

Introduction to Microeconomic Theory

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Key concepts, definitions, and analytical tools that form the foundation of microeconomics.

1. What Is Microeconomics?

Aspect	Description
Scope	Study of individual economic agents (consumers, firms, workers) and how they make choices.
Focus	Allocation of scarce resources, price formation, and the distribution of welfare among agents.
Contrast with Macro	Macroeconomics looks at aggregate variables (GDP, inflation, unemployment). Microeconomics zooms in on the “building blocks.”
Methodology	Uses mathematical models, graphical analysis, and empirical testing to predict behavior under constraints.

2. Fundamental Assumptions

- Rationality** – Agents maximize a well-defined objective (utility for consumers, profit for firms).
- Complete Information** – All relevant data about prices, technologies, and preferences are known to decision-makers.
- Perfect Competition (in baseline models)** – Many buyers and sellers, homogeneous products, free entry/exit, no single agent can influence price.
- Scarcity** – Resources (time, money, inputs) are limited, forcing trade-offs.

Note: Real-world deviations (imperfect information, market power, externalities) are studied by extending the basic framework.

3. The Consumer: Choice Theory

3.1 Preferences & Utility

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- **Preference Relations:** ($\succ$) (strictly preferred), ($\sim$) (indifferent).
- **Utility Function:** ($U(x_1, x_2, \dots, x_n)$) assigns a real number to each consumption bundle (x).
- **Key Properties**
 - *Completeness:* Any two bundles can be compared.
 - *Transitivity:* If ($A \succ B$) and ($B \succ C$), then ($A \succ C$).
 - *Monotonicity:* More of a good is (weakly) better.
 - *Convexity:* Preference for diversified bundles (diminishing marginal rate of substitution).

3.2 Budget Constraint

$$[p_1x_1 + p_2x_2 + \dots + p_nx_n \leq I]$$

- (p_i) = price of good (i)
- (I) = consumer income (or wealth)

3.3 Optimal Choice (Utility Maximization)

$$[\max_x U(x) \quad \text{s.t.} \quad p \cdot x \leq I]$$

First-order conditions (Lagrange method): $[\frac{\partial U}{\partial x_i} / \frac{\partial U}{\partial x_j} = \frac{p_i}{p_j} \quad \text{for all } i, j]$ Interpretation: **Marginal Rate of Substitution (MRS)** equals the **price ratio**.

3.4 Derived Demand Functions

- **Marshallian (Uncompensated) Demand:** ($x_i(p, I)$) – quantity demanded as a function of prices and income.
- **Hicksian (Compensated) Demand:** ($h_i(p, u)$) – quantity demanded when utility (u) is held constant (used for welfare analysis).

4. The Firm: Production Theory

4.1 Production Function

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[$q = f(L, K, \dots)$]

- q = output
- (L, K) = inputs (labor, capital)

Properties