Lecture 10-14

- Consumer theory (example)
  - Utility maximization problem
  - Duality in consumer theory
- Derivation of an individual demand
- Income and substitution effect
- Consumer surplus
Consumer Theory

• Utility maximization problem:
  \[ \text{Max}_{(X, Y)} U(X, Y) \quad \text{s.t.} \quad P_X X + P_Y Y = I \]
  - \[ Y = (I - P_X X)/P_Y \] substitute into \( U(X, Y) \)
  - \[ U_X + U_Y(- P_X/P_Y) = 0 \Rightarrow MU_X/MU_Y = P_X/P_Y = \text{MRS}_{XY} \]

• Duality:
  \[ \text{Min}_{(X, Y)} E = P_X X + P_Y Y \quad \text{s.t.} \quad U(X, Y) = U_0 \]
  - \[ U = X^aY^{1-a} \]
  - \[ X = a I/P_X \quad Y = (1-a) I/P_Y \]

• Derivation:
  - Individual demand
  - Market demand --- examples:
    - Wheat market
    - Housing market
Individual Demand

- **Price-Consumption curve:**
  Gives all the market baskets (or combinations of good X and Y) that maximize a consumer's utility for various prices of either good X or good Y

- **Derivation of the demand curve:**
  Derive the demand of a good from its price-consumption curve

- **Shift of the demand curve:**
  **Income-Consumption curve:**
  Gives all the market baskets (or combinations of good X and Y) that maximize a consumer’s utility for various incomes
  **Engel curve:**
  Gives the quantity consumed for each income level
Income and Substitution Effects

- **Substitution effect:**
  The substitution effect is the change of the consumption of a good associated with a change in the price of this good, with the level of utility held constant.

- **Income effect:**
  The income effect is the change of the consumption of a good associated with a change in income, with the price of the good held constant.

- **Examples:**
  - Normal good (Figure 4.6)
  - Inferior and Giffen good (Figure 4.7 and 4.8)
Consumer Surplus

• **Definition:**
  Consumer surplus is the difference between what a consumer is willing to pay for a good and what the consumer actually pays when buying it.

• **Examples:**
  – Rock concert tickets (Figure 4.12)
  – A generalized case

• **Limitation:**
  Unable to separate income and substitution effects