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Elasticity of Demand

4.1 DEFINITION OF PRICE ELASTICITY OF DEMAND

The law of demand states that when the price of a good falls, consumers demand more units of the good. But *how much* more? It is important and useful to have magnitude of change in quantity demanded to a change in price. It is called **price elasticity of demand.**

Price elasticity of demand measures the responsiveness of demand of a good to a change in its price. Alfred Marshall was the first economist to formulate the concept of price elasticity of demand as the ratio of a *relative* change in quantity demanded to a *relative* change in price. A *relative measure* is needed so that changes in different measures can be compared. These relative changes in demand and price are measured by *percentage changes.* The percentage changes are independent of units. Numerically, price elasticity of demand e_D, is calculated as:

$$e_D = -\frac{\text{percentage change in quantity demanded}}{\text{percentage change in price}}$$

$$e_D = -\frac{\dfrac{\text{change in quantity demanded}}{\text{original quantity demanded}}}{\dfrac{\text{change in price}}{\text{original price}}}$$

$$= -\frac{(Q_1 - Q) \,/\, Q}{(P_1 - P) \,/\, P} = -\frac{\dfrac{\Delta Q}{Q}}{\dfrac{\Delta P}{P}} = -\frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

where,

ΔQ = Change in quantity demanded (or $Q_1 - Q$)

Q = Original quantity demanded

ΔP = Change in price (or $P_1 - P$)

P = Original price

e_D = Coefficient of elasticity of demand. e_D is negative. **The ratio is a negative number because price and quantity demanded are inversely related.** In numerical sums, the minus sign is dropped from the numbers and all percentage changes are treated as positive.

4.2 FACTORS AFFECTING PRICE ELASTICITY OF DEMAND

The factors which determine the price elasticity of demand for a commodity or service are:

1. **Availability of Close Substitute.** *A good having close substitutes will have an elastic demand and a good with no close substitutes will have an inelastic demand. Example:* commodities such as pen, cold drink, car, etc. have close substitutes. When the price of these goods rise, the price of their substitutes remaining constant, there is proportionately greater fall in the quantity demanded of these goods. That is, their demand is elastic. Commodities such as prescribed medicines and salt have no close substitutes and hence, have an inelastic demand.
2. **Income of the Consumers.** *If the income level of consumers is high, the elasticity of demand is less.* It is because change in the price will not affect the quantity demanded by a greater proportion. But in low income groups, the elasticity of demand is high.
3. **Luxuries *versus* Necessities.** *The price elasticity of demand is likely to be low for necessities and high for luxuries.* A necessity is a good or service that the consumer must have such as food (bread, milk) and medicines. Luxuries are goods that are enjoyable but not essential. *Example:* eating in a 5-Star hotel. If the price of necessities rise, then demand will not fall by a greater proportion because their purchase cannot be delayed. That is why, the price elasticity of demand in case of necessity is low.
4. **Proportion of Total Expenditure Spent on the Product.** *Higher the cost of the good relative to total income of the consumer, more will be the price elasticity of demand.* If the price of bread, ink, salt, match box, etc., which is relatively low, doubles it would have almost no effect on the quantity demanded of them. On the other hand, if price of car doubles then the quantity demanded will fall by a greater proportion showing high price elasticity of demand.
5. **Number of Uses of the Commodity.** *The more the number of uses a commodity can be put to, the more elastic is the demand.* If a commodity has few uses, it has an inelastic demand. *Examples:* goods like milk, eggs and electricity can be put to many different uses and hence, enjoy elastic demand, *i.e.*, when prices are low, demand increases by a greater proportion as the goods can now be put to less important uses also.

6. **Time Period.** *If the time period needed to find substitutes of the commodity is more, the price elasticity of demand is more and vice versa. Example*: flying by aeroplane has inelastic demand as no substitutes are available in the short run.

Before deciding whether the demand for a commodity is elastic or inelastic, all the factors mentioned above must be simultaneously considered. A summary of the factors affecting elasticity of demand is given in Table 4.1.

Table 4.1 **Determinants of Price Elasticity of Demand**

Factors	Elasticity of demand is more when....
1. Availability of substitutes.	1. More substitutes are available.
2. Income of the consumers.	2. The income of the consumer is less.
3. Luxuries *versus* necessities.	3. High priced luxuries are available.
4. Proportion of total expenditure spent on the product.	4. The proportion of total expenditure spent is more.
5. Number of uses of the purchased commodity.	5. The number of uses of the good are more.
6. Time period.	6. The time period required to find substitutes is more.