CHAPTER 4 - INDIVIDUAL AND MARKET DEMAND

Key Concepts and Topics

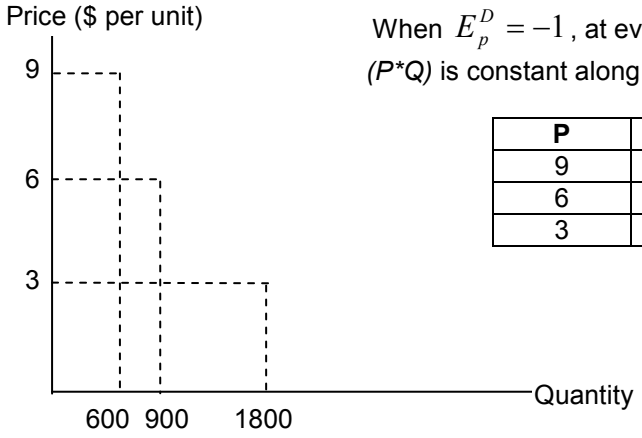
- Elasticity of Demand
- Consumer Surplus

Elasticity of Demand

- Price Elasticity of Demand
  - Measures the percentage change in the *quantity demanded* resulting from a one-percent change in *price*

$$E_P^D = \frac{\%\Delta Q}{\%\Delta P} = \frac{\Delta Q / Q}{\Delta P / P} = \frac{\Delta Q}{\Delta P} * \frac{P}{Q}$$

  - Inelastic demand (i.e., $\left|E_P^D\right| < 1$)
    - Q_D is relatively *unresponsive* to a price change (i.e., $\%\Delta Q < \%\Delta P$) $\Rightarrow$ *total expenditure* (P^*Q) $\uparrow$ when $P \uparrow$
  - Elastic demand (i.e., $\left|E_P^D\right| > 1$)
    - Q_D is relatively *responsive* to a price change (i.e., $\%\Delta Q > \%\Delta P$) $\Rightarrow$ *total expenditure* (P^*Q) $\downarrow$ when $P \uparrow$
  - Isoelastic demand
    - E_P^D is *constant* along the entire demand curve $\Rightarrow$ demand curve *bows inward* (*not linear*)
    - Example: Unit-elastic demand (i.e., $E_P^D = -1$)
      - $P \uparrow \Rightarrow Q \downarrow$ but *no change* in total expenditure
  - Unit-elastic demand curve



When $E_p^D = -1$, at every price, the total expenditure *(P*Q)* is constant along the demand curve D

P	Q	P*Q
9	600	
6	900	
3	1800	

– Price elasticity and consumer expenditures

Demand	P ↑, Expenditure	P ↓, Expenditure
Inelastic		
Unit elastic		
Elastic		

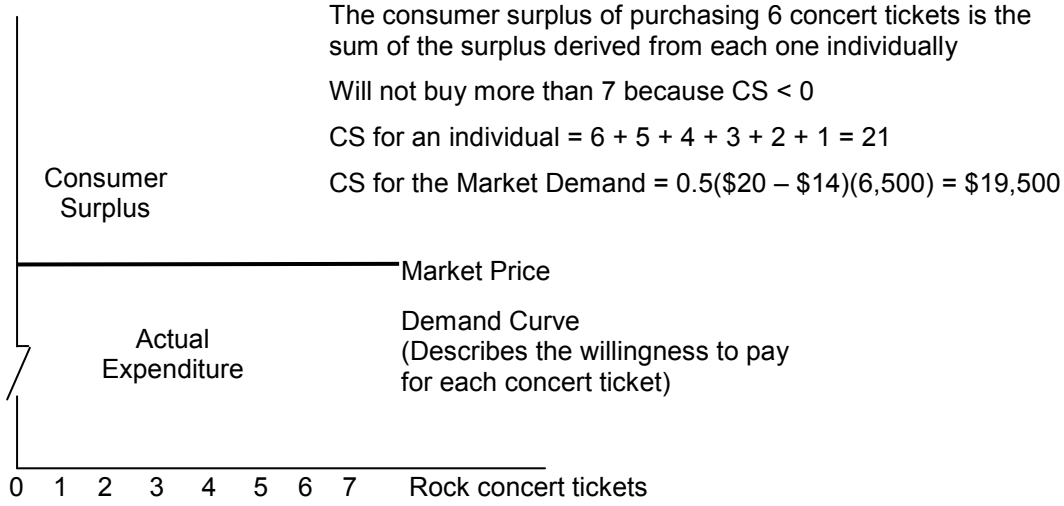
– Point elasticity of demand: price elasticity of demand *at a particular point* on the demand curve, $E_P^D = (P/Q)(\Delta Q/\Delta P)$

– Arc elasticity of demand: price elasticity of demand calculated *over a range of prices*, $E_P^D = (\overline{P}/\overline{Q})(\Delta Q/\Delta P)$, where $\overline{P}$ and $\overline{Q}$ is the average of the *initial* and *final* price/quantity *(When is arc elasticity preferred to point elasticity?)*

Arc elasticity is preferred to point elasticity for a large price change

Consumer Surplus (CS)

- CS measures the *total benefit* from the consumption of a product, less the *total cost* of purchasing it *(in aggregate how much better off consumers are)*
  - The difference between the *maximum* price a consumer is willing to pay for a good and the *actual* price paid
  - The *area* below the *market demand* curve and above the *price line*
- Example: Consumers buying rock concert tickets at market price = $14



- Applying CS
  - Combining CS with the aggregate profits that producers obtain (*producer surplus*) we can evaluate:
    1. *Costs* and *benefits* of different market structures
    2. *Public* policies that alter the behavior of *consumers* and *firms*

Quick Quiz

1. Suppose the arc income elasticity of demand for food is 0.5 and the arc price elasticity of demand is –1.0. Suppose also that Felicia spends a $10,000 a year on food, the price of food is $2, and her income is $25,000.
    a. If a sales tax on food caused the price of food to increase to $2.50, what would happen to her consumption of food?
    b. Suppose that Felicia gets a tax rebate of $2,500 to ease the effect of the sales tax. What would her consumption of food be now?

2. Suppose you are in charge of a toll bridge that costs essentially nothing to operate. The demand for bridge crossings Q is given by $P = 15 – 0.5Q$.
    a. Draw the demand curve for bridge crossings.
    b. How many people would cross the bridge if there were no toll?
    c. What is the loss of consumer surplus associated with a bridge toll of $5?
    d. The toll bridge operator is considering an increase in the toll to $7? At this higher price, how many people would cross the bridge? Would the toll bridge revenue increase or decrease? What does your answer tell you about the elasticity of demand?