The price system and the microeconomy

A-Level Economics

Demand

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

The **law of demand**, holding other determinants constant, says: when the price rises, the **quantity demanded** falls; when the price falls, the quantity demanded rises. Price and quantity move in opposite directions.

So the **demand curve** 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 a non-price determinant shifts the whole curve to a new position – this is a **shift** of demand. The main causes (the **determinants**) are:

- **income** – for most goods, higher income raises demand.
- the price of a **substitute** – 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** – 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.

Apply movement versus shift. Consider three separate coffee-market events. (1) Coffee price falls from \$7 to \$6, all other conditions fixed: quantity demanded rises along the original curve. (2) Tea becomes dearer: coffee demand shifts right **if** tea is a substitute. (3) Income rises, but no income relationship is given: the direction needs a normal/inferior-good assumption. Draw the relevant change before reading each explanation.

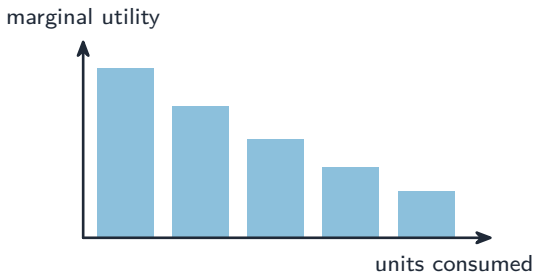
■ Individual and market demand

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

■ Marginal utility and demand

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

The law of **diminishing marginal utility** says each extra unit gives less extra satisfaction than the one before. This can help explain lower willingness to pay in a simple model, but it is not by itself a general proof of downward-sloping demand. Full utility analysis is an A-Level Topic 7 preview here. For marginal utilities $12, 9, 6, 3$, total utility is $12, 21, 27, 30$: total utility rises while marginal utility stays positive.



Each extra unit adds less satisfaction in this illustrative diminishing-marginal-utility model

Supply

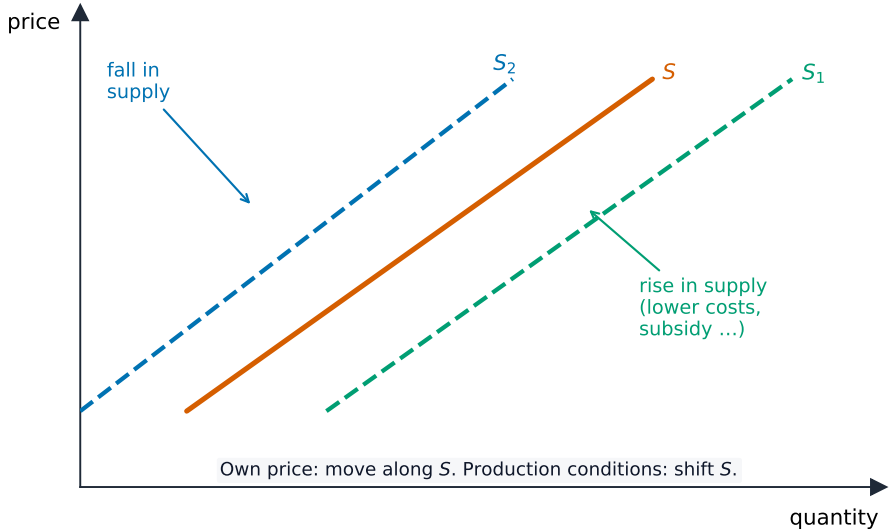
supply is the quantity of a good that **producers** are willing and able to sell at each price in a period of time.

The **law of supply**, holding other determinants constant, says: when the price rises, the **quantity supplied** rises. Higher prices can make extra output worthwhile. Total **profit** also depends on costs; price alone does not establish it. So the **supply curve** 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** – if wages, raw materials or rent get dearer, supply falls.
- technology – better machines raise supply.
- a per-unit producer **subsidy** raises supply; a per-unit tax on sellers lowers it.
- the number of **firms** 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).

Bakery application. A higher bread price, other conditions fixed, raises quantity supplied along the original curve. Cheaper flour or a more efficient oven shifts supply right: more bread can be offered at the **same** price. A change unrelated to willingness or ability to produce does not automatically shift supply.

Individual and market supply

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

Price elasticity of demand

price elasticity of demand (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.

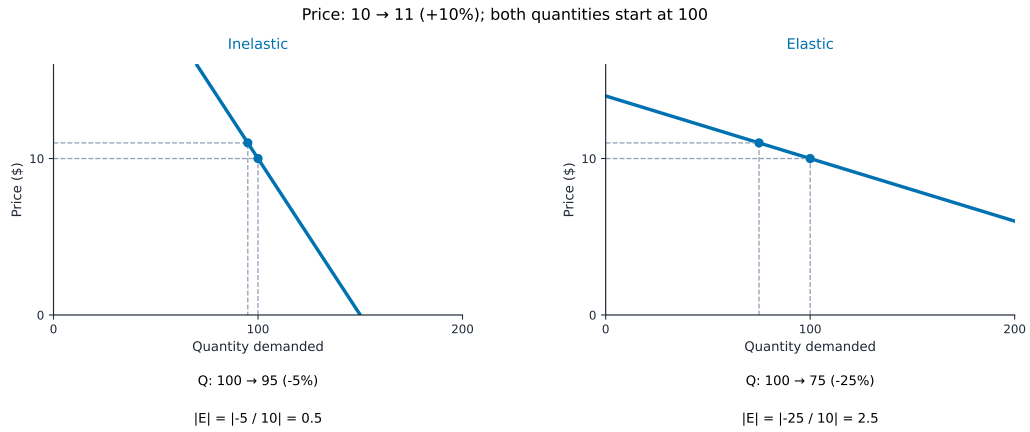
> **Worked example.** The price of a good rises by 10% and the quantity demanded falls by 25%. Find the PED and classify the demand.

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

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

A petrol station: demand responsiveness depends on available alternatives and adjustment time; the photo alone cannot establish PED.

PED magnitude	Name	Meaning
more than 1	**elastic**	quantity responds a lot
less than 1	**inelastic**	quantity responds a little
equal to 1	**unit elastic**	quantity changes by the same % as price
0	**perfectly inelastic**	quantity does not change at all
infinity	**perfectly elastic**	horizontal demand at a given price in the idealized model



The same 10% price rise gives quantity falls of 5% and 25%: PED magnitudes 0.5 and 2.5. Compare percentages, not slope alone.

What makes demand elastic or inelastic

- the number and closeness of substitutes (more substitutes → more elastic).
- whether the good is a **necessity** or a **luxury**; these influence responsiveness but do not guarantee a particular own-price coefficient.
- the share of income spent on the good (a large share → more elastic).
- time – more time usually lets buyers find alternatives, making demand more responsive; it does not guarantee elasticity above 1.
- habit or addiction can reduce responsiveness, alongside other determinants.

One straight-line curve. For $Q_d = 10 - P$, the gradient $\Delta Q_d / \Delta P = -1$ is constant. **Point elasticity** uses that gradient with the current price and quantity:

$$PED = \frac{\Delta Q_d}{\Delta P} \frac{P}{Q_d}.$$

At $(P, Q) = (8, 2)$, $PED = (-1)(8/2) = -4$; at $(5, 5)$, it is -1; at $(2, 8)$, it is -0.25. The curve has the same slope but different percentage responsiveness. These are point values, not a claim that a large finite change has the same elasticity. Revenue $TR = PQ$ is $16, 25, 16$ respectively: the midpoint maximizes revenue on this straight-line curve with positive intercepts. A constant unit-elastic demand curve instead keeps revenue constant throughout its unit-elastic segment.

PED and total revenue

total revenue is the money a firm earns: TR = price × 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 segment	total revenue stays the same	total revenue stays the same

Worked revenue comparison. Both goods start at price \$10 and quantity 100. Price rises to \$11 (+10%, using the initial base). Good A sells 95 (−5%); good B sells 75 (−25%).

$$PED_A = \frac{-5}{10} = -0.5, \qquad PED_B = \frac{-25}{10} = -2.5.$$

$$TR_0 = P_0 Q_0 = 10(100) = \$1000.$$

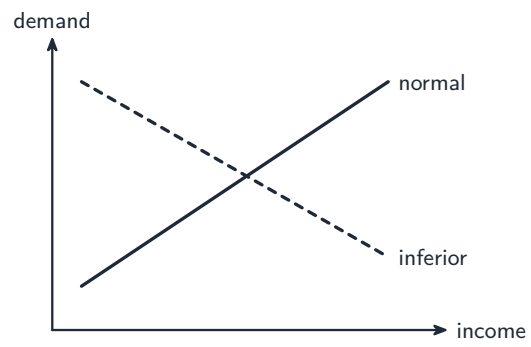
$$TR_{A,1} = P_1 Q_{A,1} = 11(95) = \$1045, \qquad TR_{B,1} = 11(75) = \$825.$$

Higher revenue does not establish higher profit without cost information. **Governments** also use responsiveness when considering taxes, but tax revenue requires the tax per unit and the taxed quantity; PED alone gives neither.

Official application: 9708/21 O/N/25 Q2(a). Explain why a commuter may keep using petrol this week but change transport or car over a year. Then judge whether time is decisive: a remote commuter with no viable alternatives may still be unresponsive later. Use the formula, explain the adjustment mechanism and reach a conditional judgement; do not just list determinants.

Income elasticity of demand

income elasticity of demand (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** has positive YED: demand rises as income rises. Necessities have YED between 0 and 1; luxuries have YED above 1.
- an **inferior good** has negative YED: demand falls as income rises (people switch to better goods). Cheap instant noodles may be inferior for some consumers over a particular income range; the label is not a judgement about quality.

> **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.

YED helps firms plan for income changes. The nature of the good, income level and whether alternatives are available can affect its value; the estimate need not remain fixed as conditions change.

Cross elasticity of demand

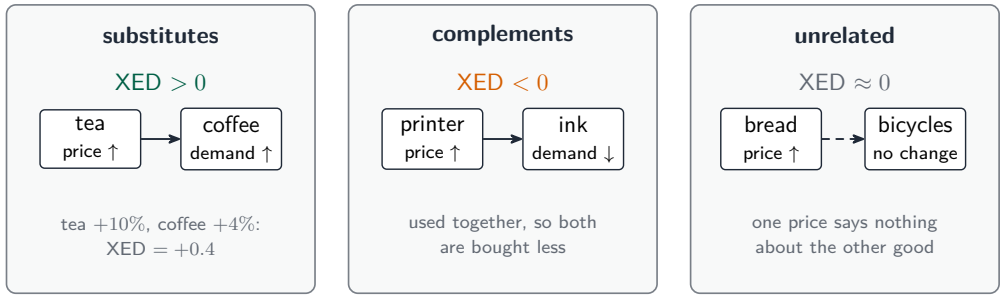
cross elasticity of demand (XED) measures how much demand for one good responds when the price of *another* good changes.

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

- 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.

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



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

XED is positive, so tea and coffee are substitutes.

XED depends on the closeness of substitutes or strength of complementary use, and on the market definition. A positive value predicts that a rival price cut reduces this good's demand, other determinants fixed.

Complement practice. Printer price rises 10% and ink quantity demanded falls 6%: $XED_{ink,printer} = \frac{-6}{10} = -0.6$. The negative sign supports complementary use. It says nothing about whether ink is an inferior good; that needs an income change.

Decision practice for 9708/21 O/N/25 Q2(b). A fictional restaurant has YED = 1.5 and XED with a close rival = 0.8. In separate scenarios, income rises 2% or the rival cuts price 10%.

$$\%\Delta Q = YED(\%\Delta Y) = 1.5(2) = +3\%.$$

$$\%\Delta Q = XED(\%\Delta P_B) = 0.8(-10) = -8\%.$$

YED matters for income forecasts; XED matters for rival-price changes. Use the expected changes and business decision to judge which is more useful. These are estimates holding other determinants fixed, not guaranteed exact forecasts or an unconditional ranking of the two measures.

Price elasticity of supply

price elasticity of supply (PES) measures how much the quantity supplied responds when the price changes.

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

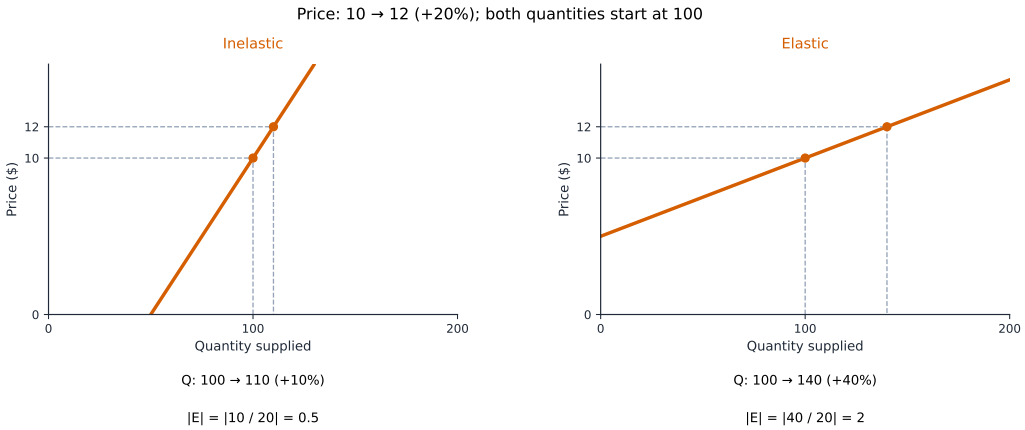
PES is nonnegative for an upward-sloping or vertical supply curve. A value above 1 is elastic; below 1 is inelastic. Compare percentage changes, not slope alone.

■ Compare two firms

Both start at price 10, quantity 100. Price rises to 12 (+20%). A supplies 110 (+10%); B supplies 140 (+40%). Percentages use the initial values.

$$PES_A = \frac{\%\Delta Q_s}{\%\Delta P} = \frac{10}{20} = 0.5, \qquad PES_B = \frac{40}{20} = 2.$$

Firm A is inelastic and firm B elastic. The diagram uses the same initial values and scales; visual steepness alone cannot classify arbitrary supply curves.



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** – unused machines and workers, so firms can quickly make more.
- **stocks** – 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** period – supply is fixed; PES is zero.
  - the **short run** – at least one factor is fixed; spare capacity and stocks may still allow a substantial response.
  - the **long run** – all factors can change, usually allowing more adjustment. This does not guarantee PES above 1.

■ Policy application: 9708/02/SP/23 Q3(b)

Refrigeration can preserve saleable stocks; training can ease skill constraints. Neither necessarily makes **all** agricultural supply elastic: perishability, costs and biological growing time differ. Explain the constraint removed, a limitation, then a product-specific judgement. A supply shift after a subsidy is not by itself evidence that PES has increased.

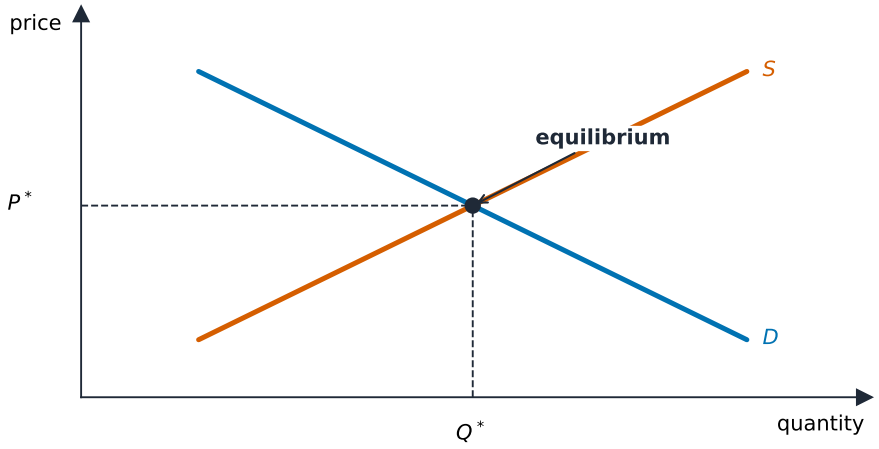
The interaction of demand and supply

Compare the quantities demanded and supplied at the same price.

A stall offers goods at posted prices; this photograph does not establish market equilibrium

■ Equilibrium

The market is in **equilibrium** where the demand curve crosses the supply curve. Here quantity demanded equals quantity supplied at the same price. This gives the **equilibrium price** and the **equilibrium quantity** . There is no pressure for the price to change.



equilibrium: $Q_d = Q_s$ at (P^*, Q^*) (market clears)

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

Worked market. Let $Q_d = 12 - P$ and $Q_s = P - 2$. At prices $4, 6, 7, 8$, the corresponding demand quantities are $8, 6, 5, 4$ and supply quantities $2, 4, 5, 6$. Solve the equality:

$$Q_d = Q_s, \qquad 12 - P = P - 2, \qquad P^* = \$7, \quad Q^* = 5.$$

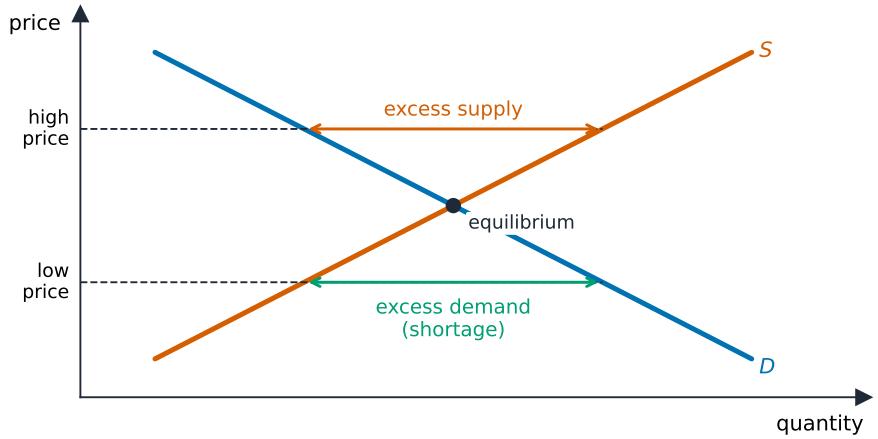
At \$6, excess demand is $6 - 4 = 2$ units; at \$8, excess supply is $6 - 4 = 2$ units. A shortage provides **signalling** of unmet demand. A higher price performs **rationing** through willingness **and ability** to pay and gives suppliers an **incentive** to offer more, other costs unchanged.

Disequilibrium

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

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

With other conditions unchanged and prices free to adjust, these imbalances create pressure towards equilibrium. Contracts, controls or new shocks can interrupt the path. This shows the price mechanism doing its jobs of signalling, rationing and giving an incentive.

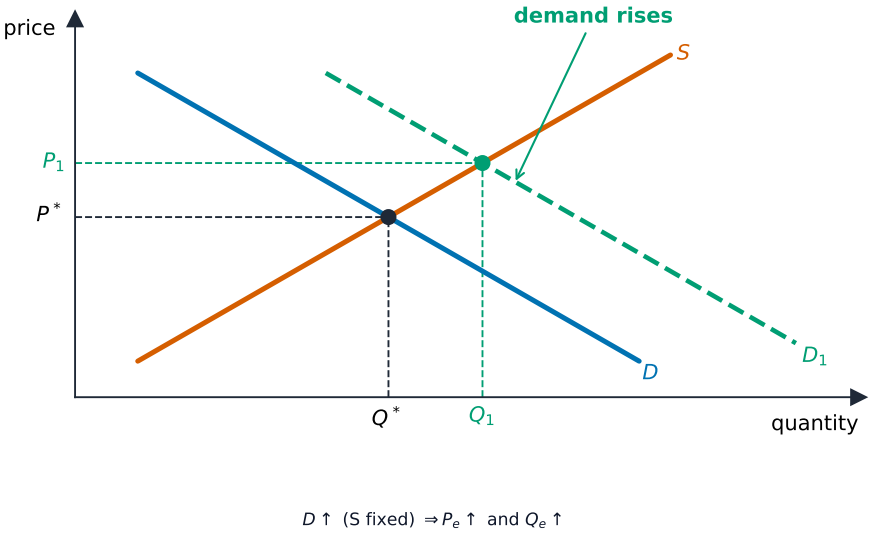


P too high $\Rightarrow$ surplus · P too low $\Rightarrow$ shortage · price adjusts toward P^*

Above the equilibrium price there is excess supply; below it there is excess demand (a shortage). With flexible prices and other conditions unchanged, the imbalance creates pressure towards 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 ($D \to D_1$) 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**, demand and supply set the price of goods and services.
- in **factor markets**, they set the price of factors – for example, the demand for and supply of labour set the **wage**.
- in a floating **foreign exchange market**, the demand for and supply of a currency set the **exchange rate** (the price of one currency in terms of another).

■ Relationships between markets

- **Joint demand**: printers and ink are complements; more printer use can increase ink demand.
- **Alternative demand**: substitutes such as tea and coffee; dearer tea can increase coffee demand.
- **Derived demand**: bread demand creates demand for bakers' labor.
- **Joint supply**: beef production also produces hides; more beef output can increase leather supply.

Identify the market and relevant determinant before drawing its curve.

Consumer and producer surplus

consumer surplus 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 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.

Worked surplus and cost change. Use the same fictional competitive market: inverse demand $P_D = 12 - Q$ and inverse supply $P_S = 2 + Q$. Equilibrium is $Q = 5$, $P = \$7$.

$$CS = \tfrac{1}{2}Q(P_{D,0} - P) = \tfrac{1}{2}(5)(12 - 7) = \$12.50.$$

$$PS = \tfrac{1}{2}Q(P - P_{S,0}) = \tfrac{1}{2}(5)(7 - 2) = \$12.50.$$

$$TS = CS + PS = \$25.$$

For 9708/22 O/N/25 Q2(a), consider the claim that producers always gain when a cost increase raises price. These are illustrative numbers, not data from that paper. Higher input costs shift supply to $P_{S,1} = 4 + Q$:

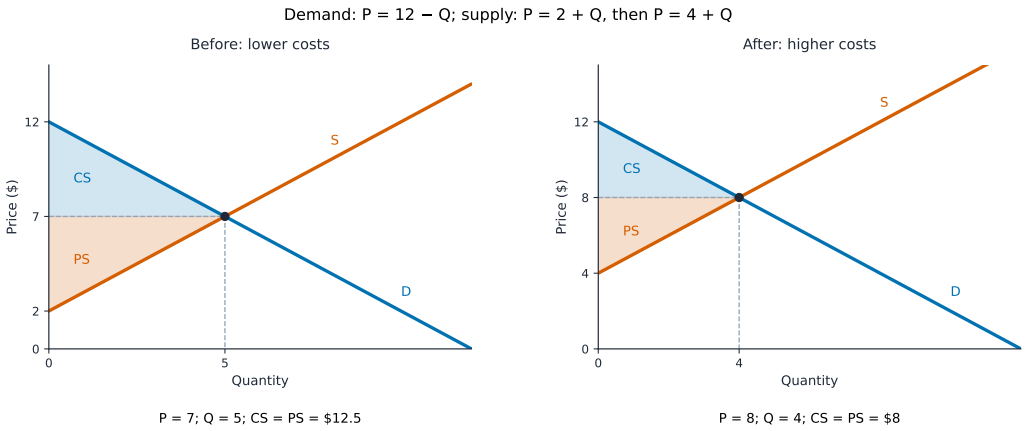
$$P_D = P_{S,1}, \qquad 12 - Q = 4 + Q, \qquad Q_1 = 4, \quad P_1 = \$8.$$

$$PS_1 = \tfrac{1}{2}Q_1(P_1 - 4) = \tfrac{1}{2}(4)(8 - 4) = \$8.$$

$$CS_1 = \tfrac{1}{2}Q_1(12 - P_1) = \tfrac{1}{2}(4)(12 - 8) = \$8.$$

$$TR_0 = P_0Q_0 = 7(5) = \$35, \qquad TR_1 = P_1Q_1 = 8(4) = \$32.$$

Price rises, but producer surplus and revenue fall in this example. The new equilibrium can still be efficient: lower total surplus reflects the higher real production costs, not automatically deadweight loss. Judge the outcome using the new cost curve, quantity and demand/supply responsiveness. Producer surplus is not automatically total profit because fixed costs also matter.



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

A demand increase raises equilibrium price and quantity with supply fixed, but do not infer consumer surplus from price alone: both the demand curve and price have changed. A supply increase raises consumer surplus with demand fixed; producer surplus depends on the new curve and outcome. If a price is imposed away from equilibrium, specify the quantity actually traded and any rationing before measuring areas.

Consumer surplus plus producer surplus is total market **welfare** in this simple model. Competitive equilibrium maximizes it when private costs and benefits reflect social costs and benefits and there are no market failures. This is a conditional benchmark, not a claim about every real market.

Exam tips

- Quote the **elasticity formula** and interpret the value: PED magnitude 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.

Vocabulary card meanings

market demand: The total amount buyers want at each price. diminishing marginal utility: Each extra unit adds less satisfaction than the unit before it. market supply: The total amount sellers offer at each price. perfectly elastic: A situation in which price stays unchanged across the whole range of quantities buyers or sellers choose. momentary: Lasting only an instant, before anyone can adjust. equilibrium quantity: The amount bought and sold when buyers' and sellers' plans match. product market: The place where finished goods and services are traded. point elasticity: Responsiveness of quantity, measured at one exact price. joint demand: Demand for two products that are wanted together. alternative demand: Demand for two products that can replace each other. joint supply: Two products that come from the same production process.