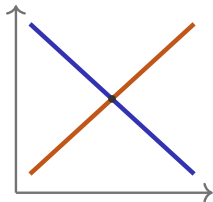


Supply and Demand

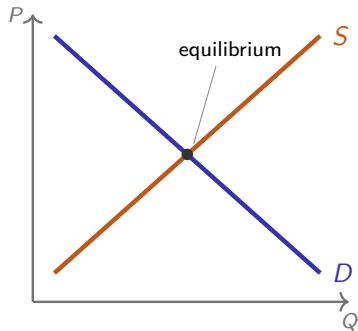
AP Microeconomics ■ Unit 2

AP Microeconomics



What we will cover

- 1 Demand & supply
- 2 Elasticity (PED & PES)
- 3 Cross-price & income elasticity
- 4 Equilibrium & surplus
- 5 Price controls & taxes
- 6 International trade





The law of demand

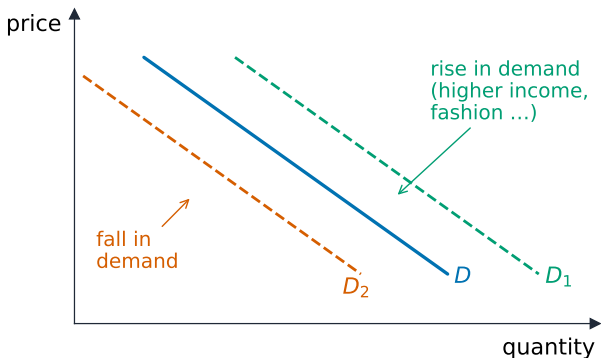
Demand is the whole price–quantity relationship; **quantity demanded** is one point on it.

- price up $\Rightarrow$ quantity down
(**inverse**)
- **substitution effect** : switch to cheaper goods
- **income effect** : your money buys less



Buyers respond when prices change

The demand curve slopes down; income



The demand curve slopes down; income, tastes, and related prices shift it

Movement vs shift

Movement along

only the good's **own price**
changed – slide to another point

Shift

something **else** changed –
whole curve moves left/right

TIPEN shifts demand: **Tastes** , Income, Prices of related goods
(**substitutes** / **complements**), Expectations, Number of buyers.

What shifts each curve, and what a market needs first

property rights

a market works only where these are well defined – owners can use, exclude others from, and transfer what they own

demand shifters

TRIBE: Tastes, Related goods, Income, Buyers (number of consumers), Expectations

supply shifters

input prices, technology, taxes and subsidies, number of sellers, expectations

horizontal summation

the market curve is the individual curves added **across quantities** at each price

the determinants

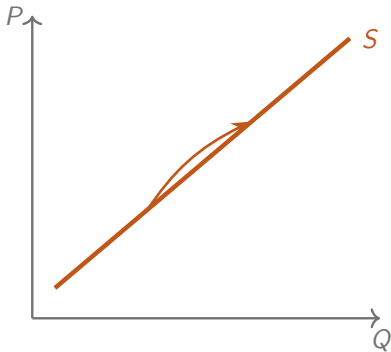
anything except the good's own price – which moves you *along* the curve

the exam skill

you must **draw correctly labelled** supply-and-demand graphs and shift the right curve in the right direction

Drawing and labelling the graph is worth points **before** any explanation on the free-response section. Label both axes, both curves, and the equilibrium.

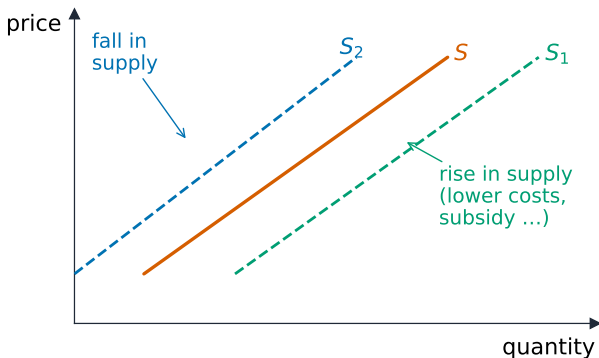
The law of supply



Supply : price up $\Rightarrow$ quantity up (a **direct relationship**). The curve slopes up because each extra unit adds **marginal cost** .

TITEN shifts supply: **Technology** , Input prices, Taxes/**subsidies** , Expectations, Number of sellers.

The supply curve slopes up; costs



The supply curve slopes up; costs, technology, tax, and subsidy shift it



Price elasticity of demand

PED = $\frac{\% \Delta Q_d}{\% \Delta P}$ – how strongly quantity responds to price. Use the **midpoint method** and read $|\text{PED}|$.

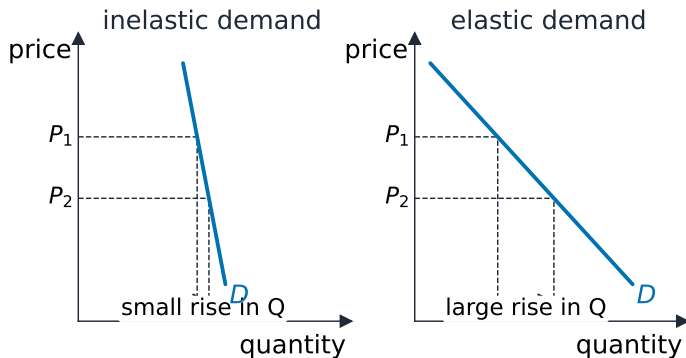
Elastic
 $|\text{PED}| > 1$

Unit elastic
 $|\text{PED}| = 1$

Inelastic
 $|\text{PED}| < 1$

More elastic when: many substitutes, a large share of income, more **time** to adjust.

Inelastic versus elastic demand



Inelastic versus elastic demand: a small versus large response to a price change

The total revenue test

$TR = P \times Q$. When you change price, elasticity decides whether revenue rises.

Elastic

price & TR move **opposite**

cut price $\rightarrow$ TR up

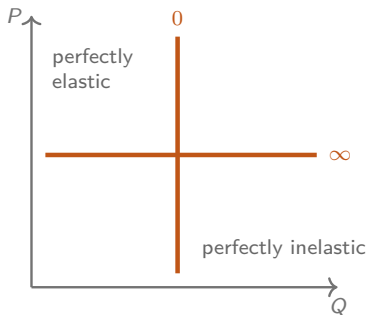
Inelastic

price & TR move **together**

raise price $\rightarrow$ TR up

On a straight-line demand curve the **upper** half is elastic, the **midpoint** is unit elastic, the **lower** half inelastic. TR is greatest at the midpoint.

Price elasticity of supply



$$\text{PES} = \frac{\% \Delta Q_s}{\% \Delta P} \text{ (positive).}$$

- > 1 elastic, < 1 inelastic
- horizontal S : **perfectly elastic** (∞)
- vertical S : **perfectly inelastic** (0)

More elastic with more **time** and **spare capacity** .

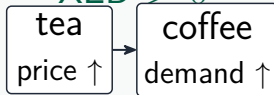
Other Elasticities

- **Cross-price elasticity** = $\frac{\% \Delta Q_x}{\% \Delta P_y}$: **positive** for substitutes.
- **Income elasticity** = $\frac{\% \Delta Q}{\% \Delta \text{income}}$: **positive** for normal goods (and > 1 for luxuries), **negative** for inferior goods.

Other Elasticities, in detail

substitutes

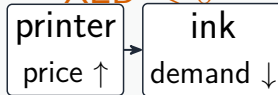
$$XED > 0$$



tea +10%, coffee +4%:
 $XED = +0.4$

complements

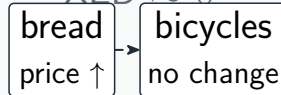
$$XED < 0$$



used together, so both
are bought less

unrelated

$$XED \approx 0$$



one price says nothing
about the other good

Cross elasticity: positive for substitutes, negative for complements

Cross-price & income elasticity

$$\mathbf{XED} = \frac{\% \Delta Q_X}{\% \Delta P_Y}$$

+ $\Rightarrow$ substitutes -
 $\Rightarrow$ complements

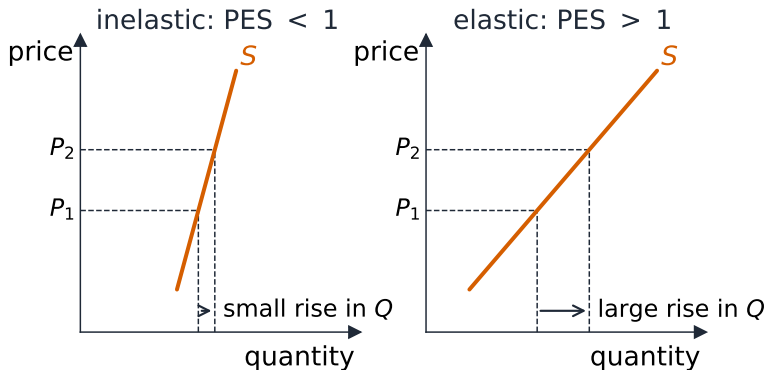
$$\mathbf{YED} = \frac{\% \Delta Q}{\% \Delta \text{income}}$$

+ $\Rightarrow$ **normal good**
- $\Rightarrow$ **inferior good**

Worked example

Income rises 10%; bus-ticket demand falls 5%. $\text{YED} = \frac{-5\%}{10\%} = -0.5$ – negative, so bus travel is an **inferior good**.

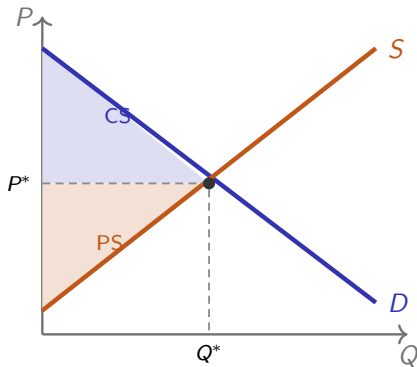
Cross-price & income elasticity, in detail



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



Equilibrium, consumer & producer surplus



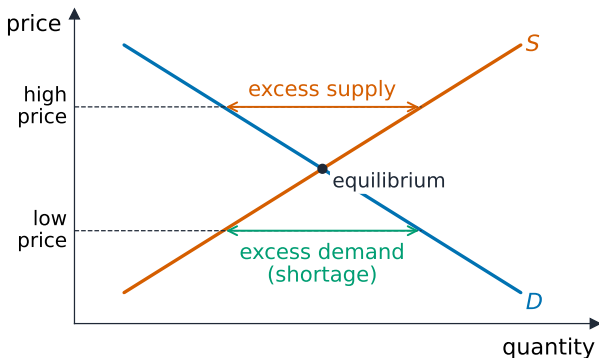
Equilibrium : where D meets S ; $Q_d = Q_s$.

- **consumer surplus** : below D , above P^*

- **producer surplus** : above S , below P^*

Total surplus is largest here – **allocative efficiency** , where $MB = MC$.

Above equilibrium there is excess supply; below it



Above equilibrium there is excess supply; below it, excess demand

Worked example – surplus

Solve for equilibrium and surplus

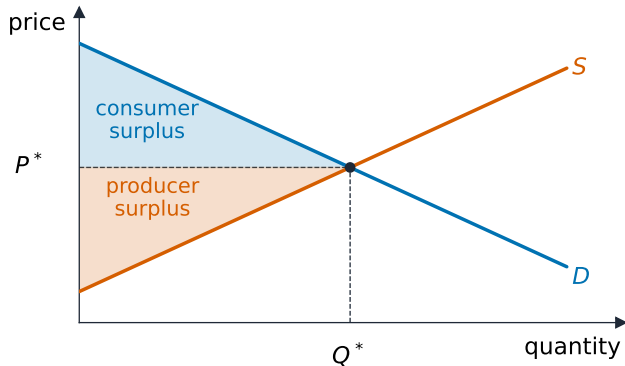
Demand $P = 20 - Q$, supply $P = 2 + Q$. Set equal: $20 - Q = 2 + Q \Rightarrow Q = 9$, $P = \$11$.

Consumer surplus $= \frac{1}{2} \times 9 \times (20 - 11) = \40.50 .

Producer surplus $= \frac{1}{2} \times 9 \times (11 - 2) = \40.50 .

Total surplus $= \$81$.

Worked example – surplus, in detail



Consumer surplus and producer surplus at the market equilibrium

Disequilibrium & shifts

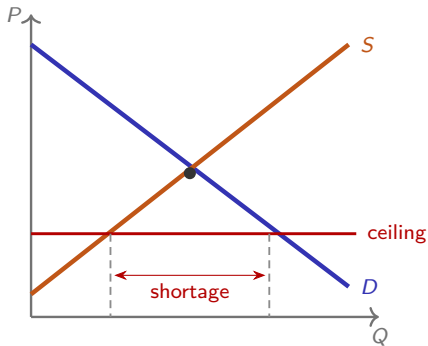
Price too high $\Rightarrow$ surplus $\rightarrow$ price falls

Price too low $\Rightarrow$ shortage $\rightarrow$ price rises

Shift rules: D right $\rightarrow P \uparrow Q \uparrow$; D left $\rightarrow P \downarrow Q \downarrow$; S right $\rightarrow P \downarrow Q \uparrow$; S left $\rightarrow P \uparrow Q \downarrow$. When **both shift**, one result is **indeterminate**.



Price controls

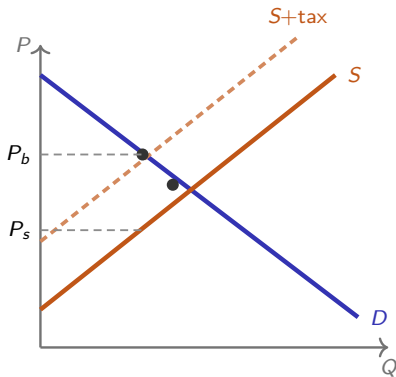


Price ceiling (max): binds **below** equilibrium $\Rightarrow$ shortage (rent control).

Price floor (min): binds **above** equilibrium $\Rightarrow$ surplus (minimum wage).

Any binding control cuts quantity below efficient:
a **deadweight loss** .

Taxes & incidence



A **per-unit tax** shifts S up by the tax: buyers pay more (P_b), sellers keep less (P_s), quantity falls, deadweight loss appears.

Tax incidence : the **more inelastic** side pays the larger share – it cannot escape by changing quantity.

International trade

Under **autarky** the price is domestic; opening up, the country trades at the **world price** .

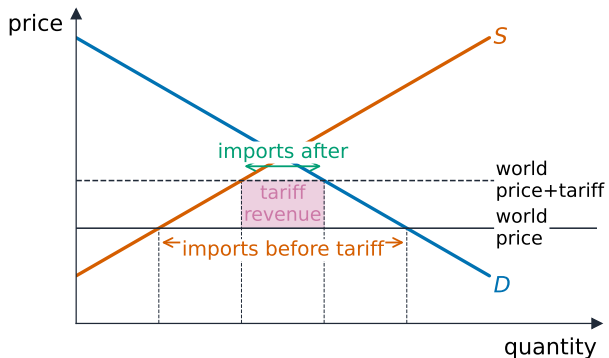
- World price **below** domestic $\Rightarrow$ **importer** ; CS up
- World price **above** domestic $\Rightarrow$ **exporter** ; PS up

Free trade raises total surplus. A **tariff** or quota creates deadweight loss.



Open trade links local and world prices

A tariff raises domestic supply



A tariff raises domestic supply, cuts demand, and shrinks imports

Key points

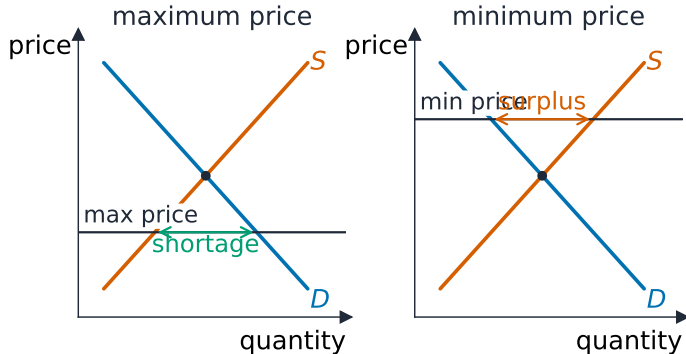
Own price → move along;
a **determinant** → shift

PED/PES classify response;
TR test follows elasticity

Equilibrium maximises total surplus ($MB = MC$)

Controls, taxes & tariffs → **deadweight loss**

The Effects of Government Intervention in Markets



A price ceiling causes a shortage; a price floor causes a surplus

Intervention, deadweight loss, and trade

why intervene

governments intervene for equity or to correct a failure – usually **reducing total surplus** in the process

a price ceiling

below equilibrium: shortage, queues, and lost trades

a price floor

above equilibrium: surplus, and unsold output

an excise tax

raises price, cuts quantity, and splits the burden by relative elasticity

deadweight loss

each of these destroys **mutually beneficial trades that no longer happen**

world price above domestic

the country **exports** : producers gain more than consumers lose. **Below**, it imports and the reverse holds

An outcome is **allocatively efficient** where marginal benefit equals marginal cost. Every intervention here moves the quantity away from that point.

Exam tips

- Separate a **movement along** a curve (own price) from a **shift** (a determinant); a single shift gives a definite result, a double shift leaves one variable indeterminate.
- Compute elasticity $E_d = |\% \Delta Q \div \% \Delta P|$; elastic (> 1) means a price cut raises total revenue, inelastic (< 1) lowers it.
- Read the sign of cross-price elasticity (substitutes $+$, complements $-$) and income elasticity (normal $+$, inferior $-$).
- Shade **consumer/producer surplus** and the **deadweight loss** from a tax or price control; incidence falls on the more **inelastic** side.
- A price ceiling below equilibrium causes a shortage; a price floor above causes a surplus.



Unit 2 – key takeaways

1

Move vs shift

own price vs a determinant

2

Elasticity

$E_d = |\% \Delta Q \div \% \Delta P|$; TR rises if elastic

3

Signs

cross-price + substitutes; income + normal

4

Controls

ceiling $\Rightarrow$ shortage; floor $\Rightarrow$ surplus

Check yourself

- 1 Price rises and total revenue falls. Elastic or inelastic?
- 2 A change in price: movement or shift?
- 3 A price ceiling below equilibrium causes what?
- 4 Who bears more of a tax – the more inelastic side or the more elastic?

Answers 1. elastic 2. a movement along the curve 3. a shortage 4. the more inelastic side