

## ELASTICITY

The quantity demanded of a good is affected by changes in the price of a good, changes in price of other goods, changes in income and changes in other relevant factors.

**Elasticity is a measure of just how much the quantity demanded will be affected by a change in price or income etc.**

Different elasticities of demand measures the responsiveness of quantity demanded to changes in variables which affect demand so>

1. **Price elasticity of demand**- measures the responsiveness of quantity demanded b changes in the price of the good
2. **Income elasticity of demand** – measures the responsiveness of quantity demanded by changes in consumer incomes.
3. **Cross elasticity of demand** – measures the responsiveness of quantity demanded by changes in price of another good

### 3.1. Price elasticity of demand

Economists choose to measure responsiveness in term of % change which is the degree of responsiveness in changes in quantity demanded to changes in price is calculated by using the formula:

$$\frac{\% \text{Change In Quantity Demanded}}{\% \text{ Change In Price}}$$

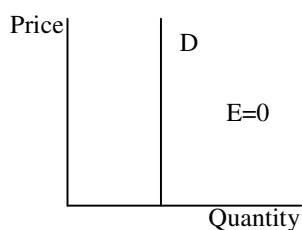
Change in price (%)	Change in quantity demanded (%)	Elasticity
10	20	2
50	25	0.5

Data to calculate price elasticities are often not presented in the form of % changes. These have to be worked out.

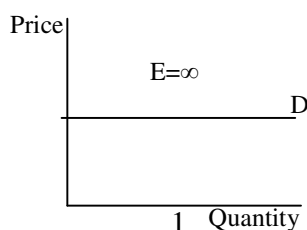
$$\text{Price elasticity} = \frac{\% \Delta \text{in Quantity}}{\% \Delta \text{in Price}} \Rightarrow \frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100} \Rightarrow \frac{\Delta Q}{Q} \times \frac{P}{\Delta P} \Rightarrow \frac{P}{Q} \times \frac{\Delta Q}{\Delta P}$$

## GRAPHICAL PRESENTATION

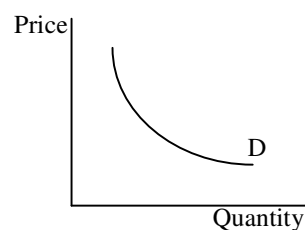
Perfectly inelastic (A)



Perfectly elastic (B)



Unitary elastic (C)



### 3.2. Income elasticity of demand

Income elasticity of demand is a measure of that when income elasticity of demand is the responsiveness of quantity demanded to changes in consumers' income.

Just as with price elasticity, it is sometimes easier to use formula to calculate income elasticity of demand.

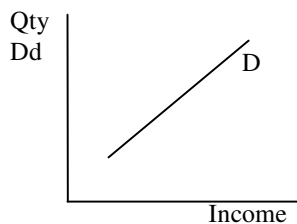
The formula is equivalent to:

$$\frac{\frac{\Delta Q}{Q}}{\frac{\Delta Y}{Y}} \Rightarrow \frac{\Delta Q}{Q} \times \frac{Y}{\Delta Y} \Rightarrow \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}$$

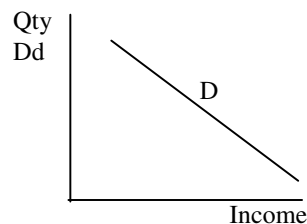
**Normal goods:** Any goods whose income elasticity of demand is greater than zero

**Inferior goods:** any good in which consumers have negative income elasticity of demand.

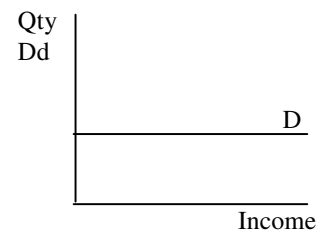
(A)



(B)



(C)



Positive Income Elasticity can be divided into 3 categories:

1. Income inelastic  $\rightarrow E_Y < 1$  (Dd rises by a smaller proportion as Y)
2. Unit income elasticity  $\rightarrow E_Y = 1$  (Dd rises by exactly the same proportion as Y)
3. Income elastic  $\rightarrow E_Y > 1$  (Dd rises by a greater proportion than Y)

In the short run, people often save increases in income, so most goods except impulse – bought goods like furniture, jewelry and watches have low-income elasticities, Hence economists generally focus on the Long run income elasticities. Some goods have Income elasticity less than 1 e.g. consumption doesn't keep pace with rises in income. These are generally relative necessities (goods which are necessities compared to other good).

Other goods have long run elasticities greater than 1, their consumption is more than keeps pace with rises in income. They tend to be relative luxuries.

### 3.3. Cross elasticity of demand

The quantity demanded of a particular good varies according to the price of other goods. A rise in price of a good such as beef would increase the quantity demanded of a substitute such as pork; On the other hand a rise in price of a good such as tennis racket

would lead to a fall in quantity demanded of a complement such as tennis ball. Cross elasticity of demand measures the responsiveness of quantity demanded of one good to change in the price of another.

Two goods, which are substitutes, will have a positive cross elasticity while two goods, which are complements, will have a negative cross elasticity.

The cross elasticity of two goods which have little relationship to each other would be zero e.g. a rise in the price of cars of 10% is likely to have no effect (0%) change on the demand for tipp-ex.

As with price and income elasticity, it is sometimes more convenient to use alternative formulae for cross elasticity of demand. These are:

$$\text{Cross elasticity of good X} = \frac{\frac{\Delta Q_X}{Q_X}}{\frac{\Delta P_Y}{P_Y}} \Rightarrow \frac{\Delta Q_X}{Q_X} \times \frac{P_Y}{\Delta P_Y}$$

### **3.4. Price elasticity of supply**

Price elasticity of supply measures the responsiveness of quantity supplied to changes in price

The formula for measuring price elasticity of supply is:  $\frac{\% \Delta \text{in Quantity Supplied}}{\% \Delta \text{in Price}}$

This is equivalent to:  $\frac{\Delta Q}{Q} \div \frac{\Delta P}{P} \Rightarrow \frac{\Delta Q}{Q} \times \frac{P}{\Delta P} \Rightarrow \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$

Its with price elasticity of demand, different ranges of elasticities are given different name.

We distinguish:

Perfectly inelastic supply - value of elasticity is zero

Inelastic supply - if the value of elasticity is less than one

Unitary elastic supply - if the value of elasticity is exactly one

Elastic supply - if the value of elasticity is greater than one

Perfectly elastic supply - if the value of elasticity is infinity, e.g. producers are prepared to supply any amount at a given price