SITARE
University

Introduction to Microeconomics

Microeconomics vs. Macroeconomics

pc: icicidirect
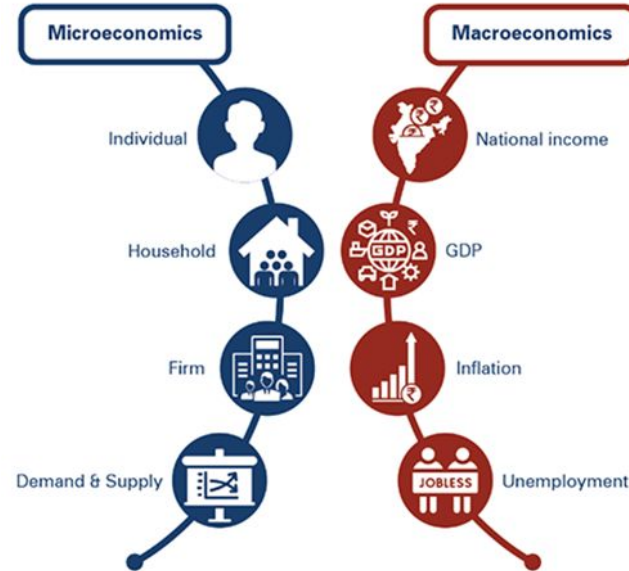
What is Microeconomics?

- **Definition**: Microeconomics is the study of **individual economic units** - such as households, firms, and industries - and how they make decisions to allocate limited resources.

- It examines how these entities interact in specific markets, focusing on factors like prices, supply and demand, and consumer choices.

- By understanding microeconomics, we gain insight into how resources are distributed and how individual choices affect larger economic outcomes.

pc: cfi

What is Microeconomics?

Why It Matters for CS Students:

- Microeconomics helps computer scientists understand how businesses set prices for software, apps, and tech products.
- It informs decisions related to the optimization of product offerings taking into consideration market demand.
- Helps in strategic decision-making in tech startups considering market competition and create a competitive advantage.

pc: cfi

What is Microeconomics?

Example:

- The pricing strategy of Uber in India (surge pricing during peak hours) is based on microeconomic principles like demand elasticity and competition.
- How a tech startup decides to price its cloud-based service offering depends on demand elasticity, competition, and cost of production.
- Zomato's pricing of food delivery services is influenced by consumer demand, competition, and operational costs.
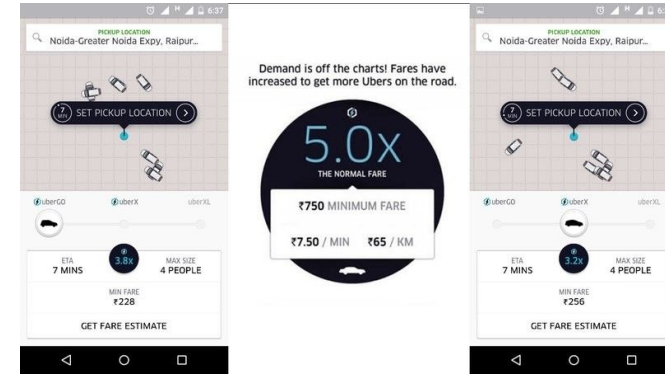
Key Concepts of Microeconomics

- **Supply & Demand**: Interaction between producers and consumers that determines prices and quantities in the market.
  - **Example**: The release of a popular software or tech gadget creates high demand, leading to higher prices.
- **Elasticity**: Measures how responsive the quantity demanded or supplied is to changes in price.
  - **Example**: If a new feature in an app increases the demand for the product, understanding price elasticity can help set optimal prices.

Key Concepts of Microeconomics

- **Market Structures:** The way a market is organized based on the number of firms, the nature of competition, and the level of control over prices. e.g. perfect competition, monopoly, oligopoly, and monopolistic competition.
  - **Example**: Comparing the monopoly of Google's search engine with the competitive environment of app stores.
- **Cost Structures**: Includes fixed costs and variable costs, and understanding them helps businesses manage profitability.
  - Example: Fixed costs - office rent vs. Variable costs - cloud server costs

Key Concepts of Microeconomics

Marginal Analysis:

- **Definition:** An economic decision-making tool that evaluates the additional benefits and costs of a small change in production or consumption - impact of producing or consuming "one more unit".

- **Example**:
  - If the marginal benefit (new user revenue) exceeds the marginal cost (additional server expenses), the company should expand its storage capacity.

P

Marginal Cost (MC)

Marginal Benefit (MB)

Q

15

pc: wizeprep
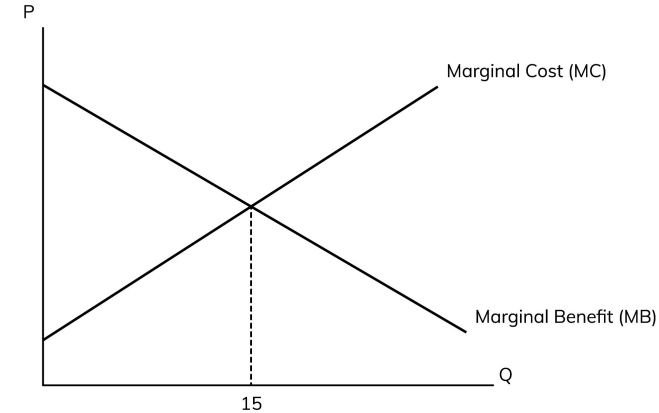
Supply & Demand

Supply & Demand

Definition:

- **Supply** refers to the total amount of a good or service that producers are willing to sell at different prices during a given period.
- **Demand** refers to the total amount of a good or service that consumers are willing to buy at different prices during a given period.

Importance: Understanding how supply and demand work is essential for determining prices, making business decisions, and understanding market dynamics.
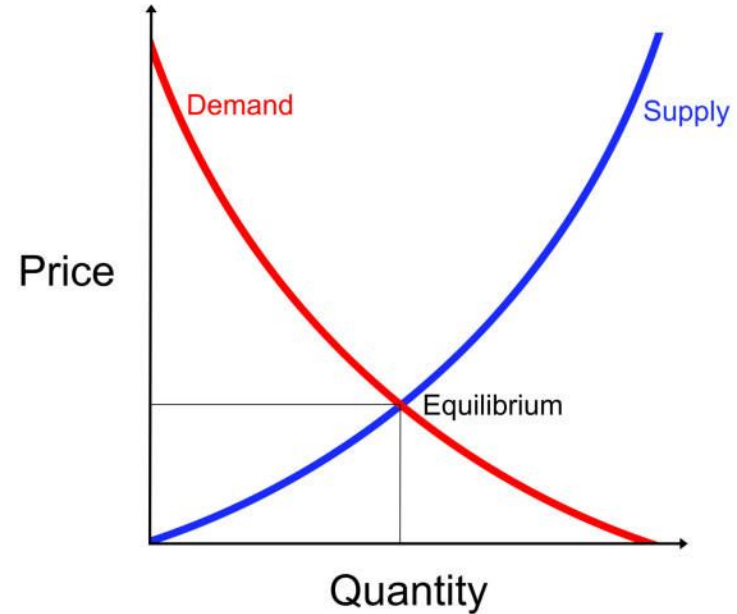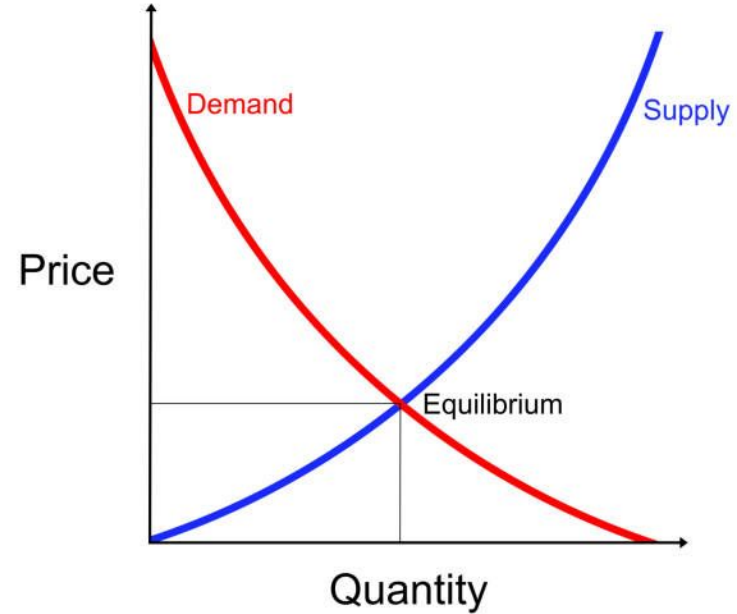
Law of Demand

Definition:

The **Law of Demand** states that, all else being equal, as the price of a good or service increases, the quantity demanded decreases, and as the price decreases, the quantity demanded increases.

Reasoning: This occurs because consumers tend to buy more of a good when it is cheaper and less when it is more expensive (substitution effect and income effect). e.g. people buy more during a sale.

Graph: A downward sloping demand curve, where the y-axis represents price and the x-axis represents quantity demanded.

Law of Demand

Factors Affecting Demand:

- **Price**: The primary factor that influences demand.
- **Income**: When income rises, consumers have more purchasing power, increasing demand.
- **Substitute Goods**: When the price of one good rises, demand for a substitute (like Pepsi for Coke) may increase.
- **Complementary Goods**: If the price of a complement (like printers and cartridges) rises, the demand for the related good may decrease.
- **Consumer Preferences**: Trends and tastes, such as the demand for electric vehicles rising due to environmental concerns, can shift demand.
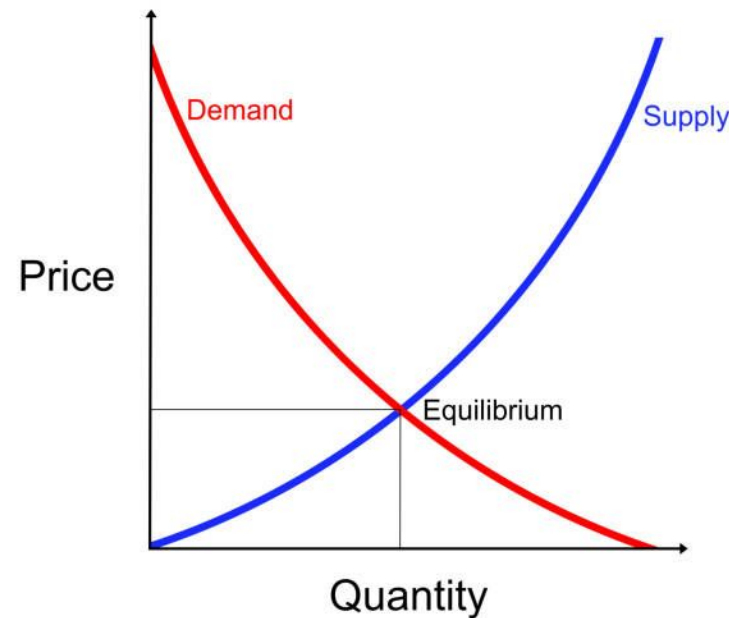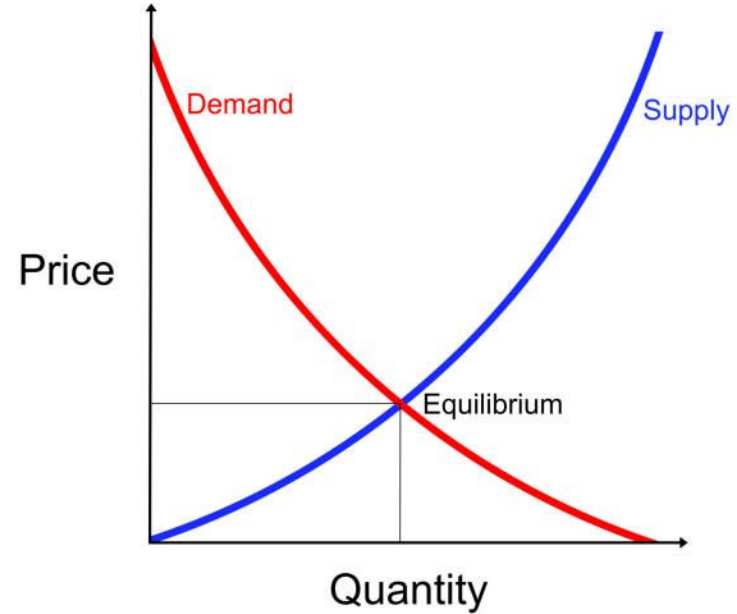
Law of Supply

Definition:

The **Law of Supply** states that, all else being equal, as the price of a good or service increases, the quantity supplied increases, and as the price decreases, the quantity supplied decreases.

Reasoning: Producers are more willing to produce and sell more of a good at higher prices because they can earn more profit.

Graph: An upward sloping supply curve, where the y-axis represents price and the x-axis represents quantity supplied.

pc: istock

Law of Supply

Factors Affecting Supply:

- **Production Costs**: If production costs rise (e.g., due to higher wages or raw material prices), supply decreases as it becomes less profitable for producers to offer the good.
- **Technology**: Advancements in technology can lower production costs and increase supply (e.g., automation in manufacturing increases supply).
- **Expectations of Future Prices**: If producers expect prices to rise in the future, they may decrease current supply in anticipation of higher profits later.

pc: istock
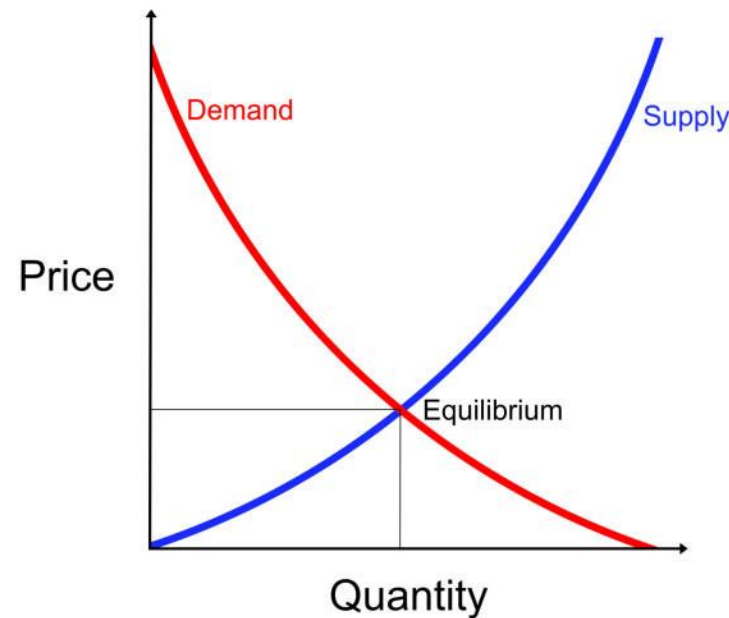
Law of Supply

Factors Affecting Supply:

- **Number of Sellers**: An increase in the number of sellers (e.g., new competitors entering the market) typically increases supply.
- **Government Regulations**: Taxes, subsidies, and regulations can influence how much producers are willing or able to supply e.g. electric cars production post government subsidies.
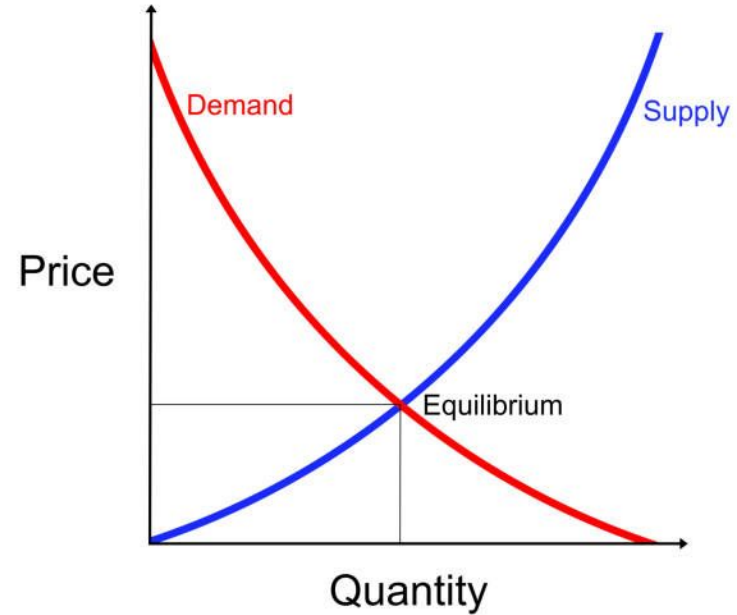
Supply & Demand

Market Equilibrium:

- In a market, equilibrium occurs where the quantity demanded by consumers equals the quantity supplied by producers.
- At this price, there is neither surplus nor shortage in the market.
- This balance determines the **equilibrium price** and **equilibrium quantity**.
- **Graph**: The equilibrium point is where the supply and demand curves intersect. At this point, the market clears (there is neither a surplus nor shortage).
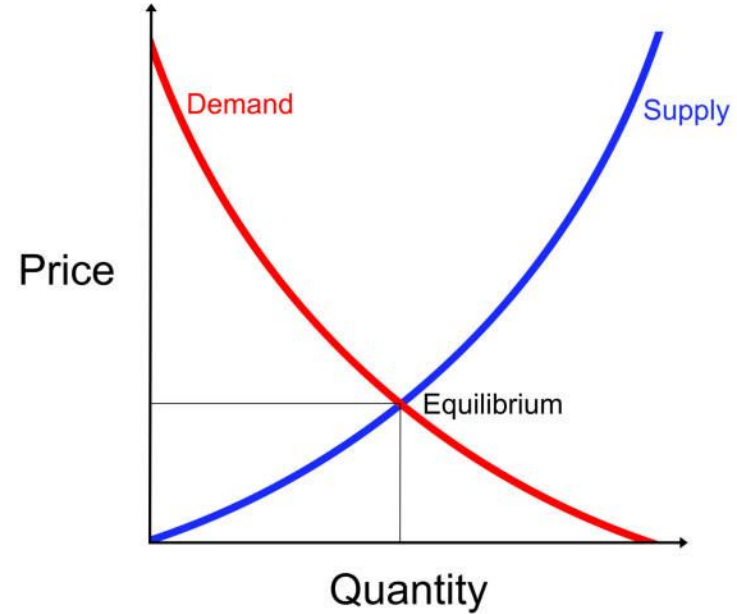
Supply & Demand

Market Equilibrium:

- **Example**: In the housing market, equilibrium might be the price at which the number of houses buyers want to purchase equals the number of houses available for sale.
- **Example**: When a tech company sets the price of a smartphone that matches both production costs and consumer demand.
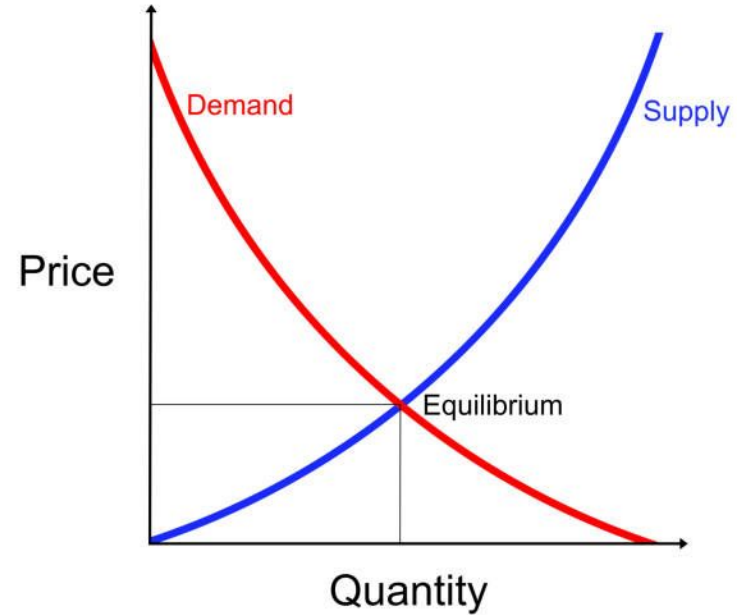
Supply & Demand

Surplus and Shortage:

- **Surplus**: If the price is above the equilibrium, there will be more supply than demand, leading to a surplus. Sellers may lower the price to clear the surplus.
  - **Example**: A **surplus** in the market for shoes may happen during an off-season sale if the price is set too high, and retailers may lower prices to encourage buying.
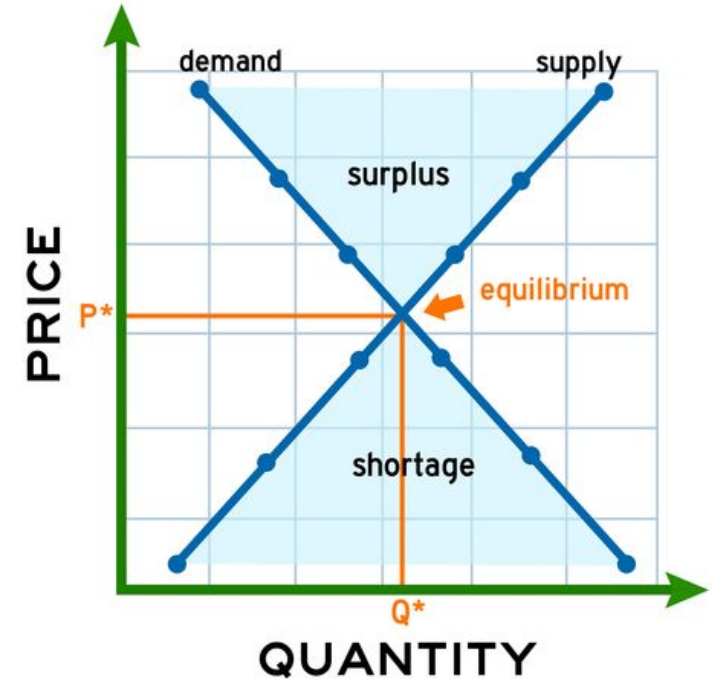
Supply & Demand

Surplus and Shortage:

- **Shortage**: If the price is below the equilibrium, there will be more demand than supply, leading to a shortage. Sellers may raise the price to reduce the shortage.
  - **Example**: When a new smartphone is released, demand increases quickly while supply may not yet be able to meet the demand, creating a **shortage** that leads to higher prices.
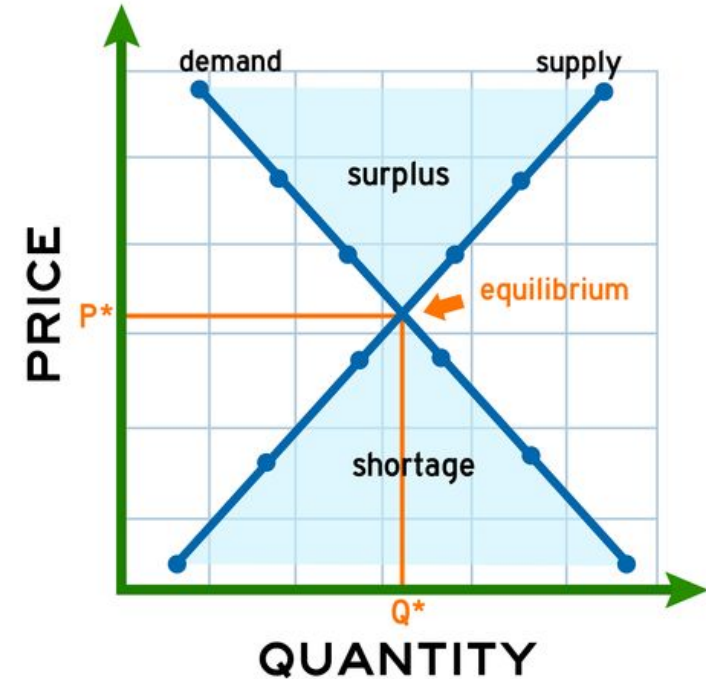
Elasticity

Elasticity

Definition:

Elasticity in economics refers to the responsiveness of one variable to changes in another variable. It measures how much quantity demanded or supplied responds to changes in price, income, or other factors.

Types of Elasticity:

$$e_{(p)} = \frac{dQ/Q}{dP/P}$$

$e_{(p)}$ = price elasticity

Q = quantity of the demanded good

P = price of the demanded good

- **Price Elasticity of Demand (PED)**: The responsiveness of quantity demanded to a change in price.
- **Price Elasticity of Supply (PES)**: The responsiveness of quantity supplied to a change in price.
- **Income Elasticity of Demand (YED)**: The responsiveness of demand to a change in income.
- **Cross-Price Elasticity of Demand (XED)**: The responsiveness of demand for one good to a change in the price of another good.

Elasticity of Demand and Supply

Price Elasticity of Demand (PED): Measures how much the quantity demanded of a good responds to a change in price.

Formula: PED = % Change in Quantity Demanded / % Change in Price.

Determinants of PED:

$$e_{(p)} = \frac{dQ/Q}{dP/P}$$

$e_{(p)}$ = price elasticity
Q = quantity of the demanded good
P = price of the demanded good

- **Availability of Substitutes**: More substitutes make demand more elastic.

- **Necessities vs. Luxuries**: Necessities tend to have inelastic demand, while luxuries are more elastic.

- **Time Horizon**: Demand tends to be more elastic over the long term than in the short term.

- **Proportion of Income**: Goods that take up a larger portion of a consumer's income tend to have more elastic demand.

Elasticity of Demand and Supply

Price Elasticity of Demand (PED): Measures how much the quantity demanded of a good responds to a change in price.

- **Elastic Demand**:
    a. PED>1 a significant change in quantity demanded when the price changes.
    b. Example: If price of high-end smartphone model (like the latest iPhone or Samsung Galaxy) rises significantly, the demand can drop noticeably, as consumers might switch to alternatives.
    c. Example: If Netflix raises its subscription price significantly, the demand for its service could decrease, especially if consumers perceive there are good alternatives like Disney+, Amazon Prime, or other streaming services.

$$e_{(p)} = \frac{dQ/Q}{dP/P}$$

$e_{(p)}$ = price elasticity

Q = quantity of the demanded good

P = price of the demanded good

Price Elasticity of Demand (PED): Measures how much the quantity demanded of a good responds to a change in price.

- **Inelastic Demand**:
    a. PED<1 a small change in quantity demanded despite a price change.
    b. Example: Necessities like rice, wheat, salt - even if prices rise, people will still purchase it in roughly the same quantity.
    c. Example: Medicines like insulin for diabetics or EpiPens for severe allergies, demand remains relatively inelastic.
    d. Example: Fuel/Electricity/Water: Demand for basic utilities or no/low alternatives relatively inelastic.

$$e_{(p)} = \frac{dQ/Q}{dP/P}$$

$e_{(p)}$ = price elasticity
Q = quantity of the demanded good
P = price of the demanded good

Elasticity of Demand and Supply

Price Elasticity of Demand (PED): Measures how much the quantity demanded of a good responds to a change in price.

- **Unitary Elastic Demand**:
    a. PED=1 a price change results in an equal proportional change in quantity demanded
    b. Example: If an airline increases its fares by 10%, the demand for its flights could decrease by 10% because people might opt for other travel options or different airlines.
    c. In a competitive restaurant market, a modest price increase could lead to a proportional drop in demand if consumers have many alternatives in terms of different restaurants or food options.

$$e_{(p)} = \frac{dQ/Q}{dP/P}$$

$e_{(p)}$ = price elasticity
Q = quantity of the demanded good
P = price of the demanded good

Elasticity of Demand and Supply

Price Elasticity of Supply (PES): Measures the responsiveness of quantity supplied to a price change.

Formula: PES = % Change in Quantity Supplied / % Change in Price.

- If **PES > 1**, supply is **elastic** (producers can increase production quickly when price rises).

- If **PES < 1**, supply is **inelastic** (producers cannot increase production easily even when price rises).

- If **PES = 1**, supply is **unitary elastic** (proportional change in quantity supplied).

$$PES = \frac{\Delta Q_s / Q_s}{\Delta P / P}$$

Where:

- ΔQ_s = Change in quantity supplied
- Q_s = Initial quantity supplied
- ΔP = Change in price
- P = Initial price

Elasticity of Demand and Supply

Price Elasticity of Supply (PES): Measures the responsiveness of quantity supplied to a price change.

$$PES = \frac{\Delta Q_s/Q_s}{\Delta P/P}$$

Examples:

- **Elastic (PES>1)**
  - If the price of smartphones increases, manufacturers can ramp up production relatively quickly.
  - If the price of clothing increases (for example, a popular clothing item), manufacturers can often increase production by adjusting their production lines

- **Inelastic (PES<1)**
  - Supply for real-estate or oil/gas is relatively inelastic in the short term as you cannot increase production immediately to price changes

Where:

- ΔQ_s = Change in quantity supplied
- Q_s = Initial quantity supplied
- ΔP = Change in price
- P = Initial price

Elasticity of Demand and Supply

Price Elasticity of Supply (PES): Measures the responsiveness of quantity supplied to a price change.

$$PES = \frac{\Delta Q_s / Q_s}{\Delta P / P}$$

Determinants of PES:

- **Time Frame**: Supply is more elastic in the long run than in the short run.
- **Availability of Resources**: If inputs are readily available, supply is more elastic.
- **Flexibility of Production**: If firms can easily adjust production methods, supply is more elastic.
- **Spare Capacity**: If firms have unused capacity, supply can be increased more easily (more elastic).

Where:

- ΔQ_s = Change in quantity supplied
- Q_s = Initial quantity supplied
- ΔP = Change in price
- P = Initial price

Income Elasticity of Demand

Definition: The responsiveness of demand to a change in income.

Formula for YED: %Change in Quantity Demanded / %Change in Income

- If **YED > 1**, the good is a **luxury good** (demand increases more than income).

- If **0 < YED < 1**, the good is a **necessity** (demand increases but less than income).

- If **YED < 0**, the good is an **inferior good** (demand decreases as income increases).

$$\epsilon_d = \frac{\Delta D/D}{\Delta I/I}$$

ϵ_d = income elasticity of demand

$\Delta D/D$ = change in quantity demanded

$\Delta I/I$ = change in income

pc: Cristos Makridis

Income Elasticity of Demand

Definition: The responsiveness of demand to a change in income.

Examples:

- **Luxury Goods** (e.g., designer clothes, vacations) tend to have high positive YED.
- **Necessities** (e.g., food, basic utilities) tend to have lower YED.
- **Inferior Goods** (e.g., public transport, canned goods) tend to have negative YED.

$$\epsilon_d = \frac{\Delta D / D}{\Delta I / I}$$

ϵ_d = income elasticity of demand

$\Delta D / D$ = change in quantity demanded

$\Delta I / I$ = change in income

Cross Price Elasticity of Demand

Definition: The responsiveness of demand for one good to a change in the price of another good.

Formula for XED: %Change in Quantity Demanded of Good A / % Change in Price of Good B

$$XED = \frac{\Delta Q_x / Q_x}{\Delta P_y / P_y}$$

Where:
- ΔQ_x = Change in quantity demanded of Good X
- Q_x = Initial quantity demanded of Good X
- ΔP_y = Change in price of Good Y
- P_y = Initial price of Good Y

- If **XED > 0**, the goods are **substitutes** (an increase in the price of Good B increases demand for Good A).

- If **XED < 0**, the goods are **complements** (an increase in the price of Good B decreases demand for Good A).

- If **XED = 0**, the goods are **unrelated** (changes in the price of Good B have no effect on demand for Good A).

Cross Price Elasticity of Demand

Definition: The responsiveness of demand for one good to a change in the price of another good.

Examples:

- **Substitutes**: Tea and coffee (if the price of coffee rises, demand for tea increases).
- **Complements**: Cars and gasoline (if the price of gasoline rises, demand for cars may decrease).

$$XED = \frac{\Delta Q_x / Q_x}{\Delta P_y / P_y}$$

Where:

- ΔQ_x = Change in quantity demanded of Good X
- Q_x = Initial quantity demanded of Good X
- ΔP_y = Change in price of Good Y
- P_y = Initial price of Good Y

Market Structures

Market Structures

Definition:

Market structures classify markets based on the competitive environment and determine how prices and output are set.

Key Aspects of Market Structures:

- **Number of Firms**: Ranges from many in perfect competition to one in a monopoly.
- **Product Differentiation**: Varies from identical products to highly differentiated ones.
- **Barriers to Entry**: Determines how easily new firms can enter the market.
- **Pricing Power**: The ability of a firm to set its prices above marginal cost.

Types of Market Structures — Perfect Competition, Monopolistic Competition, Oligopoly, Monopoly

Types of Market Structures

Main Types of Market Structures:

- **Perfect Competition**: Many firms, identical products, no pricing power.
- **Monopoly**: Single firm, unique product, high pricing power.
- **Monopolistic Competition**: Many firms, differentiated products, some pricing power.
- **Oligopoly**: Few firms, interdependent pricing strategies.

pc: marketing91

Perfect Competition

Definition: A market where numerous small firms produce identical products, leading to no individual firm having pricing power.

Example: Agricultural products like wheat and corn, where each farmer's produce is almost identical and prices are dictated by market forces.

Example in Tech: Small app developers creating identical utility apps (e.g., calculators, note-taking apps) in an open marketplace.

Perfect Competition

Monopolistic Competition

Types of Market Structures

Oligopoly

Monopoly

pc: marketing91

Perfect Competition

Characteristics:

- **Large Number of Small Firms**: Each firm is too small to influence market price.

- **Homogeneous Products**: All firms produce identical goods, so consumers see no difference between suppliers.

- **Free Entry and Exit**: Firms can freely enter or exit the market, ensuring no long-term profits or losses.

- **Perfect Information**: All market participants have complete information about prices, products, and technology.

- **Price Takers**: Firms must accept the market price, determined by overall demand and supply.

Monopoly

Definition: A market with a single seller that has substantial control over price due to the lack of close substitutes.

Example: Utility companies (electricity, water), some pharmaceutical companies with patented drugs.

Example in Tech: Companies like **Google** with search (over 90% market share in many regions) and **Amazon** in e-commerce (especially in the U.S.) are seen as monopolies due to network effects, massive user bases, and high barriers to entry for new competitors.

Types of Market Structures: Perfect Competition, Monopolistic Competition, Oligopoly, Monopoly

Monopoly

Characteristics:

- **Single Firm**: The sole provider of a good or service.
- **High Barriers to Entry**: Legal, technological, or resource barriers prevent new entrants.
- **Unique Product**: No close substitutes, granting significant pricing power.

Sources of Monopoly Power:

- **Legal Barriers**: Patents, licenses, or government regulations.
- **Natural Monopolies**: High fixed costs make a single provider more efficient (e.g., utilities).
- **Resource Control**: Exclusive access to key resources (e.g., diamond mines).

Types of Market Structures: Perfect Competition, Monopolistic Competition, Oligopoly, Monopoly

pc: marketing91

Monopolistic Competition

Definition: A market structure with many firms offering differentiated products, leading to some pricing power. Competition with Differentiation.

Example: Restaurants, clothing brands, and consumer electronics.

Example in Tech: Dating apps (Tinder, Bumble, Hinge) or food delivery apps (Uber Eats, DoorDash, Grubhub), competing for similar customer bases.

Monopolistic Competition

Characteristics:

- **Many Firms**: Moderate number of competitors with limited influence over the whole market.

- **Product Differentiation**: Firms compete through branding, quality, and product variations.

- **Relatively Low Barriers to Entry**: Firms can enter or exit with moderate ease.

- **Some Pricing Power**: Due to differentiation, firms have some control over pricing.

Oligopoly

Definition: A market dominated by a few large firms, where each firm's actions significantly impact competitors.

Example: Airlines, automobile manufacturers, telecommunications.

Example in Tech: Smartphone OS market is controlled mainly by two firms—Google and Apple. Together, they account for nearly the entire global market share in mobile operating systems.

Other Examples: Cloud computing (dominated by Amazon AWS, Microsoft Azure, and Google Cloud) and semiconductors (dominated by companies like Intel, AMD, and NVIDIA).

Oligopoly

Characteristics:

- **Few Large Firms**: Dominated by a small number of firms controlling most of the market.
- **High Barriers to Entry**: Economies of scale, legal restrictions, or capital requirements prevent new entrants.
- **Product May Be Homogeneous or Differentiated**: Examples include steel (homogeneous) and automobiles (differentiated).
- **Strategic Interdependence**: Firms must consider rivals' reactions when setting prices and output levels.
- **Collusion:**

Perfect Competition — Monopolistic Competition — Types of Market Structures — Oligopoly — Monopoly

Oligopoly

Collusion:

- **Definition**: Collusion is explicit or implicit coordinated actions—such as fixing prices or limiting production—to reduce competition and increase profits.
- **Example**: In the pharmaceutical industry, companies have occasionally faced allegations of collusion to delay generic drug launches to keep brand-name drug prices high.
- **Example**: In the airline industry, major airlines sometimes engage in implicit collusion by matching each other's price hikes for ticket fares.
- **Detection and Prevention**: Collusion is illegal and authorities monitor markets and impose fines on companies found colluding.

Types of Market Structures: Perfect Competition, Monopolistic Competition, Oligopoly, Monopoly

Cost Structures

Cost Structures

Definition: Cost structures refer to the breakdown of various types of costs a firm incurs while producing goods or services.

Importance of Cost Analysis:

- Helps firms determine optimal production levels and pricing strategies.
- Influences long-term decisions, such as scaling, market entry, and investment.

Categories of Costs:

- **Fixed Costs**: Do not vary with output.
- **Variable Costs**: Change directly with output level.
- **Total Costs, Average Costs, Marginal Costs**: Key metrics for decision-making.
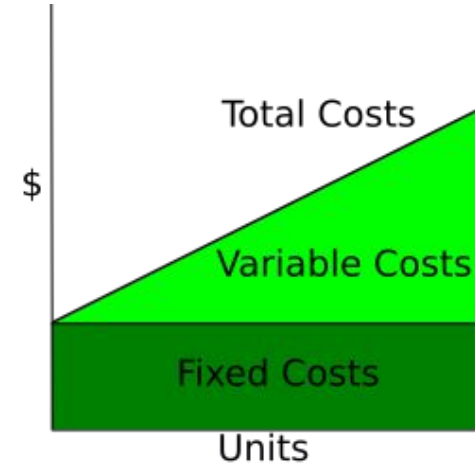
Fixed Costs

Definition:

Fixed costs are expenses that do not change regardless of the production level within a certain range.

Characteristics:

- Incurred even if output is zero (e.g., rent, salaries of permanent staff, insurance).
- Not influenced by short-term changes in production volume.
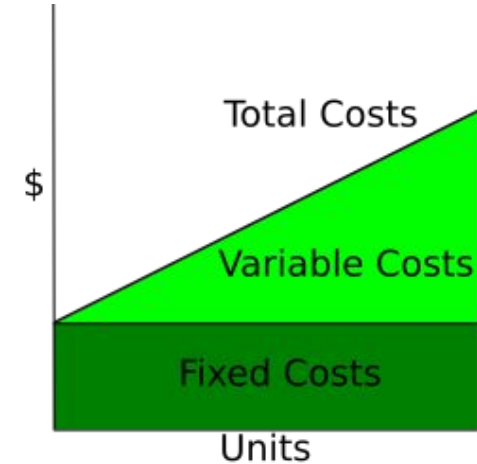
Fixed Costs

Examples of Fixed Costs:

- Rent for facilities.
- Depreciation on equipment.
- Administrative Salaries for permanent employees.
- Fixed annual or monthly fee for tools like GitHub, Jira, or Slack

Implications:

- High fixed costs can create a barrier to entry for new firms.
- Economies of scale can help spread fixed costs over a larger output, lowering the cost per unit.
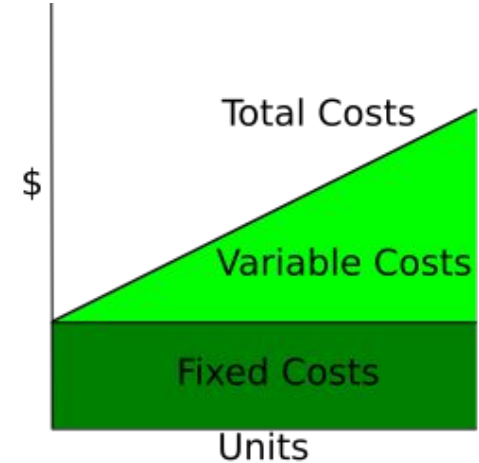
Variable Costs

Definition:

Variable costs change directly with the level of output; they increase as production increases and decrease as production decreases.

Characteristics:

- Vary with output, directly linked to the quantity produced.
- Essential for determining the *cost of goods sold (COGS)*.
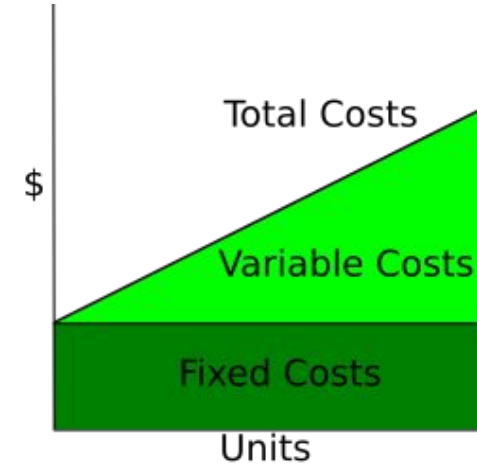
Variable Costs

Examples of Variable Costs:

- Raw Materials: Costs vary based on production volume.
- Direct Labor: Wages for hourly workers that increase with output.
- Utilities: Power, water, and other utilities that fluctuate with production.
- For services like AWS, Google Cloud, or Microsoft Azure, the costs associated with server usage, data storage, and computing power.

Implications:

- High variable costs make a firm's total costs more flexible.
- Lower variable costs enable firms to be more competitive on pricing.
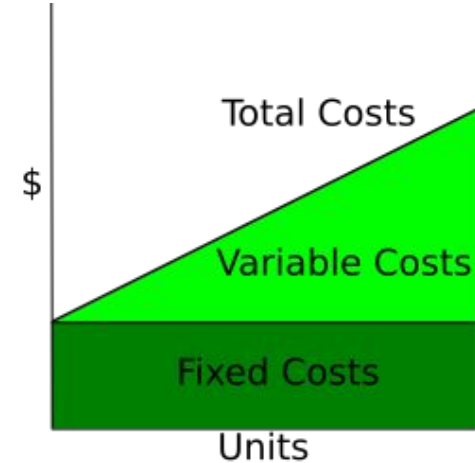
Total Costs

Definition:

Total costs represent the sum of fixed and variable costs at any level of output.
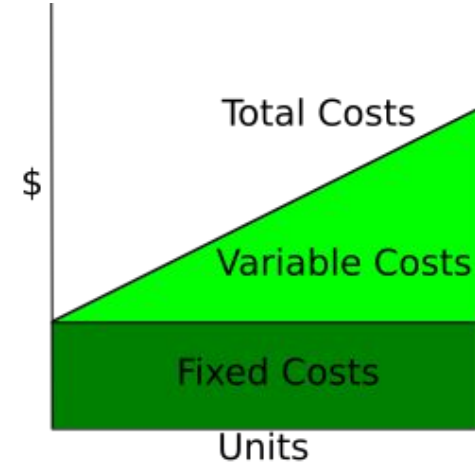
Formula:

Total Cost (TC) = Fixed Costs (FC) + Variable Costs

Note:

- Total costs increase as output increases, due to variable costs.

- At zero output, total cost equals fixed costs.

Importance:

- Provides a complete picture of production expenses.

- Helps in understanding break-even points and cost-volume-profit analysis.

pc:wikipedia

Average Costs

Definition:

Average cost is the cost per unit of output, calculated by dividing total cost by the quantity of output produced.

Formula:

Average Cost (AC)=Total Cost (TC) / Quantity (Q)

Example: If it costs 1000 Rs to produce 10 units, the average cost per unit is 100 Rs.

Why It Matters: Businesses aim to lower average costs to increase profitability. As production increases, average costs often decrease due to **economies of scale**.

Key Insight: At low levels of production, average costs are usually high because fixed costs are spread over fewer units. As production increases, fixed costs spread out, often lowering the average cost.


AC, AVC and AFC
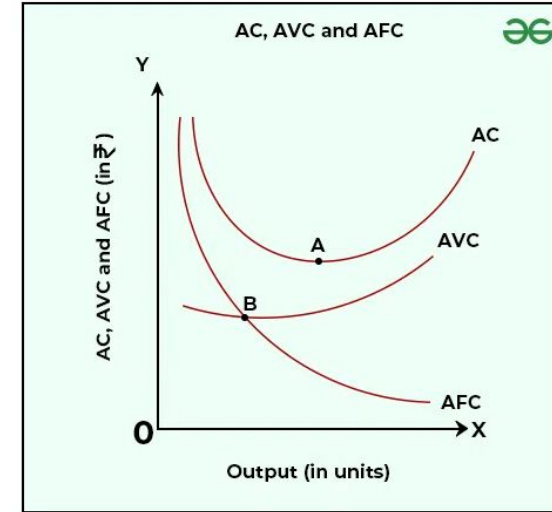
Economies of Scale

Definition: Economies of scale mean that as a business makes more of a product, the cost per unit goes down.

Why It Happens: When a business grows and produces in larger quantities, it can buy materials in bulk, use more efficient machines, and spread out fixed costs (like rent) over more units.

Implications:

- Reduces average costs, enhancing profitability.
- Gives large firms a competitive advantage over smaller firms.

AC, AVC and AFC
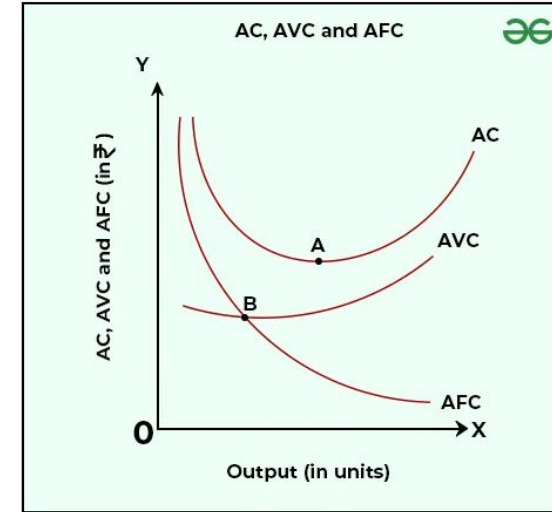
Economies of Scale

- **Example**: Think of a factory producing cars. If it only makes a few cars, each one is very expensive to make. But if the factory makes thousands of cars, the cost of each car goes down because they're spreading costs like factory rent, machinery, and bulk materials over many more cars.
- Example: When AWS or Google Cloud provides storage to millions of customers, they can spread the high fixed costs (like building data centers and buying servers) over a huge amount of storage space.
- Each additional unit of storage costs them less, which allows them to keep prices competitive or increase profit margins.


AC, AVC and AFC
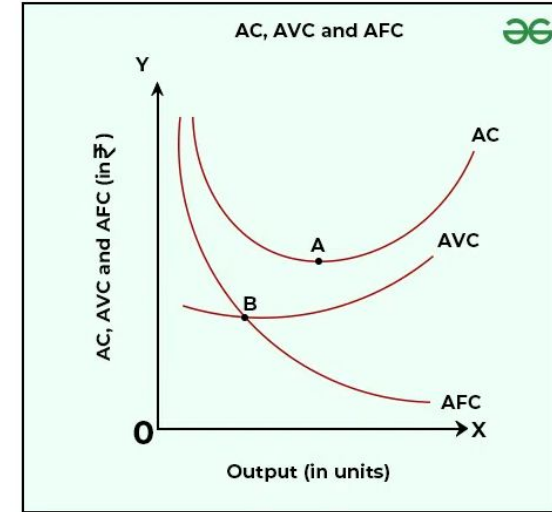
Diseconomies of Scale

Definition: Diseconomies of scale occur when increasing production raises the average cost per unit, typically due to inefficiencies.

Causes:

- **Overuse of Resources**: Producing more might lead to overworking machinery, crowding in the workspace, or requiring more management layers, which can increase maintenance and administrative costs.
- **Inefficiencies**: As a company grows, communication and coordination become harder, leading to inefficiencies and higher costs per unit.
- **Higher Variable Costs**: At high levels of production, variable costs (like overtime wages or higher energy usage) may increase as more units are produced.

AC, AVC and AFC
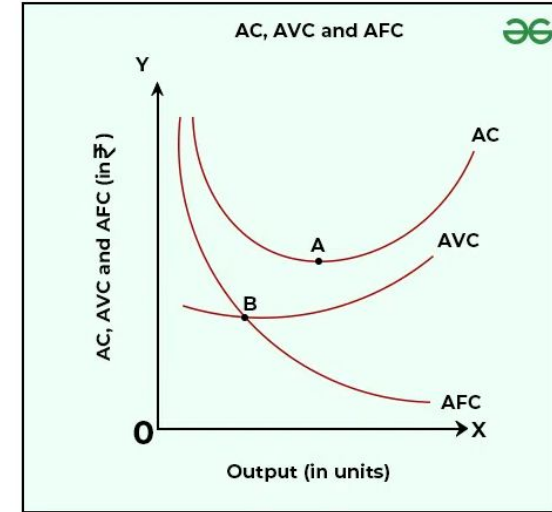
# Marginal Costs, Marginal Revenue, and Profit Maximization

Marginal Cost (MC): This is the cost of producing one extra unit of a product.

Marginal Revenue (MR): This is the revenue (income) from selling that extra unit.

The Key Idea: A business maximizes profit by producing up to the point where the cost of making one more unit (MC) is exactly the same as the revenue it brings in (MR).

Why It Works:

- **If MR > MC**: The extra unit is adding more to revenue than it costs to make, so producing more will increase profit.
- **If MC > MR**: The extra unit costs more to make than it brings in revenue, so producing more will reduce profit.
- **If MC = MR**: This is the "sweet spot" where making one more unit neither increases nor decreases profit. It's the most profitable level of output.

pc: outlier
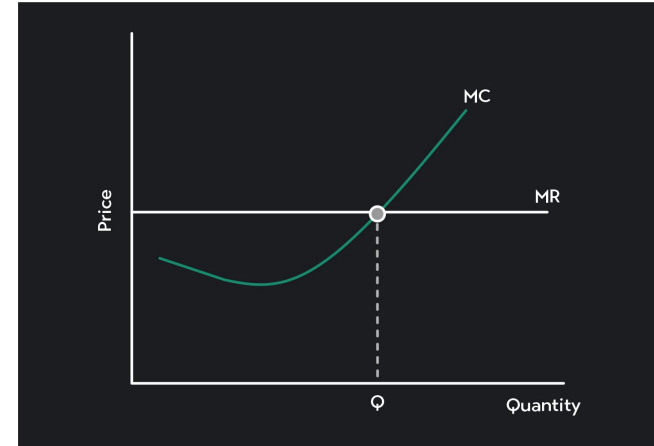
Game Theory

Game Theory

- Game theory studies strategic decision-making between interdependent agents (firms, consumers, etc.).
- Studies how people (or companies) make decisions when they know others are also making decisions that might affect them.
- It's like a game where everyone is trying to get the best outcome for themselves, but their choices depend on what others decide.

Types of Games:

- **Simultaneous Games**: Players choose their actions at the same time (e.g., setting prices).
- **Sequential Games**: Players make decisions one after another (e.g., bidding for resources).

pc: Cristos Makridis

Prisoner's Dilemma

Concept: A situation in which two individuals can benefit by cooperating, but each has an incentive to betray the other (act on their self-interest) and end up with worse outcome.

Scenario:

- Two suspects are arrested and interrogated separately.
- Each can either Cooperate (stay silent) or Defect (betray the other).
- If both cooperate (stay silent), they get a light sentence (1 year).
- If one defects (betrays) and the other cooperates, the defector goes free, and the cooperator gets a heavy sentence (5 years).
- If both defect, both get moderate sentences (3 years each) **<- this is what they will choose**

	Prisoner B Cooperates	Prisoner B Defects
Prisoner A Cooperates	(1, 1)	(5, 0)
Prisoner A Defects	(0, 5)	(3, 3)