

ELASTICITY

It shows the degree of responsiveness of the change in the one variable due to the change in the quantity of the other variable.

$$\text{Elasticity} = \frac{\text{Percentage change in the one variable}}{\text{Percentage change in the other variable}}$$

It is simply a way of quantifying cause of and effect relationship. The concept of elasticity can be used in demand and supply.

ELASTICITY OF DEMAND

We can study the elasticity of demand under the following categories.

- Price elasticity of demand
- Income elasticity of demand
- Cross price elasticity of demand

PRICE ELASTICITY OF DEMAND

It shows the degree of responsiveness of the change in the quantity demanded due to the change in the price of the product

$$\text{PED} = \frac{\text{Percentage change in the Qd}}{\text{Percentage change in the P}}$$

OR

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

For example

P	Qd
20	70
15	100

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

$$30/-5 \times 20/70$$

$$= -1.71$$

Price elasticity of demand is always with negative sign. This negative sign shows that the price and quantity are negatively related, so we can ignore this negative sign. According to the value of price elasticity of demand there are following types of elasticity.

- If $PED > 1$ Elastic Demand
- If $PED < 1$ Inelastic Demand
- If $PED = 1$ Unitary Elastic Demand
- If $PED = 0$ Perfectly Inelastic Demand
- If $PED = \infty$ Perfectly elastic demand

Elastic Demand

Demand is said to be price elastic if small proportionate change in the price brings a larger proportionate change in the quantity demanded.

- In this case the value of PED is always greater than 1.
- Shape of the demand curve is flatter.
- Luxuries have elastic demand.

P	Qd
100	100
110	80

(% $\Delta Q >$ % ΔP because demand is elastic)

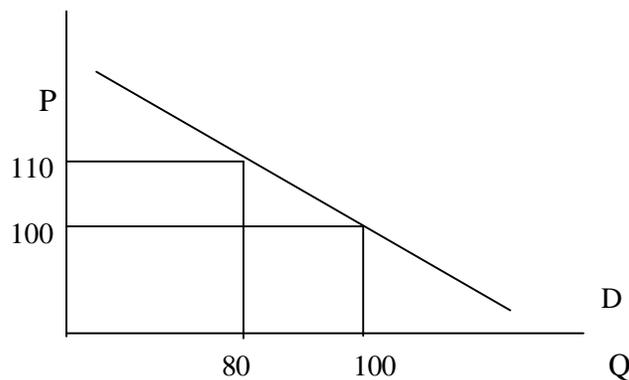
$$PED = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

$$= \frac{-20}{10} \times \frac{100}{100}$$

$$= -2$$

Ignore this -ve sign, so

$PED = 2$



Inelastic Demand

Demand is said to be price inelastic if larger proportionate change in the price brings a small proportionate change in the quantity demanded.

- In this case the value of PED is always less than 1.
- Shape of the demand curve is steeper.
- Necessities have elastic demand.

P	Qd
100	100
130	90

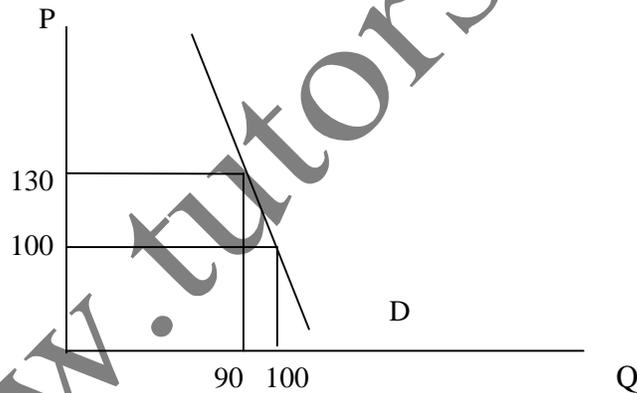
(% $\Delta P >$ % ΔQ because demand is inelastic)

$$PED = \Delta Q / \Delta P \times P / Q$$

$$-10 / 30 \times 100 / 100$$

$$= -0.33 \quad \text{Ignore this -ve sign, so}$$

$$PED = 0.33$$



Unitary Elastic Demand

Demand is said to be price unitary elastic if any proportionate change in the price brings an equal proportionate change in the quantity demanded.

- In this case the value of PED is always equal to 1.
- Shape of the demand curve is rectangular hyperbola.

P	Qd
100	100
110	90

(% $\Delta P =$ % ΔQ because demand is unitary elastic)

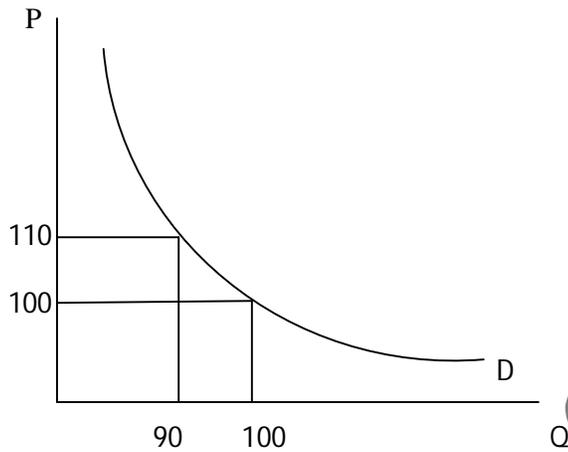
$$PED = \Delta Q / \Delta P \times P / Q$$

$$-10 / 10 \times 100 / 100$$

$$= -1$$

Ignore this -ve sign, so

$$PED = 1$$



Perfectly Inelastic Demand

Demand is said to be perfectly inelastic if any proportionate change in the price brings a no change in the quantity demanded. We can say that given quantity can be demanded at any price in case of perfectly inelastic demand.

- In this case the value of PED is always zero.
- Shape of the demand curve is vertical line.
- Necessities without which we cannot survive have perfectly inelastic demand.

P	Qd
100	100
130	100

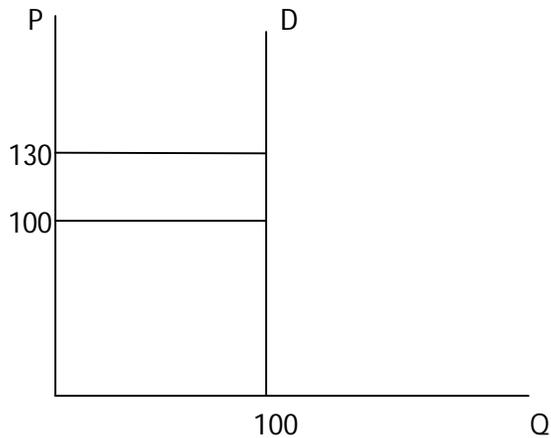
(% ΔQ is zero at all prices)

$$PED = \Delta Q / \Delta P \times P / Q$$

$$0 / 30 \times 100 / 100$$

$$= 0$$

$$PED = 0$$



Perfectly Elastic Demand

Demand is said to be perfectly elastic if any small proportionate change in the price brings a infinite change in the quantity demanded. We can say that at given price any quantity can be demanded in case of perfectly elastic demanded.

- In this case the value of PED is infinity.
- Shape of the demand curve is horizontal line.
- Very luxurious goods have perfectly elastic demand.

P	Qd
100	100
100	130

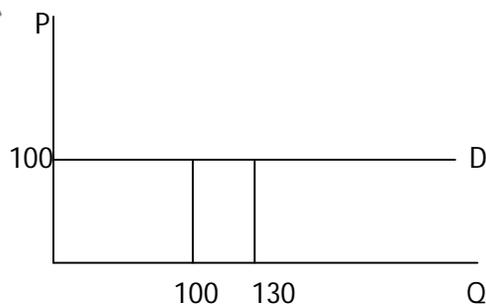
(Any quantity can be demanded at given price)

$$PED = \Delta Q / \Delta P \times P / Q$$

$$= 30 / 0 \times 100 / 100$$

$$= \infty$$

$$PED = \infty$$



Determinants of price elasticity of demand

Although we know how to measure the elasticity. We have not yet discussed the reasons why some products have elastic demand and others not so. The most important determinants of elasticity are discussed below.

1. Number of substitutes

The goods which tend to have more substitutes have elastic demand. For example LUX has elastic demand because of so many substitutes available in the market.

If the good have less substitutes then the demand will be inelastic, i.e. wheat.

2. The number of uses

The greater the number of uses to which a commodity can be put, the greater its elasticity of demand.

For example electricity has many uses; heating, lighting and cooking etc. a rise in the price of electricity might cause people not only to make economies in all these areas but also to substitute other fuels in some cases.

3. Nature of the product

Luxuries tend to have elastic demand than necessities. For example cars have elastic demand because buyers can switch away from the market and stop buying if price rises.

Wheat has inelastic demand because buyers cannot afford not to buy it because it is necessity.

4. Time

Following the changes in price, elasticity of demand will tend to be greater in the long run than the short run.

In short run consumers have no sufficient information regarding with the market situation and less substitutes are available in the short run. While situation is opposite in the long run consumers have sufficient information about the market and more substitutes are available.

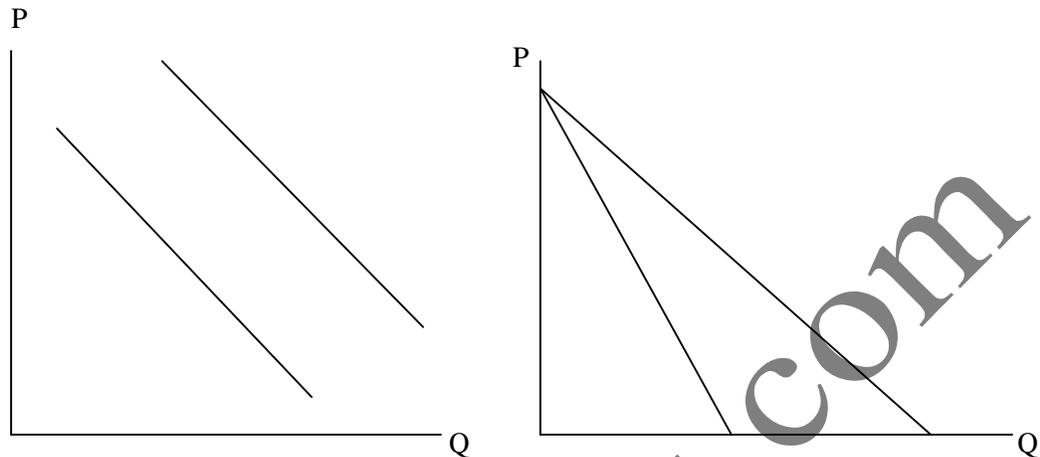
5. Proportion of the income spent on the product

The greater the proportion of income which price of product represents the greater its elasticity of demand will tend to be.

For example the price of match box is Rs 1 if this becomes double even than people will demand it because a small fraction of income is used upon the product, so the demand for match box will be inelastic.

6. The price of other products

An increase (or decrease) of demand by a constant percentage leaves elasticity unchanged but a rightward shift of the curve by a fixed amount reduces elasticity.



7. Durability

The greater the durability of the product, the greater its elasticity of demand will tend to be. For example if the price of the furniture rises, we can make our existing tables and chairs last a little longer.

8. Habit forming good

If a good is habit forming for example cigarettes this will tend to reduce its elasticity of demand.

9. Whether the firm has built a relationship with its customers

Some firms aim to develop loyalty from their customers these will make the customers less sensitive to price changes, so the demand for such product is inelastic.

10. The breadth of product category being considered

The demand for petrol as a whole is inelastic. Petrol users can not easily do without it. However demand for any one filling station's petrol is likely to be more price elastic than petrol as a whole. This is because customers can switch towards any other filling station if there is any increase in the price at that filling station. So the wider category examined the more price inelastic demand will be.

11. Who is paying

If you have to pay a bill by yourself you are likely to be fairly sensitive to price. If however someone else is paying e.g. firm you are likely to be less sensitive to price.

So if you are paying the bill demand will be elastic while if someone else is paying demand will be inelastic.

PRACTICAL APPLICATIONS OF THE CONCEPTS OF ELASTICITY

1. Producers would be interested in the concepts of elasticity because their price policy will be affected by the responses expected.
2. For price elasticity demand, the producer will push up prices if the demand for the product is inelastic (in the case of necessities or goods with no close substitutes).
3. If demand for the product is elastic, then the producer will lower price in order maximize sales and revenue. This is the case of luxuries or goods with several close substitutes.
4. For income elasticity of demand, the producer must first consider whether the product is a normal good or an inferior good. If it is a normal good, then he will promote the good when there is an increase in income example during bonus time. Promotions can be in the form of some marketing gimmicks such as 'buy one get one free', or lucky draws or 'buy one and get the second one' at a lower price. The producer can also promote the good with attractive display or perhaps demonstrations.
5. However, if the product is an inferior good, the producer would only promote the good in times of falling income or when the economy is in a state of recession. For example, the supermarket manager can promote instant noodles and canned food. In the case of an inferior good, a falling income will lead to an increase in quantity demand.
6. For cross elasticity of demand where the two products are substitutes, with an increase in the price of one good (e.g. chicken), the producer will promote the substitutes (e.g. pork, mutton, beef, fish). This will increase sales and hence more revenue.
7. For negative cross elasticity of demand, the producer will promote complements. For example, if the price of bread has fallen, then the producer will promote spreads such as butter, kaya, honey, peanut butter and jam. This will also boost sales.
8. There are also other uses of the concepts of elasticity other than increasing sales. For example, elasticity concepts will be useful to determine tax burden and to identify the market structures that the business is in.

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Practical limitations of the concept of elasticity of demand

In theory, the various measures of the elasticity of demand help managers to understand the impact of changes in different variables on their sales. This is important to their planning; for example, when estimating the required staffing and stock levels. However, whilst a knowledge of the price, income and cross elasticities of demand would certainly be useful, in reality using them can be difficult due to the following reasons.

- They do not show the actual cause and effect. For example, an increase in demand may be accompanied by an increase in income. It could be that the higher advertising has caused the increase in demand. However, it could be that with more demand market managers feel they have the funds necessary to pay for more advertising. The initial increase in demand may have been caused by something else entirely. It is not necessarily the increase in advertising that is causing the increase in demand, and so a high advertising elasticity of demand may be misleading in terms of future decision making.
- Each of the equations for the elasticity of demand measures the relationship between one specific factor and demand; for example, the price elasticity of demand analyses the impact of a change in price on the quantity demanded. In reality, many factors may be changing at the same time, such as the spending on advertising, competitors' promotional strategies and customers' incomes, as well as the firm's price. It may therefore be difficult to know what specifically has caused any change in the quantity demanded. Any change in the quantity demanded may not have been due to a price change at all, and so the value of the price elasticity of demand may be misleading.
- To know the elasticity of demand managers must either look back at what happened in the past when, for example, prices or income were changed (but the conditions are likely to have altered since then) or estimate for themselves what the values are now (in which case they may be wrong because it is an estimate). The value of elasticity is, therefore, not actually known at any moment, it is merely estimated. This means that managers should be careful about basing decisions on their estimates of the elasticity as the values will be changing all the time as demand conditions change.

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Why is the demand of primary products inelastic?

1. In the case of necessities, i.e. goods which are required no matter what the price is (consumption of such goods cannot be dispensed with). For example, when the price of rice rises, the quantity demanded will decrease only slightly because rice is essential to our Asian diet. This is true for all staple food.
2. Most raw materials, except rubber, have *no close substitutes*. So, despite changes in price the demand for such goods will be inelastic. This is also generally true for food.
3. When a taste or preference becomes *a force of habit*, it becomes very difficult to change that habit. For instance, a person who must consume rice daily will find it difficult to switch to other types of grain. Such forces of habit would bring about inelastic demand.
4. Most primary products are *relatively cheap* and consumers are not overly bothered by price changes. Most vegetables, for example, do not cost more than \$5 per kg. Moreover, these goods constitute only a minor portion of one's total expenditure, such as salt and sugar.
5. The *intake* of food is *limited*. Hence, even though the prices of primary products may be very cheap, or prices may have dropped considerably, consumers will not buy large quantities of such goods (e.g. rice) because human intake of food is limited.
6. Most primary products are *produced in bulk and* although the price may be cheap, consumers would not buy in large quantities because they do not have the facilities to store such goods.
7. Associated with *the problem of storage* is that of *perishability*. Most primary products, especially agricultural goods such as eggs and fresh fish, cannot be kept for long as they rot easily.

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INCOME ELASTICITY OF DEMAND (YED)

It shows the degree of responsiveness of the change in the quantity demanded due to the change in the income of the consumer.

$$YED = \frac{\text{Percentage change in the } Q_d}{\text{Percentage change in the } Y}$$

OR

$$YED = \Delta Q / \Delta Y \times Y / Q$$

As the income of the consumer increases than the demand for the product may

- 1) Increase
- 2) Decrease
- 3) Remain same

1 If demand for the product increase as income increases

Y	Qd
1000	2000
1500	2200

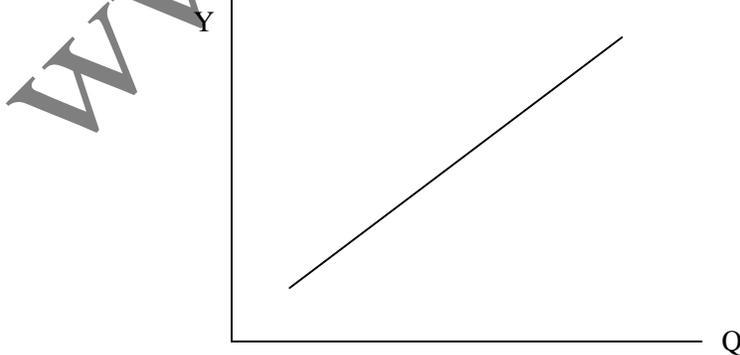
$$YED = \Delta Q / \Delta Y \times Y / Q$$

$$200 / 500 \times 1000 / 2000$$

$$= 0.2$$

$$YED = 0.2$$

If YED is + ve the good will be a normal good



2 If demand for the product decrease as income increases

Y	Qd
1000	2000
1500	1700

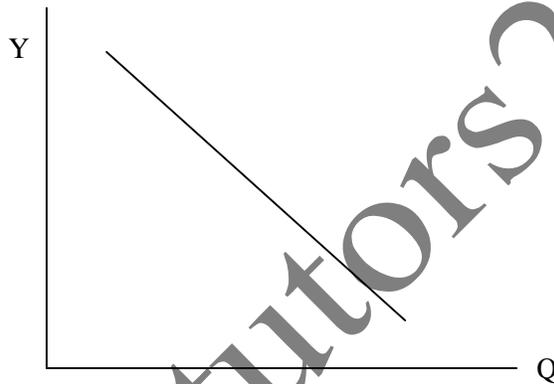
$$YED = \Delta Q / \Delta Y \times Y / Q$$

$$-300 / 500 \times 1000 / 2000$$

$$= -0.3$$

$$YED = -0.3$$

If YED is -ve the good will be a inferior good



3 If demand for the product remain same as income increases

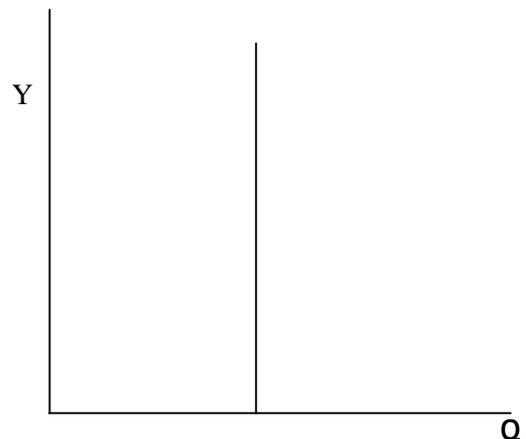
Y	Qd
1000	2000
1500	2000

$$YED = \Delta Q / \Delta Y \times Y / Q$$

$$0 / 500 \times 1000 / 2000$$

$$= 0$$

$$YED = 0$$



If YED is zero the good will be a basic necessity.

According to the value of income elasticity of demand there are following types of elasticity.

If $YED > 1$ Income Elastic Demand

If $YED < 1$ Income Inelastic Demand

If $YED = 1$ Unitary Income Elastic Demand

Income Elastic Demand

Demand is said to be income elastic if small proportionate change in the income brings a larger proportionate change in the quantity demanded.

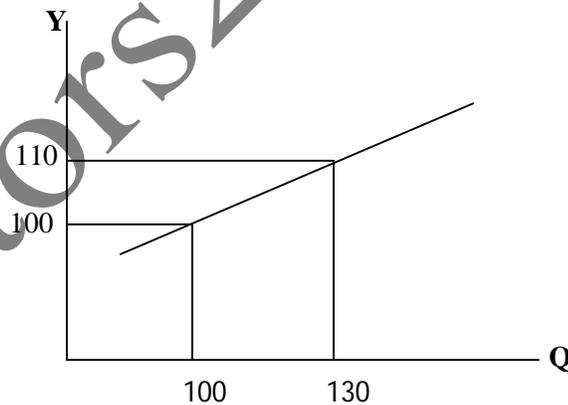
- In this case the value of YED is always greater than 1. If YED is +ve then good will be normal and if YED is -ve the good will be inferior.
- Shape of the demand curve is flatter.

Y	Qd
100	100
110	130

$$YED = \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}$$

$$= \frac{30}{10} \times \frac{100}{100}$$

$$YED = 3$$



Y	Qd
100	100
110	80

$$YED = \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}$$

$$= \frac{-20}{10} \times \frac{100}{100}$$

$$= -2$$

