

CIE Economics AS-level

Topic 2: Price System and the Microeconomy

b) Price elasticity, income elasticity and cross-elasticities of demand

Notes



Price elasticity of demand

 The price elasticity of demand is the responsiveness of a change in demand to a change in price. The formula for this is:

$$PED = \frac{\% \Delta QD}{\% \Delta P}$$

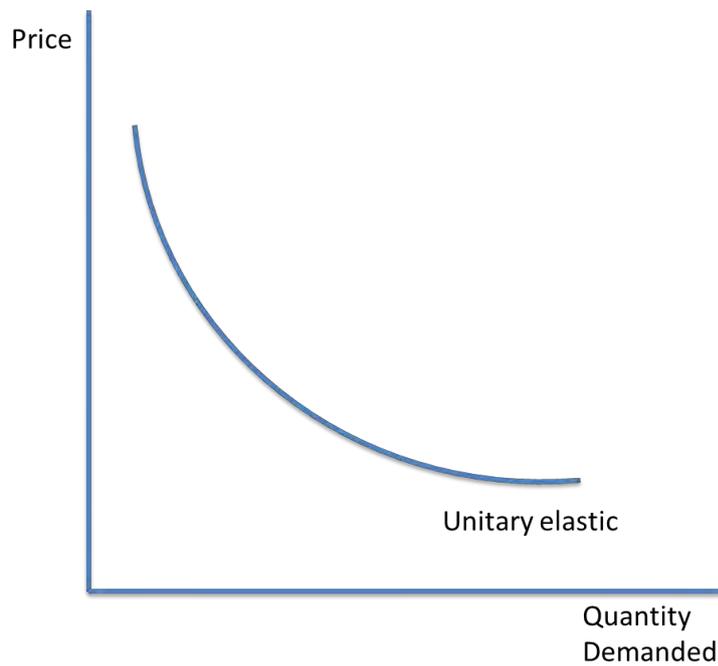
 A price elastic good is very responsive to a change in price. In other words, the change in price leads to an even bigger change in demand. The numerical value for PED is >1 .



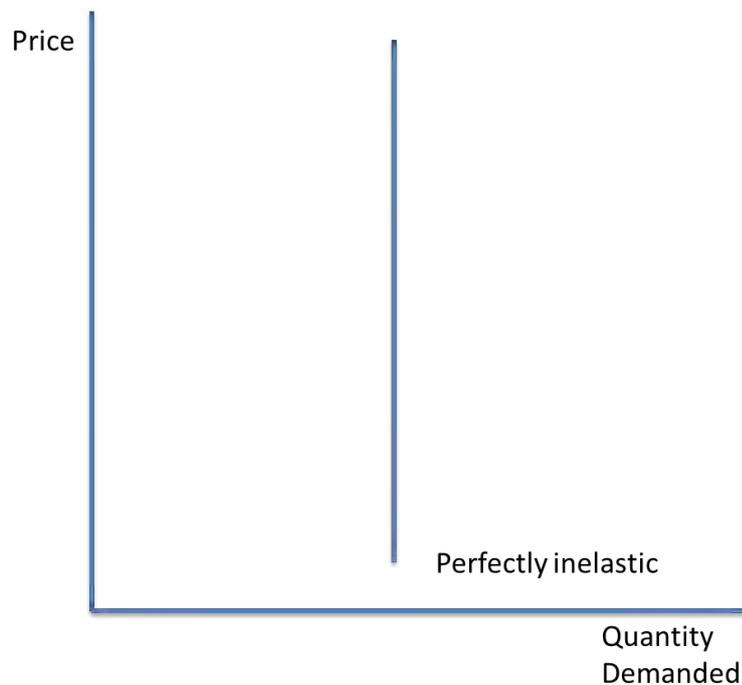
 A price inelastic good has a demand that is relatively unresponsive to a change in price. PED is <1 .



-  A unitary elastic good has a change in demand which is equal to the change in price.
 $PED = 1$.

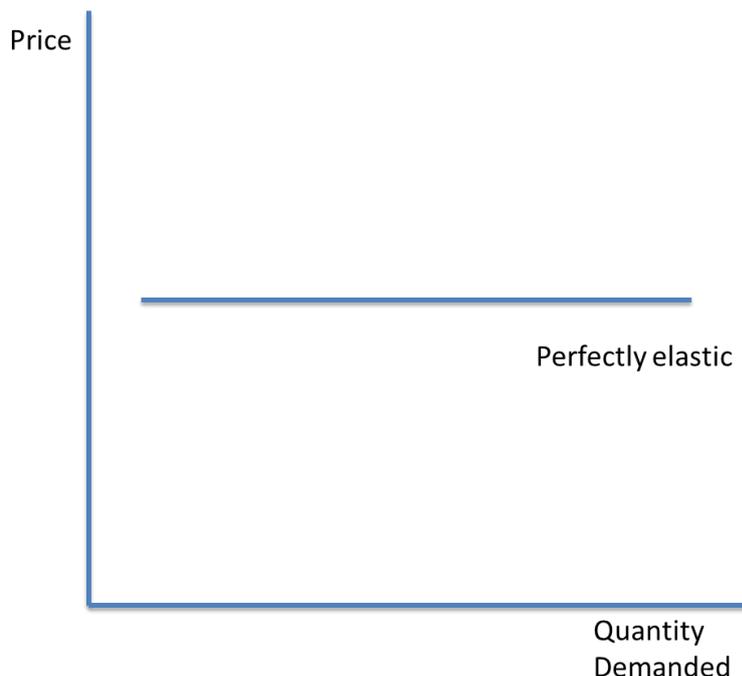


-  A perfectly inelastic good has a demand which does not change when price changes.
 $PED = 0$.



-  A perfectly elastic good has a demand which falls to zero when price changes. $PED = \text{infinity}$.





 If the price of bread increased by 15%, and the quantity demanded decreased by 20%, the PED of bread is: $-20\% / 15\% = -1.33$. Since the value is greater than 1 (the positivity or negativity does not matter here) bread is price elastic.

Factors influencing PED:

1) **Necessity:**

A necessary good, such as bread or electricity, will have a relatively inelastic demand. In other words, even if the price increases significantly, consumers will still demand bread and electricity, because they need it. Luxury goods, such as holidays, are more elastic. If the price of flights increases, the demand is likely to fall significantly.

2) **Substitutes:**

If the good has several substitutes, such as Android phones instead of iPhones, then the demand is more price elastic. The elasticity can also change within markets. For example, the market for bread is less elastic than the market for white bread. This is because there are fewer substitutes for bread in general, but there are several substitutes for white bread. Hence, white bread is more price elastic. The closer and more available the substitutes are, the more price elastic the demand.

Elasticity also changes in the long and short run. In the long run, consumers have time to respond and find a substitute, so demand becomes more price elastic. In the short run, consumers do not have this time, so demand is more inelastic.



3) Addictiveness or habitual consumption:

The demand for goods such as cigarettes is not sensitive to a change in price because consumers become addicted to them, and therefore continue demanding the cigarettes, even if the price increases.

4) Proportion of income spent on the good:

If the good only takes up a small proportion of income, such as a magazine which increases in price from £1.50 to £2, demand is likely to be relatively price inelastic. If the good takes up a significant proportion of income, such as a car which increases in price from £15,000 to £20,000, the demand is likely to be more price elastic.

5) Durability of the good:

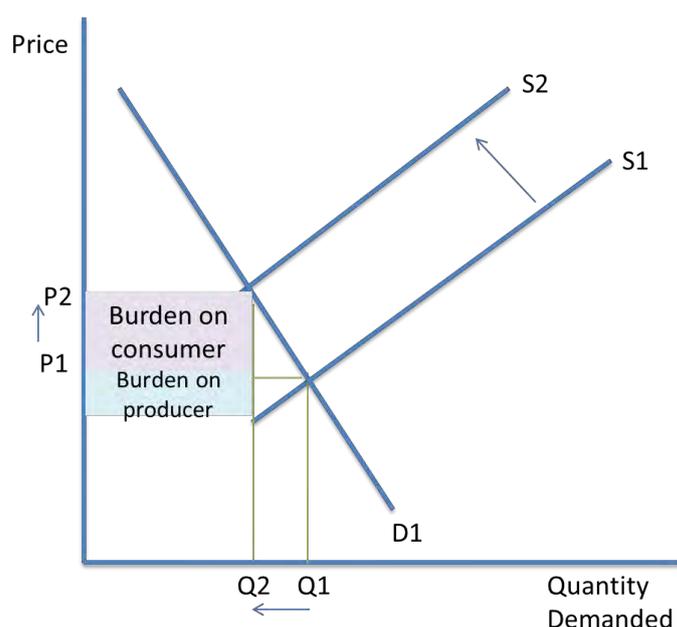
A good which lasts a long time, such a washing machine, has a more elastic demand because consumers wait to buy another one.

6) Peak and off-peak demand:

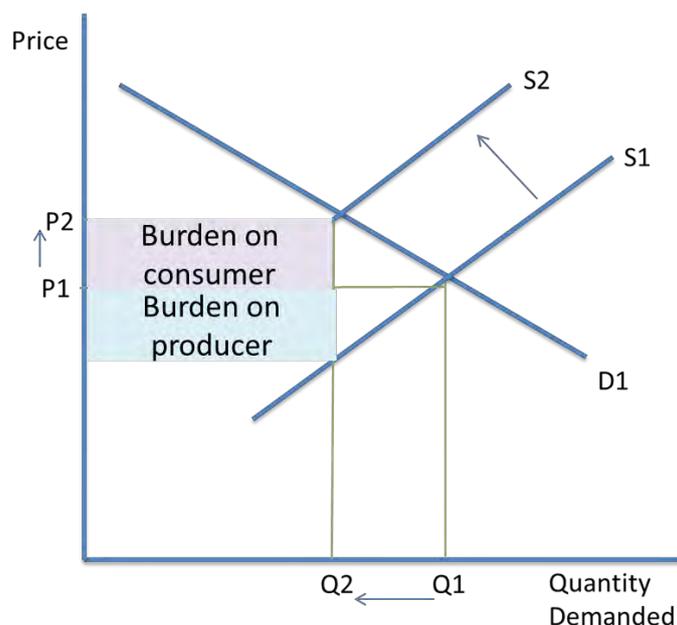
During peak times, such as 9am and 5pm for trains, the demand for tickets is more price inelastic.

Elasticity of demand and tax revenue:

-  The burden of an indirect tax will fall differently on consumers and firms, depending on if the good has an elastic or inelastic demand. It is important to note, however, that taxes shift the supply curve, not the demand curve.
-  If a firm sells a good with an inelastic demand, they are likely to put most of the tax burden on the consumer, because they know a price increase will not cause demand to fall significantly. An increase in tax will decrease supply from S_1 to S_2 , which increases price from P_1 to P_2 , and therefore demand contracts from Q_1 to Q_2 .
-  This is most effective for raising government revenue.

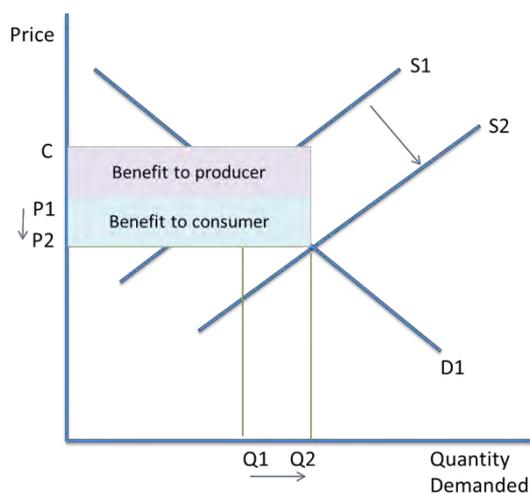


-  If a firm sells a good with an elastic demand, they are likely to take most of the tax burden upon themselves. This is because they know if the price of the good increases, demand is likely to fall, which will lower their overall revenue.
-  This is not as effective for raising government revenue, but if a government wants to reduce the demand of a particular good, it is effective. Demand will fall significantly, from Q_1 to Q_2 .



 **Elasticity of demand and subsidies:**

-  A subsidy is a payment from the government to firms to encourage the production of a good and to lower their average costs. It has the opposite effect of a tax because it increases supply. The benefit of the subsidy can go to both the producer, in the form of increased revenue ($C-P_1$), or to the consumer, in the form of lower prices (P_1-P_2).



PED and total revenue:

-  Total revenue is equal to average price times quantity sold. $TR = P \times Q$
-  If a good has an inelastic demand, the firm can raise its price, and quantity sold will not fall significantly. This will increase total revenue.
-  If a good has an elastic demand and the firm raises its price, quantity sold will fall. This will reduce total revenue.

Income elasticity of demand

-  Income elasticity of demand is the responsiveness of a change in demand to a change in income. The formula for this is:

$$YED = \frac{\% \Delta QD}{\% \Delta Y}$$

Inferior, normal and luxury goods:

-  Inferior goods are those which see a fall in demand as income increases. For example, the 'value' options at supermarkets could be seen as inferior. As income increases, consumers switch to branded goods. $YED < 0$.
-  With normal goods, demand increases as income increases. $YED > 0$.
-  With luxury goods, an increase in income causes an even bigger increase in demand. $YED > 1$. For example, a holiday is a luxury good. Luxury goods are also normal goods, and they have an elastic income.
-  During periods of prosperity, such as economic growth when real incomes are rising, firms might switch to producing more luxury goods and fewer inferior goods, because demand for luxury goods will be increasing.

Cross elasticity of demand

-  Cross elasticity of demand is the responsiveness of a change in demand of one good, X, to a change in price of another good, Y. The formula for this is:

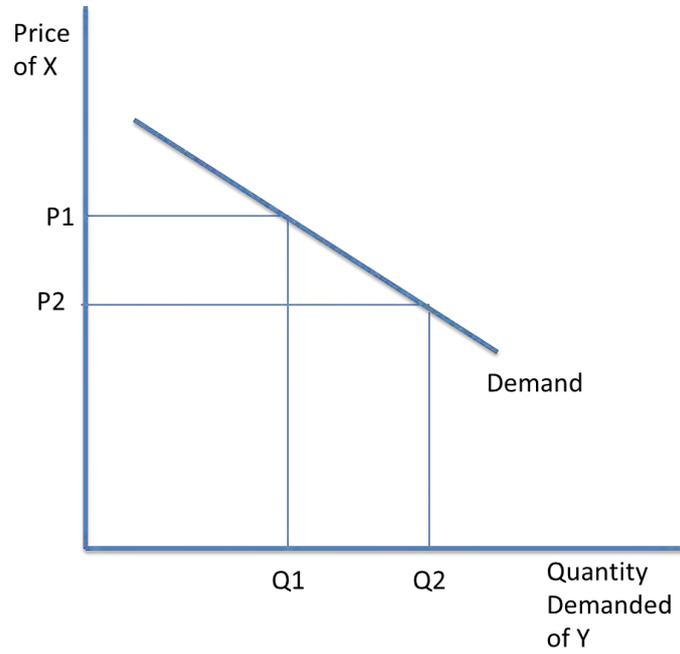
$$XED = \frac{\% \Delta QD \text{ of } X}{\% \Delta P \text{ of } Y}$$

Complements, substitutes and unrelated goods:

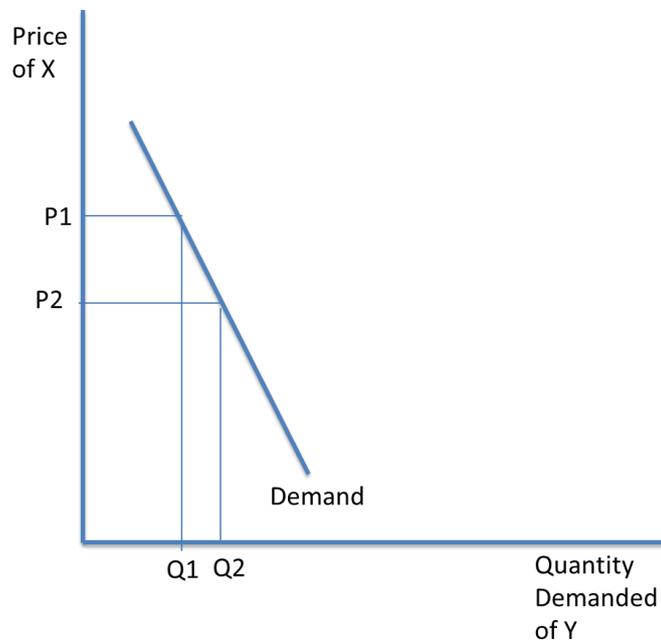
-  Complementary goods have a negative XED. If one good becomes more expensive, the quantity demanded for both goods will fall.



- Close complements: a small fall in the price of good X leads to a large increase in QD of Y.

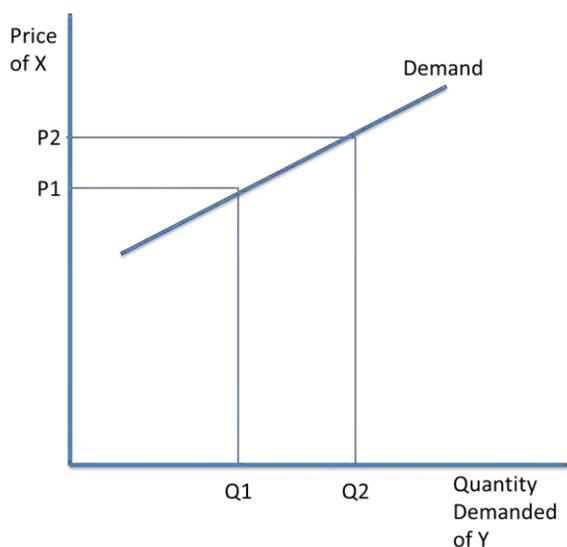


- Weak complements: a large fall in the price of good X leads to only a small increase in QD of Y.

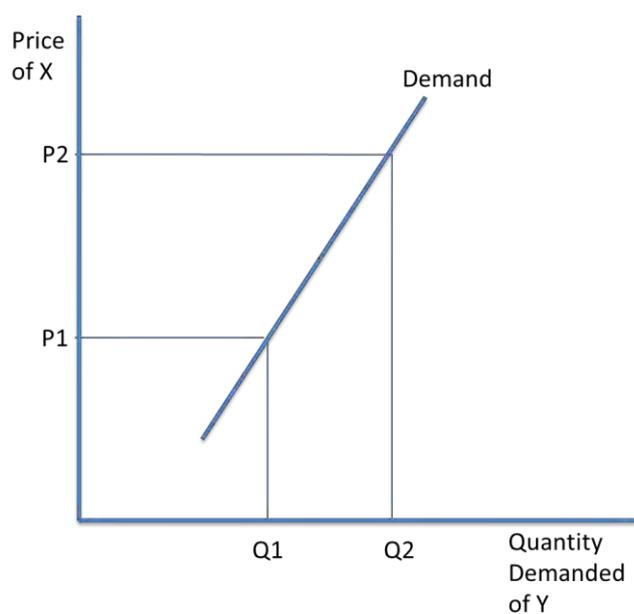


 Substitutes can replace another good, so the XED is positive and the demand curve is upward sloping. If the price of one brand of TV increases, consumers might switch to another brand.

- Close substitutes: a small increase in the price of good X leads to a large increase in QD of Y.



- Weak substitutes: a large increase in the price of good X leads to a smaller increase in QD of Y.



-  Unrelated goods have a XED equal to zero. For example, the price of a bus journey has no effect on the demand for tables.
-  Firms are interested in XED because it allows them to see how many competitors they have. Therefore, they are less likely to be affected by price changes by other firms, if they are selling complementary goods or substitutes.

