(i) Calculate the price elasticity of demand if a 0.2 per cent change in price of a product results in a 0.1 per cent change in quantity demanded. Indicate whether this demand is elastic, inelastic, or unit-elastic. Provide an example of such a product.

Answer:

The price elasticity of demand is a measure of responsiveness of the quantity of a good or service demanded to changes in its price. The formula for the coefficient of price elasticity of demand for a good is:

$$E_d = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} = \frac{\Delta Q_d / Q_d}{\Delta P / P}$$

$$E_d = \left| \frac{0,1}{0,2} \right| = 0,5$$

In general case the demand is inelastic. The above formula usually yields a negative value, due to the inverse nature of the relationship between price and quantity demanded. The examples of inelastic goods are Steel ($-0.2 < E_d -0.3$), medical insurance ($E_d = -0.31$ in the USA), rice ($E_d = -0.25$ in Japan).

However, we have no information whether the price and the quantity demanded change in the same direction. For example if both price and quantity demanded grow it can be an example of so called Giffen good (Example: Potatoes during the Irish Great Famine).

(ii) Calculate the price elasticity of demand when the price of a good rise from $4.50 to $8.00 and the quantity demanded changes from 150 units to 75 units. Indicate whether demand is elastic, inelastic, or unit-elastic.

Answer:

a. Point elasticity (Ed).

$$E_d = \frac{\delta Q}{\delta P} \cdot \frac{P}{Q},$$

P1=4,5, Q1=150;

P2=8, Q2=75;

Point elasticity at the price P1: $E_{d1} = \frac{(75 - 150)}{(8 - 4,5)} \cdot \frac{4,5}{150} = -0,64$ The demand curve is inelastic.

Point elasticity at the price P2: $E_{d2} = \frac{(75 - 150)}{(8 - 4,5)} \cdot \frac{8}{75} = -2,28$ The demand curve is elastic.

b. Arc elasticity (Ed).

$$E_d = \frac{\delta Q}{\delta P} \cdot \frac{P_1 + P_2}{Q_1 + Q_2}$$

$$E_{d1} = \frac{(75 - 150)}{(8 - 4,5)} \cdot \frac{(4,5 + 8)}{(75 + 150)} = -1,19 \text{ The demand curve is elastic.}$$