Changes in Price: Complements, Substitution and Income Effects

Key Issues

- Substitutes and Complements
- Cross-Price Elasticity
- Implications for Price Consumption Curve
- Income and Substitution Effects

Substitutes & Complements

- Two goods are considered complements if an increase (decrease) in the price of one leads to a decrease (increase) in the quantity demanded of the other (Ex: gasoline and motor oil)
- If two goods are independent, then a change in the price of one good has no effect on the quantity demanded of the other (Ex: price of chicken and price of airplane tickets)
- Two goods are considered substitutes if an increase (decrease) in the price of one leads to an increase (decrease) in the quantity demanded of the other (Ex: movie tickets and video rentals)

Substitutes & Complements

- If the price consumption curve is downward-sloping, the two goods are considered substitutes
- If the price consumption curve is upward-sloping, the two goods are considered complements
- They could be both

Income and Substitution Effects

- A change in the price of a good has two effects:
  - Substitution Effect
  - Income Effect
- Substitution Effect
  - Relative price of a good changes when price changes
  - Consumers will tend to buy more of the good that has become relatively cheaper, and less of the good that is relatively more expensive
- Income Effect
  - Consumers experience an increase in real purchasing power when the price of one good falls

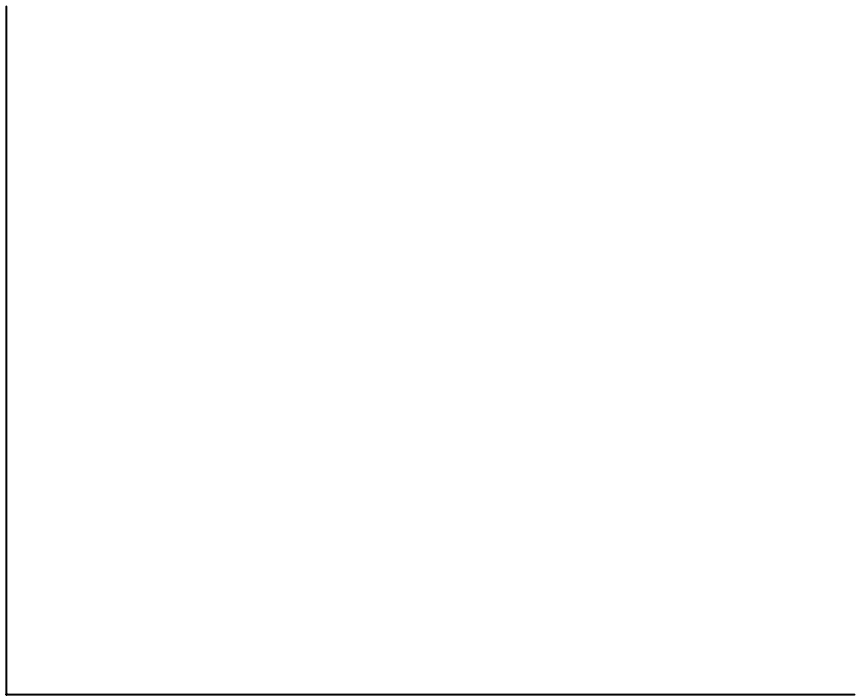
Income and Substitution Effects

- Substitution Effect
  - The substitution effect is the change in an item's consumption associated with a change in the price of the item, with the level of utility held constant
  - When the price of an item declines, the substitution effect always leads to an increase in the quantity demanded of the good

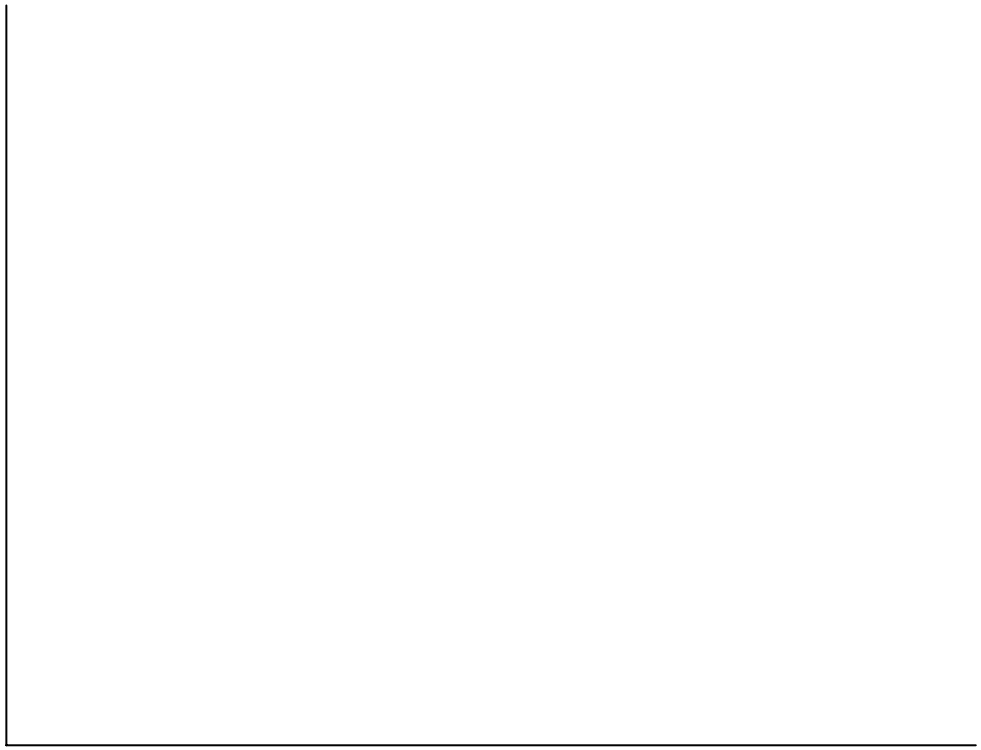
Income and Substitution Effects

- Income Effect
  - The income effect is the change in an item's consumption brought about by the increase in purchasing power, with the price of the item held constant
  - When a person's income increases, the quantity demanded for the product may increase or decrease
- Income Effect
  - Even with inferior goods, the income effect is rarely large enough to outweigh the substitution effect

Income and Substitution Effects: Normal Good



Income and Substitution Effects: Inferior Good



The response of Demand to a Change in Price is composed of two components

- Substitution Effect

$$\partial Q / \partial P_Q \,|_{U=U^*}$$

- Income Effect

$$(\partial Q / \partial P_Q)(\partial I / \partial P_Q)$$

From the Consumer's Budget Equation ($I = P_Q Q + P_Y Y$)

$$\partial I / \partial P_Q = Q$$

For a consumer an increase in P_Q has a negative effect reflecting a loss in purchasing power. Hence Total Effect = Substitution Effect – Income Effect

- Slutsky Equation

$$\frac{dQ}{dP_Q} = \frac{\partial Q}{\partial P_Q}\Big|_{U=U^*} - Q\left(\frac{\partial Q}{\partial I}\right)$$

- Alternative Formulation
  - Hicks use of Revealed Preference