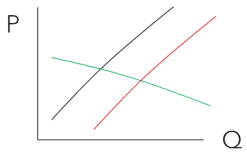
Economics Workshop

Topic 3: Elasticity

1. Consider a market for electric vehicles (EVs). Assume that there is a technological breakthrough that significantly reduces the cost of producing batteries used in EVs.
    a. Illustrate with a diagram how this technological breakthrough affects the supply curve for electric vehicles. Explain your diagram.



Supply curve shifts right, demonstrating an increase in supply due to the reduction of production cost.

    b. Describe the likely impact of this change on the equilibrium price and quantity of electric vehicles.

Equilibrium price falls, while equilibrium quantity rises.

    c. Assuming demand for electric vehicles is elastic, what effect would you expect this change in supply to have on total revenue for EV manufacturers? Explain your reasoning.

% decreases in price will lead to a larger proportional increase in quantity demanded, which results in an increase in total revenue.

2. When Sam's income increases by 10%,
    - Her demand for Good A increases by 2%
    - Her demand for Good B increases by 15%
    - Her demand for Good C decreases by 5%

    Calculate and comment on Sam's income elasticity of demand for good A, B and C. Given that

$$Y\varepsilon_D = \frac{\%\Delta Q_D}{\%\Delta Y}$$

- Good A: $Y\varepsilon_D$ = 2% / 10% = 0.2
    - Positive but low, suggesting Good A is a normal good but relatively income inelastic.
- Good B: $Y\varepsilon_D$ = 15% / 10% = 1.5
    - Positive and high, suggesting Good B is a normal good and is income elastic.
- Good B: $Y\varepsilon_D$ = -5% / 10% = -0.5
    - Negative, suggesting Good C is inferior good.

3. At present, Freda's income is $25,000 per year, the price of Good X is $0.70, the price of Good Y is $0.60 and Freda buys 500 units of Good X. You are given the following elasticities of demand for Freda:
   - Cross-price elasticity of demand for Good X with respect to Good Y = +0.5
   - Income elasticity of demand for Good X = +0.7

   Using the original formulae, explain, with reference to the definition of the relevant measure of elasticity, what will happen to Freda's demand for Good X if:

   a. The price of Good Y decreases to $0.48
   b. Freda's income increases to $26,000 per year

   a. The formula for cross-price elasticity of demand is given by:

$$C\varepsilon_{XY} = \frac{\%\Delta Q_X}{\%\Delta P_Y}$$

   The percentage change in the price of Good Y is:

$$\%\Delta P_Y = \frac{0.48 - 0.60}{0.60} \times 100 = -20\%$$

   Then,

$$\%\Delta Q_X = C\varepsilon_{XY} \times \%\Delta P_Y = 0.5 \times -20\% = \ -10\%$$

   ∴ The quantity demanded for Good X will decrease by 10% or $500 \times 0.9 = 450$ units.

   b. The formula for income elasticity of demand is given by:

$$Y\varepsilon_X = \frac{\%\Delta Q_X}{\%\Delta Y}$$

   The percentage change in income is:

$$\%\Delta Y = \frac{26{,}000 - 25{,}000}{25{,}000} \times 100 = 4\%$$

   Then,

$$\%\Delta Q_D = Y\varepsilon_D \times \%\Delta Y = 0.7 \times 4\% = 2.8\%$$

   ∴ The quantity demanded for Good X will increase by 2.8% or $500(1.028) = 514$ units.

4. Chloe is a golfing enthusiast. Her weekly income is $250 and she buys four different golfing magazines per week, each costing the same price. When her weekly income rises to $275, she buys five golfing magazines per week, again each costing the same price. Calculate her income elasticity of demand for golfing magazines.
   a. -2.5
   b. -0.4
   c. +0.4
   d. +1.5
   e. +2.5

5. The cross-price elasticity of demand measures the responsiveness of:
    a. the income of consumers to a change in the price of goods
    b. the quantity of one good demanded when the quantity demanded of another good changes
    c. the price of a good when the quantity demanded of another good changes
    d. the quantity of one good demanded when the price of another good changes.

6. Which of the following is true about the relationship between price elasticity of demand and total sales revenue?
    a. If demand is elastic, total revenue changes in the same direction as price.
    b. If demand is elastic, total revenue changes in the same direction as quantity.
    c. If demand is inelastic, total revenue changes in the same direction as price.
    d. If demand is inelastic, total revenue changes in the same direction as quantity.
    e. a. and d.
    f. b. and c.

7. The maker of a particular breakfast cereal found that increasing the price from $4.00 to $4.25 per box had no impact on total revenue, but increasing the price further to $4.50 reduced total revenue by 2%. Thus, the demand for the cereal is:
    a. Inelastic over the range $4.00 to $4.50
    b. Elastic over the range $4.00 to $4.25 but not over the range $4.25 to $4.50
    c. Unit elastic over the range $4.00 to $4.25 and elastic over the range $4.25 to 4.50
    d. Unit elastic over the range $4.00 to $4.25 and inelastic over the range $4.25 to 4.50

8. A firm finds that its price elasticity of demand is +4.0. Currently, the firm is selling 2000 units per month at $5 per unit. If it wishes to increases its quantity sold by 10%, it must lower its price by:
    a. $0.40
    b. $0.50
    c. 2.5%
    d. 4.0%

9. The cross-elasticity of demand between two goods is reported to be +0.2. This implies that:
    a. A 2% increase in the price of one shifts the demand curve for the other to the left by 1%
    b. The two goods are complements
    c. The two goods are substitutes
    d. Both goods are normal goods