

## CHAPTER 4 - INDIVIDUAL AND MARKET DEMAND

### Key Concepts and Topics

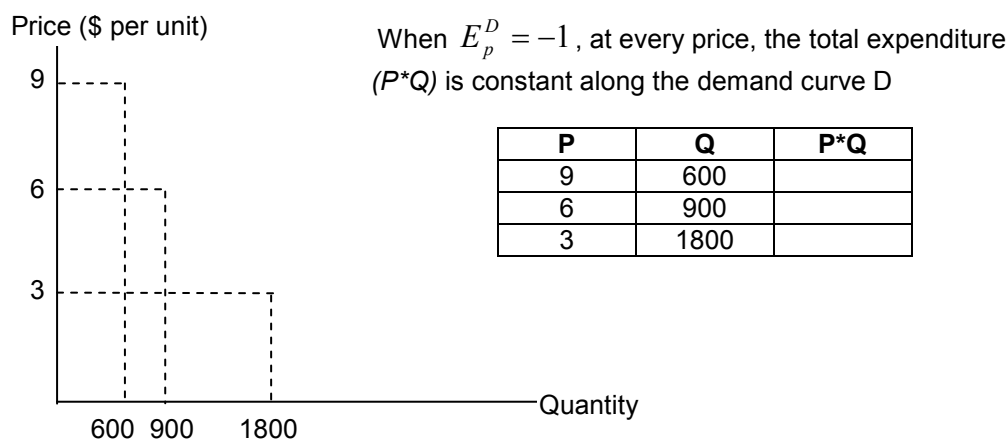
- Elasticity of Demand
- Consumer Surplus

### 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.,  $|E_P^D| < 1$ )
  - ♦  $Q_D$  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.,  $|E_P^D| > 1$ )
  - ♦  $Q_D$  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



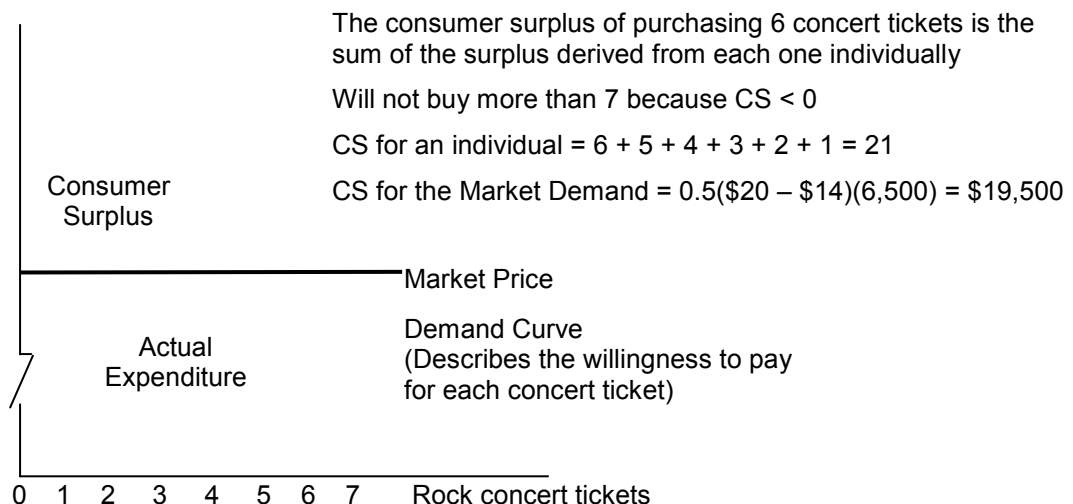
- Price elasticity and consumer expenditures

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*,  $E_p^D = (\bar{P}/\bar{Q})(\Delta Q/\Delta P)$ , where  $\bar{P}$  and  $\bar{Q}$  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?