L8. Introduction to Elasticity

SENSITIVITY OF DEMAND

- A useful descriptor for explain the degree of sensitivity to a change in price (or some other factor) is the elasticity of demand.

- Responsiveness of one variable to change in other variable. When variable X response to change in variable Y, Variable X is to be elastic.

PRICE ELASTICITY OF DEMAND

The coefficient of price elasticity of demand 'e' measures the percentage change in the quantity of commodity demanded per unit of time, resulting from a given percentage change in the price of the commodity.

Since price and quantity are inversely related, the coefficient of price elasticity of demand is a negative number. In order to avoid dealing with negative values, a minus sign is often introduced into the formula for 'e'.

Let ΔQ represents the change in the quantity demanded of a commodity resulting from a given change, ΔP in its price,

$$\text{Then,} \quad e = -\frac{\Delta Q/Q}{\Delta P/P} = -\frac{\Delta Q}{\Delta P}\frac{P}{Q}$$

e = percentage change in quantity demanded that accompanies as 1% change in price.

Demand is said to be Elastic if e>1, Percentage change in quantity will be larger than percentage change in price. In this case, demand is relatively sensitive to price.

Inelastic if e<1 : demand relatively insensitive to price.

Unitary elastic if e = 1.

FACTORS AFFECTING ELASITICITIES

INCOME ELASTICITY OF DEMAND

The coefficient of income elasticity of demand (e_m) measures the percentage change in the amount of a commodity purchased per unit of time resulting from a given percentage change in a consumer's income.

Thus,

$$e_m = \frac{\Delta Q/Q}{\Delta M/M} = \frac{\Delta Q}{\Delta M} \cdot \frac{M}{Q}$$

$$e_i = \frac{\%\ change\ in\ quantity\ of\ good\ demanded}{\%\ change\ in\ income}$$

When, e_m is negative, the good is inferior. If e_m is positive, the good is normal.

A normal good is usually a luxury if its $e_m > 1$, otherwise it is a necessity.

Depending on the level of the consumer's income, e_m for a good is likely to vary considerably.

Thus, a good may be a luxury at 'low' levels of income, a necessity at 'intermediate' levels of income and an inferior good for 'high' levels of income.

A good is considered to be normal if the demand for the good goes up when a consumer's income increases ($e_m > o$). Most goods are normal.

A good is superior good if it goes up in demand when a consumer's income increases and its share in income also goes up ($e_m > 1$).

On the other hand, a good is inferior if the demand for the good goes down when a consumer's income goes up.

Numerical Example:

For the market demand schedule given in the Table, let us find the price elasticity of demand, e for a movement from point B to D; C to G and from D to B.

Point	P_x	Q_x
A	8	0
B	7	1000
C	6	2000
D	5	3000
F	4	4000
G	3	5000
H	2	6000
L	1	7000
M	0	8000

$$\text{Then,} \quad e = -\frac{\Delta Q/Q}{\Delta P/P} = -\frac{\Delta Q}{\Delta P}\frac{P}{Q}$$

$$e = -\left(\frac{\text{Present value of Q} - \text{Previsous value of Q}}{\text{Present price} - \text{Previous price}}\right)\left(\frac{\text{Previous price}}{\text{Previous quantity}}\right)$$

For movement from B to D,

$$e = -\left(\frac{Q_D - Q_B}{P_D - P_B}\right)\frac{P_B}{Q_B} = -\left[\frac{(3000 - 1000)}{-2}\right]\frac{7}{1000} = 7$$

For movement from D to B,

$$e = -\left(\frac{Q_B - Q_D}{P_B - P_D}\right)\frac{P_D}{Q_D} = -\left[\frac{(1000 - 3000)}{2}\right]\frac{5}{3000} = 1.67$$