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शक्तिउत्थानआश्रमलखीसरायबिहार

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Revised notes Elasticity of Demand

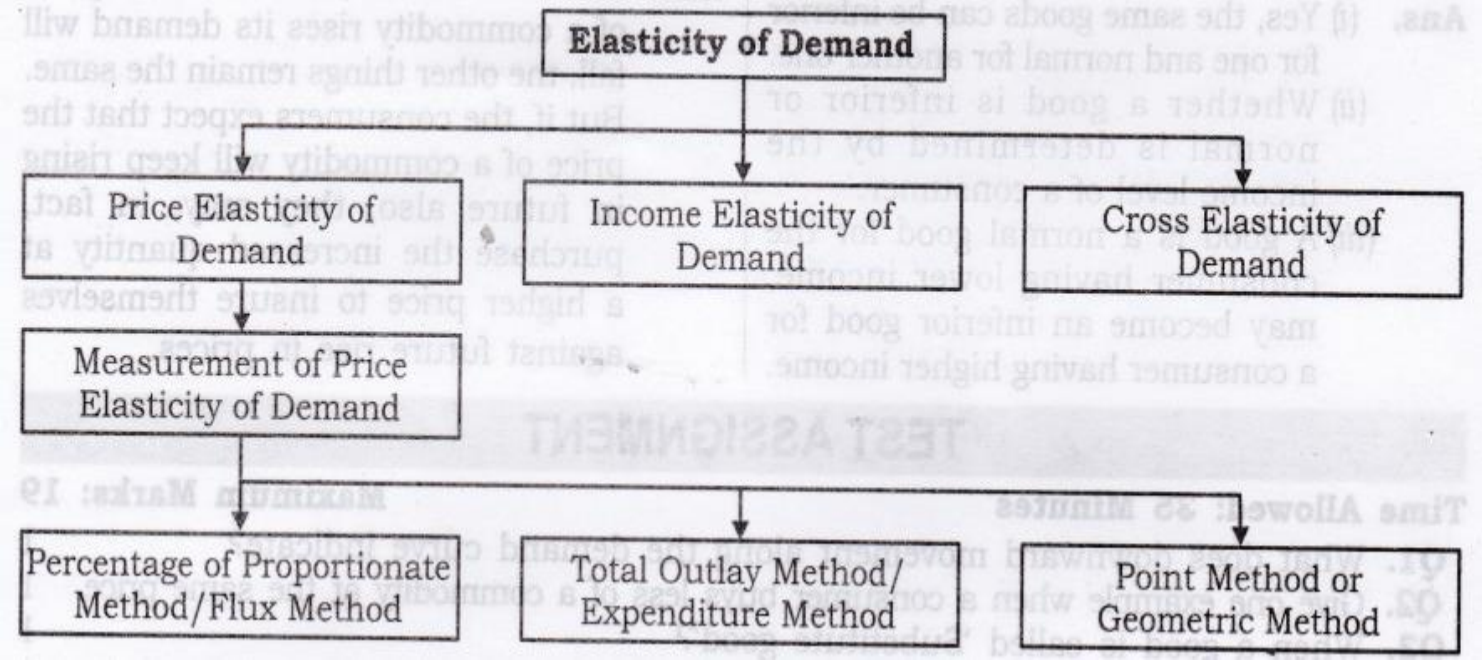
1. Elasticity of Demand: The degree of responsiveness of demand to the changes in determinants of demand (Price of the commodity, Income of a Consumer, Price of related commodity) is known as elasticity of Demand.

2. It may be of three types: namely,

(a) Price elasticity of Demand.

(b) Income elasticity of Demand,

(c) Cross elasticity of Demand.



3. (a) The degree of responsiveness of quantity demanded to changes in price of commodity is known as price elasticity of Demand.

(b) It is quantitative statement, i.e., it tells us the magnitude of the change in quantity demanded as a result of change in price.

4. The degree of responsiveness of demand to change in income of consumer is known as income elasticity of demand.

5. The degree of responsiveness of demand to change in the price of related goods (substitute goods, complementary goods) is known as cross elasticity of demand.

Note: Income and cross elasticity of demand is outside the scope of 12 class syllabus. So, this chapter deal with price elasticity of demand.

6. Percentage Method/Flux Method for calculating price elasticity of demand:

According to this method, price elasticity of demand is measured by dividing the percentage change in quantity demand by the percentage change in price.

$$ED = \frac{\text{Percentage Change in Quantity demanded}}{\text{Percentage Change in Price}}$$

$$\text{or } ED = \frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where, ΔQ = Change in quantity demanded

ΔP = Change in Price

P = Initial or Base Price

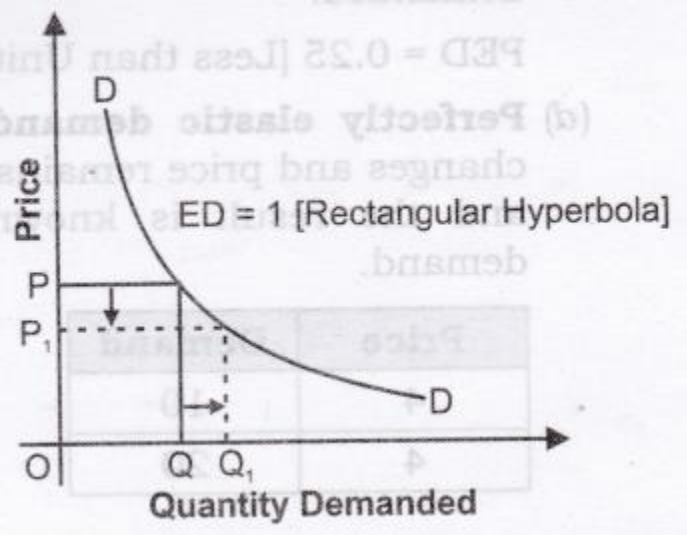
Q = Initial or Base Quantity

Note: Mathematically speaking, price elasticity of demand (e_p) is negative, since the change in quantity demanded is in opposite direction to the change in price. When price falls, quantity demanded rises and vice-versa. But for the sake of convenience in understanding the magnitude of response of quantity demanded to the change in price, we ignore the negative sign and take into account only the numerical value of the elasticity. Thus, if 5% change in price leads to 15% change in quantity demanded of good X and 30% change in that of Y, the above formula of elasticity will give the value of price elasticity of good X equal to 3 and of good Y equal to 6. It indicates that the quantity demanded of good Y changes much more than that of good X in response to a given change in price. But if we write minus signs before the numerical values of elasticities of two goods, that is, if we write the elasticities as – 3 and – 6 respectively as strict mathematics would require us to do, then since – 6 is smaller than – 3, we would be misled in concluding that price elasticity of demand of Y is less than that of X.

But as we have noted above, response of demand for Y to the change in price is greater than that of X, it is better to ignore minus signs and draw conclusions from
the numerical values of elasticities. Hence by convention minus sign before the value of price elasticity of demand is generally ignored in economics.

7. There are five degrees of price elasticity of demand.

(a) Unitary elastic demand: If percentage change in the quantity demanded is equal to percentage change in price of the commodity, then ED = 1 and the result is known as unitary elastic demand.



Price	Demand
10	20
5	30

$$PED = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{10}{[-]5} \times \frac{10}{20} = [-]1$$

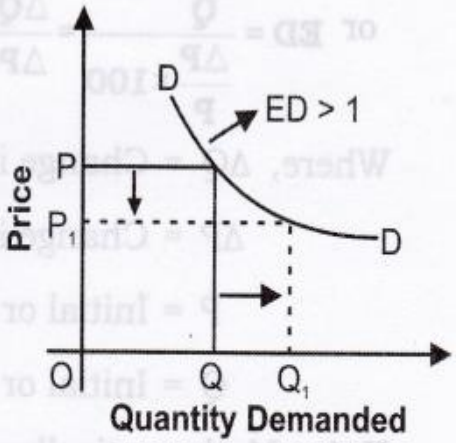
Negative sign indicates the inverse relationship between price and the quantity demanded.
PED = 1 [Unitary elastic demand]

(b) More than unitary elastic demand or elastic demand: If percentage change in quantity demanded is more than the percentage change in price of the commodity then, ED > 1 and result is known as more than unit elastic demand.

Price	Demand
30	100
20	400

$$PED = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

$$\frac{300}{[-]10} \times \frac{30}{100} = [-]9$$



Negative sign indicates the inverse relationship between price and the quantity demanded.

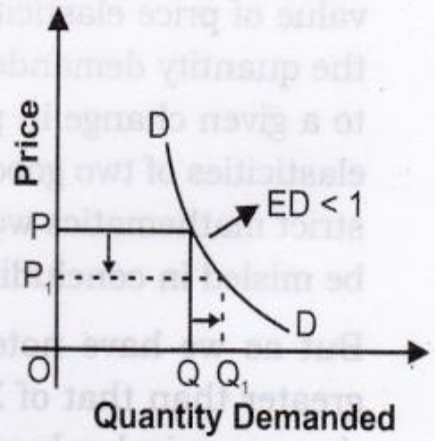
PED = 9 [More than Unitary elastic demand]

(c) Less than unitary elastic demand or inelastic demand: If percentage change in quantity demanded is less than the percentage change in price of the commodity, then ED < 1 and the result is known as less than unit elastic demand.

Price	Demand
50	100
40	105

$$PED = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

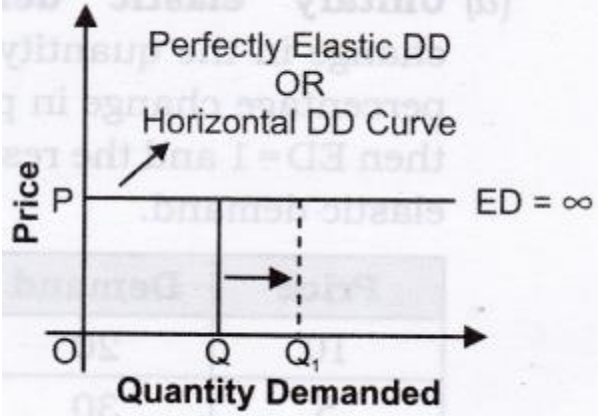
$$\frac{5}{[-]10} \times \frac{50}{100} = [-]0.25$$



Negative sign indicates the inverse relationship between price and the quantity demanded.

PED = 0.25 [Less than Unitary elastic demand]

(d) Perfectly elastic demand: If quantity demand changes and price remains constant, then ED = α and the result is known as perfectly elastic demand.



Price	Demand
4	10
4	20

$$PED = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{10}{0} \times \frac{4}{10} = \frac{40}{0} = \infty$$

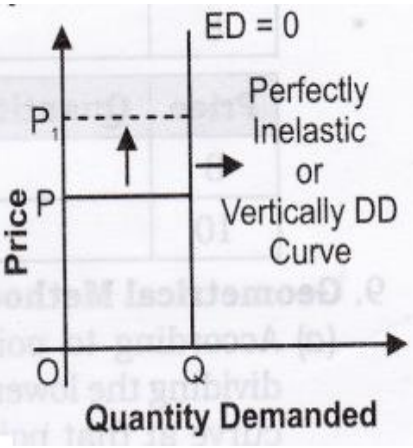
P.ED = ∞ [Perfectly elastic demand]

(e) Perfectly Inelastic demand: If price is changed ,and quantity demanded constant,then ED=0 and the result is known as Perfectly Inelastic demand.

Price	Demand
2	10
4	10

$$PED = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{0}{2} \times \frac{2}{10} = \frac{0}{20} = 0$$

PED = 0 [Perfectly Inelastic demand]



8. Total outlay method or Total Revenue Method or Expenditure method for calculating price elasticity of demand

(a) Total expenditure method indicates the direction in which total expenditure on a product changes as a result of change in price of the commodity.

(b) According to this method, there are three broad possibilities as shown below:

Case I: Inelastic Demand:

(i) When the total expenditure (Total revenue) varies directly with price, price elasticity of demand is less than one (i.e., demand is inelastic).

(ii) In other words, with the fall in price, total expenditure (Total revenue) decreases or with a rise in price, total expenditure (Total revenue) increases.

Price	Quantity Demanded	Expenditure
10	100	1000
8	110	880

Price	Quantity Demanded	Expenditure
8	110	880
10	100	1000

Case II: Elastic Demand:

(i) When the total expenditure (Total revenue) varies inversely with price, price elasticity of demand is greater than one, (i.e. demand is elastic).

(ii) In other words, with the fall in price, total expenditure (Total revenue) increases, or with a rise in price, total expenditure (Total revenue) decreases.

Price	Quantity Demanded	Expenditure
10	100	1000
8	150	1200

Price	Quantity Demanded	Expenditure
8	150	1200
10	100	1000

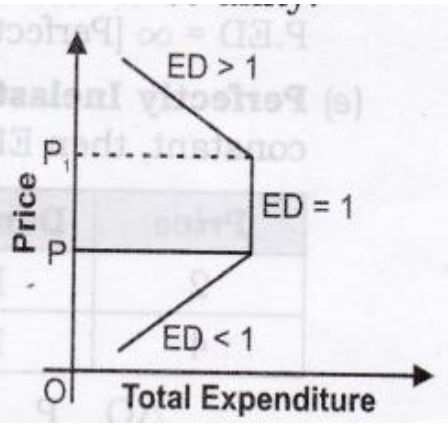
Case III: Unitary Price Elasticity:

(i) When the total expenditure (Total revenue) remains the same, whatever may be the change in the

price level, price elasticity of demand is said to be unity.

Price	Quantity Demanded	Expenditure
10	100	1000
8	125	1000

Price	Quantity Demanded	Expenditure
8	125	1000
10	100	1000



9. Geometrical Method or Point Method for Calculating Price Elasticity of Demand:

(a) According to point method, elasticity of demand at any point is measured by dividing the lower segment of demand curve with the upper segment of the demand curve at that point. It can be calculated by dividing the lower segment by upper segment.

$$\text{PED} = \frac{\text{Lower Segment}}{\text{Upper Segment}}$$

(*b*) Calculation of price elasticity of demand on Linear demand curve:

- At point C,

$$\text{PED} = \frac{\text{Lower Segment}}{\text{Upper Segment}} = \frac{CE}{CA} = \text{PED} = 1$$

- At point B,

$$\text{PED} = \frac{\text{Lower Segment}}{\text{Upper Segment}} = \frac{BE}{BA} = \text{PED} > 1$$

- At point D,

$$\text{PED} = \frac{\text{Lower Segment}}{\text{Upper Segment}} = \frac{DE}{DA} = \text{PED} < 1$$

- At point E,

$$\text{PED} = \frac{\text{Lower Segment}}{\text{Upper Segment}} = \frac{0}{EA} = \text{PED} = 0$$

- At point A,

$$\text{PED} = \frac{\text{Lower Segment}}{\text{Upper Segment}} = \frac{AE}{0} = \text{PED} = \infty$$