final output. It includes:

- Employee compensation.
- Corporate and government enterprise profits before taxes, which includes:
    - Dividends paid to households.
    - Corporate profits retained by businesses.
    - Corporate taxes paid to the government.
- Interest income.
- Rent and unincorporated business net income (proprietor's income): Amounts earned by unincorporated proprietors and farm operators, who run their own businesses.
- Indirect business taxes less subsidies: This amount reflects taxes and subsidies that are included in the final price of a good or service, and therefore represents the portion of national income that is directly paid to the government.

The **capital consumption allowance (CCA)** accounts for the wear and tear or depreciation that occurs in capital stock during the production process.

- It represents the amount that must be reinvested by the company in the business to maintain current productivity levels.
- You should think of profits + CCA as the amount earned by capital.

Other GDP-Related Measures

Personal income measures the ability of households to make purchases and includes all income received by households, regardless of whether it is **earned** or **unearned.**

- National income includes income that goes to businesses and the government which personal income does not.
- National income does not include household income that is not earned.

Personal income = National income – Indirect business taxes – Corporate income taxes – Undistributed Corporate profits + Transfer payments

Personal disposable income measures the amount of income that households have left to spend or to save after paying taxes.

Personal disposable income = Personal income – Personal taxes

Personal disposable income = Household consumption + Household saving

Household saving = Personal disposable income – Consumption expenditures –
Interest paid by consumers to businesses – Personal transfer payments to foreigners

Business sector saving = Undistributed corporate profits + Capital consumption allowance