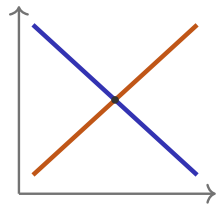
Supply and Demand

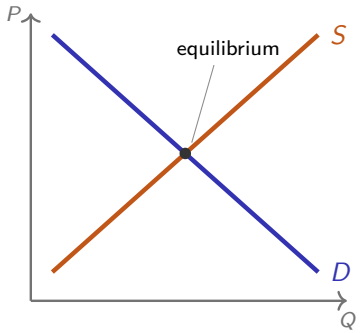
AP Microeconomics ▪ Unit 2

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



1 Demand & supply

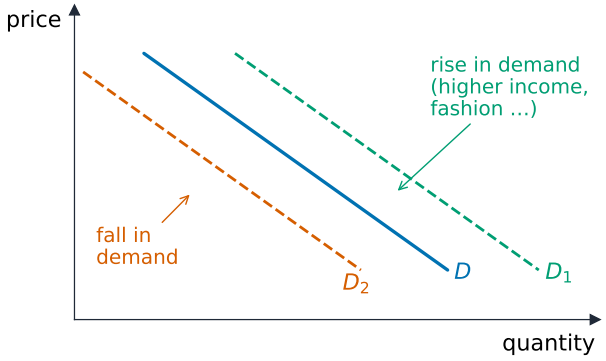
The law of demand

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

- price up ⇒ quantity down (**inverse** 反向关系)
- **substitution effect** 替代效应: switch to cheaper goods
- **income effect** 收入效应: 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 沿曲线移动
only the good's **own price** changed – slide to another point

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

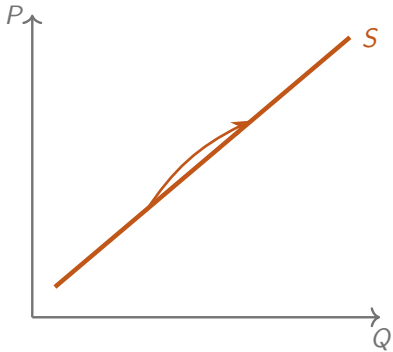
TIPEN shifts demand: **Tastes** 偏好, Income, Prices of related goods (**substitutes** 替代品/**complements** 互补品), Expectations, Number of buyers.

What shifts each curve, and what a market needs first

property rights 产权	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 水平加总	the market curve is the individual curves added across quantities at each price
the determinants 决定因素	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.

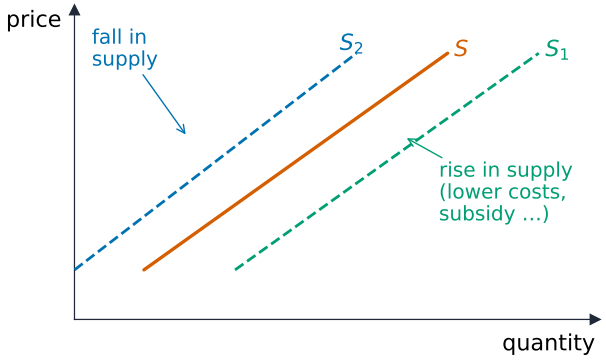
The law of supply



Supply 供给: price up ⇒ quantity up (a **direct relationship** 正向关系). The curve slopes up because each extra unit adds **marginal cost** 边际成本.

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

The supply curve slopes up; costs



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

2 Elasticity

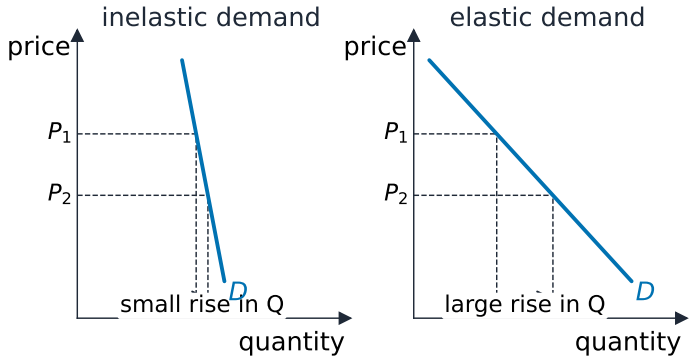
Price elasticity of demand

PED 需求价格弹性 $= \dfrac{\%\,\Delta Q_d}{\%\,\Delta P}$ – how strongly quantity responds to price. Use the **midpoint method** 中点法 and read |PED|.

Elastic	**Unit elastic**	**Inelastic**
$\lvert\text{PED}\rvert > 1$	$\lvert\text{PED}\rvert = 1$	$\lvert\text{PED}\rvert < 1$

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

Inelastic versus elastic demand



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

The total revenue test

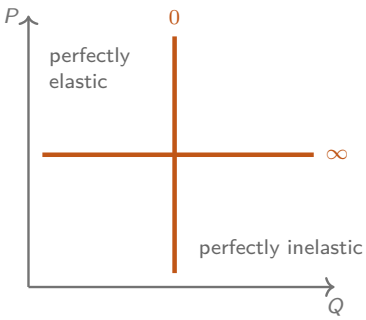
$\text{TR} = P \times Q$. When you change price, elasticity decides whether revenue rises.

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



PES 供给价格弹性 $= \dfrac{\%\,\Delta Q_s}{\%\,\Delta P}$ (positive).

- > 1 elastic, < 1 inelastic
- horizontal S: **perfectly elastic** 完全弹性 (∞)
- vertical S: **perfectly inelastic** 完全无弹性 (0)

More elastic with more **time** 时间跨度 and **spare capacity** 闲置产能.

Other Elasticities

- **Cross-price elasticity 交叉价格弹性** $= \dfrac{\%\ \Delta\ Q_x}{\%\ \Delta\ P_y}$: **positive** for substitutes.
- **Income elasticity 收入弹性** $= \dfrac{\%\ \Delta\ Q}{\%\ \Delta\ \text{income}}$: **positive** for normal goods (and > 1 for luxuries), **negative** for inferior goods.

Other Elasticities, in detail

substitutes

$\text{XED} > 0$

tea (price ↑) → coffee (demand ↑)

tea $+10\%$, coffee $+4\%$:
$\text{XED} = +0.4$

complements

$\text{XED} < 0$

printer (price ↑) → ink (demand ↓)

used together, so both are bought less

unrelated

$\text{XED} \approx 0$

bread (price ↑) → bicycles (no change)

one price says nothing about the other good

Cross elasticity: positive for substitutes, negative for complements

Cross-price & income elasticity

XED 交叉价格弹性 $= \dfrac{\%\Delta Q_X}{\%\Delta P_Y}$

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

YED 收入弹性 $= \dfrac{\%\Delta Q}{\%\Delta \text{income}}$

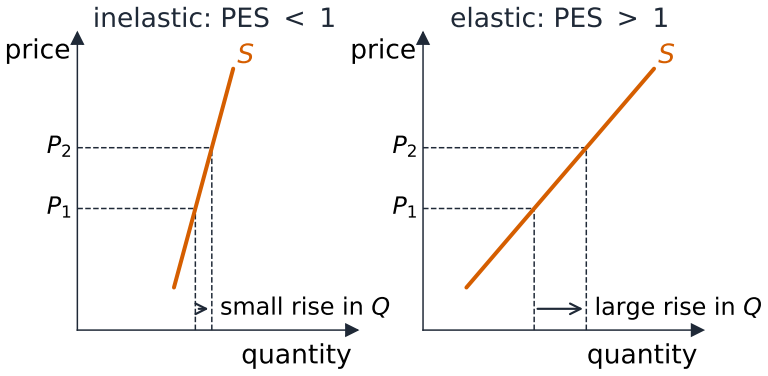
$+ \Rightarrow$ **normal good** 正常商品

$- \Rightarrow$ **inferior good** 低档商品

Worked example

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

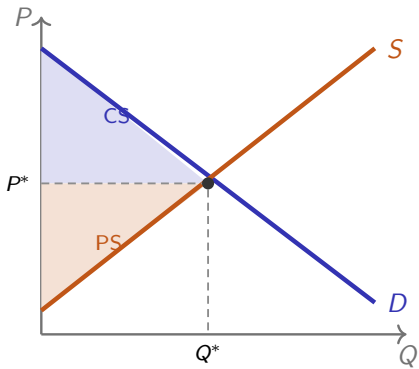
Cross-price & income elasticity, in detail



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

3 Equilibrium & surplus

Equilibrium, consumer & producer surplus

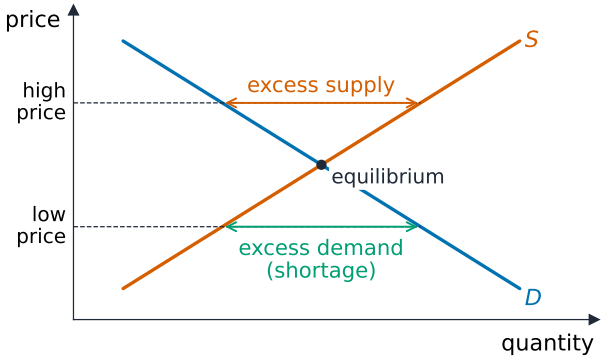


Equilibrium 均衡: where D meets S; $Q_d = Q_s$.

- **consumer surplus** 消费者剩余: below D, above P^*
- **producer surplus** 生产者剩余: above S, below P^*

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

Above equilibrium there is excess supply; below it



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

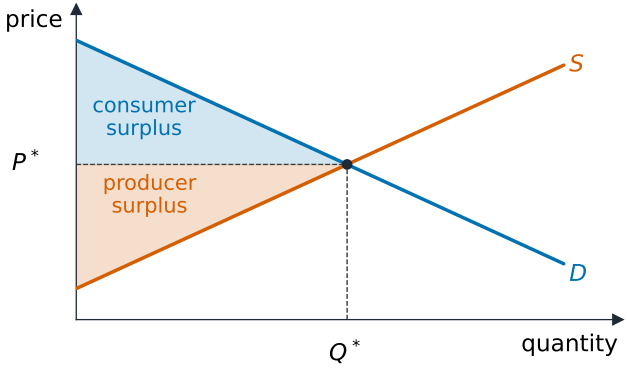
Worked example – surplus

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

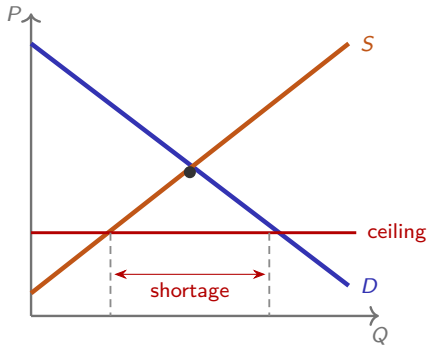
Price too high ⇒ **surplus** 过剩 → price falls

Price too low ⇒ **shortage** 短缺 → price rises

Shift rules: D right → $P\uparrow$ $Q\uparrow$; D left → $P\downarrow$ $Q\downarrow$; S right → $P\downarrow$ $Q\uparrow$; S left → $P\uparrow$ $Q\downarrow$. When **both shift** 同时移动, one result is **indeterminate** 不确定.

4 Intervention & trade

Price controls

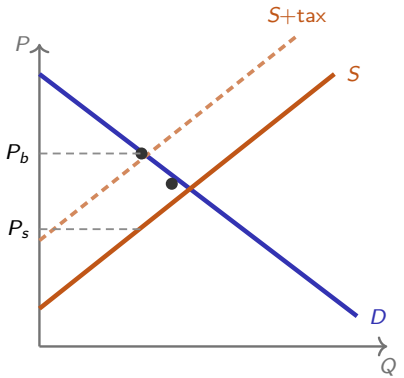


Price ceiling 价格上限 (max): binds **below** equilibrium ⇒ shortage (rent control).

Price floor 价格下限 (min): binds **above** equilibrium ⇒ surplus (minimum wage).

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

Taxes & incidence



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

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

International trade

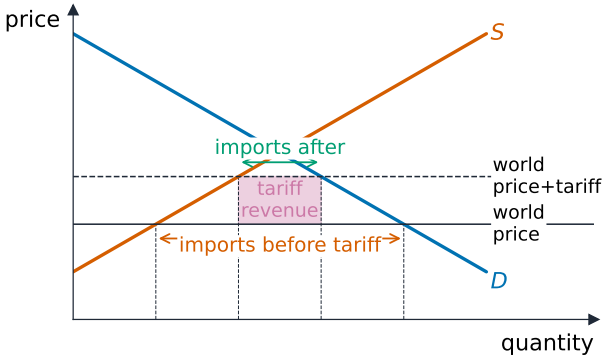
Under **autarky** 自给自足 the price is domestic; opening up, the country trades at the **world price** 世界价格.

- World price **below** domestic ⇒ **importer** 进口国; CS up
- World price **above** domestic ⇒ **exporter** 出口国; PS up

> **Free trade** 自由贸易 raises total surplus. A **tariff** 关税 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

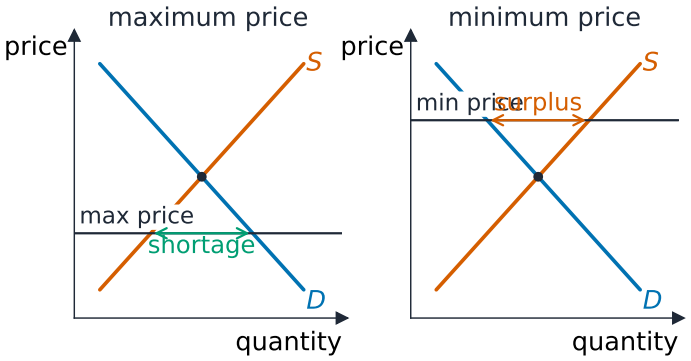
Own price → move along; a **determinant** → shift

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 消费税	raises price, cuts quantity, and splits the burden by relative elasticity
deadweight loss 无谓损失	each of these destroys mutually beneficial trades that no longer happen
world price above domestic	the country **exports** 出口: producers gain more than consumers lose. Below, it imports and the reverse holds

An outcome is **allocatively efficient** 配置有效 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.

5 Recap

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