

Laxmi Narain Dubey College, Motihari

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NAAC Accredited 'B+'

Department of Economics

Topic: ELASTICITY OF DEMAND

Paper-I: MICROECONOMICS

Part-I

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ELASTICITY OF DEMAND

- ✓ According to the law of demand, when the price of a good increases, the demand for the good decreases, and conversely, when the price of a good decreases, the demand for the good increases, *ceteris paribus*.
- ✓ While the law shows the direction of change and depicts the negative relationship between price and quantity, it does not indicate how responsive the demand for a good is to its price. In other words, the law does not give the magnitude or the degree of the change. This is given by the concept of elasticity of demand.

PRICE ELASTICITY OF DEMAND

- ✓ The concept of price elasticity of demand was first discussed by the British economist Alfred Marshall.
- ✓ Price elasticity of demand (E_p) is a measure of the responsiveness of the quantity demanded of a good to a change in the price of the good.
- ✓ It can be defined as the ratio of the percentage change in the quantity demanded of a good per unit of time to the percentage change in the price of the good.
- ✓ $E_p = \frac{\text{Percentage change in the quantity demanded of a good}}{\text{Percentage change in the price of the good}}$
= $\frac{\text{Change in quantity demanded}}{\text{Change in price}}$
= $\frac{\Delta Q/Q}{\Delta P/P}$
= $\Delta Q/\Delta P \times P/Q$

where, E_p is the price elasticity of demand, Q is the original quantity demanded, P is the original price of the good, ΔQ is the change in quantity demanded, and ΔP the change in price.

FACTORS INFLUENCING ELASTICITY OF DEMAND

Price elasticity of demand depends on the following factors:

1. Nature of the good:

- ✓ Good can be grouped into necessities, comforts and luxuries.
- ✓ Necessities are goods that are necessary for survival. Examples of necessities are bread, milk, and clothes. Their demand elasticity is low.
- ✓ Comforts are goods whose demand is more elastic compared with luxuries. Luxuries such as LCD television set and fancy cars are goods whose demand is highly elastic. An increase in the price of luxuries leads to a decrease in demand while a decrease in the price leads to an increase in demand.

2. Availability of substitutes for the good:

- ✓ When the elasticity of demand is high, the more is the availability of close substitutes for the good. For example, tea and coffee are close substitutes and thus have a high

elasticity of demand. An increase in the price of coffee implies that tea is relatively less expensive. Hence, there is an increase in demand for the relatively less expensive tea.

- ✓ For goods such as sugar and salt, in general, the elasticity of demand will be low because they do not have any close substitutes.
- ✓ In addition, the elasticity of demand may be much greater for different brands of soap, for example, than for soap itself. This is because each brand of soap is a close substitute of another brand.

3. *Variety of uses of the good:*

- ✓ At a lower price, a good will be used for different purposes. For example, there are many uses of electricity. Thus, if a good has a large number of uses then for a fall in price, its elasticity will be high as it can be used for less important tasks.
- ✓ However, if the price of the good is high, the good will be used only to satisfy the more essential needs.

4. *Fraction of the income spent on the good:*

- ✓ If a consumer spends only a small fraction of his income on buying a good, then its elasticity will be low. For example, salt, pens, and pencils are goods of low elasticity.
- ✓ If the price of any of these goods increases, there will be almost no change in demand because the expenditure on them forms only a very small part of the total expenses by a consumer.
- ✓ On the other hand, if a consumer spends a large portion of his income on buying a good, for example, an LCD television set or a car, then an increase in its price may lead to a decrease in demand of this good of high elasticity of demand.

5. *Possibility of postponement of consumption:*

- ✓ Those goods whose the consumption can be postponed will have a high elasticity of demand. An increase in the price of durable goods such as televisions will lead to a postponement of demand by the consumers and thus the demand will fall.

6. *Price of the good:*

- ✓ If the price of the good is high, then the demand for the good is elastic; and
- ✓ If the price is low, then the demand is said to be inelastic.

Measurement of price elasticity of demand

The following are the different methods for measuring the price elasticity of demand.

- Percentage method
- Outlay method
- Point method

PERCENTAGE METHOD

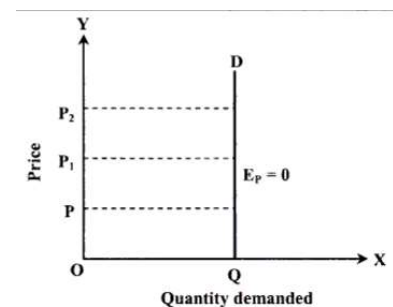
- ✓ According to this method, the price elasticity of demand is the ratio of the percentage change in the quantity of a good that is demanded per unit of time to the percentage change in the price of the good.
- ✓ $E_p = \frac{\text{Percentage change in the quantity demanded of a good}}{\text{Percentage change in the price of the good}}$
 $= \frac{\text{Change in quantity demanded}}{\text{Change in price}}$
 $= \frac{\Delta Q/Q}{\Delta P/P}$
 $= \Delta Q/\Delta P \times P/Q$

where, E_p is the price elasticity of demand, Q is the original quantity demanded, P is the original price of the good, ΔQ is the change in quantity demanded, and ΔP the change in price.

- ✓ The following are the **different situations** in which the coefficient of elasticity of demand can take a value between zero and infinity.

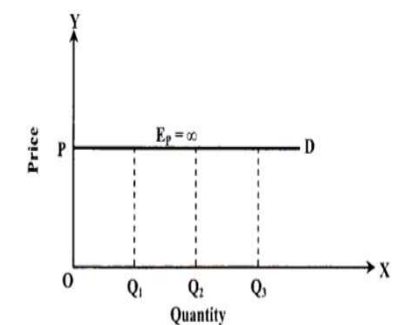
1. Demand is perfectly inelastic, $E_p = 0$

- ✓ In this situation, the ratio of percentage change in the quantity of the good demanded to the percentage change in the price of the good is zero.
- ✓ This implies that whatever be the price of the good, the quantity of the good demanded remains the same.
- ✓ The demand curve is shown in the figure as a straight line parallel to the Y-axis.
- ✓ Example: medicines. The demand for medicines remains unchanged despite a change in prices as they are necessary goods.



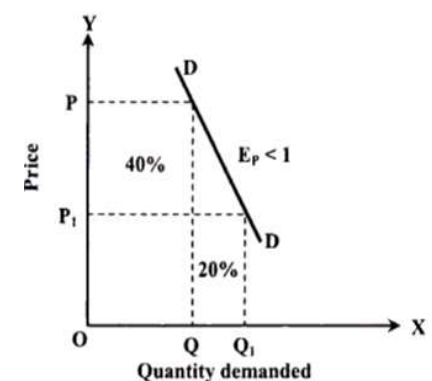
2. Demand is perfectly elastic, $E_p = \infty$

- ✓ In a situation like this, any change in price, however small, leads to an infinite change in the quantity of good x that is demanded.
- ✓ The demand curve is shown in the figure as a straight line parallel to the X-axis.
- ✓ Such a situation exists under perfect competition.



3. Demand is relatively inelastic, $E_p < 1$

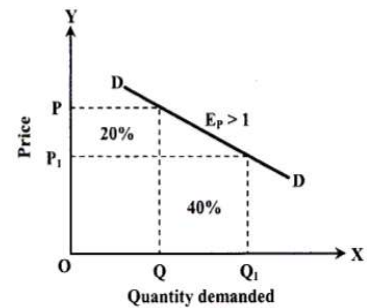
- ✓ In such a situation, the ratio of percentage change in the quantity of the good demanded to the percentage change in the price of the good is < 1 .
- ✓ This implies that the percentage change in the quantity demanded is less than the percentage change in the price of the good.



- ✓ The demand curve is shown in the figure. A decrease in the price of the good from P_1 to P_2 leads to an increase in the quantity demanded from OQ_1 to OQ_2 .
- ✓ The decrease in price ΔP is greater than the increase in the quantity of the good demanded, ΔQ .
- ✓ For example: necessities. Demand for goods such as milk and salt, which are necessities are comparatively static as they represent items needed for minimum requirements to be fulfilled. The demand for these goods does not undergo a marked change despite change in prices.

4. Demand is relatively elastic, $E_P > 1$

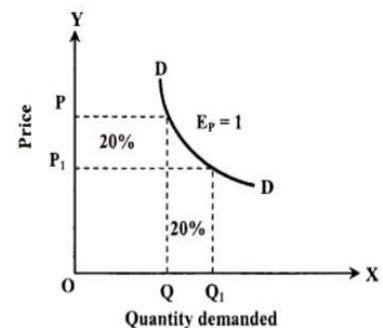
- ✓ In such a situation, the ratio of percentage change in the quantity of the good demanded to the percentage change in the price of the good is >1 .
- ✓ This implies that the percentage change in the quantity demanded is more than the percentage change in the price of the good.



- ✓ The demand curve shown in the figure is relatively flatter.
- ✓ A decrease in the price of the good from P_1 to P_2 leads to an increase in the quantity of the good demanded from OQ_1 to OQ_2 .
- ✓ The decrease in the price ΔP is less than the increase in the quantity of the good demanded, ΔQ . Example: luxuries. The price of luxuries greatly defines the demand. Even a small change in price can lead to a more than proportional change in demand.

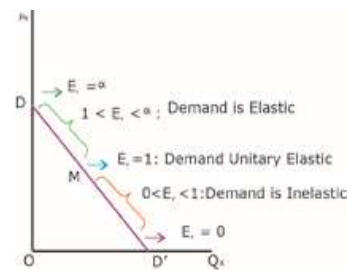
5. Demand has unitary elasticity, $E_P = 1$

- ✓ In situations like this, the ratio of percentage change in the quantity demanded equals the percentage change in the price of the good.
- ✓ The demand curve is shown in the figure as a rectangular hyperbola.
- ✓ A decrease in the price of the good from P_1 to P_2 leads to an increase in the quantity of the good demanded from OQ_1 to OQ_2 .
- ✓ The decrease in price ΔP is equal to the increase in the quantity demanded, ΔQ .
- ✓ Example: normal goods.



PRICE ELASTICITY ON A LINEAR DEMAND CURVE

- ✓ Along a linear demand curve, which is downward sloping, price elasticity varies at different points along the demand curve.
- ✓ In the following figure, the demand curve DD' , we can calculate price elasticity by the formula, $E_p = \text{Lower segment}/\text{Upper segment}$
- At point D on the Y-axis, $E_p = DD'/0 = \infty$.
- At point M , the midpoint on the demand curve DD' , $E_p = MD'/DM = 1$.
- At point D' on the X-axis, $E_p = 0/DD' = 0$.
- ✓ Thus, as we move down a demand curve, the price elasticity goes on decreasing.



INCOME ELASTICITY OF DEMAND

An important determinant of demand is the income of the consumer.

Income elasticity of demand is a measure of the responsiveness of the quantity of a good demanded to a change in the income of the consumer, *ceteris paribus*.

Income elasticity of demand can be defined as the ratio of the percentage change in the quantity of a good demanded per unit of time to the percentage change in the income of the consumer.

$$\begin{aligned}
 E_y &= \frac{\text{Percentage change in the quantity of a good demanded}}{\text{Percentage change in the income of the consumer}} \\
 &= \frac{\text{Change in quantity demanded}}{\text{Change in income}} \\
 &= \frac{\Delta Q/Q}{\Delta Y/Y} \\
 &= \Delta Q/\Delta Y \times Y/Q
 \end{aligned}$$

CROSS PRICE ELASTICITY OF DEMAND

- ✓ Besides the price of the good and the income of the consumer, there are many other factors which influence the demand for a good. An important determinant of demand is the price of the related goods.
- ✓ Cross price elasticity of demand is a measure of the responsiveness of the quantity of a particular good that is demanded to a change in the price of another good, *ceteris paribus*.
- ✓ Cross price elasticity of demand can be defined as the ratio of the percentage change in the quantity demanded of good x to the percentage change in the price of good y .
- ✓ $E_{xy} = \frac{\text{Percentage change in the quantity demanded of good } x}{\text{Percentage change in the price of good } y}$

$$\begin{aligned}
 &= \frac{\text{Change in the quantity demanded of good } x}{\text{Change in the price of good } y} \\
 &= \frac{\Delta Q_x/Q_x}{\Delta P_y/P_y} \\
 &= \Delta Q_x/\Delta P_y \times P_y/Q_x
 \end{aligned}$$