Module #01
Engineering Economics, Estimation & Costing

Module Outcome

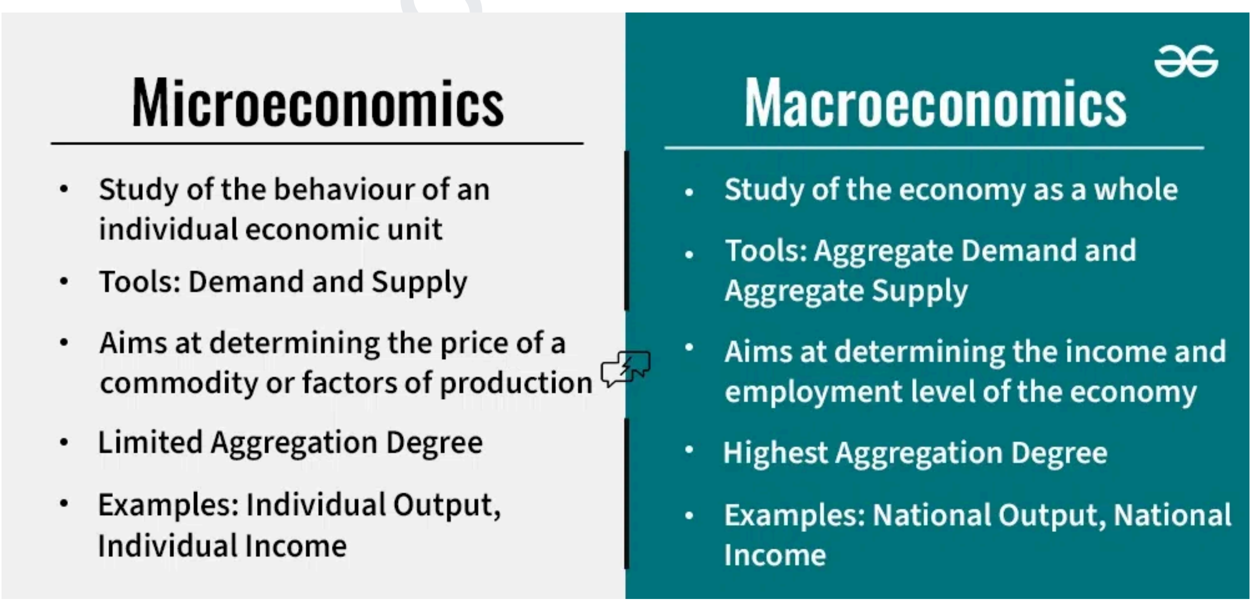
- Understand Core Economic Concepts
- Analyze Market Structures
- Apply Macroeconomic Indicators
- Understand Aggregate Demand and Supply
- Interpreting Price Indices and Interest Rates
- Evaluate Taxation System

Economics

- Economics is the study of how societies use scarce resources to produce valuable commodities (goods and services) and distribute them among different people.
- The main objective of the economy is to produce goods and services.

Branches of Economics

- The study of fundamentals of economics can be subcategorized into two branches – Microeconomics and Macroeconomics.



- We can say, Microeconomics studies individuals and business decisions and Macroeconomics studies the impact of business decisions made by countries and governments.
- Professor Ragnar Frisch coined the term microeconomics and John Maynard Keynes is largely credited with as the inventor of modern macroeconomics.

Types of Economy

- Based on how the central problems of an economy are addressed and the role of the state therein, the fundamentals of economic systems are classified into 3 categories:
- ***Capitalist Economy***
  - The capitalistic form of economy is based on the concept of 'laissez faire' state i.e. non-interference by the government, which was given by **Adam Smith**.
  - In such an economy, the decisions of what to produce, how much to produce, and at what price to sell are taken by private enterprises in the market, with the state having no economic role.
  - One of the most prominent features of a capitalist economy is that the market determines prices through the laws of supply and demand. For example, when demand for coffee increases, a profit-seeking business will boost prices in order to increase its profit. If, at the same time, society's appetite for tea diminishes, growers will face lower prices and aggregate production will decline.
- ***Socialist Economy***
  - Under a true socialist system, it is the government's role to determine output and pricing levels.
  - As opposed to a Capitalist Economy, distribution in a Socialist Economy is supposed to be based on what people need and not on what they can afford to purchase. Unlike capitalism, for example, a socialist nation provides free healthcare to the citizens who need it.
- ***Mixed Economy***
  - It is an economic system that features characteristics of both capitalism and socialism. A mixed economic system allows a level of private economic freedom in the use of capital but also allows for

    governments to interfere in economic activities in order to achieve social aims whenever required.
    - For example, in a Mixed Economy, the Government seeks to redistribute wealth by taxing the private sector and using funds from taxes to promote social objectives.
    - ***India is considered a mixed economy.***

Economic Activity

- Activities that involve money, or the exchange of products or services, are economic activities.

Basic Economic Activities in an Economy

- Production
- Consumption
- Capital Formation (i.e. Saving and Investment)

Factors of production

- Factors of production are those inputs used in the production process to produce the outputs (finished goods and services).
- There are mainly four factors of production.
    - Land
    - Labour
    - Physical Capital
    - Human Capital

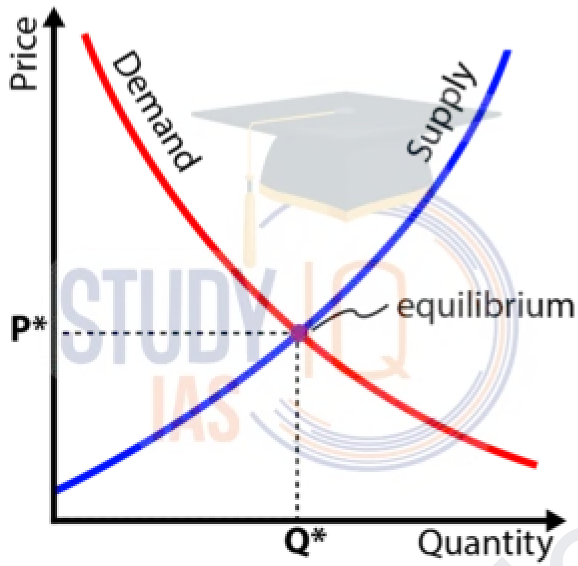
Demand & Supply

- Demand refers to the desire and ability of consumers to purchase a certain quantity of a good or service at a given price during a specific period. It is influenced by various factors, including consumer preferences, income levels, prices of related goods, and expectations.
- Supply, on the other hand, represents the quantity of a good or service that producers are willing and able to offer for sale at different price levels during a particular period. The supply of a product is influenced by factors such as production costs, technology, government regulations, and the availability of inputs.

Law of Demand and Supply

- The law of demand states that, all other factors remain constant, as the price of a good or service increases, the quantity demanded decreases, and vice versa. In simpler terms, when the price of a product goes up, people tend to buy less of it, and when the price goes down, people tend to buy more of it.
- The law of supply, on the other hand, states that all other factors remain constant, as the price of a good or service increases, the quantity supplied also increases, and vice versa. In other words, producers are willing to supply more of a product as its price rises, and they are less willing to supply it when the price falls.

Demand	Supply
Represents consumer willingness and ability to purchase a product or service at a given price.	Represents the producer's willingness and ability to offer a product or service for sale at a given price.
Shows the quantity of a product or service that consumers desire to purchase at different price levels.	Shows the quantity of a product or service that producers are willing to supply at different price levels.
Influenced by factors such as consumer preferences, income levels, prices of related goods, and expectations.	Influenced by factors such as production costs, technology, government regulations, and resource availability.
Subject to the law of demand, which states that as price increases, quantity demanded decreases, and vice versa.	Subject to the law of supply, which states that as price increases, quantity supplied increases, and vice versa.
Represents the demand curve, which is typically downward sloping.	Represents the supply curve, which is typically upward-sloping.
Determines the equilibrium price and quantity in a market when combined with supply.	Determines the equilibrium price and quantity in a market when combined with demand.
Changes in demand can be caused by factors such as consumer preferences, income changes, or prices of related goods.	Changes in supply can be caused by factors such as production costs, technological advancements, or government policies.



Demand & Supply Curve

The demand and supply curves are graphical representations that illustrate the relationship between price and quantity demanded or supplied in a market.

Demand and Supply Elasticity

- Demand elasticity and supply elasticity are measures that quantify the responsiveness of the quantity demanded and supplied to changes in price, respectively.
    - ***Demand Elasticity:*** Demand elasticity measures how sensitive the quantity demanded of a good or service is to changes in its price. It calculates the percentage change in quantity demanded divided by the percentage change in price. If the demand for a product is elastic (elastic demand), a small change in price will result in a relatively larger change in quantity demanded.
    - On the other hand, if the demand is inelastic (inelastic demand), a change in price will lead to a proportionally smaller change in the quantity demanded. Demand elasticity helps determine the extent to which changes in price affect consumer behaviour and total revenue.
    - ***Supply Elasticity:*** Supply elasticity, on the other hand, measures the responsiveness of the quantity supplied to changes in price. It calculates the percentage change in quantity supplied divided by the percentage change in price. If the supply of a product is elastic (elastic

supply), a small change in price will result in a relatively larger change in the quantity supplied.
  - Conversely, if the supply is inelastic (inelastic supply), changes in price will have a proportionally smaller impact on the quantity supplied. Supply elasticity helps assess the ability of producers to adjust their output in response to price changes and is important in analyzing market stability and resource allocation.

Government Policies: Effect on Demand & Supply

- Government policies play a crucial role in shaping demand and supply in the Indian economy by influencing various economic factors such as prices, production, and consumption patterns.
- ***Taxation Policies:***
  - Impact on Demand: When the government changes tax rates, it directly affects consumers' disposable income. For example, if income tax rates are reduced, people have more disposable income, increasing the demand for goods and services.
  - Impact on Supply: Taxation on goods and services, like the Goods and Services Tax (GST), affects the cost of production. A higher GST rate increases the cost of goods, leading to reduced supply if producers pass on the tax burden to consumers. Conversely, lower taxes can encourage production by reducing costs.
  - Example: The introduction of the GST in 2017 unified various state and central taxes, making it easier for businesses to operate across India, thereby influencing both supply and demand by reducing the overall tax burden and increasing efficiency in the supply chain.
- ***Subsidies:***
  - Impact on Demand: Subsidies on essential goods such as food, fuel, or fertilizers lower the prices for consumers, thereby increasing demand.
  - Impact on Supply: Subsidies to producers reduce their production costs, allowing them to supply more at a lower price. This often leads to an increase in the overall supply of subsidized goods.
  - Example: The Indian government provides subsidies on agricultural inputs like fertilizers, which lowers costs for farmers, boosting

agricultural output (supply) and keeping food prices low (affecting demand).

- ***Price Controls:***
  - Impact on Demand: The government sometimes imposes price ceilings (maximum prices) on essential goods to make them affordable. This usually increases demand since consumers can purchase these goods at lower prices.
  - Impact on Supply: However, price controls can also lead to shortages if the controlled price is below the equilibrium price, where supply meets demand. Suppliers may be unwilling to sell at lower prices, reducing the overall supply.
  - Example: The Essential Commodities Act allows the government to control prices of essential items like onions, sugar, and oil during periods of high inflation, ensuring they remain affordable, although this sometimes leads to supply bottlenecks.

- ***Monetary Policy:***
  - Impact on Demand: The Reserve Bank of India's (RBI) monetary policies, such as changes in interest rates, affect consumer and business borrowing. Lower interest rates make loans cheaper, increasing consumer spending and business investments, which raises demand.
  - Impact on Supply: Lower interest rates also encourage businesses to borrow and invest in expanding their production capacities, thereby increasing supply.
  - Example: During the COVID-19 pandemic, the RBI reduced the repo rate to stimulate economic activity by making credit more affordable, which increased both demand and supply as businesses were able to borrow more easily to sustain operations.

- ***Trade Policies:***
  - Impact on Demand: Import tariffs and trade restrictions can affect the availability and prices of foreign goods, influencing consumer preferences and demand for domestic versus imported goods.

- Impact on Supply: Trade policies that encourage exports or restrict imports can impact domestic industries by either increasing demand for their products internationally or protecting them from foreign competition, thereby influencing supply.
- Example: The "Make in India" initiative, which includes a range of policies to boost domestic manufacturing and reduce reliance on imports, has influenced the supply side by encouraging local production and altering the demand for imported goods.

Theory of the Firm

- The theory of the firm is a framework that explains how firms make decisions to maximize their profits.
- Firms aim to balance their costs and revenues to achieve the highest possible profit.
- The theory assumes that firms operate with the objective of profit maximization, which involves deciding on the quantity of output to produce, the price at which to sell it, and how to allocate resources efficiently.

Market Structure

- Market structure refers to the organizational characteristics of a market that influence the behavior and performance of firms within it. The main types of market structures are:
    - Perfect Competition
        - Characteristics: Many small firms, identical products, easy entry and exit from the market, and no control over prices.

    - Monopolistic Competition
        - Characteristics: Many firms, differentiated products (through branding, quality, etc.), some control over prices, and relatively easy entry and exit.

    - Oligopoly
        - Characteristics: Few large firms dominate the market, products may be homogeneous or differentiated, significant barriers to entry, and firms are interdependent.

- Monopoly
    - Characteristics: A single firm controls the entire market, unique products with no close substitutes, significant barriers to entry, and complete control over prices.

Gross Domestic Product (GDP)

- Gross Domestic Product (GDP) measures the aggregate production of final goods and services taking place within the domestic economy during a year.
- Key Points:
    - ***Final Goods and Services:*** It means that only the final, and not the intermediate, goods and services are taken into account for the calculation of GDP.
    - ***Within the Domestic Economy:*** It means that the produce of resident citizens as well as foreign nationals who reside within that geographical boundary is considered.

Gross National Product (GNP)

- Gross national product (GNP) is an estimate of the total value of all the final products and services produced in a given period by the production owned by a country's citizens.
- Key points:
    - ***Owned by a Country's Citizens:*** It means that the product of resident as well as non-resident citizens of the country is considered, whereas that of the foreign nationals who reside within that geographical boundary of the country is NOT considered.

Thus, GNP = GDP + Factor Income from Abroad to India – Factor Income from India to Abroad.

Real GDP

- Real GDP refers to the total value of all goods and services produced by an economy in a given year, expressed in constant prices or base year's prices.
- Thus, Real GDP = GDP at Constant Price.

Nominal GDP

- Nominal GDP refers to the total value of all goods and services produced by an economy in a given year, expressed in current market prices.
- Thus, Nominal GDP = GDP at Current Price.

GDP Deflator

- The GDP Deflator refers to the ratio of Nominal GDP to Real GDP.
- Thus, GDP Deflator = Nominal GDP/Real GDP

Net Domestic Product (NDP)

- Net Domestic Product (NDP) is arrived at by deducting the depreciation from GDP.
- Net Domestic Product = GDP – Depreciation.

Net National Product (NNP)

- Net National Product (NNP) is calculated by subtracting the depreciation from GNP.
- Net National Product = GNP – Depreciation.

Methods of Computing National Income (NI)

- National Income (GDP or GNP) can be calculated by 3 methods:
  - Income Method
  - Expenditure Method
  - Production Method

- ***Income Method:*** Under this method, NI is obtained by summing up the incomes of all individuals in an economy.
  - Individuals earn incomes by contributing their own services and the services of their property such as land and capital to the national production.
  - National Income (NI) = Employee compensation + Corporate profits + Proprietors' Income + Rental income + Net Interest

- Product or Value Added Method
  - This is also called "Output Method".

    - Under this method, NI is computed by adding the values of output produced or services rendered by the different sectors of the economy during the year.
    - It is to be noted that while computing the values of output figures, only the value added by each firm in the production process is taken into account. Thus, this method makes use of the concept of Value-added.

- **Expenditure Method**
    - It is also called 'Total Outlay Method'.
    - This method assumes that the income earned by an individual is either spent on consumer goods/services or saved and invested.
    - National Income (NI) = Personal Consumption Expenditure (C) + Investments (I) + Government Expenditure (G) + Exports (X) – Imports (I)

Disposable Income

- Disposable income is the amount of money that a person or family has left after paying their taxes.
- It is the portion of income that can be spent on necessities, such as food and rent.
- People can also use disposable income to pay for discretionary items, leisure activities, and investments.

Inflation

- Inflation is defined as a situation where there is a sustained, unchecked increase in the general price level and a fall in the purchasing power of money.
- Hence, it is a condition of price rise.
- Inflation can be measured at three levels – producer, wholesaler, and retailer (consumer).
- Prices generally rise at each level till the commodity finally reaches the hand of the consumer.

- ***Inflation at the Producer Level***
    - As of now in India, there is no index to measure inflation at the producer level. A Producer Price Index (PPI) has been proposed, but so far this type of inflation calculation has not started in India.
- **Inflation at Wholesale Level**
    - This is the most popular rate calculation methodology in India. The index used to calculate wholesale inflation is known as ***Wholesale Price Index (WPI)***. This inflation rate is often known as headline inflation. WPI is released by the Ministry of Commerce and Industry.
    - It measures the changes in the prices of goods sold and traded in bulk by wholesale businesses to other businesses.
    - Though RBI used WPI for most of its policy decisions before 2014. However, the WPI-based inflation calculation was not false proof. WPI shows the combined price of a commodity basket comprising 676 items. But WPI does not include services, and it neither reflects the bottlenecks between producer and wholesaler nor between wholesaler and retailer (consumer).
    - Hence in 2014, as part of the reforms initiated by RBI governor Raghu Ram Rajan, RBI shifted to CPI for policy decisions.
- **Inflation at Retail Level (Consumer Level)**
    - The consumer often directly buys from the retailer. So the inflation experienced at retail shops is the actual reflection of the price rise in the country. It also shows the cost of living better.
    - It measures price changes from the perspective of a retail buyer. It is released by the National Statistical Office (NSO).
    - CPI is based on 260 commodities but includes certain services too. There were four Consumer Price Indices covering different socio-economic groups in the economy.
    - These four indices were the Consumer Price Index for Industrial Workers (CPI-IW); the Consumer Price Index for Agricultural Labourers (CPI-AL); the Consumer Price Index for Rural Labourers (CPI-RL) and the Consumer Price Index for Urban Non-Manual Employees (CPI-UNME).

Taxation in India

- The taxation system in India is such that the taxes are levied by the Central Government and the State Governments. Some minor taxes are also levied by the local authorities such as the Municipality and the Local Governments.
- Broadly taxes are divided into two categories:
  - Direct Taxes
  - Indirect Taxes
- ***Direct Taxes:*** A direct tax can be defined as a tax that is paid directly by an individual or organization to the imposing entity (generally government).
  - A direct tax cannot be shifted to another individual or entity.
  - The individual or organization upon which the tax is levied is responsible for the fulfillment of the tax payment.
  - The Central Board of Direct Taxes deals with matters related to levying and collecting Direct Taxes and formulation of various policies related to direct taxes.
  - A taxpayer pays a direct tax to a government for different purposes, including real property tax, personal property tax, income tax or taxes on assets, FBT, Gift Tax, Capital Gains Tax, etc.
- ***Indirect Taxes:*** The term indirect tax has more than one meaning. An indirect tax such as sales tax, a specific tax, a value-added tax (VAT), or goods and services tax (GST) is a tax collected by an intermediary (such as a retail store) from the person who bears the ultimate economic burden of the tax (such as the consumer).
  - The intermediary later files a tax return and forwards the tax proceeds to the government with the return. In this sense, the term indirect tax is contrasted with a direct tax which is collected directly by the government from the persons (legal or natural) on which it is imposed.

Assignment #01

- Using the latest data, analyze the GDP, GNP, and National Income of India for the past five years. Discuss the trends and their implications for the economy.