

The price system and the microeconomy

A-Level Economics

Demand

demand 需求 is the quantity of a good that buyers are willing and able to buy at each **price** 价格 in a period of time. It is not just a wish —buyers must also be able to pay.

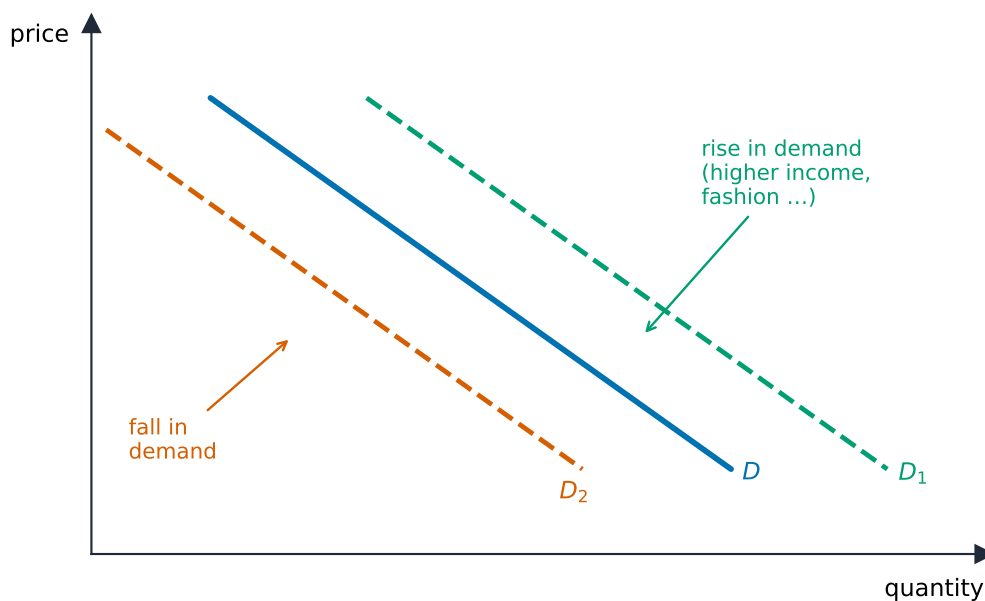
The **law of demand** says: when the price rises, the **quantity demanded** 需求量 falls; when the price falls, the quantity demanded rises. Price and quantity move in opposite directions.

So the **demand curve** 需求曲线 slopes downward, from top-left to bottom-right.

What shifts the demand curve

A change in the good's **own price** is shown as a *movement along* the demand curve. A change in any other cause shifts the whole curve to a new position —this is a **shift** 移动 of demand. The main causes (the **determinants** 决定因素) are:

- **income** 收入—for most goods, higher income raises demand.
- the price of a **substitute** 替代品—a good you can use instead (tea for coffee). If the substitute's price rises, demand for this good rises.
- the price of a **complement** 互补品—a good used together with this one (cars and petrol). If the complement's price rises, demand for this good falls.
- tastes and fashion, the size of the population, and advertising.



A change in income, tastes or related prices shifts the whole curve (D_1 right, D_2 left); a change in the good's own price is a movement along it.

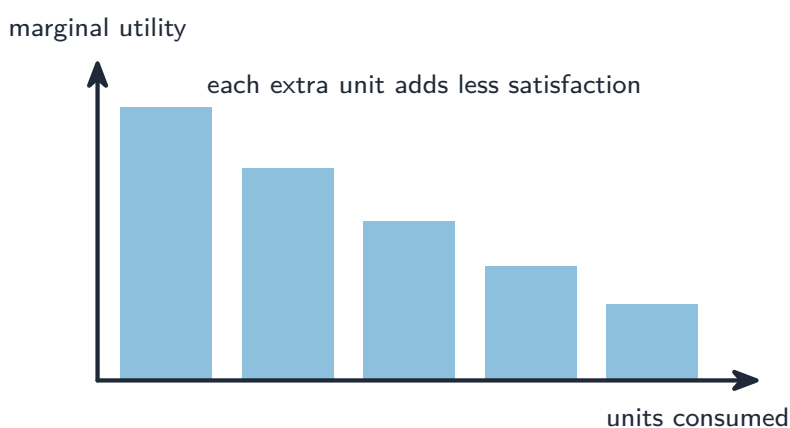
Individual and market demand

One **consumer** 消费者 has an individual demand. The **market demand** 市场需求 is found by adding up the quantity that all consumers want at each price (adding the curves sideways).

Marginal utility and demand

utility 效用 is the satisfaction you get from consuming a good. **marginal utility** 边际效用 is the extra utility from one more unit.

The law of **diminishing marginal utility** 边际效用递减 says each extra unit gives less extra satisfaction than the one before. Because later units are worth less to you, you will only buy them at a lower price. This is why the demand curve slopes downward.



Each extra unit adds less satisfaction than the last —so buyers will only pay less for later units, which is why demand slopes downward

Supply

supply 供给 is the quantity of a good that **producers** 生产者 are willing and able to sell at each price in a period of time.

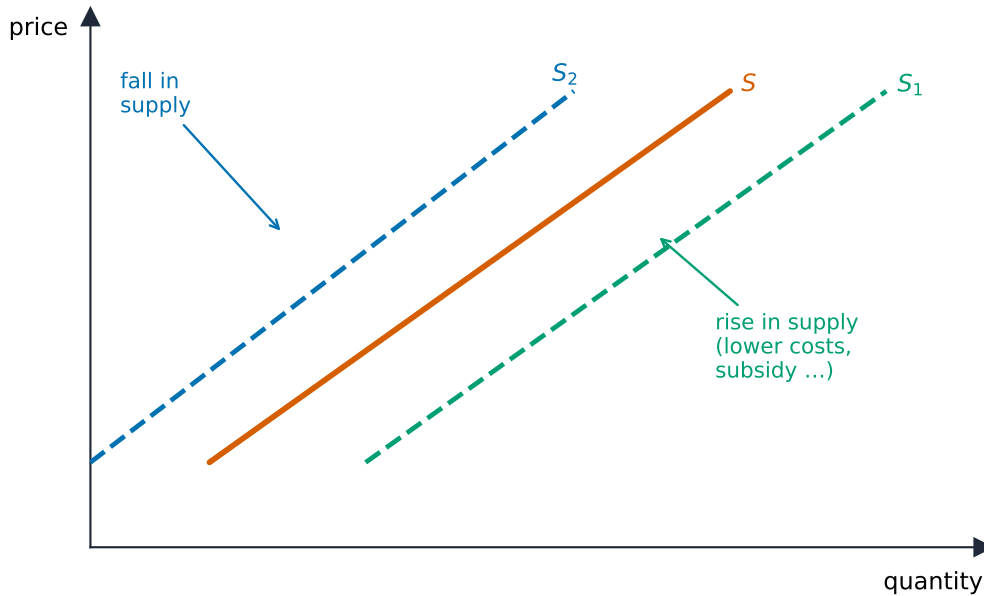
The **law of supply** says: when the price rises, the **quantity supplied** 供给量 rises. Higher prices mean more **profit** 利润, so firms make more. So the **supply curve** 供给曲线 slopes upward.

What shifts the supply curve

A change in the good's own price is a movement along the supply curve. Other causes shift the whole curve:

- **costs of production** 生产成本—if wages, raw materials or rent get dearer, supply falls.

- technology —better machines raise supply.
- a **subsidy** 补贴 (government payment to producers) raises supply; an indirect tax lowers it.
- the number of **firms** 企业 in the market, and weather (for farm goods).



Lower costs, better technology or a subsidy shift supply right (S_1); higher costs or a tax shift it left (S_2).

Individual and market supply

The **market supply** 市场供给 is found by adding up the quantity all firms will sell at each price.

Price elasticity of demand

price elasticity of demand 需求价格弹性 (PED) measures how much the quantity demanded responds when the price changes.

$$\text{PED} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}}$$

PED is normally negative (because of the law of demand), but we usually look at the size and drop the minus sign.

Worked example. The price of a good rises by 10% and the quantity demanded falls by 25%. Find the PED and classify the demand.

$$\text{PED} = \frac{-25}{10} = -2.5$$

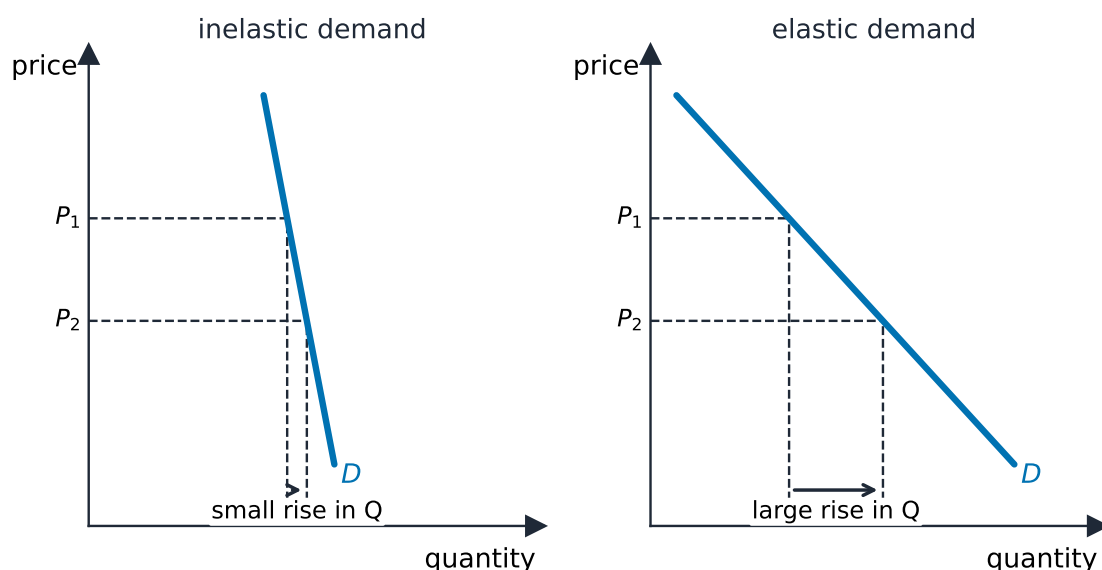
Ignoring the minus sign, $2.5 > 1$, so demand is elastic —quantity responded much more than the price did.



Petrol has price-inelastic demand: drivers must buy it, so a higher price cuts the quantity bought only a little.

Image: Arild Vågen, CC BY-SA 4.0 (commons.wikimedia.org)

Value	Name	Meaning
more than 1	elastic 富有弹性	quantity responds a lot
less than 1	inelastic 缺乏弹性	quantity responds a little
equal to 1	unit elastic 单位弹性	quantity changes by the same % as price
0	perfectly inelastic 完全无弹性	quantity does not change at all
infinity	perfectly elastic 完全有弹性	any price rise sends demand to zero



When demand is inelastic (steep), a price change barely moves quantity; when it is elastic (shallow), the same price change moves quantity a lot.

What makes demand elastic or inelastic

- the number and closeness of substitutes (more substitutes → more elastic).
- whether the good is a **necessity** 必需品 (inelastic) or a **luxury** 奢侈品 (elastic).
- the share of income spent on the good (a large share → more elastic).
- time —demand is more elastic in the long run, when buyers can find other options.
- habit or addiction makes demand inelastic.

PED and total revenue

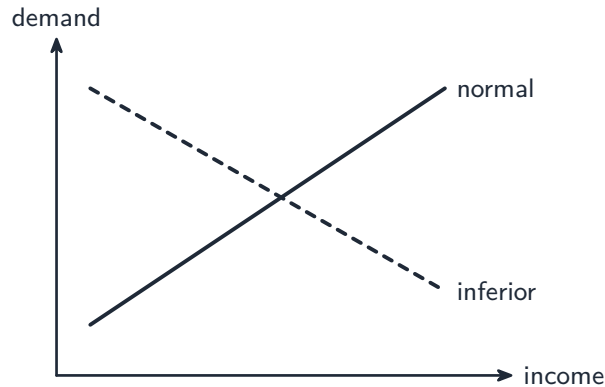
total revenue 总收益 is the money a firm earns: $TR = \text{price} \times \text{quantity}$. PED tells a firm what happens to revenue when it changes the price:

If demand is...	price rises	price falls
inelastic	total revenue rises	total revenue falls
elastic	total revenue falls	total revenue rises
unit elastic	total revenue stays the same	total revenue stays the same

This is useful to firms (how to price for more revenue) and to **governments** 政府 (a tax on an inelastic good, like petrol, raises a lot of revenue without cutting sales much).

Income elasticity of demand

income elasticity of demand 需求收入弹性 (YED) measures how much demand responds when income changes.



As income rises, demand for a normal good rises but an inferior good falls

$$\text{YED} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}}$$

- a **normal good** 正常品 has positive YED: demand rises as income rises. Necessities have YED between 0 and 1; luxuries have YED above 1.
- an **inferior good** 低档品 has negative YED: demand falls as income rises (people switch to better goods). An example is cheap instant noodles.

Worked example. A person's income rises by 20% and their demand for restaurant meals rises by 30%. Find the YED and classify the good.

$$\text{YED} = \frac{+30}{+20} = +1.5$$

YED is positive and greater than 1, so restaurant meals are a normal good —and a luxury.

This helps firms plan: as incomes grow, demand for luxuries grows fastest.

Cross elasticity of demand

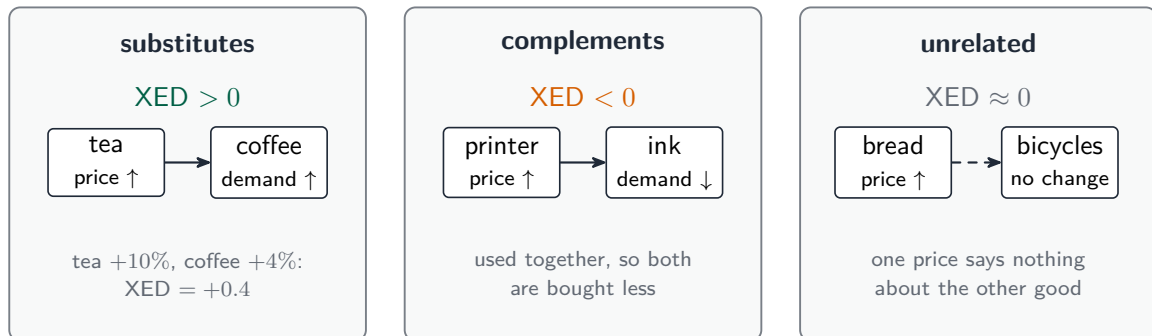
cross elasticity of demand 需求交叉弹性 (XED) measures how much demand for one good responds when the price of *another* good changes.

$$\text{XED} = \frac{\% \text{ change in quantity demanded of A}}{\% \text{ change in price of B}}$$

- for **substitutes**, XED is positive (the price of B rises, so people buy more A).
- for **complements**, XED is negative (the price of B rises, so people buy less A and less B).
- for goods that are not related, XED is about zero.

Worked example. When the price of tea rises by 10%, the quantity of coffee demanded rises by 4%. Find the XED and say how the two goods are related.

$$XED = \frac{+4}{+10} = +0.4$$



The sign of XED: positive for substitutes, negative for complements, about zero for unrelated goods

XED is positive, so tea and coffee are substitutes.

This helps a firm watch its rivals: if XED with a rival's good is high and positive, a price cut by the rival will hurt its sales.

Price elasticity of supply

price elasticity of supply 供给价格弹性 (PES) measures how much the quantity supplied responds when the price changes.

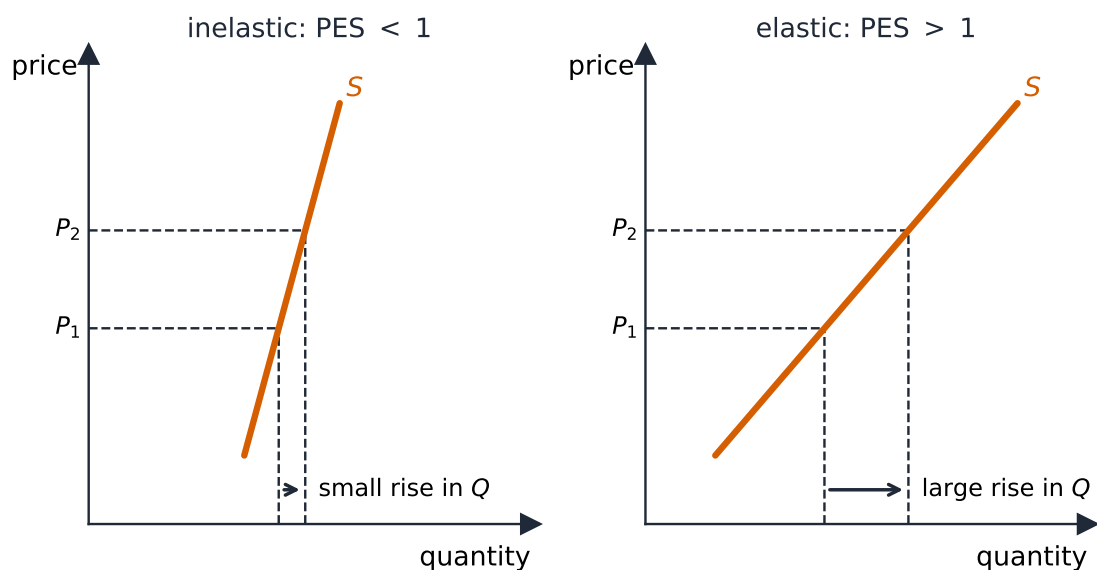
$$PES = \frac{\% \text{ change in quantity supplied}}{\% \text{ change in price}}$$

PES is positive. Supply is elastic if it responds a lot, inelastic if it responds little.

Worked example. The price of a good rises by 8% and the quantity supplied rises by 4%. Find the PES.

$$PES = \frac{4}{8} = 0.5$$

PES is less than 1, so supply is inelastic.



The same price rise: a small supply response when PES is below 1, a large one when PES is above 1

What makes supply more elastic:

- **spare capacity** 闲置产能—unused machines and workers, so firms can quickly make more.
- **stocks** 库存—goods stored in a warehouse that can be sold fast.
- how easily factors of production can move into the industry.
- time. Economists split time into three periods:
 - the **momentary** 瞬时 period—supply is fixed; PES is zero.
 - the **short run** 短期—at least one factor is fixed, so supply can rise only a little.
 - the **long run** 长期—all factors can change, so supply is most elastic.

The interaction of demand and supply

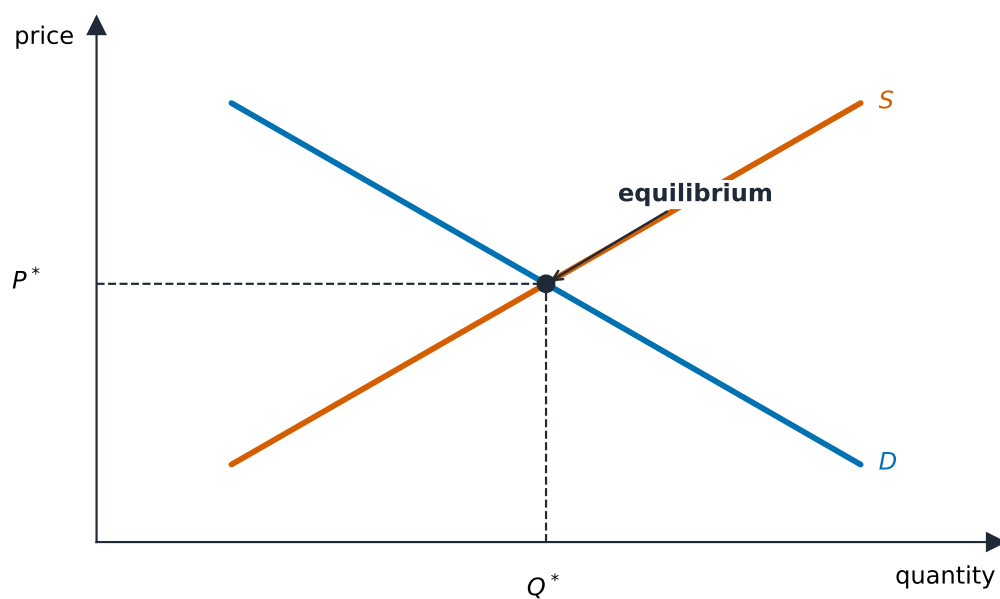


In a market, buyers and sellers meet and the price settles where demand equals supply

Image: Acabashi, CC BY-SA 4.0 (commons.wikimedia.org)

Equilibrium

The market is in **equilibrium** 均衡 where the demand curve crosses the supply curve. Here demand equals supply. This gives the **equilibrium price** 均衡价格和 the **equilibrium quantity** 均衡数量. There is no pressure for the price to change.



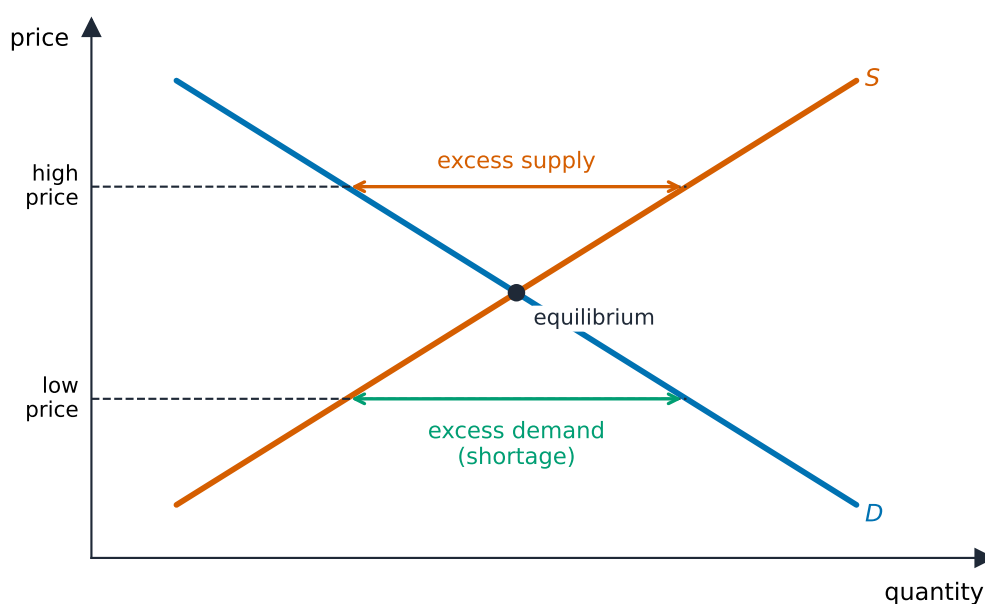
At the equilibrium price P^ and quantity Q^* the curves cross, so quantity demanded equals quantity supplied.*

Disequilibrium

When the price is not at equilibrium, the market is in **disequilibrium** 非均衡:

- if the price is **too low**, there is **excess demand** 超额需求 (a **shortage** 短缺). Buyers compete, so the price is pushed up.
- if the price is **too high**, there is **excess supply** 超额供给. Sellers cannot sell everything, so the price is pushed down.

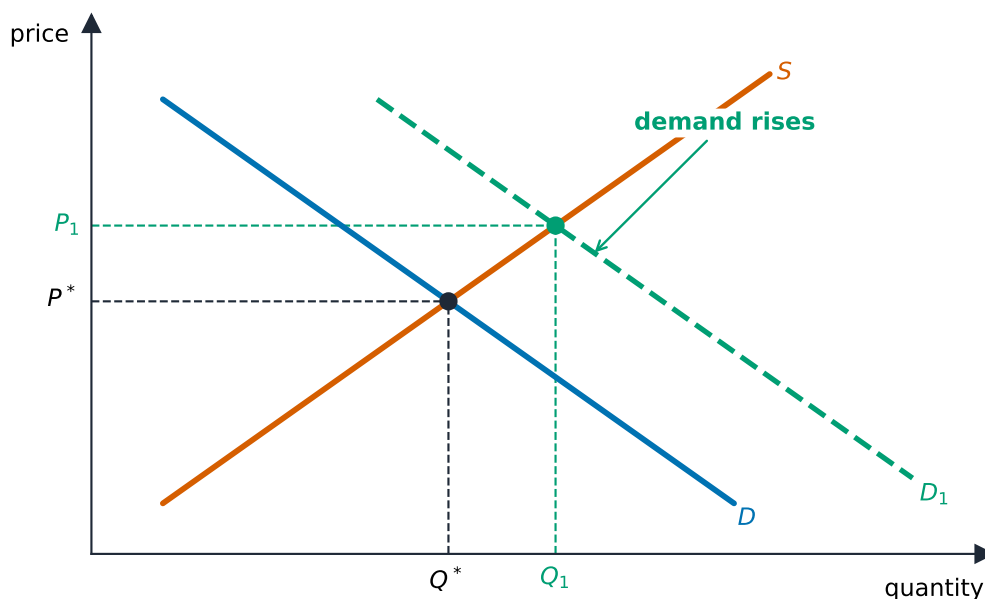
In both cases the price moves back to equilibrium. This shows the price mechanism doing its jobs of signalling, rationing and giving an incentive.



Above the equilibrium price there is excess supply; below it there is excess demand (a shortage). Either way the price is pushed back to equilibrium.

How shifts change the equilibrium

Change	Effect on price	Effect on quantity
demand rises (shifts right)	rises	rises
demand falls (shifts left)	falls	falls
supply rises (shifts right)	falls	rises
supply falls (shifts left)	rises	falls



With supply fixed, a rise in demand ($D \rightarrow D_1$) raises both the equilibrium price and the equilibrium quantity.

Demand and supply in different markets

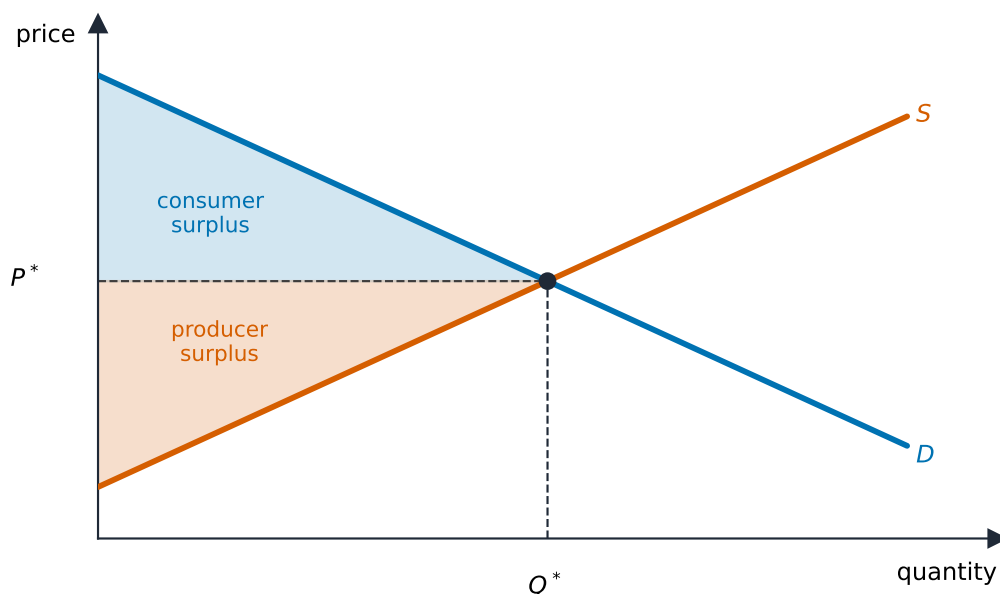
The same analysis works in many markets:

- in **product markets** 产品市场, demand and supply set the price of goods and services.
- in **factor markets** 要素市场, they set the price of factors—for example, the demand for and supply of labour set the **wage** 工资.
- in the **foreign exchange market** 外汇市场, the demand for and supply of a currency set the **exchange rate** 汇率 (the price of one currency in terms of another).

Consumer and producer surplus

consumer surplus 消费者剩余 is the gain to buyers. It is the difference between the most a consumer was willing to pay and the price actually paid. On a diagram it is the area below the demand curve and above the price line.

producer surplus 生产者剩余 is the gain to sellers. It is the difference between the price a producer receives and the lowest price the producer would have accepted. On a diagram it is the area above the supply curve and below the price line.



Consumer surplus is the area below demand and above the price; producer surplus is the area above supply and below the price.

How they change:

- if demand rises, the price and quantity rise, so producer surplus rises and consumer surplus usually rises too.
- if supply rises, the price falls and quantity rises, so consumer surplus rises.
- a higher price (with the curves fixed) raises producer surplus but lowers consumer surplus.

Together, consumer surplus plus producer surplus is the total **welfare** 福利 (gain to society) from the market. It is largest at the free-market equilibrium.

Exam tips

- Quote the **elasticity formula** and interpret the value: PED inelastic (< 1), elastic (> 1); link PED to total revenue.
- Distinguish a **movement along** (a price change) from a **shift** (a non-price factor) of demand or supply.
- Use the **sign** of XED (substitutes +, complements $-$) and YED (normal +, inferior $-$).
- On a diagram, label **consumer and producer surplus** and show how a price change alters each.