

# Revision – Elasticity of demand and supply

**Elasticity:** A measure of the responsiveness of how much something changes when there is a change in one of the factors that determines it.

**Elasticity of demand:** A measure of how much the demand for a product changes when there is a change in one of the determinants of demand.

**Price elasticity of demand:** A measure of how much the quantity demanded of a product changes when there is a change in its price.

**Cross elasticity of demand:** A measure of how much the demand for a product changes when there is a change in the price of another product.

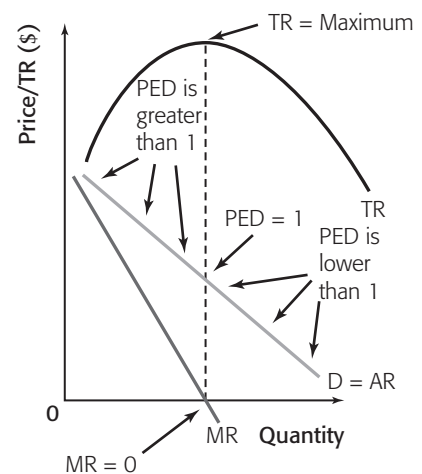
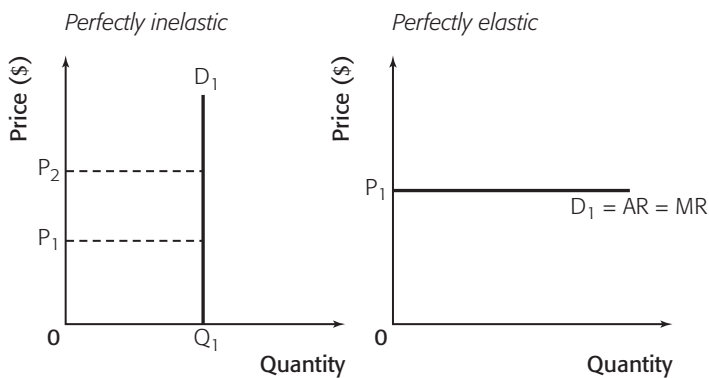
**Income elasticity of demand:** A measure of how much the demand for a product changes when there is a change in the consumer's income.

**Price elasticity of supply:** A measure of how much the quantity supplied of a product changes when there is a change in its price.

## Price elasticity of demand (PED)

Formula: 
$$PED = \frac{\text{Percentage change in quantity demanded of the product}}{\text{Percentage change in price of the product}}$$

**The range of values** is from zero to infinity. PED is perfectly inelastic when the value is zero. PED is inelastic when the value is between zero and 1. PED is unitary when the value is 1. PED is elastic when the value is between 1 and infinity. PED is perfectly elastic when the value is infinity.



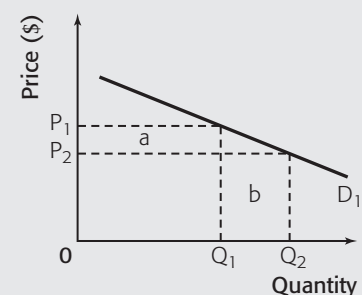
**Values of PED for a normal demand curve** will fall as the price falls, i.e. as we go down the demand curve.

- If PED is elastic, then total revenue can be increased by lowering the price of the product.
- If PED is inelastic, then total revenue can be raised by increasing the price of the product.
- If PED is equal to 1, then total revenue is being maximized.

### The determinants of PED are:

- the number and closeness of substitutes – the more substitutes it has, the more elastic will be the demand for a product
- the necessity of the product and how widely it is defined – the less necessary it is, the more elastic will be the demand for a product
- the time period being considered – the longer the time period being considered, the more elastic will be the demand for a product.

Revenue boxes may be used to show the same relationships, e.g. when demand is relatively elastic, a fall in price from  $P_1$  to  $P_2$  leads to an increase in revenue of  $(b - a)$ .



## Cross elasticity of demand (XED)

$$\text{Formula: XED} = \frac{\text{Percentage change in quantity demanded of product X}}{\text{Percentage change in price of product Y}}$$

**The range of values** is important. The sign tells us the relationship between the goods.

- If the value of XED is positive, then goods are substitutes for each other, e.g. Coke and Pepsi. The larger the value, the closer the relationship.
- If the value of XED is negative, then goods are complements for each other, e.g. DVD players and DVDs. The larger the value, the closer the relationship.
- If the value of XED is zero, then the goods are unrelated, e.g. strawberries and mobile phones.

**The determinants of XED** are the relationships between the goods in question, as shown above.

## Income elasticity of demand (YED)

$$\text{Formula: YED} = \frac{\text{Percentage change in quantity demanded of the product}}{\text{Percentage change in income of the consumer}}$$

**The range of values** is important. For normal goods, the value of YED is positive, i.e. as income increases the demand for the good increases. If the value is between zero and 1, then the YED is said to be income inelastic. If the value is greater than 1, then the YED is said to be income elastic.

The sign tells us the type of good that is being considered.

- Necessity goods are products that have low-income elasticity, essential products, e.g. bread.
- Superior goods are products that have high-income elasticity, non-essential products, e.g. foreign holidays.
- Inferior goods are products that have negative income elasticity, because the demand decreases as income increases, e.g. cheap wine or non-brand name jeans.

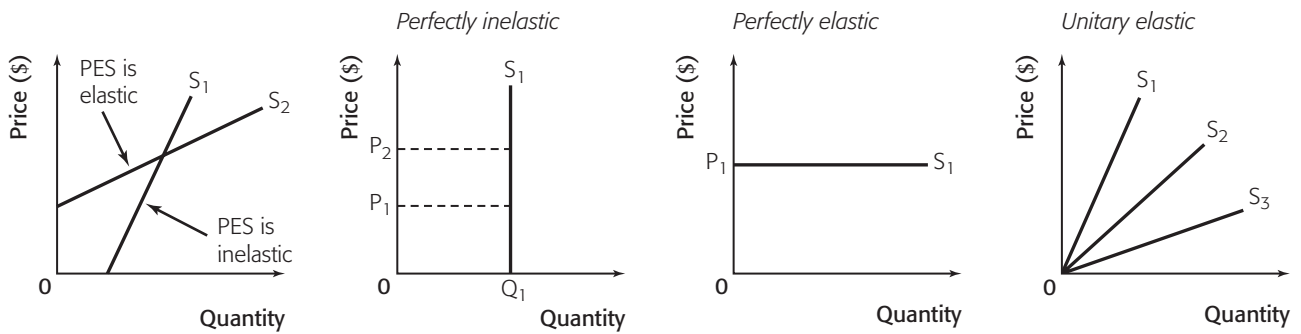
**The determinants of YED** are the types of goods in question, as shown above.

## Price elasticity of supply (PES)

$$\text{Formula: PES} = \frac{\text{Percentage change in quantity supplied of the product}}{\text{Percentage change in price of the product}}$$

**The range of values** is from zero to infinity. PES is perfectly inelastic when the value is zero. PES is inelastic when the value is between zero and 1. PES is unitary when the value is 1. PES is

elastic when the value is between 1 and infinity. PES is perfectly elastic when the value is infinity.



In international trade, it is assumed that the supply of commodities, such as wheat, available to a country for import is perfectly elastic, because consumers can import all that they want as long as they are prepared to pay the 'world price'.

### The determinants of PES are:

- how much costs rise as output increases – if total costs rise significantly as a producer attempts to increase supply, then supply will not be raised and so supply will be relatively inelastic
- the time period being considered – the longer the time period being considered, the more elastic will be the supply of a product. In the immediate time period, PES will be perfectly inelastic. In the short run, as firms can change variable factors, PES will become more elastic. In the long run, when firms can change all factors, PES will be even more elastic.