Elasticity of Demand

The Law of Demand explains the direction of change in demand due to change in the price. It fails to explain the rate of change in demand due to a given change in price. Elasticity of demand explains the rate of change in quantity demanded due to a given change in price.

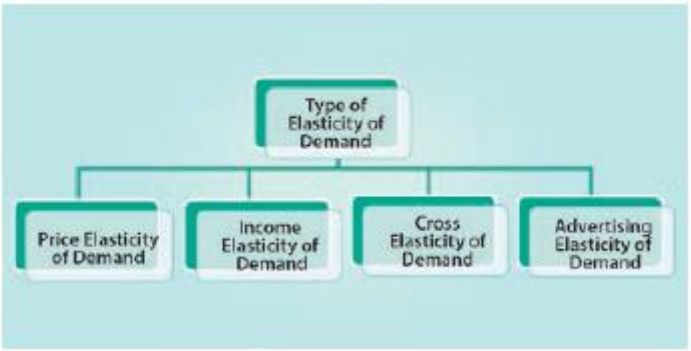
"Elasticity of demand is, therefore, a technical term used by the Economists to describe the degree of responsiveness of the Quantity demand for a commodity to a change in its price".

- Stonier And Hague

Elastic demand or More Elastic demand

Demand for a commodity is said to be "Elastic" when the quantity demanded increases by a large amount due to a little fall in the price and decreases by a large amount due to a little rise in the price. To be more scientific, Elastic demand is called as "More Elastic Demand".

Types of Elasticity of Demand



Price Elasticity of Demand

Price elasticity of demand is commonly known as elasticity of demand. This is because price is the most influential factor affecting demand. "Elasticity of demand measures the

responsiveness of the quantity demanded to changes in the price".

1. Price Elasticity of Demand:

The price elasticity of demand, commonly known as the elasticity of demand refers to the responsiveness and sensitiveness of demand for a product to the changes in its price. In other words, the price elasticity of demand is equal to

$$E_p = \frac{\text{Proportionate change in Quantity Demanded}}{\text{Proportionate change in Price}}$$

Numerically,

$$E_p = \frac{\Delta Q}{\Delta P} X \frac{P}{Q}$$

ΔQ = changes in demand.

ΔP = changes in price.

P = original price.

Q = original quantity.

where, $\Delta Q = Q_1 - Q_0$, $\Delta P = P_1 - P_0$,
Q_1 = New quantity,

Q_0 = Original quantity, P_1 = New price,
P_0 = Original price.

2. Income Elasticity of Demand:

The income is also a factor that influences the demand for a product. Hence, the degree of responsiveness of a change in demand for a product due to the change in the income is known as income elasticity of demand. The formula to compute the income elasticity of demand is:

$$E_Y = \frac{\text{Proportionate change in Quantity Demand for a product}}{\text{Proportionate change in Income}}$$

For most of the goods, the income elasticity of demand is greater than one indicating that with the change in income the demand will also change and that too in the same direction, i.e. more income means more demand and vice-versa.

3. Cross Elasticity of Demand:

The cross elasticity of demand refers to the percentage change in quantity demanded for one commodity as a result of a small change in the price of another commodity. This type of elasticity usually arises in the case of the interrelated goods such as substitutes and complementary goods. The cross elasticity of demand for goods X and Y can be expressed as:

$$E_c = \frac{\textit{Proportionate change in demand of Commodity X}}{\textit{Proportionate change in price of Commodity Y}}$$

4. Advertising Elasticity of Demand:

The responsiveness of the change in demand due to the change in advertising or other promotional expenses, is known as advertising elasticity of demand. It can be expressed as:

$$E_a = \frac{\text{Proportionate change in Demand}}{\text{Proportionate change in Advertising Expenditure}}$$

Levels or Degrees of Price Elasticity of Demand

Definition:

The **Price Elasticity of Demand** is commonly known as the elasticity of demand, which refers to the degree of responsiveness of demand to the change in the price of the commodity.

1. Perfectly Elastic Demand (Ep = ∞):

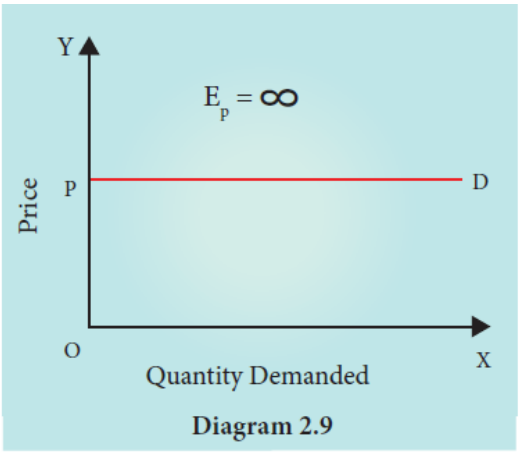


Diagram 2.9

The demand is said to be perfectly elastic when a slight change in the price of a commodity causes an infinite change in its quantity demanded. Such as, even a small rise in the price of a commodity can result in greater fall in demand even to zero. In some cases a little fall in the price can result in the increase in demand to infinity. In perfectly elastic demand the demand curve is a **horizontal straight line** parallel to x axis.

2. Perfectly Inelastic Demand (Ep =0):

When there is no change in the demand for a product due to the change in the price,

then the demand is said to be perfectly inelastic. Here, the demand curve is a **vertical straight line** which shows that the demand remains unchanged irrespective of change in the price.,

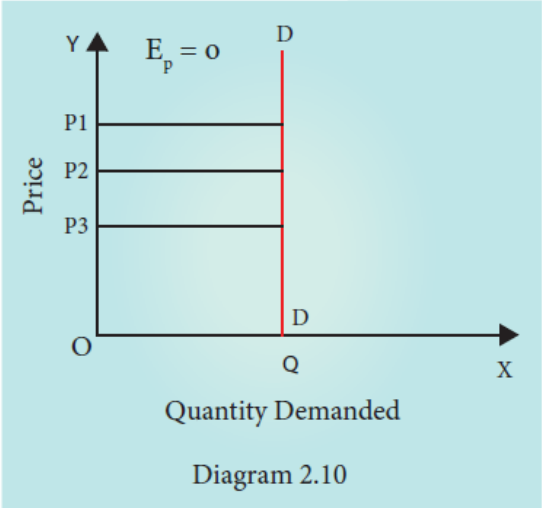


Diagram 2.10

i.e. quantity OQ remains unchanged at different prices, P1, P2, and P3.

3. Relatively Elastic Demand (Ep>1):

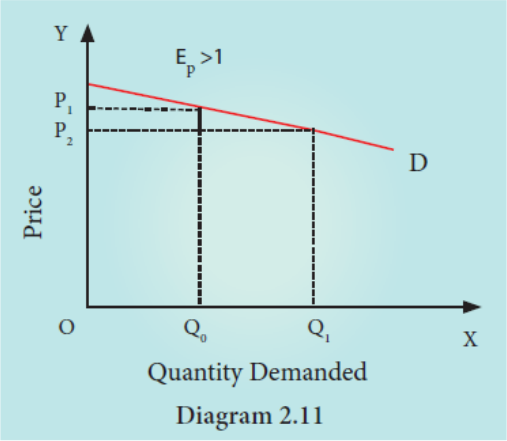


Diagram 2.11

The demand is relatively elastic when the proportionate change in the demand for a commodity is greater than the proportionate change in its price. Here, the demand curve is **gradually sloping** which shows that a proportionate change in quantity from 5 to 10 is greater than the proportionate change in the price from 11 to 10. Change in demand is: 10–

5/5 × 100 = 100% Change in price =10%. Hence, it is more elastic demand.

5. Relatively Inelastic Demand (Ep<1):

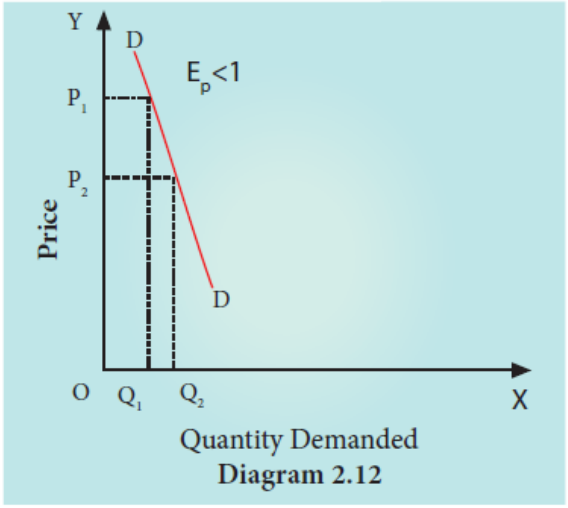


Diagram 2.12

When the proportionate change in the demand for a product is less than the proportionate change in the price, the demand is said to be relatively inelastic. It is also called as the elasticity less than unity. Here the demand curve is steeply sloping, which shows that the change in the quantity from OQ0 to OQ1 is relatively smaller than the change in the price from OP1 to Op2.

6. Unitary Elastic Demand (Ep =1):

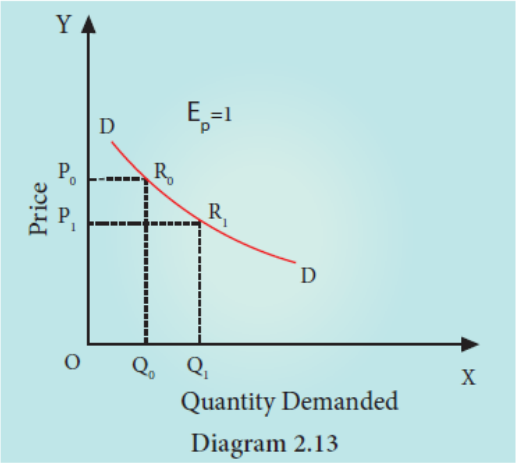


Diagram 2.13

The demand is unitary elastic when the proportionate change in the price of a product results in the same propionate change in the quantity demanded. Here the shape of the demand curve is a rectangular hyperbola, which shows that area under the curve is equal to one.

Here OP0 R0Q0 = OP1 R1Q1

Table 2.5 Degrees of Price Elasticity of Demand

Numerical Value	*Terminology*	*Description*	*Shape of the Demand curve*
$e_p = \infty$	Perfectly elastic	Change in demand is infinite at a given price	Horizontal
$e_p = 0$	Perfectly inelastic	Demand remains unchanged whatever be the change in price	Vertical
$e_p = 1$	Unitary elastic	$\%\Delta Q = \%\Delta P$	Rectangular Hyperbola
$0 < e_p < 1$	Inelastic	$\%\Delta Q < \%\Delta P$	Steeper
$\infty > e_p > 1$	Elastic	$\%\Delta Q > \%\Delta P$	Flatter