Week 3: What determines price and quantity?

Elasticity: Responsiveness of buyers/sellers to price change

- Willingness of buyers/sellers to leave the market when conditions become unfavorable

Demand elasticity

- **Price elasticity of demand**: Measures how much the quantity demanded responds to change in price
  - Demand elastic → Quantity demanded responds substantially to price change
  - Demand inelastic → Q_D responds slightly to price change
- Factors that affect price elasticity of demand:
  - Availability of close substitutes
    - ex. If price of butter ↑, its Q_D dramatically ↓, since we can use margarine
  - Time period (longer time → more responsive buyers are to price change)
  - Necessities(inelastic) or luxuries(elastic)
  - Definition of the market (broad/narrow category)
    - Ex. Vanilla ice cream(very narrow) → elastic demand, since there are many other flavors to choose
- **Point-price elasticity**: Measures demand elasticity at a specific point
  - Price elasticity of demand = Percentage change in Q_D / Percentage change in P

$$\varepsilon_D = \frac{\partial Q_D/Q_D}{\partial P/P} = \frac{\partial Q_D}{\partial P} \times \frac{P}{Q_D}$$

- **Arc-price elasticity**: Measures demand elasticity between 2 points
  - Midpoint formula

$$\hat{\varepsilon}_D = \frac{\partial Q_D/[(Q_1+Q_2)/2]}{\partial P/[(P_1+P_2)/2]} = \frac{\partial Q_D}{\partial P} \times \frac{(P_1+P_2)/2}{(Q_1+Q_2)/2}$$

  - ∂ means difference; ∂ Q / ∂ P = rise/run = slope
- Ex. if PED = -2 → change in Q_D is twice as large as the change in price
- Quantity demanded is always negatively related to its price (negative slope)→ ε_D is always negative(demand curve), except cross-price elasticity

The variety of demand curves:

- Perfectly inelastic: $\varepsilon_D = 0$ (vertical demand curve, demand is inelastic to price change)
- Inelastic: $-1 < \varepsilon_D < 0$
- Unit elastic: $\varepsilon_D = -1$ (ideal responsiveness; 1 unit of price change alters 1 unit of Q_D)
- Elastic: $-\infty < \varepsilon_D < -1$
- Perfectly elastic: $\varepsilon_D = -\infty$ (Horizontal demand curve, very small changes in price lead to huge change in Q_D
- The flatter the demand curve, the more elastic the Q_D