Course Companion

Pearson Edexcel · International A-Level · Economics

Every topic handout in one volume

全部专题讲义合集

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Choice, models and market adjustment

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Why it matters. In August 2018 African swine fever reached China. The virus kills almost every pig it infects, and there is no vaccine. Within a year China's pig herd had fallen by around 40%, and in October 2019 the National Bureau of Statistics reported that pork cost 101% more than a year earlier. Nobody ordered shops to double their prices. Fewer pigs met the same appetite for pork, and the price rose until the two matched again. Families bought more chicken and beef, farmers who still had healthy pigs earned record profits and rushed to restock, and the government sold frozen pork from its state reserves. That chain of events – scarcity, a price signal, people changing what they buy and produce – is what this unit teaches.

In this unit you will:

- use models, ceteris paribus and the production possibility frontier to think about scarcity and choice;
- explain demand and supply, what moves along a curve and what shifts it;
- calculate and use price, income and cross elasticities of demand and the price elasticity of supply;
- find a market equilibrium, consumer and producer surplus, and the three functions of the price mechanism;
- work out who really pays an indirect tax and who gains from a subsidy.

Introductory concepts

Economics is a **social science** 社会科学: it studies people, so it cannot put a whole economy in a laboratory. Instead economists build **models** 模型, simplified pictures of the world based on stated assumptions. The most important assumption is **ceteris paribus** 其他条件不变, "all other things equal": change one thing, hold everything else fixed, and see what happens. Real markets never hold still, but the model tells you the direction of each separate force.

A **positive statement** 实证表述 can be checked against evidence: "China's pork price rose 101% in the year to October 2019." A **normative statement** 规范表述 contains a **value judgement** 价值判断: "the government should have released its pork reserves sooner." Both matter in policy, but only the first can be proved right or wrong.

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An open-pit mine: land and minerals are scarce, so using them one way means not using them another

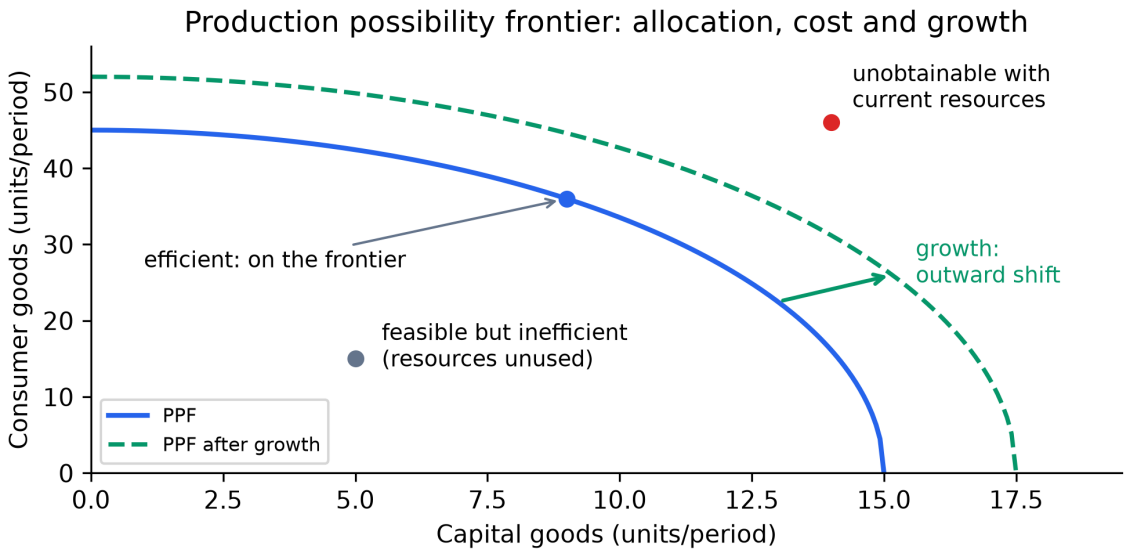
Scarcity 稀缺性 means that wants are unlimited but resources are limited. Some resources are **renewable** 可再生的 (forests, fish, solar energy); others are **non-renewable** 不可再生的 (oil, copper). Because we cannot have everything, every choice has an **opportunity cost** 机会成本: the benefit of the next-best alternative given up. A student who spends Saturday working in a café for ¥200 gives up a day of revision; a government that spends ¥10 billion on a high-speed line gives up whatever else that money could have built. A **free good** 免费物品 such as air has no opportunity cost; an **economic good** 经济物品 does.

The **production possibility frontier** 生产可能性边界 (PPF) shows the maximum combinations of two goods an economy can produce with all its resources and today's technology.

- A point **on** the frontier is efficient: you cannot make more of one good without making less of the other.
- A point **inside** is possible but wasteful: some workers or machines are idle, as in a recession.
- A point **outside** is unobtainable with current resources.
- The frontier is bowed outward because resources are not equally good at everything. Moving more resources into capital goods means using workers and land that are worse and worse at making them, so the opportunity cost of each extra unit rises.
- The whole frontier shifts **outward** with more resources, better education or new technology, and **inward** after a war or a natural disaster.

The clearest real PPF movement happened in the USA in 1942. After Pearl Harbor the government stopped the production of private cars, and factories at Ford and General Motors turned to tanks, aircraft engines and trucks. The country moved along its

frontier from "butter" to "guns". Choosing more **capital goods** 资本品 (machines, factories, railways) instead of **consumer goods** 消费品 today is a similar trade: less consumption now, more productive capacity and an outward shift later. China's very high investment rate since the 1990s is that choice on a national scale.



Point on the frontier is efficient, point inside wastes resources, point outside is unobtainable; growth shifts the whole frontier out

Specialisation and the division of labour 劳动分工 raise output. In 1776 Adam Smith described a pin factory where ten workers, each doing one or two steps, made about 48,000 pins a day, while one untrained worker alone "certainly could not make twenty". The costs are boring, repetitive work and narrow skills that can become useless when demand changes.

Specialists must trade, and trade needs **money** 货币. Money has four functions: a **medium of exchange** 交换媒介, a measure of value, a store of value and a method of deferred payment (you can borrow now and repay later). How much people need money showed in German prisoner-of-war camps in the Second World War: with no coins, prisoners priced everything in cigarettes, and the camp "price" of a chocolate bar rose and fell with the supply of Red Cross parcels.

Financial markets 金融市场 move savings to the businesses and people who want to borrow. They also help people exchange goods and services, offer forward markets in commodities and currencies (a farmer can fix next year's wheat price today), and provide a market for shares, or **equities** 股票.

Every economy must answer three questions: what to produce, how, and for whom.

- In a **free market economy** 自由市场经济, prices answer them. Incentives are strong, but the result can be very unequal, and markets fail to provide some goods.

- In a **command economy** 计划经济, the state answers them. In the Soviet Union, the planning office Gosplan set output targets for the whole economy. It could build heavy industry fast, but it often misread what people wanted and weakened the reward for effort.
- A **mixed economy** 混合经济 uses markets for most goods while the state provides public goods, regulates and redistributes income.

China's move from command towards mixed began in 1978 in Xiaogang village, Anhui, where 18 farmers secretly divided their collective land into family plots and agreed to keep any grain above the state quota. Output jumped, and the household responsibility system spread across the country within a few years. Incentives matter.

Consumer behaviour and demand

Standard models assume **rational** 理性的 decision making: consumers try to maximise **utility** 效用 (satisfaction) and firms try to maximise profit. Real people often do not.

- **Herding**: copying others, as in queues outside a newly famous milk-tea shop.
- **Habit** and **inertia**: staying with the same phone plan for years although a cheaper one exists.
- Weak **computational skills**: misjudging the true cost of an instalment plan.
- The need to feel valued, and framing: "90% fat-free" sells better than "10% fat".

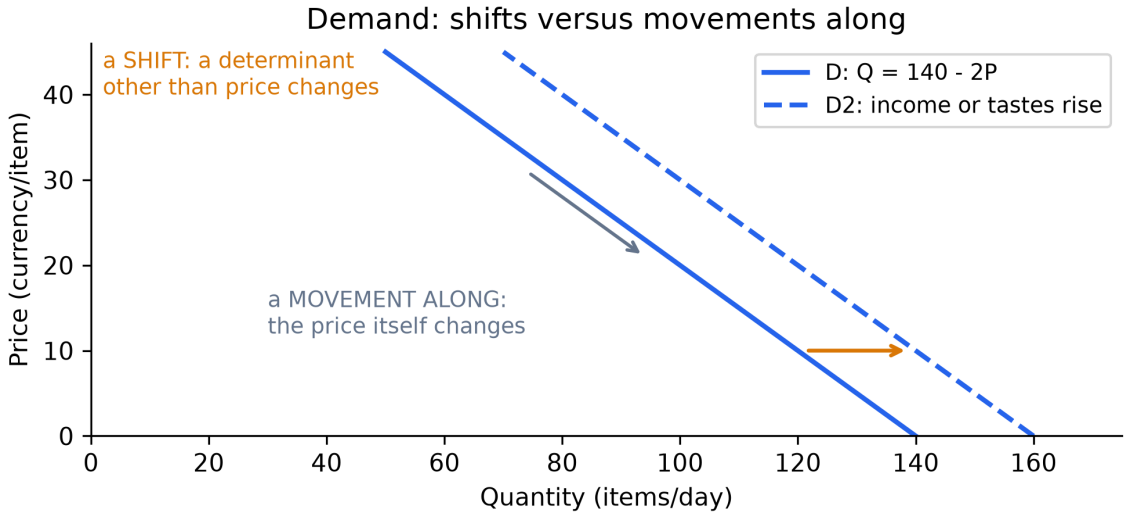
Demand 需求 is the quantity buyers are willing **and able** to buy at each price over a period. A change in the good's own price causes a **movement along** the demand curve. A change in anything else **shifts** the curve:

- the price of a **substitute** 替代品 (chicken for pork) or a **complement** 互补品 (petrol for cars);
- real income;
- tastes and fashion;
- the size and age structure of the population;
- advertising.

Why does demand slope downward? Because of **diminishing marginal utility** 边际效用递减: each extra unit gives less extra satisfaction than the one before. Your first bowl of noodles at lunch is worth a lot to you; the third is worth little. You will only buy more if the price falls.

In the rest of this unit we use one model market so that every number connects. Its demand is $Q_d = 140 - 2P$ and its supply is $Q_s = 20 + 4P$, with P in yuan per item and Q in items per day.

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A price change moves along the curve; a rise in income or a change in tastes shifts the whole curve

Elasticities of demand

Price elasticity of demand 需求价格弹性 (PED) measures how strongly quantity demanded responds to a price change:

$$\text{PED} = \frac{\%\Delta Q_d}{\%\Delta P}$$

Worked example: PED and revenue on the model.

- Known: at $P = 20$, $Q_d = 140 - 2(20) = 100$. At $P = 22$, $Q_d = 140 - 44 = 96$.
- Percentage changes: price $\frac{2}{20} = +10\%$; quantity $\frac{-4}{100} = -4\%$.
- PED $= \frac{-4}{10} = -0.4$. The size is less than 1, so demand is **price inelastic** 缺乏弹性的 here.
- **Total revenue** 总收入 $TR = P \times Q$: before, $20 \times 100 = 2000$; after, $22 \times 96 = 2112$.
- Conclusion: with inelastic demand, a price rise **raises** total revenue.

There are five cases: perfectly elastic (a horizontal curve), elastic (size above 1), unitary (exactly 1), inelastic (below 1) and perfectly inelastic (a vertical curve). PED depends on:

- the number and closeness of substitutes;
- branding and loyalty;
- the share of income spent on the good;
- whether the good is addictive;
- the time period and how durable the good is.

Real estimates show the pattern. Studies for the World Bank put the PED of cigarettes in rich countries at about -0.4: smokers are addicted, so a price rise cuts sales only a little. Short-run petrol demand is similar, around -0.25, because people cannot change how they get to work overnight.

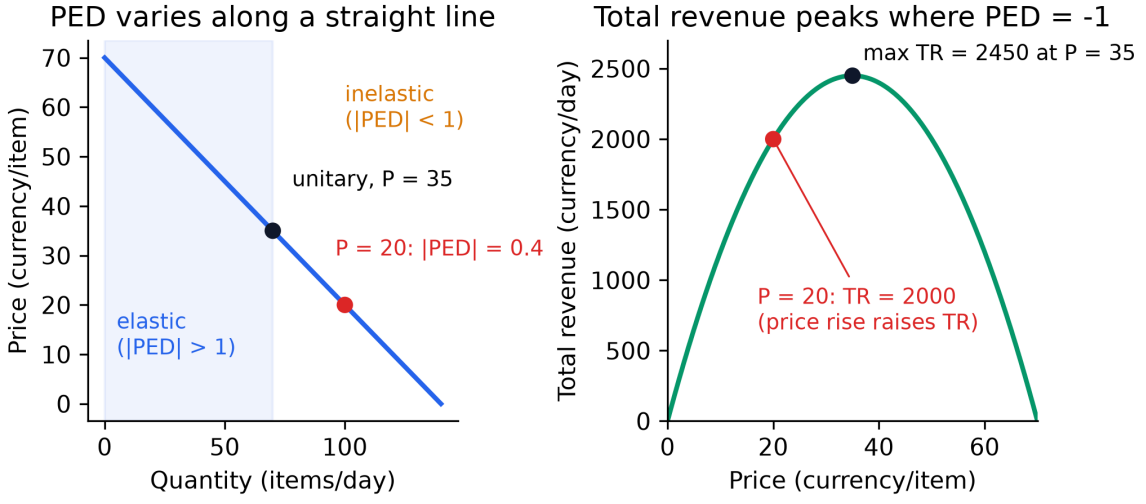
On a straight-line demand curve PED is **not** constant. It is elastic at high prices, unitary at the midpoint and inelastic at low prices. Total revenue is greatest where PED $= -1$: on our curve that is at $P = 35$, $Q = 70$, giving $TR = 2450$.

Income elasticity of demand 需求收入弹性 (YED) $= \frac{\%\Delta Q}{\%\Delta \text{income}}$.

- YED between 0 and 1: a **normal good** 正常品 that is income inelastic, such as rice in a middle-income country (income up 10%, quantity up 3%: YED $= 0.3$).
- YED above 1: income elastic, such as foreign holidays and cars. As Chinese incomes rose, outbound tourist trips grew from about 10 million in 2000 to about 155 million in 2019.
- YED below 0: an **inferior good** 劣等品, bought less as people get richer, such as long-distance bus tickets once families can afford a car or a high-speed rail fare.

Cross elasticity of demand 需求交叉弹性 (XED) $= \frac{\%\Delta Q_a}{\%\Delta P_b}$. A positive XED means the goods are substitutes (Coca-Cola and Pepsi); a negative XED means complements (printers and ink cartridges); a value near zero means the goods are unrelated.

Firms use PED to set prices, YED to plan for booms and recessions, and XED to price against rivals or bundle goods. Governments use PED to predict how much an indirect tax will raise and who will bear it.



On a straight-line demand curve PED changes along the curve; revenue is highest at $P = 35$, where PED is -1

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Supply

Supply 供给 is the quantity sellers are willing **and able** to offer at each price over a period. A change in the good's own price moves along the curve. The curve shifts when:

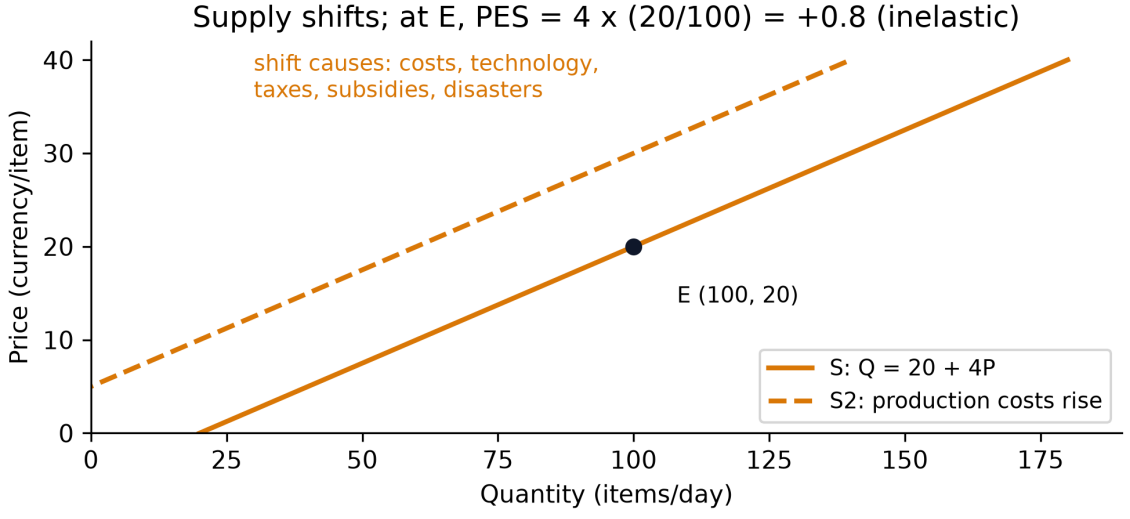
- production costs change (wages, raw materials, energy);
- technology improves;
- the government changes an **indirect tax** – a **specific tax** 从量税 (a fixed amount per unit, like China's fuel tax per litre) or an **ad valorem tax** 从价税 (a percentage of the price, like VAT);
- the government gives or removes a subsidy;
- a natural disaster or disease strikes, as African swine fever did for pork.

Price elasticity of supply 供给价格弹性 (PES) $= \frac{\%\Delta Q_s}{\%\Delta P}$. On the model at $P = 20$, $Q_s = 100$; at $P = 24$, $Q_s = 116$. So PES $= \frac{16\%}{20\%} = +0.8$: supply is inelastic.

PES depends on:

- time: in the **short run** 短期 at least one factor (such as land or a factory) is fixed; in the **long run** 长期 all factors can change, so supply becomes more elastic;
- stocks and perishability: goods that can be stored respond faster;
- how easily workers and machines can move between uses;
- legal limits such as licences or quotas;
- spare capacity.

Pork shows why time matters. A sow is pregnant for about 114 days and a piglet needs about six months to reach market weight, so after 2019 China's pork supply could not catch up for well over a year, however high the price.



A rise in production costs shifts supply left; at E the model's PES is +0.8

Price determination, surplus and the price mechanism

Equilibrium 均衡 is where quantity demanded equals quantity supplied.

> **Worked example: equilibrium and disequilibrium.**

- Set $Q_d = Q_s$: $140 - 2P = 20 + 4P$, so $120 = 6P$ and $P^* = 20$ yuan.
- Then $Q^* = 140 - 2(20) = 100$ items per day.
- At $P = 15$: $Q_d = 110$ and $Q_s = 80$. There is **excess demand** 超额需求 of 30, so buyers compete and the price rises.
- At $P = 25$: $Q_d = 90$ and $Q_s = 120$. There is **excess supply** 超额供给 of 30, so sellers cut prices.
- Either way the price moves back to 20 along the unchanged curves.

When a curve shifts, the equilibrium changes:

- demand shifts right: price and quantity both rise;
- supply shifts left (swine fever): price rises and quantity falls;
- both shift: one result is certain and the other depends on which shift is bigger. If demand rises while supply falls, price certainly rises, but quantity may go either way.



A fruit and vegetable stall: sellers raise prices when goods run short and cut them when unsold stock piles up

Consumer surplus 消费者剩余 is the difference between what buyers would be willing to pay and what they actually pay. **Producer surplus** 生产者剩余 is the difference between the price sellers receive and the lowest price at which they would supply.

> **Worked example: surplus on the model.**

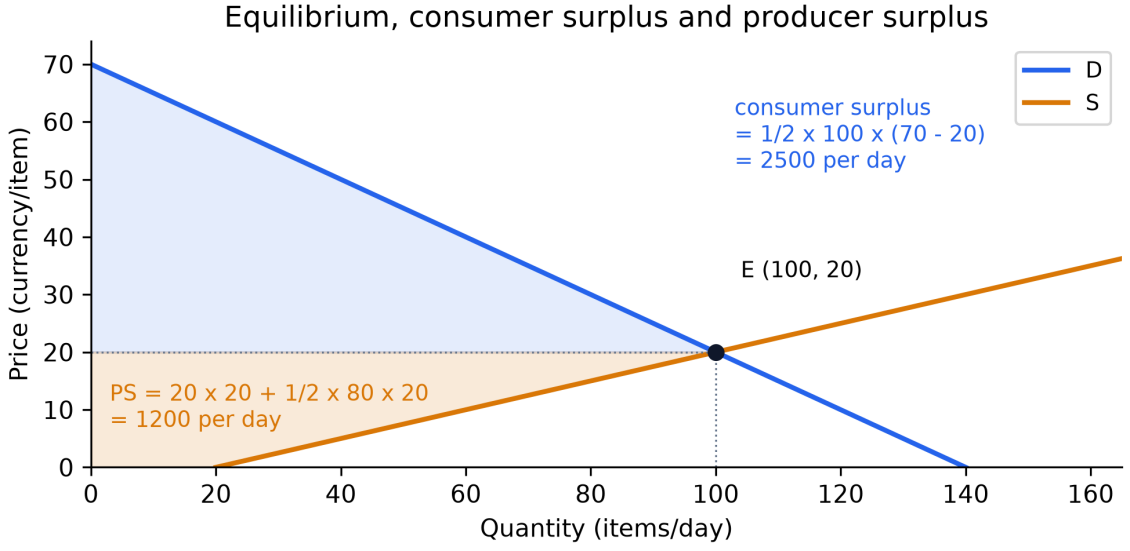
- The demand curve meets the price axis at $P = 70$ (where $Q_d = 0$). Consumer surplus is the triangle under demand and above the price: $CS = \frac{1}{2} \times 100 \times (70 - 20) = 2500$ yuan per day.
- The supply curve meets $P = 0$ at $Q = 20$: sellers would supply the first 20 items even at a price of zero. Producer surplus is the rectangle plus the triangle below the price and above supply: $PS = 20 \times 20 + \frac{1}{2} \times (100 - 20) \times 20 = 400 + 800 = 1200$ yuan per day.

A rise in demand increases both surpluses. A fall in supply reduces consumer surplus; producer surplus gains from the higher price but loses from the lower quantity.

The **price mechanism** 价格机制 allocates scarce resources through three functions, all visible in the pork crisis:

- **Rationing**: a higher price limits buying to those who value pork most; others switch to chicken.
- **Incentive**: higher profits encourage farmers to restock and invest.
- **Signalling**: the price change tells everyone where resources are now most valued.

The same mechanism works in a village market, a national market and a world market such as crude oil.



Equilibrium at $P = 20$, $Q = 100$: consumer surplus 2500 above the price, producer surplus 1200 below it

Indirect taxes and subsidies

An indirect tax raises firms' costs, so supply shifts. A specific tax shifts supply **vertically upward by the amount of the tax**.

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Worked example: a 6-yuan tax per unit on the model.

- New supply in terms of the price consumers pay: $Q_s = 20 + 4(P - 6) = 4P - 4$.
- New equilibrium: $140 - 2P = 4P - 4$, so $6P = 144$, $P_c = 24$ yuan and $Q = 140 - 48 = 92$.
- Producers keep $24 - 6 = 18$ yuan.
- Consumers pay $24 - 20 = 4$ yuan more; producers receive $20 - 18 = 2$ yuan less. The tax splits $4 : 2$.
- Government revenue $= 6 \times 92 = 552$ yuan per day.

Tax incidence 税收归宿 – who really pays – depends on the elasticities. Here PED is -0.4 and PES is $+0.8$: demand is the less elastic side, so consumers bear the larger share. If demand were more elastic than supply, producers would bear more. Output falls from 100 to 92, so jobs in the industry may fall, and the higher price adds a little to inflation.

This is why governments like to tax goods with inelastic demand. In May 2015 China raised the wholesale excise tax on cigarettes from 5% to 11%. Because smokers' demand is price inelastic, most of the tax was passed on in higher shop prices, sales fell only a little, and tobacco tax revenue rose.

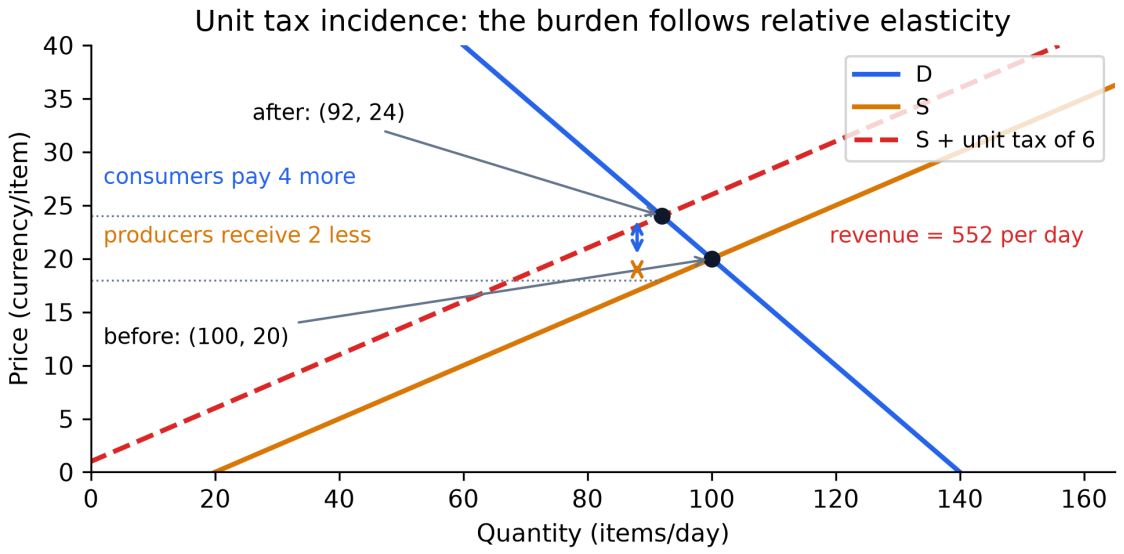
A **subsidy** 补贴 is a payment to producers that lowers their costs, so supply shifts **down** by the subsidy.

Worked example: a 6-yuan subsidy per unit.

- New supply: $Q_s = 20 + 4(P + 6) = 4P + 44$.
- New equilibrium: $140 - 2P = 4P + 44$, so $P_c = 16$ yuan and $Q = 108$.
- Producers receive $16 + 6 = 22$ yuan.
- Consumers gain 4 yuan per unit; producers gain 2 yuan per unit.
- The cost to taxpayers is $6 \times 108 = 648$ yuan per day.

The incidence logic is the same: the less elastic side of the market gains more. From 2009 to 2022 China paid purchase subsidies on new electric vehicles; together with falling battery costs, they helped make China the world's largest electric-car market.

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A 6-yuan tax raises the consumer price from 20 to 24 and cuts the producer price to 18; revenue is 552

Sources for this lesson

- National Bureau of Statistics of China, monthly CPI releases (pork price, October 2019).
- Adam Smith, *The Wealth of Nations* (1776), Book I, chapter 1 (the pin factory).
- R. A. Radford, "The Economic Organisation of a P.O.W. Camp", *Economica* 12 (1945).
- World Bank, *Curbing the Epidemic: Governments and the Economics of Tobacco Control* (1999), on cigarette price elasticity.
- Pearson Edexcel International AS Economics specification (WEC11), Issue 2, sections 1.3.1–1.3.4.

Common errors

- Writing "demand increased" when the price fell. A fall in the good's own price increases the **quantity demanded**: a movement along the curve, not a shift.
- Calling a good with PED -0.4 "elastic" because the number is negative. The size decides: below 1 is inelastic. State whether you report PED with its sign or as an absolute value.
- Saying a price rise always raises revenue. It does only when demand is price inelastic.
- Drawing a specific tax as a pivot. A specific tax shifts supply up in parallel; an ad valorem tax pivots it.

- Saying "the firm pays the tax". Legally the firm pays, but the incidence falls on consumers and producers according to the elasticities.
- Treating opportunity cost as the money price. It is the next-best alternative given up.

Key terms

- **Opportunity cost**: the benefit of the next-best alternative given up.
- **PPF**: the maximum output combinations with given resources and technology.
- **PED, YED, XED, PES**: percentage change in quantity divided by percentage change in own price, income, another good's price, or own price (for supply).
- **Equilibrium**: the price at which quantity demanded equals quantity supplied.
- **Consumer and producer surplus**: the gains to buyers and sellers above what they would have accepted.
- **Tax incidence**: how the burden of a tax is shared between consumers and producers.

Check yourself

1. Write one positive and one normative statement about China's 2015 cigarette tax rise.
2. Using a PPF, explain what happened to the US economy in 1942.
3. The price of a phone case falls from ¥50 to ¥40 and sales rise from 200 to 260 a week. Calculate PED and say what happened to total revenue.
4. On the model, find equilibrium price and quantity if demand rises to $Q_d = 160 - 2P$.
5. Explain, with the three functions of the price mechanism, how the market responded to African swine fever.
6. On the model, a 6-yuan tax is placed on the good. Explain why consumers pay 4 yuan of it.

Answers: 1. Positive: "the tax rate rose from 5% to 11%." Normative: "the tax should be higher still." 2. Resources moved from cars (consumer goods) to tanks and aircraft (military goods): a movement along the frontier, with the opportunity cost of almost no new cars. 3. $\%\Delta P = -20\%$, $\%\Delta Q = +30\%$, PED $= -1.5$ (elastic); TR rises from ¥10,000 to ¥10,400. 4. $160 - 2P = 20 + 4P$ gives $P = 23.33$ yuan and $Q = 113.3$ items per day. 5. Rationing: the higher price cut pork buying, as families switched to chicken. Incentive: high profits led farmers to restock. Signalling: the price told the whole chain that pork was now scarce. 6. Demand (PED -0.4) is less elastic than supply (PES $+0.8$), so most of the tax is passed on: the price rises from 20 to 24.

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Market failure and government intervention

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Why it matters. On 12 January 2013 the air monitor at the US Embassy in Beijing recorded fine-particle (PM2.5) pollution of 886 micrograms per cubic metre, more than thirty times the level the World Health Organization then called safe. Schools kept children indoors and hospitals filled with breathing problems. Every factory, power station and car that added to the smog made its own decision rationally: it paid for its coal and fuel, but not for the damage to millions of lungs. The market price of electricity and steel left out a cost. In September 2013 the State Council published its Air Pollution Action Plan, with coal limits, factory closures and stricter car rules, and by 2017 Beijing's average PM2.5 had fallen by about a third. This unit asks why free markets get some things wrong, and when the government makes them better – or worse.

In this unit you will:

- define market failure and name its sources;
- analyse external costs and benefits on a diagram and measure the welfare loss;
- explain public goods, information gaps, moral hazard and bubbles with real cases;
- compare the main methods of government intervention;
- explain government failure and weigh a policy against it.

Sources of market failure

Market failure 市场失灵 happens when a free market produces or consumes too much or too little of a good compared with the **socially optimal** 社会最优的 level. The price mechanism works well when prices include every cost and benefit. It fails when they do not.

There are five main sources:

- **externalities** 外部性: costs or benefits that fall on people outside the deal;
- **public goods** 公共物品 and the **free-rider problem** 搭便车问题;
- imperfect information;
- **moral hazard** 道德风险;
- speculation and market **bubbles** 市场泡沫.

Externalities

Private costs and benefits are those paid or enjoyed by the buyer or seller. An **external cost** 外部成本 or **external benefit** 外部收益 falls on a third party. Adding them gives the social total:

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$$\text{social cost} = \text{private cost} + \text{external cost}, \qquad \text{social benefit} = \text{private benefit} + \text{external benefit}$$

Externalities can come from production or consumption:

- external cost of production: a coal power station's smoke;
- external benefit of production: a firm trains engineers who later work for other firms;
- external cost of consumption: driving in rush hour slows every other road user;
- external benefit of consumption: a vaccinated child cannot pass measles to a baby too young to be vaccinated. Measles needs about 95% of people to be immune before outbreaks stop.



Each extra driver slows everyone else: an external cost of consumption that the driver does not pay

On a diagram we use **marginal** 边际 curves. The market trades where **marginal private benefit** (MPB, the demand curve) equals **marginal private cost** (MPC, the supply curve). The **social optimum** is where **marginal social benefit** (MSB) equals **marginal social cost** (MSC).

We continue the model market from Unit 1, now written with price on the left: MPB is $P = 70 - Q/2$ and MPC is $P = Q/4 - 5$, so the market settles at $Q = 100$, $P = 20$.

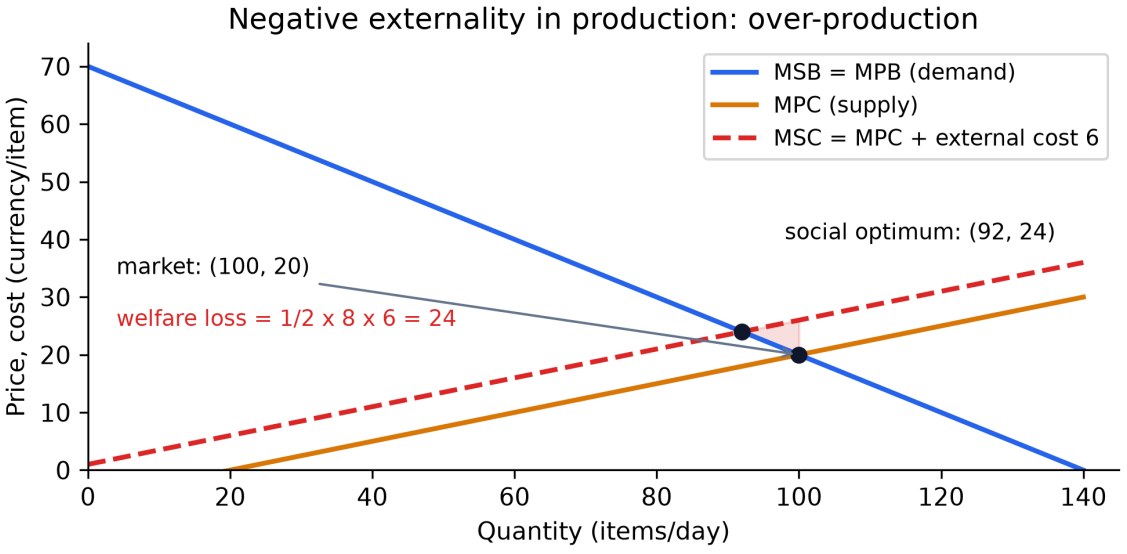
Worked example: a negative production externality.

- Each unit causes an external cost of 6 yuan, so $MSC = MPC + 6$.
- Social optimum: $70 - Q/2 = Q/4 + 1$, so $\frac{3}{4}Q = 69$ and $Q^* = 92$.
- The market makes 100: it **over-produces** by 8 units.

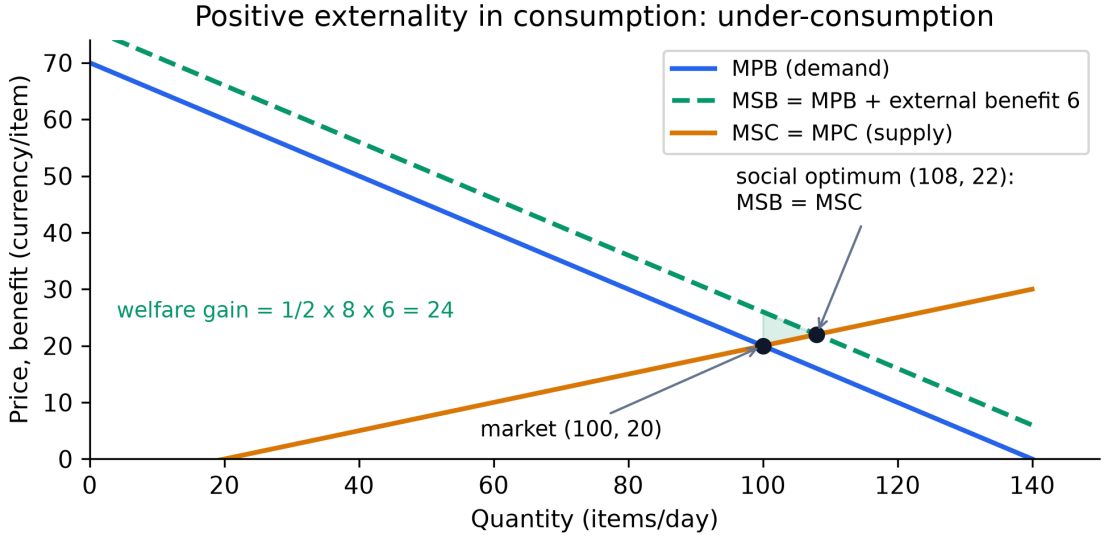
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- On each of those 8 units, social cost is above social benefit. The gap is 6 at $Q = 100$ and 0 at $Q = 92$, so the **welfare loss** 福利损失 is a triangle: $\frac{1}{2} \times 8 \times 6 = 24$ yuan per day.

With a positive consumption externality of 6, $MSB = MPB + 6$ meets MPC at $Q^* = 108$. The market **under-consumes** by 8, and the welfare that could be gained is again $\frac{1}{2} \times 8 \times 6 = 24$.



External cost: the market makes 100 where MPB = MPC; society wants 92 where MSB = MSC; the triangle between them is the welfare loss of 24



External benefit: the market stops at 100, but MSB = MSC at 108; the missing triangle is a welfare gain of 24

The specification asks for five contexts:

- transport: congestion and exhaust;
- health: vaccination, passive smoking;
- education: a skilled workforce helps other firms and lowers crime;
- environment: emissions, plastic waste;
- finance: one bank's collapse can spread to others, as Lehman Brothers' failure did in September 2008.

Public goods, information gaps, moral hazard and bubbles

A **private good** 私人物品 is **rival** 竞争性的 (if I eat the apple, you cannot) and **excludable** 排他性的 (the shop can stop non-payers). A **public good** is **non-rival** and **non-excludable**: a flood defence protects every house behind it at once, and nobody behind it can be left out.

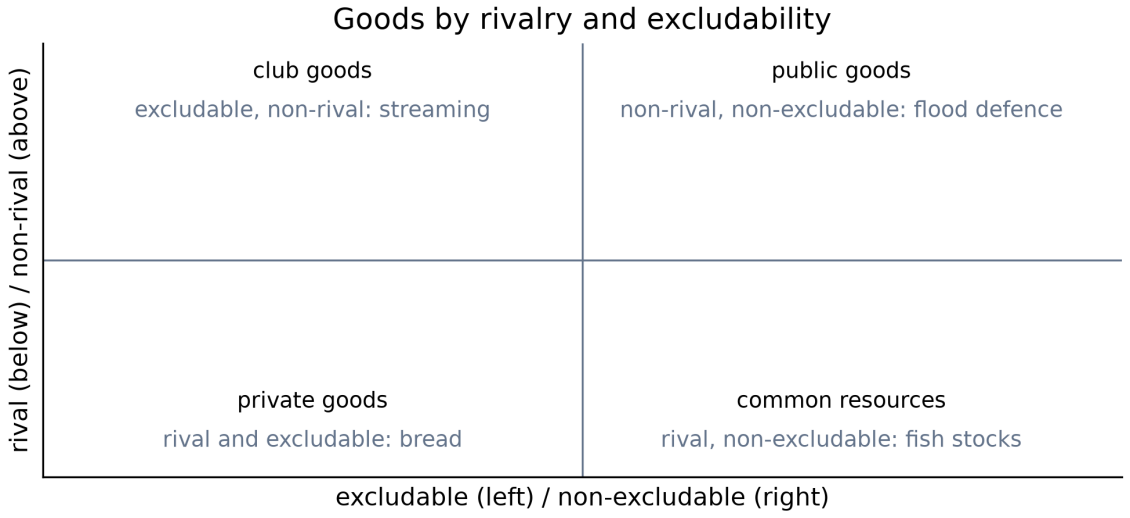
That creates the **free-rider problem**: if you will be protected anyway, why pay? A private firm cannot charge enough to cover its costs, so a pure public good is not provided by the market at all. National defence, street lighting and flood barriers are usually paid for from taxes.



A lighthouse protects every passing ship at once, and no ship can be stopped from seeing it

The lighthouse is the textbook example, but in 1974 Ronald Coase showed that many British lighthouses had been built privately and paid for by fees collected at ports. When a public good's users can be charged in some other way, the market can sometimes provide it.

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Goods sorted by rivalry and excludability: only the non-rival, non-excludable corner suffers from free-riding

Asymmetric information 信息不对称 means one side of a deal knows more than the other. In 1970 George Akerlof explained the "market for lemons": the seller of a used car knows whether it is a "lemon" (a bad car), but the buyer does not, so buyers offer only an average price and owners of good cars leave the market. The specification names four areas:

- healthcare: patients cannot judge which treatment they need;
- education: students cannot see a course's quality before they pay;
- pensions: products are complex and their costs are hidden;
- insurance: people who know they are high risk buy more cover.

The 2008 melamine milk scandal in China showed how dangerous such gaps can be. Some suppliers added melamine to watered-down milk to fake a high protein reading. Parents could not test the formula they bought; about 300,000 babies became ill and six died.

Moral hazard happens **after** a contract, when a protected person takes more risk because someone else will pay. A driver with full insurance may park carelessly. Banks that expect a government rescue may lend recklessly: in 2008 governments in the USA and Britain spent hundreds of billions of dollars rescuing banks, and taxpayers carried the risk the banks had taken.

A **bubble** forms when people buy an asset only because they expect to sell it at a higher price. Prices rise far above what the asset's earnings justify, then crash. Japan's Nikkei share index peaked at 38,916 on 29 December 1989, then fell by over 60% in less than three years; it did not return to its 1989 peak until February 2024. Land prices in Tokyo fell even further. A burst bubble hurts:

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- consumers: homes worth less than their mortgages (**negative equity** 负资产), smaller pensions;
- producers: demand collapses;
- workers: unemployment;
- governments: recession, lower tax revenue and bank rescues.

Government intervention: purpose and methods

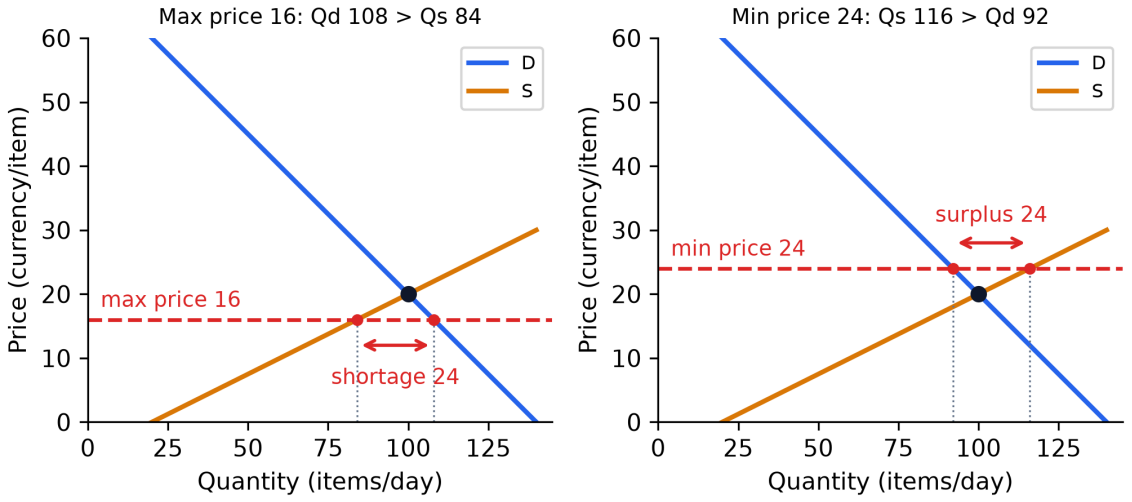
The government intervenes to move output towards the social optimum. The main methods are:

- **Indirect taxes**. A **Pigouvian tax** 庇古税, named after the economist Arthur Pigou (1920), equals the marginal external cost. On our model, a tax of 6 per unit moves supply up to MSC, and output falls to the social optimum of 92 at a consumer price of 24 – the same numbers as the tax in Unit 1.
- **Subsidies**. A subsidy of 6 per unit corrects the positive externality: output rises to 108, buyers pay 16 and sellers receive 22. China's free childhood vaccinations under the national immunisation programme work the same way, with the price cut to zero.
- **Maximum prices** 最高价格, set below equilibrium to keep a good affordable.
- **Minimum prices** 最低价格, set above equilibrium to protect producers.
- **Tradeable pollution permits** 可交易污染许可证.
- **Property rights** 产权: if a river's owner can sue the factory that pollutes it, the factory must take the cost into account.
- **State provision** of public goods and merit goods such as schooling.
- **Regulation** 监管: bans, standards and limits.
- **Information**: food labels, school league tables, health warnings.

Worked example: price controls on the model.

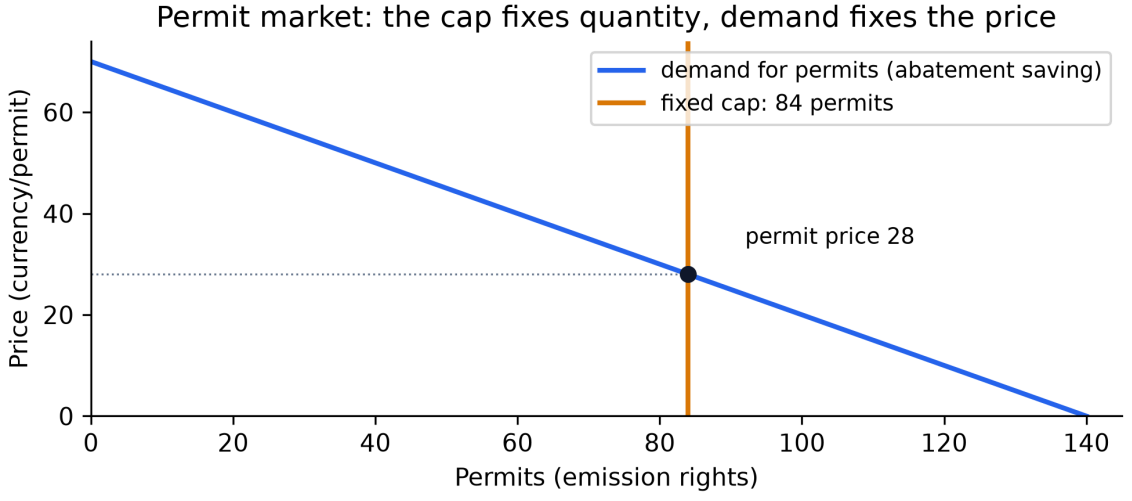
- Maximum price of 16 yuan: $Q_d = 140 - 2(16) = 108$ and $Q_s = 20 + 4(16) = 84$. There is a **shortage** of 24. Queues, waiting lists and black markets follow. Rent controls show the effect: in Stockholm, which caps rents, people wait years in the city's official queue for a flat.
- Minimum price of 24 yuan: $Q_s = 116$ and $Q_d = 92$. There is a **surplus** of 24, which the government may have to buy and store. Since 2004 China has set minimum purchase prices for rice, and since 2006 for wheat; the state grain company Sinograin buys the surplus when market prices fall below them. In the 1980s the European Union's guaranteed farm prices filled government stores with "butter mountains" and "wine lakes".

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A maximum price of 16 causes a shortage of 24; a minimum price of 24 causes a surplus of 24

Tradeable permits combine regulation with the market. The government sets a **cap** on total emissions and issues that many permits. Firms that can cut pollution cheaply do so and sell their spare permits; firms for which cutting is expensive buy them. The cap fixes the pollution; the market finds the cheapest way to reach it. In our model the cap is 84 permits, and demand sets the permit price at 28. The European Union's Emissions Trading System began in 2005. China's national carbon market began trading in July 2021; it covers the power sector and about 4.5 billion tonnes of carbon dioxide a year, the largest market in the world by emissions covered.



The cap fixes 84 permits; firms' demand for permits sets their price at 28

The specification's contexts are health, housing, education, transport, environment, energy, agriculture and commodities. In an exam, always link the method to the

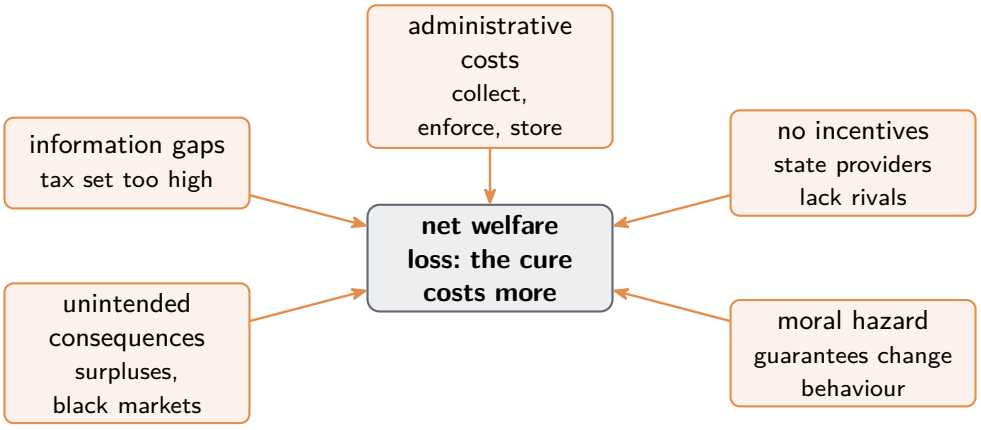
failure: a tax for an external cost, a subsidy for an external benefit, state provision for a public good, information for an information gap.

Government failure

Government failure 政府失灵 happens when intervention makes society worse off overall: the cure costs more than the disease. There are five main causes.

- **Information gaps**: the government cannot measure the external cost exactly. If it sets the tax too high, it cuts output below the social optimum and creates a new welfare loss.
- **Unintended consequences**: in 1989 Mexico City banned each car from driving on one weekday, chosen by its number plate. Many families bought a second, older and dirtier car, and later studies found no improvement in air quality.
- **Administrative costs**: collecting taxes, enforcing rules and storing surpluses all use resources.
- **Lack of incentives**: state providers that face no competition may have little reason to cut costs or improve quality.
- **Moral hazard**: guaranteed prices or expected rescues change behaviour.

China's winter of 2017 shows several causes at once. To clean the air, local governments in Hebei and nearby provinces ordered millions of homes to switch from coal to gas heating. Gas supply could not keep up, and in December some homes and schools had no heating at all, until the government allowed coal to be burned again in areas not yet connected. The goal was right; the information and timing were not.

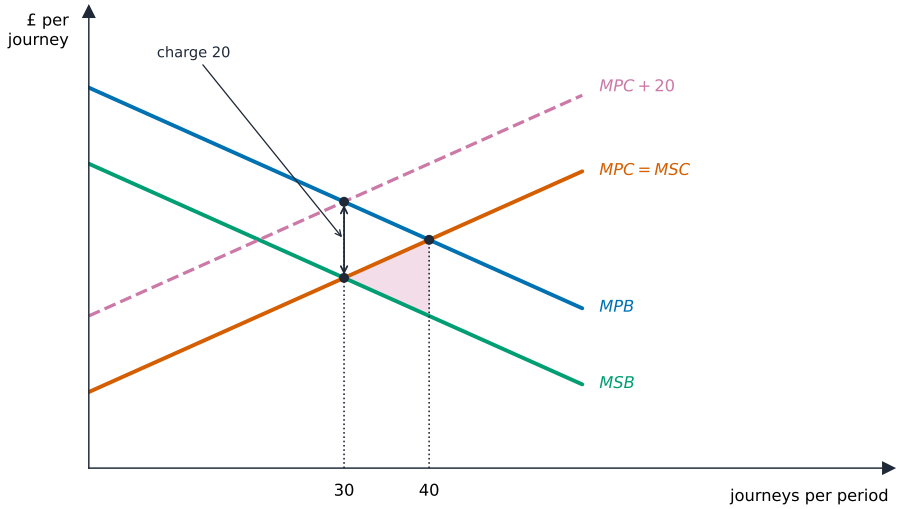


Five routes to government failure, all leading to a net welfare loss

Every answer about intervention should end by weighing the correction against these risks.

Data-response practice (Section B style)

Extract. In February 2003 London introduced a congestion charge: drivers paid £5 a day to drive into central London on weekdays. In the first year traffic entering the zone fell by about 18% and delays fell by about 30%. Bus services improved, as buses were no longer stuck in traffic. The charge rose in steps and has been £15 since June 2020. Transport for London spends the revenue on public transport. Critics argue that a flat charge takes a larger share of a low income, that some small shops inside the zone lost customers, and that congestion later returned as roadworks and delivery vans increased. In January 2025 New York City became the first US city to introduce a similar charge.



Private choice: 40; efficient quantity: 30
Harm is counted once: $MSB = MPB - 20$

Private choice gives 40 journeys. Including the external harm gives 30. A 20-pound charge raises private marginal journey cost and reaches 30 in this model; the charge is a transfer, not an extra 20 pounds of real resource cost per journey.

Questions

- (a) Explain, using the extract, why road congestion is an example of a negative externality. [4]
- (b) Before the charge, 100,000 vehicles a day entered the zone. Using the extract, calculate the number entering after the first year, and the daily revenue at £5. [4]
- (c) With the help of a diagram, explain how a congestion charge could move the market towards the socially optimal level of road use. [6]
- (d) Examine **two** problems a government faces in setting the right level of a congestion charge. [8]
- (e) Evaluate whether road pricing is a better solution to congestion than building more roads. [12]

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Model answers

(a) Each driver who enters a busy road slows down every other road user: buses, delivery vans and other drivers lose time and burn more fuel, and pedestrians breathe more polluted air. These are costs to third parties that the driver does not pay. So the marginal social cost of a journey is greater than its marginal private cost, and, without a charge, too many journeys are made at busy times. The extract's 30% fall in delays when traffic fell shows how large these external costs were.

(b) Vehicles after the charge = 100,000 × (1 − 0.18) = 82,000 a day. Revenue = 82,000 × £5 = £410,000 a day (ignoring exemptions and discounts).

(c) Use the negative-externality diagram above: the market for journeys settles where MPB = MPC, at a quantity above the social optimum where MSB = MSC. A charge equal to the marginal external cost at the optimum adds to the private cost of each journey, shifting MPC up to MSC. Drivers whose journeys are worth less than the full cost switch to buses, travel at other times or stay away, so the quantity falls to the social optimum and the welfare loss triangle is removed. The 18% fall in traffic is this movement.

(d) **Measuring the external cost is hard.** The cost of congestion depends on time of day, place and weather, and the value of time lost differs between people. A flat £15 charge will be too high at quiet times and too low at peak times, so it cannot match MSC everywhere. **Demand responses change over time.** Demand for car journeys into a city centre may be price inelastic for those with no alternative, so a charge reduces traffic less than expected; over time, the effect can wear off as incomes rise and as other causes, such as roadworks and delivery vans, add to congestion (as the extract notes). *Evaluation:* technology such as number-plate cameras allows charges to vary by time, which reduces the first problem; regular review of the charge reduces the second.

(e) *For road pricing:* it tackles the cause of the externality by making drivers pay the external cost, so the space on roads goes to journeys valued most. It raises revenue (about £410,000 a day in the example) that can fund buses and rail, giving people alternatives. It worked quickly in London: traffic fell 18% and delays 30% in a year.

For building roads: new roads add capacity without charging drivers, so they are popular and do not hurt low-income drivers. In growing cities with little road space, more capacity may be needed.

Against building roads: new roads often fill up with new traffic (induced demand) because lower congestion makes driving cheaper in time, so congestion returns. Roads are very costly, take years to build, use scarce land and raise pollution, an external cost of their own.

Against road pricing: a flat charge is regressive, and some city-centre businesses lose trade. Setting the right charge is hard (part d), and enforcement and cameras cost money. Its effect may fade without regular increases.

Judgement: road pricing is usually the better policy in dense city centres, where there

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is no space for new roads and public transport is a real alternative, because it targets the externality and funds alternatives. Its success depends on charges that vary with congestion and on reinvesting revenue in public transport; building roads may still be needed between cities, where road pricing is harder to apply and alternatives are fewer.

What examiners reward: the externality explained with the extract's evidence, calculations with clear working, a labelled MSC/MPC diagram used in the explanation, problems that are examined (with a counter-point), and a judgement that depends on clear conditions.

Sources for this lesson

- US Embassy Beijing air-quality readings, January 2013; State Council, Air Pollution Prevention and Control Action Plan (September 2013).
- G. Akerlof, "The Market for 'Lemons'", *Quarterly Journal of Economics* 84 (1970).
- R. Coase, "The Lighthouse in Economics", *Journal of Law and Economics* 17 (1974).
- L. Davis, "The Effect of Driving Restrictions on Air Quality in Mexico City", *Journal of Political Economy* 116 (2008).
- Transport for London, congestion charge monitoring reports.
- Pearson Edexcel International AS Economics specification (WEC11), Issue 2, sections 1.3.5–1.3.6.

Common errors

- Drawing the external cost as a shift of demand. A production externality makes MSC lie above MPC; demand (MPB) does not move.
- Shading the wrong triangle. The welfare loss lies between MSC and MSB, from the social optimum to the market output.
- Calling anything the government provides a "public good". Schools and hospitals are rival and excludable: they are merit goods or state-provided private goods.
- Confusing moral hazard (behaviour changes **after** the deal) with asymmetric information before it.
- Saying a maximum price is set **above** equilibrium. A maximum price only has an effect when it is below equilibrium; a minimum price only when it is above.
- Ending an intervention answer without evaluation. Name a cause of government failure that could apply.

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Key terms

- **Market failure**: too much or too little of a good compared with the social optimum.
- **Externality**: a cost or benefit to a third party, outside the market price.
- **Public good**: non-rival and non-excludable, so free-riding stops private provision.
- **Asymmetric information**: one side of a deal knows more than the other.
- **Moral hazard**: taking more risk because someone else bears the cost.
- **Government failure**: intervention that causes a net welfare loss.

Check yourself

1. Explain why the smog in Beijing in January 2013 was a market failure.
2. On the model, with an external cost of 6 per unit, why is the welfare loss 24?
3. Is a toll motorway a public good? Use rivalry and excludability.
4. Explain why a used-car market may shrink when buyers cannot check quality.
5. On the model, a maximum price of 18 yuan is set. Calculate the shortage.
6. Using the Mexico City driving ban, explain one cause of government failure.

Answers: 1. Factories, power stations and drivers paid for their fuel but not for the damage their smoke did to other people's health, so social cost was above private cost and too much was produced and burned. 2. The market produces 100 but the optimum is 92; on those 8 extra units the gap between MSC and MSB grows from 0 to 6, so the loss is $\frac{1}{2} \times 8 \times 6 = 24$. 3. No: it is excludable (drivers who do not pay are stopped at the barrier) and rival when busy (extra cars slow everyone). 4. Buyers pay only an average price because they might get a lemon; owners of good cars will not sell at that price and leave, so the cars on offer get worse and the market shrinks. 5. $Q_d = 140 - 36 = 104$, $Q_s = 20 + 72 = 92$: a shortage of 12 per day. 6. Unintended consequences: families bought a second, older car to drive on their banned day, so traffic and pollution did not fall.

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Output measures, spending and the multiplier

Pearson Edexcel · International A-Level · Economics

Why it matters. In the autumn of 2008 the world's banks froze, and orders for Chinese exports collapsed; millions of migrant workers in Guangdong lost their factory jobs and went home early for the New Year. On 9 November 2008 China's State Council announced a stimulus package of ¥4 trillion, about 13% of a year's GDP, for railways, roads, housing and rebuilding after the Sichuan earthquake. Each yuan spent on a railway became wages for builders and income for steel mills, and part of that income was spent again in shops and restaurants. China's growth slowed only to about 9% in 2009, while the USA, Japan and Germany shrank. This unit explains how economists measure a whole economy's performance, what drives total spending, and why one injection of spending can raise national income by more than itself.

In this unit you will:

- measure economic performance: real GDP, inflation, unemployment and the balance of payments;
- explain the components of aggregate demand and what shifts them;
- distinguish short-run and long-run aggregate supply, Keynesian and classical;
- use the circular flow, injections, withdrawals and the multiplier;
- explain actual and potential growth, output gaps and the costs of growth.

Measures of economic performance

Economic growth 经济增长 is the rate of change of **real GDP**. **Gross Domestic Product** 国内生产总值 (GDP) is the value of everything produced **within** a country in a year. **Gross National Income** 国民总收入 (GNI) adds the income residents earn abroad and subtracts the income paid to foreign owners. In 2023 China's GDP was about ¥126 trillion, and real GDP grew by 5.2%.

Three pairs of measures matter:

- **nominal** 名义的 (at current prices) versus **real** 实际的 (with price changes removed);
- **total** versus **per capita** 人均 (divided by population);
- **value** (money) versus **volume** (quantity).

Worked example: real GDP per head.

- Known: nominal GDP index 112, GDP deflator 108, population index 102 (all with base year = 100).
- Real GDP index $= \frac{112}{108} \times 100 = 103.7$: real growth of 3.7%.
- Real GDP per head $= \frac{103.7}{102} \times 100 = 101.7$: living standards rose by only 1.7%.

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- Most of the nominal rise was prices; a growing population took another part.

To compare countries, use **purchasing power parities** 购买力平价 (PPP), which convert currencies at the rate that buys the same basket of goods. At market exchange rates China's GDP in 2023 was about two-thirds of the USA's; at PPP the IMF puts it above the USA's, because the same yuan buys more in China.

A **recession** 经济衰退 is usually defined as two consecutive quarters of negative growth. GDP is a weak guide to living standards because it ignores unpaid work, the shadow economy, the distribution of income, working hours and environmental damage. Countries therefore also look at life expectancy, corruption indexes and reported happiness. Above a certain level, extra income buys little extra happiness: average life satisfaction in the USA barely moved between the 1970s and the 2000s while real income per head rose by well over half.

Inflation 通货膨胀 is a sustained rise in the general price level. **Deflation** 通货紧缩 is a sustained fall. **Disinflation** 通胀放缓 is a slower rate of rise: prices still go up, but more slowly. India's CPI inflation fell from about 11% in 2013 to about 6% in 2015 – disinflation, because prices were still rising. China's CPI fell by 0.3% in the year to July 2023 – deflation.

A **consumer price index** 消费者价格指数 (CPI) weights the price changes in a typical household's basket.

Worked example: a weighted CPI.

- Three goods with weights 50%, 30% and 20% have price indexes 110, 100 and 120.
- CPI $= 0.5 \times 110 + 0.3 \times 100 + 0.2 \times 120 = 55 + 30 + 24 = 109$.
- Inflation over the period is 9%.

The CPI has limits: the basket is fixed for a year while spending patterns change, quality improvements are hard to price, and no household is exactly "typical". The **producer price index** 生产者价格指数 (PPI) measures factory-gate prices; because firms pass costs on, it often signals consumer inflation months ahead.

Inflation has three causes:

- **demand-pull** 需求拉动: aggregate demand grows faster than capacity;
- **cost-push** 成本推动: costs such as energy or wages rise. When gas prices soared after Russia invaded Ukraine, UK CPI inflation reached 11.1% in October 2022;
- **excessive growth of the money supply**: in 2008 Zimbabwe printed money to pay its bills, and prices doubled roughly every day at the peak.

Deflation comes from falling demand, a rise in supply (cheaper technology) or a shrinking money supply. Inflation and deflation affect:

- consumers' real incomes and the value of savings;
- government tax receipts and the real value of its debt;
- firms' planning and costs;
- workers' real wages;

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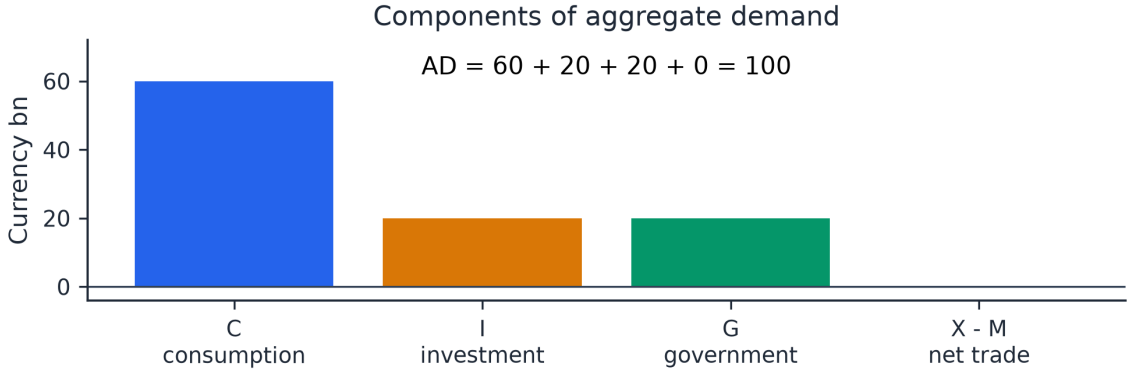
- the distribution of income: borrowers gain and lenders lose from unexpected inflation;
- investment, which falls when the future is uncertain;
- international competitiveness and the current account.

Unemployment 失业 is measured by the ILO definition: people without a job who are available for work and have actively looked for work recently. Its causes are:

- **frictional** 摩擦性: between jobs;
- **seasonal** 季节性: ski instructors in summer;
- **structural** 结构性: workers' skills no longer match the jobs available. When China restructured its state-owned enterprises in the late 1990s, tens of millions of workers were laid off, many in the old industrial north-east;
- **demand-deficient** 需求不足型: too little total spending, as in a recession;
- **real-wage inflexibility**: wages stuck above the level that clears the labour market.

Unemployment costs the unemployed their income and skills, firms their customers, the government tax revenue and benefit spending, and the economy output: it operates **inside** its PPF. Society bears costs in crime and poorer health. **Underemployment** 就业不足 means people have jobs but want more hours or a job that uses their skills. Watch three rates together – employment, unemployment and **economic inactivity** (people neither working nor looking) – and the effect of net migration on the labour force.

The **balance of payments** 国际收支 records a country's transactions with the rest of the world. Its **current account** 经常账户 includes trade in goods, trade in services, primary income (such as profits and interest from abroad) and secondary income (transfers such as money sent home by migrants). A deficit on goods and services means imports are greater than exports. In 2023 China ran a current-account surplus of about US250*billionandtheUSAadeficitofaboutUS*900 billion.



In the model economy, consumption is 60, investment 20, government spending 20 and net exports 0, so AD is 100

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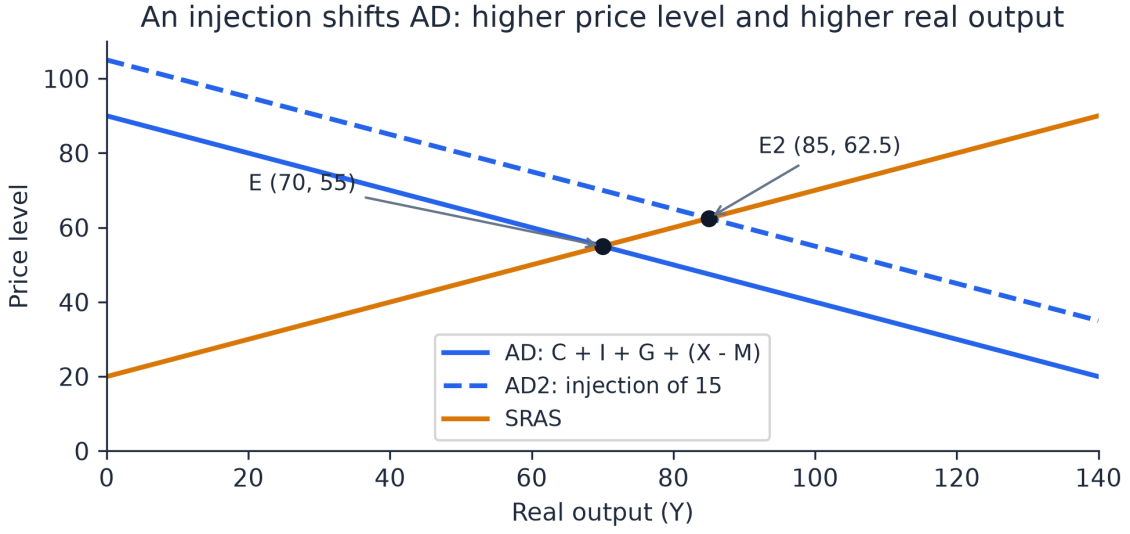
Aggregate demand

Aggregate demand 总需求 (AD) is total planned spending on a country's output:

$$AD = C + I + G + (X - M)$$

The AD curve slopes downward against the price level: when prices fall, people's money is worth more (a wealth effect), exports become more competitive, and interest rates tend to fall. A change in the price level is a movement along AD; a change in any component shifts it.

- **Consumption** 消费 (C) depends on disposable income, interest rates, confidence, wealth and credit. The **savings ratio** 储蓄率 is saving as a share of disposable income; Chinese households save about a third.
- **Investment** 投资 (I) is spending on capital goods; **net** investment is gross investment minus depreciation. It depends on growth, interest rates, business confidence, credit and corporation tax.
- **Government spending** 政府支出 (G) depends on fiscal policy, the state of the economy and political priorities.
- **Net exports** (X − M) depend on income at home, the exchange rate, growth abroad, protectionism and quality.



An injection shifts AD right: equilibrium moves from real output 70 at price level 55 to 85 at 62.5

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Aggregate supply

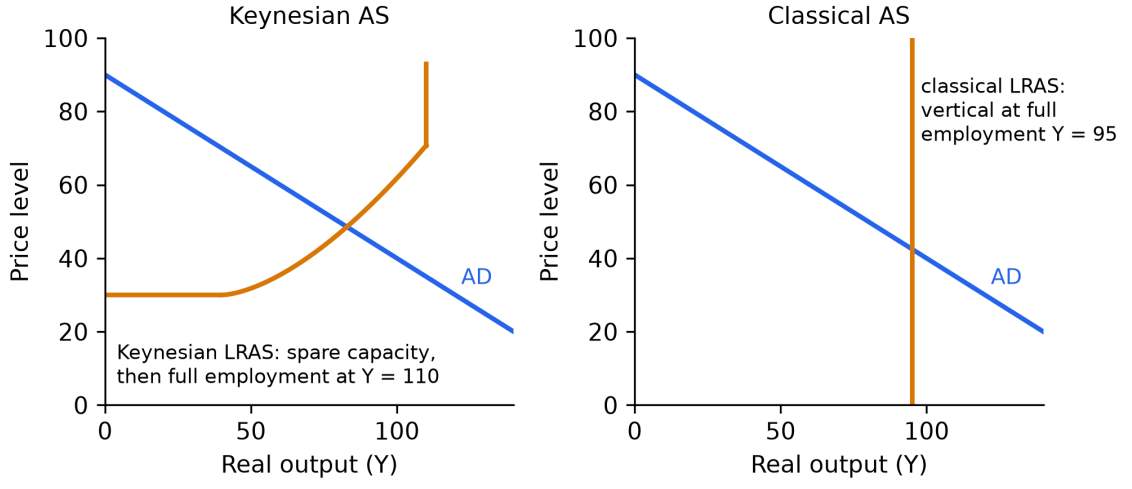
Aggregate supply 总供给 (AS) is the total output firms plan to produce at each price level. A change in the price level moves along the curve. In the **short run**, AS shifts with:

- the cost of raw materials and energy (the 1973 oil shock quadrupled oil prices and shifted AS left across the world);
- exchange rates, which change the cost of imported inputs;
- tax rates on firms.

Long-run aggregate supply 长期总供给 (LRAS) shows the economy's capacity. Economists disagree about its shape:

- the **Keynesian** 凯恩斯主义 LRAS is horizontal when there is lots of spare capacity, curves upward as the economy approaches full employment, and becomes vertical at full capacity. More demand can raise output a lot in a deep recession;
- the **classical** 古典 LRAS is vertical at full-employment output. The economy always returns there, so more demand only raises prices in the long run.

LRAS shifts right with better technology, higher productivity, education and skills, lighter regulation, lower taxes, a growing population or net migration, and stronger competition.



The same rise in AD raises output on the flat part of the Keynesian curve but only the price level on the vertical classical curve

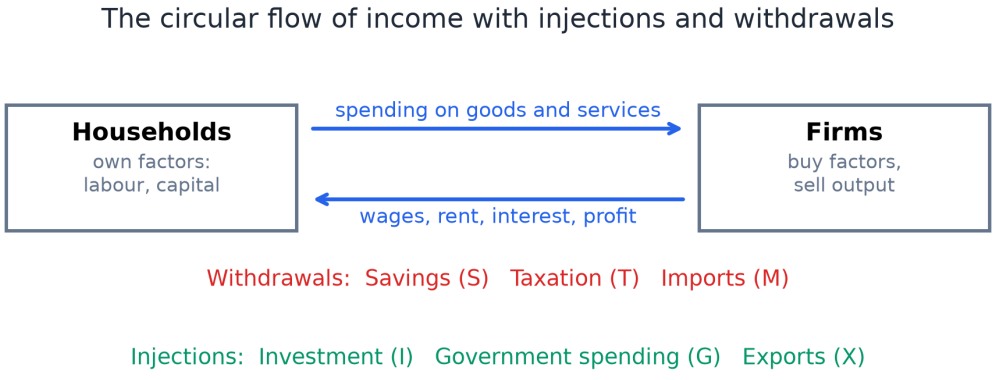
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National income and the multiplier

The **circular flow of income** 收入循环流 links households and firms: households supply labour and capital and receive income; firms sell output and pay that income. National income, output and expenditure are three ways of measuring the same flow. **Income** is a flow over time; **wealth** 财富 is a stock of assets at one moment.

- **Injections** 注入 add to the flow: investment (I), government spending (G) and exports (X).
- **Withdrawals** 漏出 take money out: saving (S), taxes (T) and imports (M).

When injections are greater than withdrawals, national income rises; when withdrawals are greater, it falls. Equilibrium is where $I + G + X = S + T + M$. On the AD/AS diagram, equilibrium is where AD meets AS.



Injections enter the flow and withdrawals leave it; equilibrium is where $I + G + X = S + T + M$

The **multiplier** 乘数 explains why an injection raises national income by more than itself. Spending on a new railway becomes wages; workers spend part of their wages in shops; shopkeepers spend part of that, and so on. The **marginal propensity to consume** 边际消费倾向 (MPC) is the share of each extra yuan that is spent. The rest leaks out as saving (MPS), tax (MPT) or imports (MPM), together the **marginal propensity to withdraw** 边际漏出倾向 (MPW).

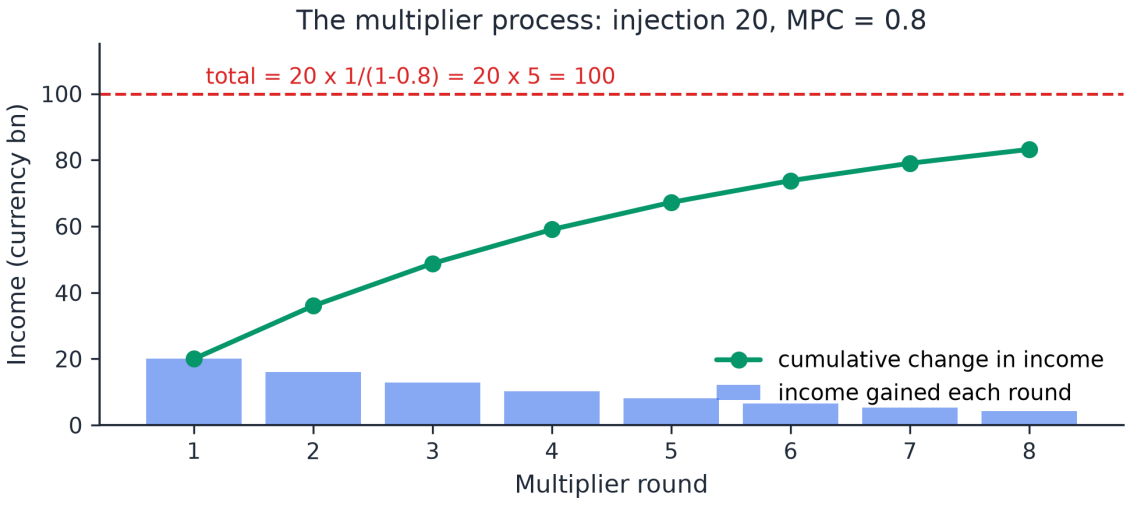
$$k = \frac{1}{1 - MPC} = \frac{1}{MPW}$$

Worked example: the multiplier.

- MPS $= 0.1$, MPT $= 0.15$, MPM $= 0.25$, so MPW $= 0.5$ and $k = \frac{1}{0.5} = 2$.
- A £30 billion rise in investment raises national income by $2 \times 30 =$ £60 billion.

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- If MPC were 0.8, $k = \frac{1}{0.2} = 5$. An injection of 20 then gives rounds of spending of 20, 16, 12.8, 10.24, … which add up to 100.
- The same stimulus works less well in a very open economy, where much of each round leaks into imports. That is one reason the ¥4 trillion stimulus had such a strong effect in 2009: most of it went on Chinese steel, cement and labour.



With MPC = 0.8, each round of spending is 80% of the last; the total rise in income approaches 20 × 5 = 100

Economic growth

Actual growth 实际增长 is a rise in real output, a movement towards the PPF. **Potential growth** 潜在增长 is a rise in capacity, an outward shift of the PPF.

- Actual growth in the short run comes from any part of AD: consumption, investment, government spending or net exports. **Export-led growth** adds demand from abroad; China's exports grew from about 4% of world exports in 2001, when it joined the WTO, to about 13% by 2015.
- Potential growth comes from investment (domestic and **foreign direct investment** 外国直接投资), innovation, a growing labour force and stronger competition. In the long run, **productivity** 生产率 – output per worker – matters most. South Korea's GDP per head rose from about the same as Ghana's in 1960 to a high-income level by the 1990s, largely through investment in education and machinery.

Growth brings higher living standards, lower unemployment, higher profits and investment, and more tax revenue for public services. It also has costs:

- opportunity cost: investing more means consuming less today;
- environmental damage, such as smog and carbon emissions;
- current-account deficits if imports rise faster than exports;

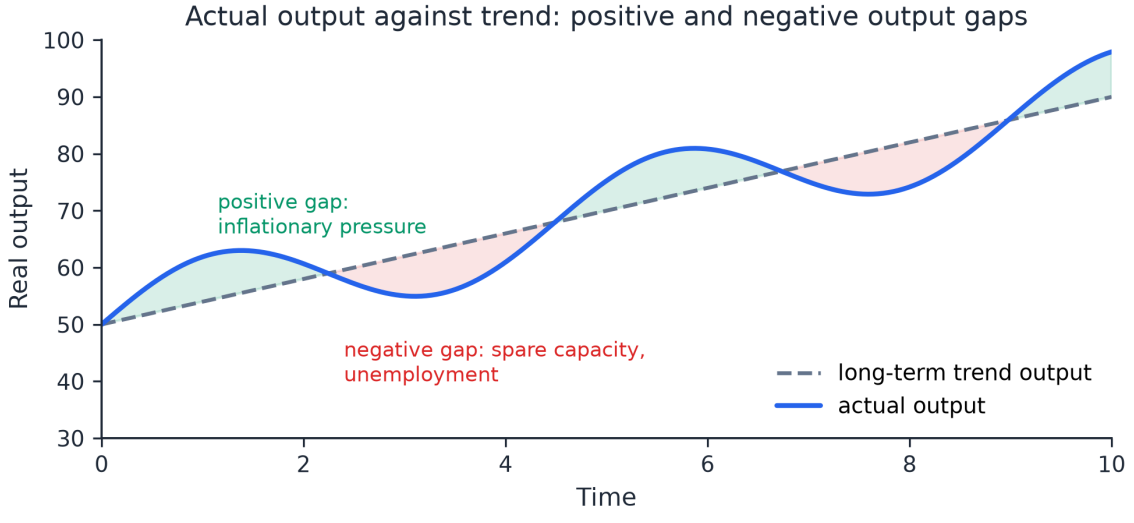
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- wider inequality;
- inflation if demand grows faster than capacity.

An **output gap** 产出缺口 is the difference between actual output and its long-run trend. A **positive** gap (output above trend) puts upward pressure on prices. A **negative** gap means spare capacity and unemployment, as in 2020 when COVID-19 lockdowns cut output in most countries. Output gaps are hard to measure, because the trend itself must be estimated and GDP data are revised for years afterwards.



New buildings and machines raise productive capacity, the source of long-run growth

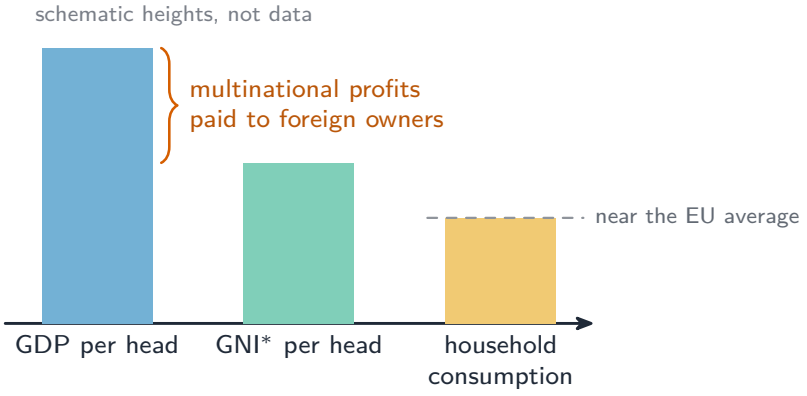


Actual output swings around its trend: above trend is a positive gap, below is a negative gap

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Data-response practice (Section B style)

Extract. In 2015 Ireland's official figures showed real GDP growth of about 26% in a single year. Little of this was new production by Irish workers. Several large multinational companies had moved valuable assets, such as patents and intellectual property, to their Irish subsidiaries, and some aircraft-leasing firms were based there. The profits from these assets were counted in Irish GDP, but much of them was later paid out to foreign owners. Because GDP had become a poor guide to living standards, Ireland's statistics office created a new measure in 2017, modified gross national income (GNI*), which removes most of these effects. GNI* is far smaller than GDP. Ireland's GDP per head is among the highest in the world, yet household consumption per head is close to the EU average.



Why Ireland built GNI star

Questions

- (a) Ireland's nominal GDP rose from €200 billion to €262 billion in a year in which the GDP deflator rose from 100 to 104. Calculate the rate of real GDP growth. [3]
- (b) Explain the difference between GDP and GNI. [3]
- (c) Using the extract, explain why GDP per head may overstate living standards in Ireland. [6]
- (d) Examine **two** problems in comparing living standards between countries using GDP per head. [8]
- (e) Evaluate whether GDP is a good measure of a country's economic performance. [12]

Model answers

(a) Real GDP in year 2 $= \frac{262}{104} \times 100 \approx$ €251.9 billion, in year-1 prices. Real growth $= \frac{251.9-200}{200} \times 100 \approx 26\%$. Nominal growth was 31%; about 4 percentage points of it was higher prices.

(b) GDP measures the value of output produced **within** a country's borders, whoever

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owns the factors of production. GNI adds income earned abroad by the country's residents and subtracts income paid to foreign owners of factors in the country: $GNI = GDP +$ net primary income from abroad.

(c) Much of Ireland's measured output comes from multinational firms' intellectual property and leased aircraft. The profits are counted in GDP but are paid to foreign shareholders, so they do not become income for Irish households. GDP per head therefore includes income that Irish residents never receive. The extract shows the gap: household consumption per head, which reflects what people actually buy, is only about the EU average, while GDP per head is near the top of the world. GNI* removes these effects and gives a far smaller figure.

(d) **Exchange rates and prices:** converting GDP at market exchange rates ignores differences in the cost of living; the same income buys more in a cheaper country. Using purchasing power parities corrects this. **What GDP leaves out:** the size of the informal economy, unpaid work, leisure hours and the distribution of income differ between countries, so equal GDP per head can mean very different living standards. (Also: differences in the quality of data and in how multinationals' profits are recorded, as in Ireland.) *Evaluation:* PPP fixes the price problem but not the others; composite measures such as the HDI add health and education.

(e) *GDP is useful:* it is measured regularly, in a standard way, for nearly every country, so it allows comparisons over time and between countries. Growth in real GDP is closely linked to jobs, tax revenue and the ability to pay for public services, and recessions show up clearly in it.

GDP has limits: as Ireland shows, it can be distorted by multinationals' accounting, so it may not show the income that residents receive. It ignores distribution, the environment (pollution and resource depletion count as zero or even raise GDP when they lead to clean-up spending), unpaid work and well-being. Revisions can be large.

Alternatives: GNI or GNI* for income received; real household disposable income for living standards; the HDI and well-being measures for broader development; measures that subtract environmental damage.

Judgement: GDP is a good measure of the **level of production** and of short-run economic performance in most countries, which is why it remains the main headline figure. It is a weak measure of **living standards** or **sustainable** performance, and in very open economies such as Ireland it can mislead. The best approach uses GDP together with income- and well-being-based measures.

What examiners reward: a correct real-growth calculation that deflates before comparing, a precise GDP/GNI distinction, use of the extract's consumption evidence, examined (not listed) comparison problems, and a judgement that separates production from living standards.

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Sources for this lesson

- State Council of the PRC, announcement of the stimulus package (9 November 2008); National Bureau of Statistics, statistical communiqués (2009, 2023).
- Office for National Statistics, UK consumer price inflation (October 2022).
- IMF World Economic Outlook database (GDP at market prices and at PPP).
- Central Statistics Office Ireland, modified GNI (GNI*) releases.
- Pearson Edexcel International AS Economics specification (WEC12), Issue 2, sections 2.3.1–2.3.5, and the WEC12 Sample Assessment Materials.

Common errors

- Comparing nominal GDP figures across years without deflating them.
- Calling disinflation "deflation". If the inflation rate falls from 6% to 2%, prices are still rising.
- Listing AD components without saying which way the curve shifts and why.
- Drawing a change in the price level as a shift of AD. It is a movement along the curve.
- Forgetting that imports are a withdrawal. A high MPM makes the multiplier small.
- Confusing actual growth (using spare capacity) with potential growth (more capacity).

Key terms

- **Real GDP**: output measured at constant prices.
- **CPI**: a weighted index of the prices a typical household pays.
- **ILO unemployment**: without work, available and actively seeking work.
- **Current account**: trade in goods and services plus primary and secondary income.
- **Aggregate demand**: $C + I + G + (X - M)$.
- **Multiplier**: the ratio of the final change in national income to the injection that caused it, $1/MPW$.
- **Output gap**: actual output minus trend output.

Check yourself

1. Nominal GDP rises by 8% while the deflator rises by 5%. Roughly how fast did real GDP grow?
2. A basket has weights 60% food and 40% housing. Food prices rise 5% and housing 10%. Calculate the inflation rate.
3. Classify each type of unemployment: a coal miner whose mine closes; a graduate who spends two months choosing between job offers; a beach café worker in winter.

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4. MPS = 0.2, MPT = 0.2 and MPM = 0.1. Calculate the multiplier and the effect of a ¥40 billion rise in government spending.
5. Using a Keynesian LRAS, explain why a stimulus may raise output a lot in a deep recession but cause mainly inflation near full capacity.
6. Give one benefit and one cost of China's high investment-led growth.

Answers: 1. About 3% ($\frac{108}{105} \times 100 = 102.9$). 2. $0.6 \times 5 + 0.4 \times 10 = 7\%$. 3. Structural; frictional; seasonal. 4. MPW = 0.5, so $k = 2$; national income rises by ¥80 billion. 5. On the flat part of LRAS there are idle workers and machines, so extra demand is met by more output; on the vertical part capacity is used up, so extra demand mainly bids up prices. 6. Benefit: more capacity and higher incomes (potential growth). Cost: less consumption today, environmental damage, or a risk of wasted investment.

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Inflation, unemployment and policy judgement

Pearson Edexcel · International A-Level · Economics

Why it matters. In 1979 prices in the USA were rising by more than 13% a year. Paul Volcker, the new chair of the Federal Reserve, decided to stop inflation whatever it cost. He let interest rates rise until the main Fed rate passed 19% in 1981. Mortgages and car loans became almost unaffordable, builders posted pieces of wood to the Fed in protest at the lost house sales, and unemployment reached 10.8% at the end of 1982, the highest since the 1930s. But by 1983 inflation had fallen to about 3%, and it stayed low for decades. Volcker's choice shows the hardest question in macroeconomics: when a government's objectives conflict, which one should come first, and which tools should it use?

In this unit you will:

- name the six macroeconomic objectives and how each is measured;
- explain the four main conflicts between them, including the Phillips curve;
- compare free-market and interventionist supply-side policies;
- explain fiscal and monetary policy and the roles of a central bank;
- evaluate policies by their timing, side effects and risks of government failure.

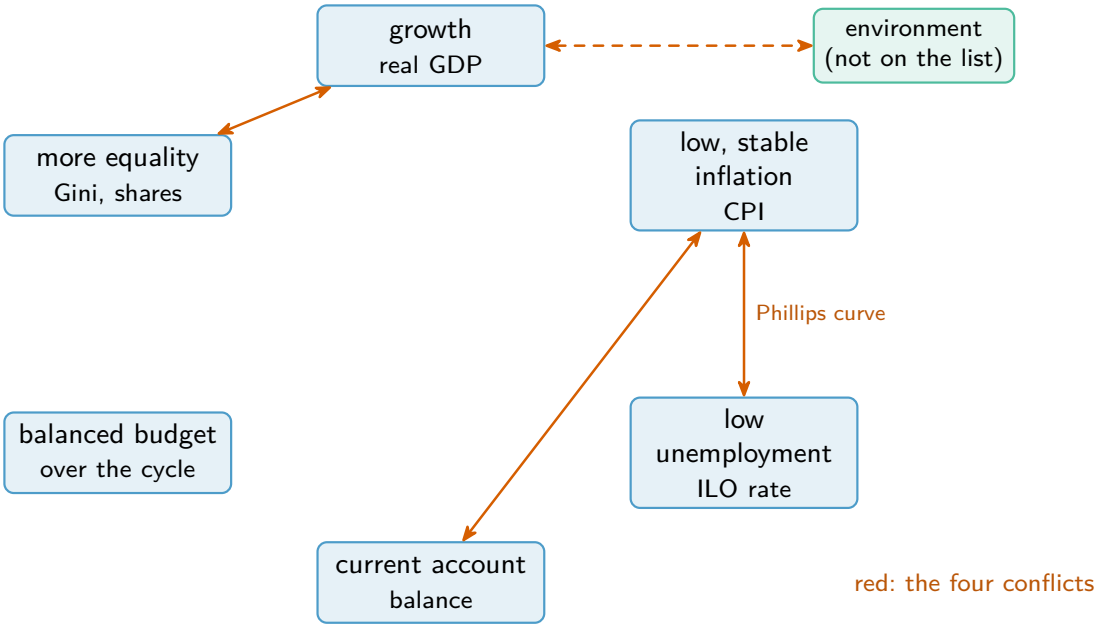
Macroeconomic objectives

Governments usually aim for six things:

- **economic growth**: rising real GDP, measured by its growth rate;
- **low and stable inflation**, measured by the CPI. Many central banks have an **inflation target** 通胀目标: the Bank of England's is 2% CPI inflation, and China sets an annual CPI target, which was "around 3%" in 2024;
- **low unemployment**, measured by the ILO unemployment rate;
- **balance of payments equilibrium** on the current account, so that a country does not build up foreign debts it cannot repay;
- **a balanced government budget** over the economic cycle, so that public debt stays affordable;
- **greater equality** of income, measured by the Gini coefficient or income shares.

Each objective has a **trade-off** 权衡 with at least one other. Policy is about choosing between them.

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Six objectives and their measures; the red links mark the four main conflicts

Conflicts between objectives

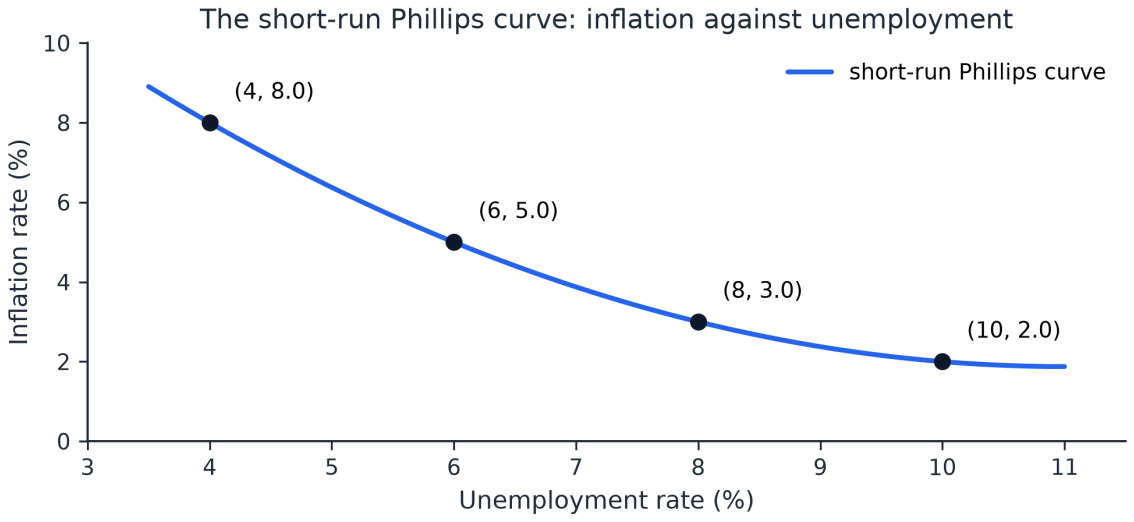
Inflation versus unemployment. In 1958 the New Zealand economist Bill Phillips plotted almost a century of British data and found that years of low unemployment were years of fast wage inflation. The short-run **Phillips curve** 菲利普斯曲线 shows this trade-off: when demand is strong, firms hire more and compete for workers, so wages and prices rise faster.

> **Worked example: reading a Phillips curve.**

- The curve passes through (unemployment 4%, inflation 8%), (6%, 5%), (8%, 3%) and (10%, 2%).
- To cut inflation from 8% to 3%, the economy moves from 4% to 8% unemployment.
- The cost of five points less inflation is four points more unemployment in the short run.

The trade-off is not fixed. In the 1970s oil shocks pushed inflation and unemployment up together, called **stagflation** 滞胀. And once people expect low inflation, as they did after Volcker, wage demands are lower and the whole curve shifts down.

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Moving along the short-run Phillips curve: lower inflation costs higher unemployment

Growth versus the environment. Faster growth usually means more energy, more transport and more waste. In November 2016, with India's economy growing by over 7% a year, Delhi closed 1,800 schools for three days because of severe smog.

Inflation versus the current account. If the government raises demand, incomes rise and people buy more imports. Faster inflation also makes exports less competitive. Both push the current account towards deficit.

Growth versus equality. Growth that rewards skills, cities and capital owners can widen gaps even as average incomes rise. China's official Gini coefficient rose from about 0.3 in the early 1980s to a peak of about 0.49 in 2008.

In an exam, name the conflict, explain the mechanism, and weigh how large the trade-off is in that context.

Supply-side policies

Supply-side policies 供给侧政策 aim to raise productivity, competition and incentives so that LRAS shifts to the right. Then output can grow without extra inflation.

Free-market policies reduce the role of the state:

- **deregulation** 放松监管: removing rules that block entry or raise costs, such as the opening of airline routes to new low-cost carriers in Europe in the 1990s;
- **privatisation** 私有化: selling state firms, so they face the discipline of profit. The UK sold British Telecom in 1984 and British Gas in 1986;
- lower taxes on income and profits, to reward work and investment;
- welfare reform: Germany's Hartz reforms of 2003–2005 cut long-term unemployment benefits and tightened job-search rules;
- cutting **bureaucracy** 官僚程序 and red tape for firms.

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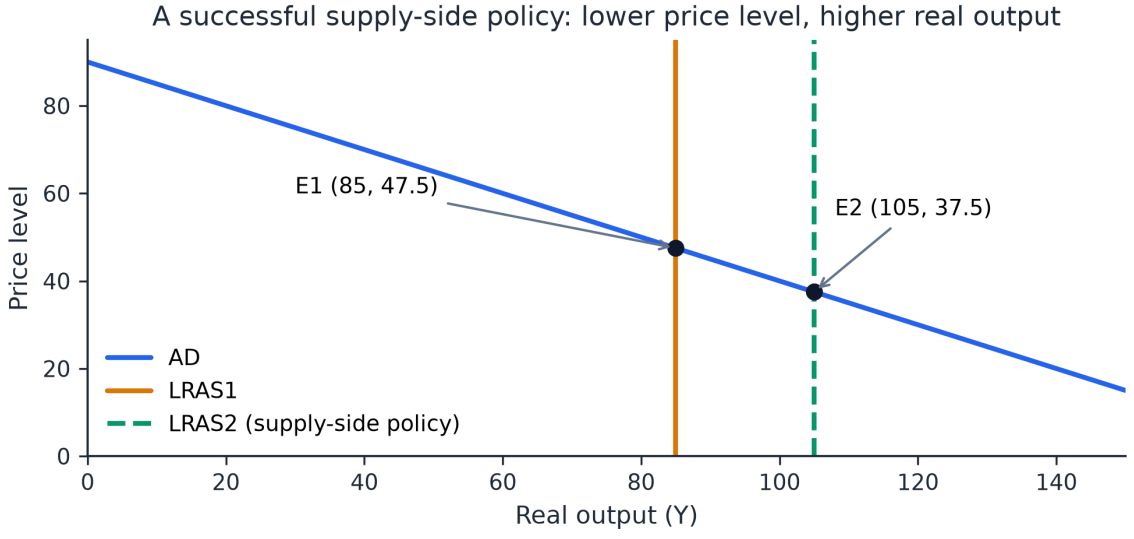
Interventionist policies use the state to build capacity:

- investment in education, training and skills, such as Singapore's SkillsFuture credits for adult training (2015);
- tax incentives and subsidies for investment;
- **infrastructure** 基础设施: China's high-speed rail network grew from nothing in 2008 to about 45,000 km by 2023, cutting travel times for workers and firms;
- finance for business start-ups;
- **regional policy** 区域政策: China's Western Development strategy, from 2000, sent investment to poorer western provinces.

Worked example: a supply-side success on the model.

- Aggregate demand is $P = 90 - Y/2$. LRAS shifts from $Y = 85$ to $Y = 105$.
- Before: $P = 90 - 42.5 = 47.5$. After: $P = 90 - 52.5 = 37.5$.
- Real output rises by 20 while the price level falls by 10: growth without inflation.

Free-market policies are cheap to announce and sharpen incentives, but they can widen inequality, and their effect on effort is uncertain. Interventionist policies tackle real bottlenecks, but they are expensive and slow, and they risk **government failure** 政府失灵: some of China's regional airports and industrial parks were built where there was too little demand to use them.



LRAS shifts right from 85 to 105: output rises and the price level falls from 47.5 to 37.5

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Demand-side policies and the central bank

Demand-side policies change aggregate demand.

- **Fiscal policy** 财政政策 uses government spending and taxation.
- **Monetary policy** 货币政策 uses interest rates, **quantitative easing** 量化宽松, lending rules and **reserve requirements** 存款准备金要求.

Reflationary 扩张性 policy raises AD: more government spending, lower taxes, lower interest rates, quantitative easing. **Deflationary** 紧缩性 policy does the opposite. In 2009 the USA's American Recovery and Reinvestment Act added about US$800 billion of spending and tax cuts; the same year China's ¥4 trillion stimulus did the same job on a bigger scale relative to GDP.

Worked example: fiscal policy and capacity.

- The multiplier is 2, and the government raises spending by 10.
- With spare capacity, AD shifts right and real income rises by up to $2 \times 10 = 20$.
- Close to full capacity (a vertical LRAS), the same rise mainly raises the **price level** 价格水平.
- So the right policy depends on the size of the output gap.

Quantitative easing is the central bank's purchase of government or corporate **bonds** 债券 with newly created money. It pushes down long-term interest rates and gives banks more money to lend, which supports consumption, investment and AD. The Bank of England began QE in March 2009, when it also cut Bank Rate to 0.5%, and had bought £895 billion of bonds by 2021. Japan first used QE in 2001 to fight deflation.

The **base rate** 基准利率 is the interest rate the central bank sets, which other rates follow. In October 2016 the Reserve Bank of India cut its policy rate from 6.5% to 6.25% to make borrowing cheaper. The People's Bank of China often changes the **reserve requirement ratio**, the share of deposits banks must hold in reserve: a cut frees money for loans.

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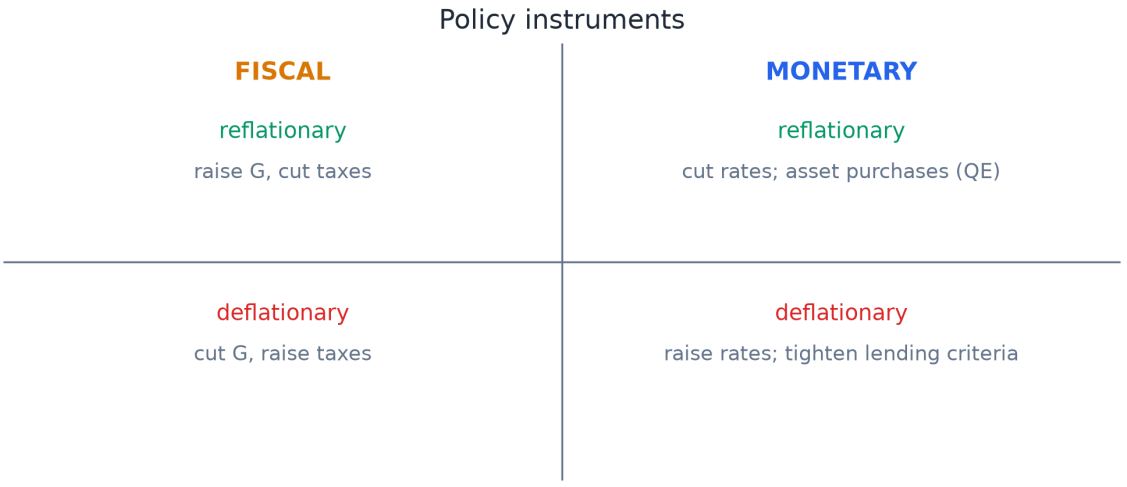
The Bank of England sets Bank Rate, its main monetary-policy tool

A **central bank** 中央银行 has four main roles:

- it carries out monetary policy, setting the base rate and running QE;
- it pursues the inflation target; if people trust it, they expect low inflation, so wage demands stay moderate and the Phillips trade-off eases;
- it is banker to the government, managing its accounts and debt;
- it is banker to the banks and **lender of last resort** 最后贷款人. In September 2007 savers queued outside Northern Rock, the first run on a British bank since 1866, until the Bank of England lent it emergency money.

Monetary policy is quick to change and usually independent of politics, but it works indirectly with long and variable **time lags** 时滞, often a year or two. Fiscal policy acts directly on demand and can target particular groups or regions, but it is slow to pass into law, may **crowd out** 挤出 private spending, and raises the **budget deficit** 预算赤字.

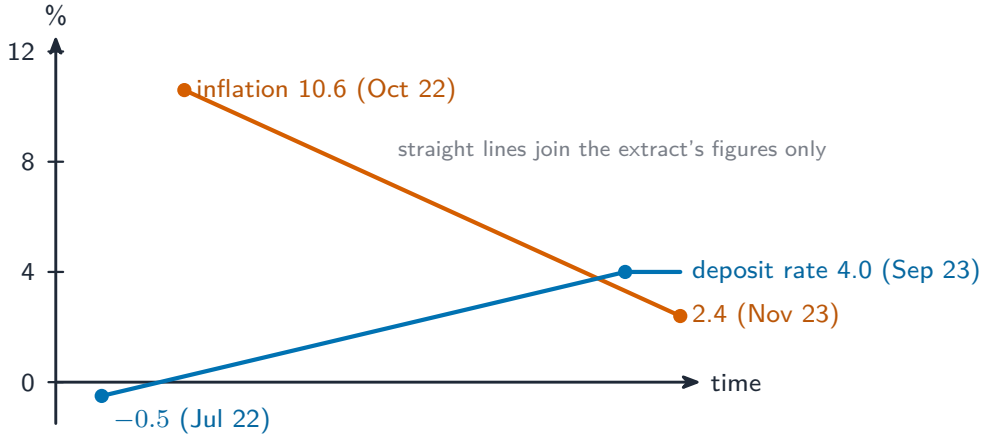
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The policy map: demand-side or supply-side, and the instruments in each

Data-response practice (Section B style)

Extract. Inflation in the euro area reached 10.6% in October 2022, driven mainly by energy and food prices after Russia's invasion of Ukraine. The European Central Bank (ECB) raised its deposit rate from −0.5% in July 2022 to 4.0% by September 2023, the fastest rise in its history. By November 2023 inflation had fallen to 2.4%. Real GDP grew by only about 0.5% in 2023, but the unemployment rate stayed close to a record low of about 6.5%. Wholesale gas prices in Europe, which had risen more than tenfold from early 2021 to their peak in August 2022, fell back sharply during 2023. Many firms kept their workers despite weak sales, because skilled staff were hard to find.



The extract's figures on one chart

Questions

- (a) Calculate the change in the ECB's deposit rate between July 2022 and September 2023, in **percentage points**. [2]
- (b) With the help of an AD/AS diagram, explain how a rise in interest rates can reduce inflation. [6]
- (c) Examine **two** reasons why unemployment in the euro area did not rise much while inflation fell. [8]
- (d) Evaluate whether higher interest rates were the main reason for the fall in euro-area inflation. [12]

Model answers

(a) $4.0 - (-0.5) = 4.5$ percentage points.

(b) A higher interest rate raises the cost of borrowing and the reward for saving. Households cut consumption, especially on goods bought with credit; firms delay investment; higher rates may also raise the euro's **exchange rate**, reducing **net exports**. AD shifts left from AD_1 to AD_2. On the AD/SRAS diagram the price level falls below where it would otherwise be and real output falls: inflation slows. The effect works with lags, often of a year or more.

(c) **Falling energy costs shifted SRAS right.** The extract says gas prices fell sharply in 2023. Lower costs shift SRAS to the right, which lowers the price level while raising output, so inflation fell without the usual rise in unemployment. This is the reverse of the **cost-push** shock of 2022. **Labour hoarding and labour shortages.** Firms kept skilled workers despite weak sales because they were hard to replace; with an ageing population, labour supply is tight. So the fall in demand showed up in lower hours and productivity rather than job losses. *Evaluation:* hoarding cannot last if weak demand continues; firms will cut jobs if profits fall for long.

(d) *For interest rates as the main reason:* the rise of 4.5 percentage points was very large and fast. It reduced credit growth and investment, and the stronger signal of a credible central bank stopped expected inflation from rising, so wage demands stayed moderate. Without the rate rises, high inflation might have spread into wages and become persistent (second-round effects).

Against: the inflation was mainly cost-push from energy and food, and the fall in gas prices removed much of the cause, whatever interest rates did. Monetary policy works with long lags of 12–24 months, so rate rises from late 2022 and 2023 could only have had part of their effect by November 2023. Unemployment stayed low, which suggests demand did not fall much, so the demand channel may have been weak.

Weighing: the timing suggests that falling energy prices explain most of the fall in headline inflation in 2023, while higher interest rates mattered more for **core** inflation (excluding energy and food) and for keeping expectations anchored. The two worked together: rate rises would have needed to be much larger, with far higher unemployment, if energy prices had stayed high.

Judgement: higher interest rates were not the main reason for the fall in headline inflation, but they were an important reason why inflation did not stay high once the

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energy shock faded. Their main contribution was to anchor expectations, which is hard to measure but explains why the fall came without a rise in unemployment.

What examiners reward: the calculation in percentage points (not per cent), a diagram used in the explanation, reasons tied to the extract's evidence with evaluation in part (c), and in part (d) a weighing of the causes that uses timing and lags, ending in a supported judgement.

Sources for this lesson

- Federal Reserve Bank historical data (federal funds rate, 1979–1983); US Bureau of Labor Statistics (unemployment, December 1982).
- A. W. Phillips, "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957", *Economica* 25 (1958).
- Bank of England, Bank Rate history and Asset Purchase Facility reports.
- European Central Bank and Eurostat, inflation and policy-rate data (2022–2023).
- Pearson Edexcel International AS Economics specification (WEC12), Issue 2, section 2.3.6, and the WEC12 Sample Assessment Materials.

Common errors

- Saying supply-side policies work quickly. Most take years; demand-side policies act in the short run.
- Treating the Phillips curve as fixed. Supply shocks and inflation expectations shift it.
- Writing "the government sets interest rates" in most advanced economies. An independent central bank does.
- Confusing a budget deficit (one year's borrowing) with the national debt (the total owed).
- Ending a policy answer with no judgement. Say which policy works best, in what conditions and over what time.
- Describing QE as "printing banknotes". The central bank creates reserves to buy bonds.

Key terms

- **Macroeconomic objectives**: growth, low and stable inflation, low unemployment, current-account balance, balanced budget, greater equality.
- **Phillips curve**: the short-run trade-off between inflation and unemployment.
- **Supply-side policy**: a policy to raise productive capacity, shifting LRAS right.
- **Fiscal policy**: changes in government spending and taxation.
- **Monetary policy**: changes in interest rates, the money supply and credit.

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- **Quantitative easing**: central-bank purchases of bonds with newly created money.
- **Lender of last resort**: the central bank's role of lending to banks in a crisis.

Check yourself

1. Using the Phillips curve points in this unit, what is the cost of cutting inflation from 5% to 2%?
2. Why did unemployment rise in the USA in 1981–1982?
3. Classify each as free-market or interventionist supply-side policy: privatising a railway; building a new port; cutting the top rate of income tax; subsidising apprenticeships.
4. With a multiplier of 2.5, how much must government spending rise to raise income by ¥100 billion if there is spare capacity?
5. Explain one reason why monetary policy may fail to reduce inflation quickly.
6. Evaluate whether infrastructure spending is a demand-side or a supply-side policy.

Answers: 1. Unemployment rises from 6% to 10%. 2. Interest rates near 20% cut borrowing, spending and investment, so AD fell and firms laid off workers. 3. Free-market; interventionist; free-market; interventionist. 4. ¥40 billion. 5. Time lags: rate rises affect spending only after a year or more, or inflation may be cost-push, which higher rates do not remove. 6. Both: in the short run the spending adds to AD (G rises); in the long run better roads and rail cut costs and raise productivity, shifting LRAS right.

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Firms, costs, growth and competition

Pearson Edexcel · International A-Level · Economics

Why it matters. From 2014 to 2016 two ride-hailing firms fought for China's cities. Didi Chuxing and Uber China both paid drivers bonuses and gave passengers discounts, so many rides cost less than the petrol used. Uber's founder said the company was losing more than US$1 billion a year in China. In August 2016 the price war ended the way such wars often end: Didi bought Uber China, and Uber took a share of the combined company. Passengers soon noticed fewer discounts and higher fares at busy times. Why do some firms grow by buying rivals? Why can a market with only a few big firms behave so differently from one with thousands of small ones? This unit builds the theory of the firm: its objectives, its costs, and the market structures it competes in.

In this unit you will:

- classify businesses and explain how and why they grow, or stay small;
- compare business objectives, including profit and revenue maximisation and the principal–agent problem;
- calculate revenue, costs and profit, and apply the shutdown and break-even rules;
- explain economies and diseconomies of scale and the four kinds of efficiency;
- analyse perfect competition, monopolistic competition, oligopoly, monopoly, monopsony and contestable markets.

Types, sizes and growth of businesses

Businesses come in several **types** 类型:

- **private-sector** firms owned by shareholders or a sole owner, usually for profit;
- **public-sector** organisations such as **state-owned enterprises** 国有企业 (State Grid, China's national power network);
- **not-for-profit** organisations, which reinvest any surplus instead of paying it to owners (Wikipedia, many hospitals and charities);
- **co-operatives** 合作社, owned by their members with one vote each (Spain's Mondragon group employs about 70,000 people, most of them member-owners);
- **joint ventures** 合资企业, where two firms share a project, its risk and its control (SAIC-Volkswagen, founded in Shanghai in 1985).

Firms range from **SMEs** 中小企业 (small and medium enterprises) to huge corporations. China often describes its SMEs with "56789": they pay about 50% of taxes, produce over 60% of GDP, account for over 70% of innovation and 80% of urban jobs, and make up over 90% of firms.

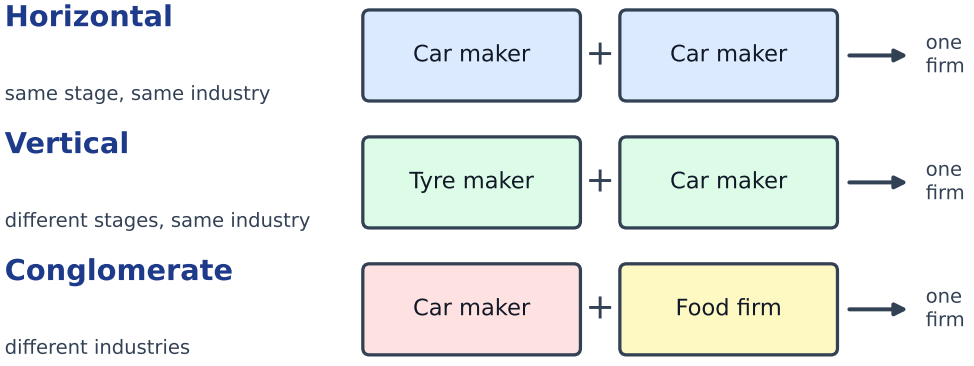
Firms grow in two ways. **Organic growth** 内部增长 uses reinvested profit to add products or outlets. **External growth** comes from **mergers** 合并 and **takeovers** 收

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购:

- **horizontal integration** 横向整合: buying a rival at the same stage, as when Didi and Kuaidi merged in 2015, and Didi then bought Uber China;
- **backward vertical integration** 后向纵向整合: buying a supplier. BYD makes its own batteries for its electric cars;
- **forward vertical integration** 前向纵向整合: buying a customer stage, such as a brewer buying pubs or a phone maker opening its own shops;
- **conglomerate integration** 混合整合: buying an unrelated business to spread risk, as India's Tata Group owns steel, cars, tea and software firms.

Integration can secure supplies, cut costs and reduce competition, but it is expensive, company cultures can clash, and a bigger firm attracts regulators. Firms stay small when the market is local, finance is hard to get, owners want to keep control, or regulation is heavy. Growth affects firms (market power, scale), workers (new jobs, but also restructuring) and consumers (lower prices, or less choice). Sometimes firms reverse it with a **demerger** 分拆: General Electric split into three separate companies in 2023–2024 because managing aircraft engines, power equipment and medical scanners together had become inefficient.



Exam: horizontal = same stage; vertical = supply chain; conglomerate = different industries

Horizontal integration joins firms at the same stage, vertical joins different stages of one industry, conglomerate joins different industries

Business objectives

Firms can pursue different objectives:

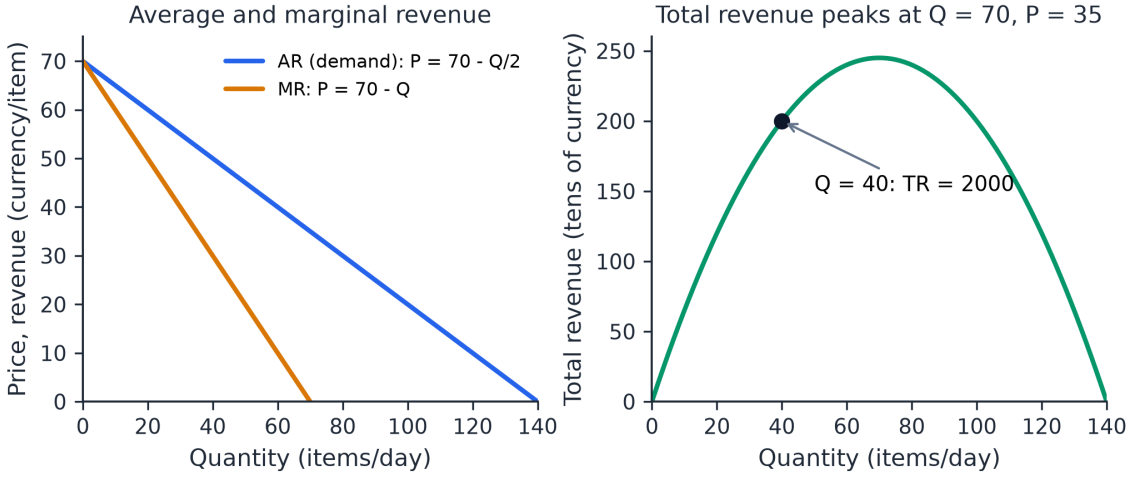
- **profit maximisation** 利润最大化: produce where **marginal revenue equals marginal cost** ($MR = MC$). If one more unit adds more to revenue than to cost, make it; if it adds more to cost, do not;
- **revenue maximisation** 收入最大化: produce where $MR = 0$, because then one more unit adds nothing to revenue;

- **sales volume maximisation** 销量最大化: the largest output that still covers costs, where average revenue equals average total cost ($AR = ATC$);
- **satisficing** 满意化: in Herbert Simon's theory, managers aim for a result that is "good enough" for all the groups they must keep happy, not the maximum.

Why would a firm not maximise profit? In large companies there is a **divorce of ownership from control**: shareholders (the **principals**) own the firm, but managers (the **agents**) run it. Managers may prefer a bigger firm, a higher salary or an easy life. This is the **principal–agent problem** 委托代理问题. Firms try to solve it by paying managers partly in shares.

Worked example: objectives on the model.

- The firm's demand (average revenue) is $P = 70 - Q/2$, so $TR = 70Q - Q^2/2$ and $MR = 70 - Q$. For a straight-line demand curve, MR is twice as steep as AR.
- At $Q = 40$: $P = 50$, $TR = 2000$ and $MR = 30$, still positive.
- Revenue is greatest where $MR = 0$: $Q = 70$, $P = 35$, $TR = 2450$ – the point where PED is -1, as in Unit 1.



AR and MR on the model: MR is twice as steep as AR, and revenue peaks where MR = 0 at Q = 70

Revenue, costs and profits

Revenue: **total revenue** $TR = P \times Q$; **average revenue** $AR = TR/Q$, which is the demand curve; **marginal revenue** $MR = \Delta TR/\Delta Q$. When demand is price elastic, MR is positive and a price cut raises revenue; when inelastic, MR is negative.

Costs: in the **short run** at least one factor, such as the factory, is fixed. Adding more workers to a fixed factory eventually brings the **law of diminishing returns** 收益递减规律: each extra worker adds less output than the one before, because they share the same machines and space. So marginal cost first falls (as workers specialise) and

then rises.

- $TC = TFC + TVC$ (total fixed plus total variable cost)
- $ATC = TC/Q$, $AVC = TVC/Q$, $MC = \Delta TC/\Delta Q$

Worked example: a cost table.

Total fixed cost is 12. Total variable cost for 1 to 9 units is 5, 9, 12, 14, 17, 21, 26, 32 and 39.

- MC (the change in TVC) is 5, 4, 3, 2, 3, 4, 5, 6, 7: falling, then rising once diminishing returns set in.
- AVC is lowest at $Q = 5$: $17/5 = 3.4$.
- ATC is lowest at $Q = 7$: $(12 + 26)/7 = 5.43$.
- MC cuts both AVC and ATC at their lowest points.

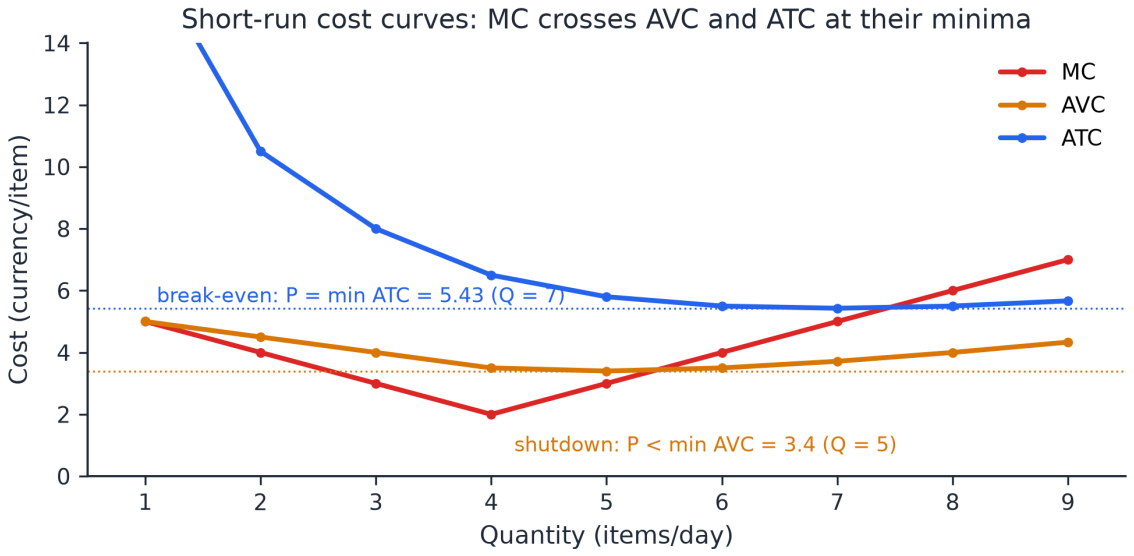
Marginal product and marginal cost are mirror images: when an extra worker adds a lot of output, the extra cost per unit is low. In the **long run** every factor can change, so the firm can choose a new scale.

Profit is $TR - TC$. **Normal profit** 正常利润 is the minimum return that keeps the owner in the industry; economists count it as a cost inside ATC. **Supernormal profit** 超额利润 is any profit above that ($P > ATC$), and a loss means $P < ATC$.

- **Short-run shutdown**: produce nothing if $P < \min AVC$ (3.4 here). Below that price, revenue does not even cover the variable costs. Between AVC and ATC, the firm keeps trading at a loss, because its fixed costs must be paid anyway.
- **Long-run exit**: leave the industry if $P < \min ATC$ (5.43 here).

Airlines show the short-run rule. In 2020 many flew nearly empty planes, because fares still covered fuel and crew (variable costs) while the aircraft leases (fixed costs) had to be paid whether they flew or not.

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The cost table plotted: MC cuts AVC at its minimum (3.4 at Q = 5) and ATC at its minimum (5.43 at Q = 7)

Economies and diseconomies of scale

In the long run, average cost changes with the scale of production. The **long-run average cost** 长期平均成本 (LRAC) curve falls while the firm enjoys **economies of scale** 规模经济, flattens at the **minimum efficient scale** 最小有效规模 (MES), the smallest output at which average cost is lowest, and rises if **diseconomies of scale** 规模不经济 set in.

Internal economies of scale (inside the firm):

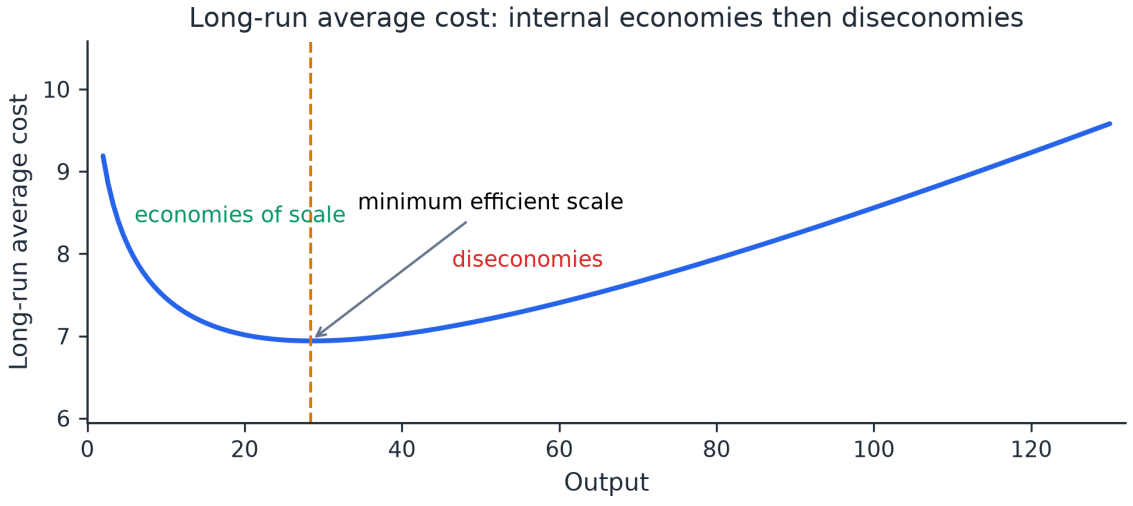
- **technical**: bigger machines are cheaper per unit of output. Maersk's Triple-E container ships of 2013 each carried about 18,000 containers, with much lower fuel and crew cost per container than older ships;
- **purchasing**: bulk discounts;
- **financial**: large firms borrow more cheaply;
- **managerial**: specialist managers;
- **marketing**: advertising costs spread over more sales;
- **risk-bearing**: a range of products spreads risk.

External economies of scale 外部规模经济 come from the growth of the whole industry in one place: skilled workers, suppliers, transport links and shared knowledge. Shenzhen's electronics cluster around Huaqiangbei lets a start-up find parts, engineers and factories within an hour's drive.

Diseconomies of scale come from communication and coordination problems in very large organisations, and from **X-inefficiency** X 低效率: costs drift above their lowest possible level when there is no competitive pressure.



A large steel plant: huge fixed costs spread over very large output give economies of scale



LRAC falls with economies of scale until the minimum efficient scale, then rises with diseconomies

Efficiency and concentration

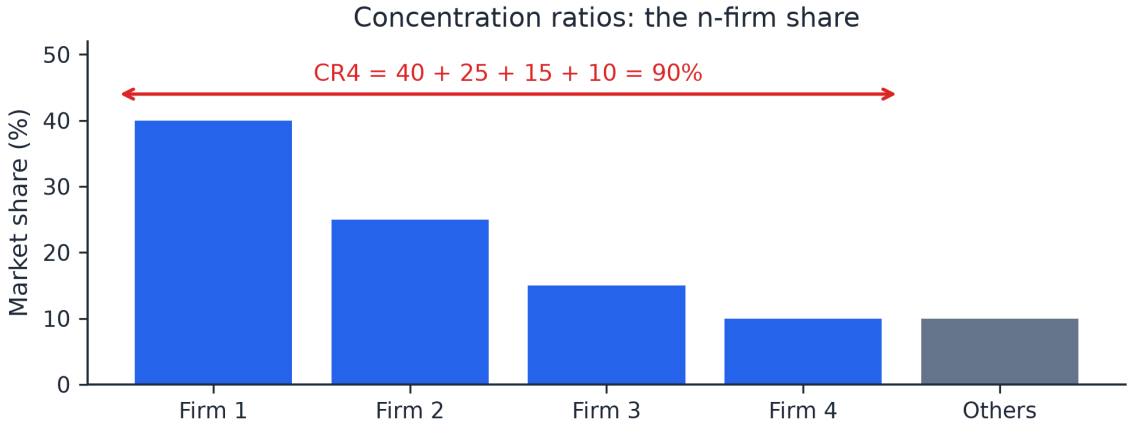
Economists use four kinds of **efficiency** 效率:

- **allocative efficiency** 配置效率: $P = MC$; the price buyers pay equals the cost of the last unit, so the right amount is produced;
- **productive efficiency** 生产效率: output at the lowest point of ATC;

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- **dynamic efficiency** 动态效率: investment and innovation over time, often paid for by profits;
- **X-inefficiency**: producing above the lowest possible cost.

A **concentration ratio** 集中度 adds the market shares of the largest firms. If five firms have shares of 40%, 25%, 15%, 10% and 10%, the four-firm ratio is $CR_4 = 40 + 25 + 15 + 10 = 90\%$: a concentrated market. China's mobile network market, shared almost entirely between China Mobile, China Telecom and China Unicom, has a three-firm ratio close to 100%. A high ratio suggests market power, but it ignores foreign competition and the threat of new entrants.



Five firms with shares 40, 25, 15, 10 and 10: the four-firm concentration ratio is 90%

Market structures: competition to monopoly

Perfect competition 完全竞争 assumes many small firms, identical products, perfect information and free entry and exit. Each firm is a **price taker** 价格接受者: it sells at the market price, so $P = AR = MR$. It maximises profit where $MC = MR$. Supernormal profits attract new firms, which pushes the price down to min ATC; in the long run firms earn only normal profit, and the market is both productively and allocatively efficient. Markets for wheat or rice come close: no single farmer can change the world price.

Monopolistic competition 垄断竞争 has many firms selling **differentiated** 差异化的 products – different in features, in branding, or in where and how they are sold. Milk-tea shops are a good example: each has its own recipes and brand, so it faces a downward-sloping demand curve and can raise prices a little without losing every customer. Short-run supernormal profits attract new shops, and in the long run profit returns to normal. Price stays above MC and firms produce below their lowest-cost output (**excess capacity**), so the market is not allocatively or productively efficient.

Oligopoly 寡头垄断 means a few large, **interdependent** 相互依存的 firms: each must think about how its rivals will react. Oligopolies are protected by **barriers to**

entry 进入壁垒: economies of scale, patents, strong brands, **sunk costs** 沉没成本 (costs that cannot be recovered on exit, such as advertising) and legal limits, and sometimes by **limit pricing** 限制性定价 – keeping prices just low enough to make entry unprofitable.

Game theory shows why oligopolists are tempted to cooperate, and why cooperation breaks down. In the two-firm game below, each firm's best move is to compete whatever the other does, so both end at the **Nash equilibrium** 纳什均衡 (2, 2), although colluding (4, 4) would pay both better. **Collusion** 共谋 can be formal, as in a **cartel** 卡特尔 such as OPEC, or tacit, as in **price leadership**, where firms follow one leader's prices. It is illegal in most countries: in 2016 the European Commission fined five lorry makers a record €2.93 billion for fixing prices for 14 years. Collusion raises producers' profits at the expense of consumers.

Oligopolists compete on price through **price wars** 价格战 (the Didi–Uber subsidies), **predatory pricing** 掠夺性定价 (pricing below cost to drive a rival out) and limit pricing. They also use **non-price competition** 非价格竞争: advertising and branding, quality, celebrity endorsement, product placement and after-sales service. These have costs and benefits for firms, consumers, employees and suppliers.

A **monopoly** 垄断 is a single seller protected by barriers to entry. It maximises profit where $MR = MC$ and charges the highest price buyers will pay for that output.

Worked example: monopoly on the model.

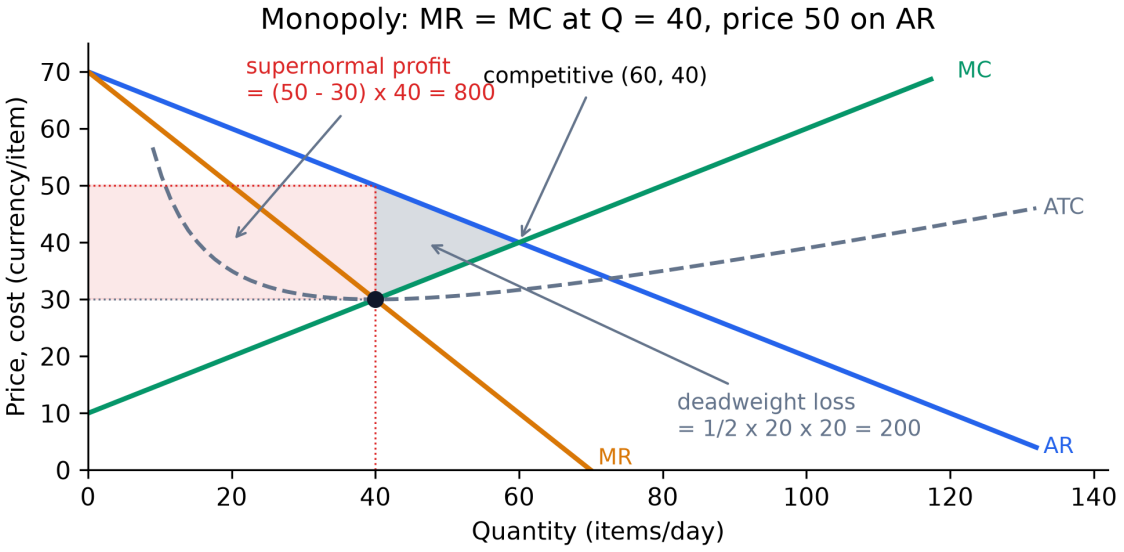
- Demand (AR) is $P = 70 - Q/2$, so $MR = 70 - Q$. Marginal cost is $MC = 10 + Q/2$.
- Set $MR = MC$: $70 - Q = 10 + Q/2$, so $Q_m = 40$.
- Price from the demand curve: $P_m = 70 - 20 = 50$.
- With $ATC = 30$ at this output, supernormal profit $= (50 - 30) \times 40 = 800$.
- A competitive market would produce where $P = MC$: $70 - Q/2 = 10 + Q/2$, so $Q_c = 60$ and $P_c = 40$.
- The monopoly charges 10 more, sells 20 fewer, and causes a **deadweight loss** 无谓损失 of $\frac{1}{2} \times 20 \times (50 - 30) = 200$.

A **natural monopoly** 自然垄断 exists when one firm can supply the whole market at a lower average cost than two or more firms could, usually because of a huge network: one national power grid is cheaper than two. Governments regulate natural monopolies rather than break them up.

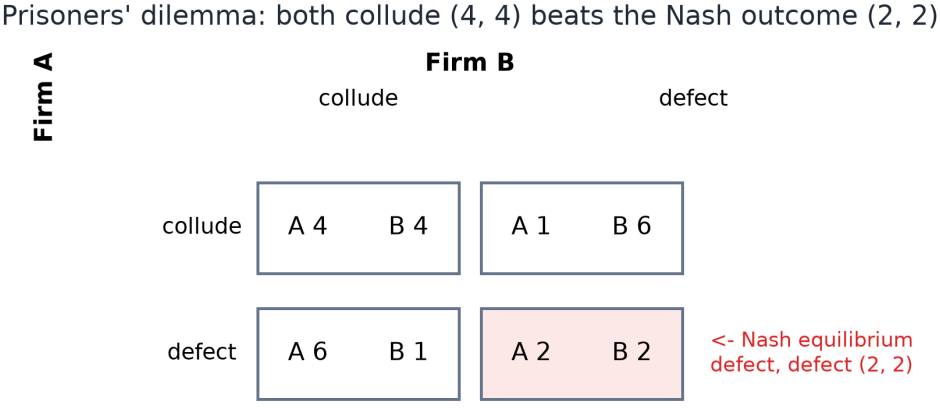
Third-degree price discrimination 三级价格歧视 means charging different groups different prices for the same product. It needs market power, groups with different price elasticities, and no way to resell between groups. Student discounts on train tickets and cheaper cinema seats on weekday mornings are examples. The firm gains producer surplus; groups with elastic demand pay less, and groups with inelastic demand pay more.

Monopoly is neither allocatively nor productively efficient, but its profits can pay for research, so it may be dynamically efficient.

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Monopoly: MR = MC at Q = 40; price 50 on AR; profit 800 shaded; deadweight loss 200 compared with the competitive 60 at 40

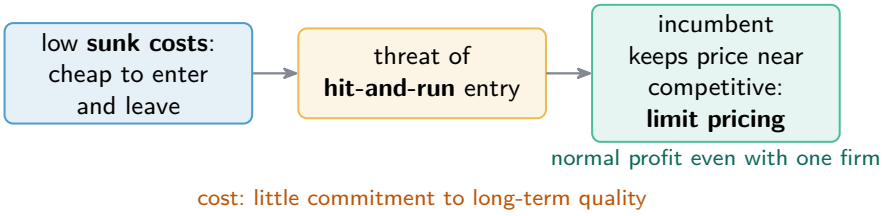


Each firm does better by competing whatever the other does, so both end at (2, 2) though colluding would give (4, 4)

Monopsony and contestability

A **monopsony** 买方垄断 is a single buyer facing many sellers, such as the only large employer in a town, or the UK's National Health Service as the main employer of nurses. A monopsony can push the price it pays below the competitive level. The firm gains from lower costs and higher profits; suppliers and workers lose from lower prices and wages, and fewer of them are hired. Consumers may gain if the cost savings are passed on in lower prices.

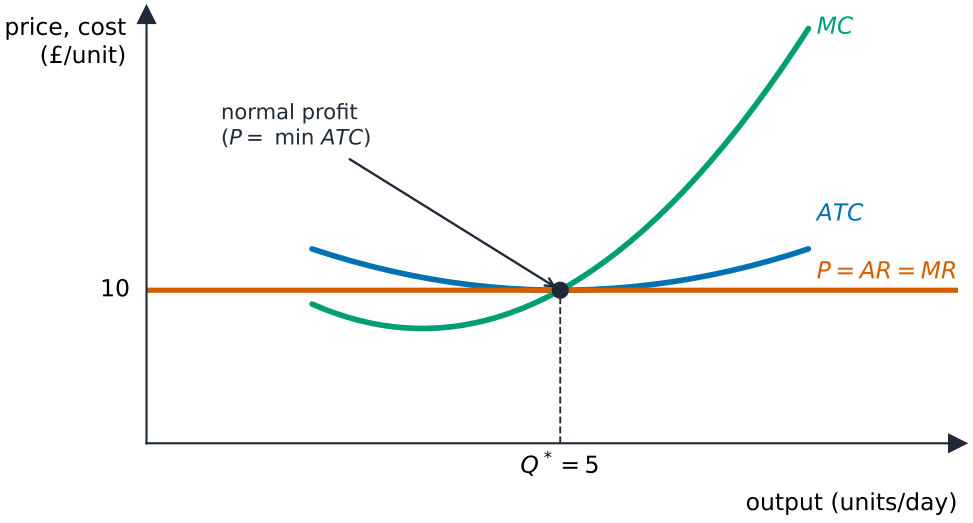
A market is **contestable** 可竞争的 when entry and exit are cheap, which means that sunk costs are low. Then a new firm can enter, take profits and leave ("hit-and-run" entry), so even a single incumbent must keep prices close to the competitive level, often by limit pricing. Air routes are fairly contestable: a low-cost airline can move an aircraft to a profitable route within weeks and move it away again if fares fall. Contestability benefits consumers through low prices, but firms that expect rivals to enter at any time may invest less in long-term quality.



Low sunk costs make hit-and-run entry possible, so the threat of entry keeps prices near the competitive level

Data-response practice (Section B style)

Extract. In January 2022 Microsoft, which makes the Xbox games console, agreed to buy Activision Blizzard, the maker of *Call of Duty*, for about US$69 billion, the largest deal in the history of video games. Rival Sony argued that Microsoft could make popular games exclusive to Xbox. In April 2023 the UK's Competition and Markets Authority (CMA) blocked the deal, mainly because Microsoft already had a large share of the young cloud-gaming market and could control access to Activision's games there. Microsoft offered 10-year agreements to keep *Call of Duty* on rival consoles, and sold the cloud-streaming rights to Activision's games outside Europe to the French firm Ubisoft for 15 years. The CMA approved the changed deal in October 2023.



long-run PC: $P = AR = MR =$ min ATC · normal profit

Long-run equilibrium in perfect competition: $P = AR = MR = MC =$ minimum ATC. The firm's price comes from its market.

Table: shares of a games console market (%)

Firm	Share
Firm A	45
Firm B	30
Firm C	20
Others	5

Questions

- (a) Using the table, calculate the three-firm concentration ratio and identify the market structure it suggests. [2]
- (b) Explain why Microsoft's purchase of Activision could be described as vertical integration. [4]
- (c) With the help of a diagram, explain why less competition could lead to higher prices for consumers. [6]
- (d) Examine **two** reasons why competition authorities investigate large mergers. [8]
- (e) Evaluate whether the CMA was right to approve the changed deal. [12]

Model answers

(a) $CR_3 = 45 + 30 + 20 = 95\%$. Three firms supply nearly the whole market: a highly concentrated oligopoly.

(b) Vertical integration joins firms at different stages of the same production chain. Activision makes games (content), while Microsoft owns the platform on which games

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are sold and played (the Xbox and its cloud and subscription services). Buying a supplier of an input to its own platform is backward vertical integration. (It also has a horizontal element, because Microsoft already published games.)

(c) Use the monopoly diagram: a firm with market power faces a downward-sloping demand (AR) curve, with MR below it, and maximises profit where MR = MC. Compared with a competitive market, where price equals MC, output is lower and price higher, and there is a deadweight loss. If a merger lets Microsoft make key games exclusive, rivals' consoles become less attractive, Microsoft's demand becomes less elastic and its market power grows, so prices for consoles, games or subscriptions could rise.

(d) **To protect consumers from higher prices and less choice:** a merged firm with a large market share can raise prices, and if it controls an important input (a popular game) it can foreclose rivals. **To protect innovation and future competition:** in a new market such as cloud gaming, a dominant firm can stop new rivals from growing, so the market never becomes competitive. *Evaluation:* mergers can also bring benefits, such as economies of scale and more investment, so authorities must weigh these against the risks; it is hard to predict how young markets will develop.

(e) *For approval:* the remedies dealt with the main concern. Selling the cloud rights to Ubisoft meant Microsoft did not control access to Activision's games in cloud gaming, and the 10-year agreements kept *Call of Duty* on rival consoles. The merger may bring economies of scale, more investment in games and wider availability through subscription services. Other authorities (the EU) also approved the deal with remedies.

Against approval: behavioural remedies such as access agreements must be monitored and may be hard to enforce; they end after 10 or 15 years. The merger still increases concentration in game publishing, and Microsoft could favour its own platforms in subtle ways (timing, features). The deal may encourage other large technology firms to buy rivals, reducing competition over time.

Judgement: the CMA's decision was reasonable, because the remedy targeted the specific risk it had identified (control of cloud gaming) through a structural change (the rights sale) rather than only promises. But its success depends on how cloud gaming develops and whether the agreements are enforced; the authority should review the market before the agreements end.

What examiners reward: a correct concentration ratio with the market structure named, clear use of vertical or horizontal integration, a monopoly diagram used to explain the price effect, examined reasons with counter-points, and a judgement that uses the extract's remedies.

Sources for this lesson

- Reports on Didi Chuxing's purchase of Uber China, August 2016 (Reuters, *Financial Times*).
- European Commission, decision on the trucks cartel (19 July 2016).

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- UK Competition and Markets Authority, Microsoft/Activision Blizzard final reports (April and October 2023).
- H. A. Simon, "A Behavioral Model of Rational Choice", *Quarterly Journal of Economics* 69 (1955).
- Pearson Edexcel International A Level Economics specification (WEC13), Issue 2, sections 3.3.1–3.3.3.

Common errors

- Producing where MR = 0 when the question asks for profit maximisation. Profit is greatest where MR = MC.
- Reading the monopoly price off the MC or MR curve. Go up from Q_m to the demand (AR) curve.
- Forgetting that normal profit is included in costs, so "zero economic profit" still means the owner earns a normal return.
- Applying the long-run exit rule to the short run. In the short run a firm keeps trading while price covers AVC.
- Saying monopolistic competition has barriers to entry. Entry is free; products are differentiated.
- Writing that a concentration ratio proves collusion. It measures structure, not behaviour.

Key terms

- **MR = MC**: the profit-maximising output rule.
- **Diminishing returns**: in the short run, each extra unit of a variable factor adds less output.
- **Economies of scale**: falling long-run average cost as output rises.
- **Allocative / productive efficiency**: $P = MC$ / output at minimum ATC.
- **Concentration ratio**: the combined market share of the largest n firms.
- **Oligopoly**: a few interdependent firms behind barriers to entry.
- **Natural monopoly**: one firm supplies the market at the lowest average cost.
- **Contestable market**: entry and exit are cheap because sunk costs are low.

Check yourself

1. Classify each: a smartphone maker buys a chip designer; a hotel chain buys a rival chain; a bank buys a football club.
2. Explain why a firm might keep producing at a loss in the short run.
3. Using the cost table, calculate ATC at $Q = 6$ and MC of the 8th unit.

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4. On the model, find the price and output that maximise revenue, and explain why they differ from the profit-maximising ones.
5. Why did the Didi–Uber price war end in a merger? Use game theory.
6. Explain why a natural monopoly is usually regulated instead of broken up.

Answers: 1. Backward vertical; horizontal; conglomerate. 2. If price covers average variable cost, each unit still pays something towards the fixed costs, which must be paid anyway; shutting down would make the loss bigger. 3. ATC $= (12 + 21)/6 = 5.5$; MC of the 8th unit $= 32 - 26 = 6$. 4. Revenue is greatest where MR $= 0$: $Q = 70$, $P = 35$. Profit is greatest where MR $=$ MC: $Q = 40$, $P = 50$. Beyond $Q = 40$, each extra unit adds more to cost than to revenue. 5. Each firm cut prices because it feared losing customers if it did not (competing was the dominant strategy), so both made huge losses; merging ended the game and let the combined firm raise prices. 6. One network has the lowest average cost; splitting it would duplicate the fixed costs and raise average cost, so regulators cap its prices or profits instead.

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Labour markets and government intervention

Pearson Edexcel · International A-Level · Economics

Why it matters. On 1 April 1992 the US state of New Jersey raised its minimum wage from 4.25*to*5.05 an hour, while neighbouring Pennsylvania kept $4.25. Textbook theory predicted that New Jersey's fast-food restaurants would hire fewer workers. Two economists, David Card and Alan Krueger, phoned 410 restaurants on both sides of the border before and after the rise. Employment in New Jersey did not fall; if anything it rose slightly compared with Pennsylvania. Their 1994 paper started a long debate about how labour markets really work, and in 2021 Card shared the Nobel Prize in economics. One explanation is that many employers have some power over the wages they pay. This unit explains how wages are set, why labour markets fail, and what governments do about it in labour and product markets.

In this unit you will:

- explain the demand for labour as a derived demand and the factors behind labour supply;
- find the competitive wage and analyse shifts in demand and supply;
- explain geographical and occupational immobility;
- evaluate how governments control monopolies, promote competition and protect suppliers and workers;
- analyse minimum and maximum wages and other labour-market policies.

The demand for and supply of labour

Firms do not want workers for their own sake; they want what workers produce. The demand for labour is a **derived demand** 派生需求: it comes from the demand for the product. When air travel collapsed in 2020, airlines stopped hiring pilots; when it recovered in 2022–2023, pilots were in short supply.

The demand for labour depends on:

- the demand for the final product;
- labour **productivity** 生产率: how much each worker adds;
- the price of the product;
- the wage compared with the cost of capital that could replace workers.

The **elasticity of demand for labour** 劳动需求弹性 is higher when demand for the product is elastic, when wages are a large share of total costs, when machines can easily replace workers, and over a longer time period.

The supply of labour to an occupation depends on:

- the size and age structure of the population: China's working-age population (15–59) has been shrinking since about 2012;

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- net migration;
- income tax rates and the level of welfare benefits;
- government rules, such as licences and working-time limits;
- **trade unions** 工会, which can limit entry or bargain for higher pay.

The **elasticity of labour supply** 劳动供给弹性 is low when an occupation needs long training (surgeons, airline pilots) and higher over a longer time period, and when workers can move easily between jobs and places.



A garment factory: firms hire workers for what they produce, so the demand for labour is derived from demand for clothes

Wage determination and labour market failure

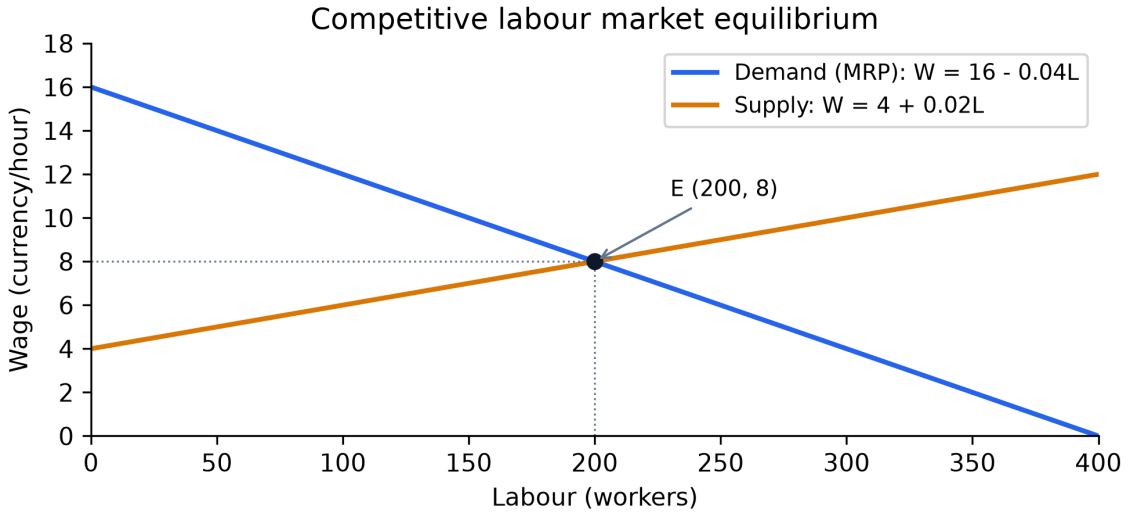
In a competitive labour market, the wage is set where the supply of labour meets the demand for labour.

Worked example: the competitive wage.

- Supply of labour: $W = 4 + 0.02L$. Demand for labour: $W = 16 - 0.04L$ (wage in yuan per hour, L in workers).
- Set them equal: $4 + 0.02L = 16 - 0.04L$, so $0.06L = 12$ and $L = 200$ workers.
- The wage is $W = 4 + 0.02(200) = 8$ yuan per hour.

Any shift moves the equilibrium. A rise in demand for the product shifts labour demand right: wages and employment both rise. More migration or lower benefits shift labour supply right: employment rises and the wage falls.

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Labour supply $W = 4 + 0.02L$ meets labour demand $W = 16 - 0.04L$ at 200 workers and 8 yuan per hour

In the **public sector** 公共部门, wages are often set by negotiation and government budgets rather than by the market. In England, teachers' pay is recommended each year by an independent review body and then set by the government. Public-sector pay can therefore end up above or below the level that would clear the market, causing either long queues of applicants or unfilled jobs.

Labour markets fail when workers cannot move to where the jobs are.

- **Geographical immobility** 地域流动性不足: workers cannot move to another area. High housing costs, family ties and lack of information all play a part. In China the *hukou* (household registration) system has long made it harder for migrant workers to get schooling and healthcare for their children in the cities where they work.
- **Occupational immobility** 职业流动性不足: workers cannot move to another job because they lack the skills, cannot afford retraining, or face discrimination. A laid-off coal miner in Shanxi cannot become a software engineer next month.

Both kinds leave unemployment in one place or occupation beside unfilled vacancies in another.

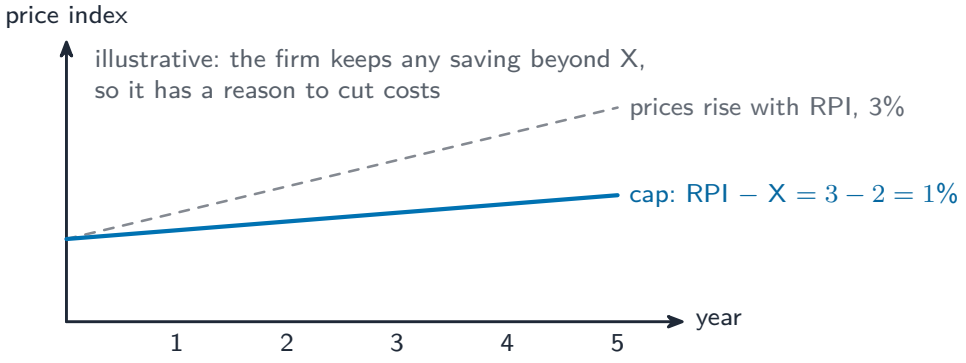
Government intervention in product markets

Governments intervene in product markets because of market power (monopoly and monopsony), externalities, information gaps and fairness.

To control monopolies and mergers, governments use:

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- **price regulation**: under an **RPI − X** price cap, a firm may raise prices by inflation (RPI) minus X percent each year. When British Telecom was privatised in 1984, its prices were capped at RPI − 3%. To keep its profits, the firm must cut costs by at least X percent a year;
- profit regulation;
- quality standards and performance targets;
- referral to a competition authority and laws to control mergers. In April 2021 China's market regulator, SAMR, fined Alibaba ¥18.2 billion for forcing merchants to sell only on its platform.



With RPI at 3%, an RPI − X cap with X = 2 allows prices to rise only 1% a year, so the firm must cut costs to keep its profits

To promote competition and contestability, governments use:

- tax incentives and grants for small firms and for foreign direct investment;
- deregulation;
- **privatisation** 私有化;
- **competitive tendering** 竞争性招标: private firms bid to run public services such as bus routes or hospital cleaning;
- **trade liberalisation** 贸易自由化: lower tariffs bring foreign competition.

To protect suppliers and employees, governments use:

- rules on local sourcing;
- employment laws against exploitation;
- limits on foreign firms entering a market;
- limits on the power of large buyers (monopsony);
- **nationalisation** 国有化: in February 2008 the UK government took over the failing bank Northern Rock.

Every measure should be judged by its effect on five things: **price, profit, efficiency, quality and choice**.

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Intervention has limits:

- **regulatory capture** 监管俘获: the regulator comes to serve the firms it regulates. After the 2010 Deepwater Horizon oil spill, investigators found that the US offshore drilling regulator had grown too close to the oil companies;
- **asymmetric information**: the firm knows its true costs better than the regulator does;
- too few staff or too little money for the regulator;
- too little legal power to act.

Government intervention in labour markets

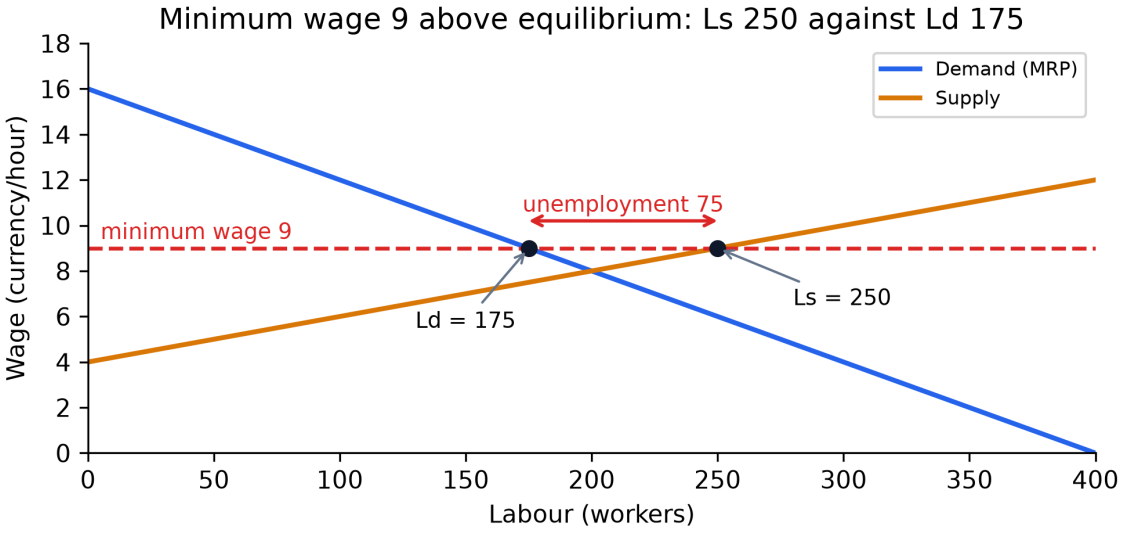
Governments intervene in labour markets because of monopsony employers paying low wages, in-work poverty, immobility, discrimination and exploitation. Their tools include:

- **maximum wages** 最高工资: rare, but public-sector pay caps are one example (the UK capped most public-sector pay rises at 1% a year from 2013 to 2017), and since 2014 EU rules have limited bankers' bonuses to the size of their salary, or twice it with shareholders' approval;
- **minimum wages** 最低工资: China's provinces set their own minimum wages; Shanghai's, the highest, was ¥2,690 a month from July 2023;
- taxes on employment, such as employers' social insurance contributions and corporation tax, which raise the cost of hiring;
- policies to reduce immobility: training, relocation grants and more housing;
- laws against discrimination and exploitation.

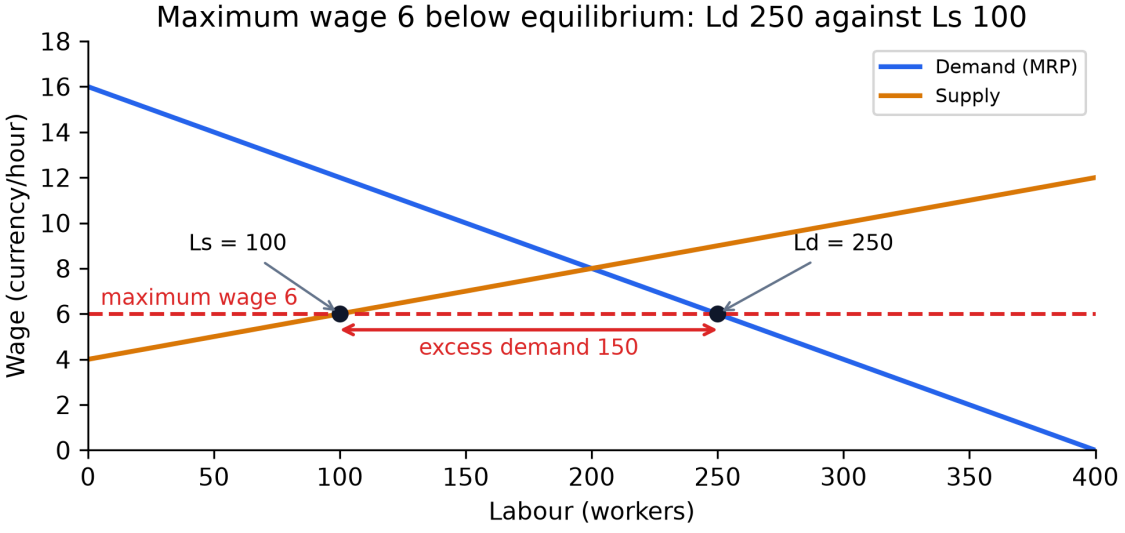
Worked example: wage controls on the model.

- **Minimum wage of 9 yuan** (above the equilibrium of 8): labour supplied $= (9-4)/0.02 = 250$; labour demanded $= (16-9)/0.04 = 175$. 75 workers who want jobs cannot find them, but the 175 who are employed earn more.
- **Maximum wage of 6 yuan** (below the equilibrium): labour demanded $= (16-6)/0.04 = 250$; labour supplied $= (6-4)/0.02 = 100$. There is a shortage of 150 workers, and jobs stay empty.

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A minimum wage of 9 above the equilibrium: 250 want to work but only 175 are hired, so 75 are unemployed



A maximum wage of 6 below the equilibrium: employers want 250 workers but only 100 offer themselves, a shortage of 150

The competitive model predicts that a minimum wage costs jobs. With a **monopsony** employer, it may not. A monopsonist keeps wages low by hiring fewer workers than a competitive market would. A minimum wage set between the monopsony wage and the competitive wage removes the reason to hold back hiring, so it can raise both wages and employment. This is one explanation for Card and Krueger's New Jersey result. In an exam, weigh the risk of unemployment against the gain in pay for low-paid workers, and say how much power employers have in that market.

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Data-response practice (Section B style)

Extract. In 2021 the UK ran short of heavy goods vehicle (HGV) drivers, and some petrol stations and supermarkets ran out of stock. The Road Haulage Association estimated a shortage of about 100,000 drivers. Many drivers from other EU countries had left during the pandemic and after Brexit, and tens of thousands of driving tests were cancelled during lockdowns. A new driver needs a special licence, which takes several months and can cost several thousand pounds to obtain. Employers raised pay and some supermarkets offered joining bonuses of £1,000 or more. In September 2021 the government offered 5,000 temporary visas for foreign HGV drivers and increased the number of driving tests.

Questions

- (a) Using the extract, explain **two** factors that reduced the supply of HGV drivers in the UK. [4]
- (b) The average HGV driver's annual pay rose from £32,000 to £36,000, while the number of drivers employed rose from 300,000 to 306,000. Calculate the elasticity of labour supply and comment on your answer. [4]
- (c) With the help of a labour market diagram, explain the effect of the shortage on drivers' wages and employment. [6]
- (d) Examine **two** causes of labour immobility in the market for HGV drivers. [8]
- (e) Evaluate whether temporary visas for foreign workers are a better solution to labour shortages than training more domestic workers. [12]

Model answers

(a) **Migration:** many EU drivers left the UK during the pandemic and after Brexit, so fewer workers were available. **Barriers to qualifying:** driving tests were cancelled in lockdowns, so fewer new drivers could get licences; the licence also takes months and costs thousands of pounds. Both shift the supply of labour to the left.

(b) $\%\Delta$ pay $= \frac{36{,}000-32{,}000}{32{,}000} \times 100 = 12.5\%$; $\%\Delta$ employment $= \frac{306{,}000-300{,}000}{300{,}000} \times 100 = 2\%$. Elasticity of labour supply $= \frac{2}{12.5} = 0.16$. Supply is very inelastic in the short run: a large pay rise attracts few extra drivers, because new drivers need time and money to qualify.

(c) The labour market diagram shows the wage on the vertical axis and the number of drivers on the horizontal axis. The supply of labour shifts left (fewer EU drivers, fewer new licences). At the old wage there is excess demand for drivers (the shortage), so employers bid up wages. The new equilibrium has a higher wage and fewer drivers employed. Because supply is inelastic, the wage rises a lot. Demand for drivers is derived from demand for goods deliveries, which stayed high, so demand did not fall to ease the shortage.

(d) **Occupational immobility:** workers in other jobs cannot quickly become HGV drivers because they need a special licence, training and a test, which cost time and money. **Geographical immobility and working conditions:** long hours away from

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home, poor roadside facilities and the high cost of housing near distribution centres discourage some workers from taking the jobs. *Evaluation:* occupational barriers fall over time as tests catch up; poor conditions are harder to fix and keep pushing workers out of the job.

(e) *For visas:* they add qualified workers quickly, which matters in a crisis when shelves are empty and supply is very inelastic. They cost the government little.

Against visas: only 5,000 visas were offered against a shortage of about 100,000, and temporary visas attracted few applicants because drivers were also scarce in other European countries. Relying on migrant workers may keep wages and conditions low, so domestic workers continue to leave. Visas do not fix the underlying causes.

For training: more test capacity and funded training raise the long-run supply of labour and make supply more elastic. Higher pay and better conditions keep drivers in the job. Domestic workers gain jobs and skills.

Against training: it takes months, so it cannot solve an immediate shortage, and it has a cost for the government or firms. Some trained drivers leave because of poor conditions.

Judgement: temporary visas can only ease the short-run crisis, and here they were too few to matter much. Training, faster testing and better pay and conditions are the better long-run solution, because they increase supply permanently. The best policy combines a short-run boost with long-run training, and depends on how quickly the shortage must be filled.

What examiners reward: supply factors tied to the extract, a correct elasticity calculation with interpretation, a labour market diagram with the supply shift and the new wage, causes of immobility that are examined (not just listed), and a time-based judgement.

Sources for this lesson

- D. Card and A. Krueger, "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania", *American Economic Review* 84 (1994).
- State Administration for Market Regulation, decision on Alibaba (10 April 2021).
- S. Littlechild, *Regulation of British Telecommunications' Profitability* (1983), the origin of RPI − X.
- Shanghai Municipal Human Resources and Social Security Bureau, minimum wage notice (2023).
- Road Haulage Association statements on the HGV driver shortage (2021).
- Pearson Edexcel International A Level Economics specification (WEC13), Issue 2, sections 3.3.4–3.3.5.

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Common errors

- Writing that firms demand labour "because they need workers". Say it is derived from demand for the product.
- Putting "price" and "quantity" on a labour market diagram. Label the axes wage rate and number of workers.
- Stating that a minimum wage always causes unemployment. In a monopsony it may raise employment.
- Mixing up geographical immobility (cannot move place) with occupational immobility (cannot change job).
- Describing an RPI − X cap as a fixed price. It allows prices to rise, but by less than inflation.
- Listing government measures without judging their effect on price, profit, efficiency, quality and choice.

Key terms

- **Derived demand**: demand for labour that comes from demand for the product it makes.
- **Elasticity of labour supply**: % change in labour supplied ÷ % change in the wage.
- **Geographical / occupational immobility**: barriers to moving place / changing job.
- **RPI − X**: a price cap that allows rises of inflation minus X percent.
- **Regulatory capture**: a regulator acting in the interests of the firms it regulates.
- **Minimum / maximum wage**: a legal floor / ceiling on pay.
- **Monopsony**: a single buyer, here a dominant employer.

Check yourself

1. Explain why the demand for delivery drivers rose in 2020.
2. On the model, labour demand rises to $W = 19 - 0.04L$. Find the new wage and employment.
3. Give one cause of geographical immobility in China and one policy that could reduce it.
4. With inflation (RPI) at 4% and X = 3, by how much may a regulated firm raise its prices?
5. On the model, what happens if the minimum wage is set at 7 yuan?
6. Explain how a minimum wage could raise employment where a single large employer dominates a town.

Answers: 1. It is derived demand: online shopping and food delivery rose during lockdowns, so firms needed more drivers. 2. $4+0.02L = 19-0.04L$ gives $L = 250$ and

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$W = 9$. 3. *Hukou* rules that limit migrants' access to city schools and healthcare; reform of *hukou* or more affordable housing in cities. 4. By 1% a year. 5. Nothing: 7 is below the equilibrium wage of 8, so the floor does not bind. 6. The monopsonist hires fewer workers to keep wages low; a minimum wage fixes the wage, so hiring one more worker no longer raises the wage of everyone else, and the firm hires more, up to the point where the supply of labour meets the wage floor.

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Globalisation, trade and international finance

Pearson Edexcel · International A-Level · Economics

Why it matters. On 26 April 1956 an old tanker, the *Ideal X*, left Newark, New Jersey, for Houston with 58 steel boxes on its deck. The trucking businessman Malcom McLean had realised that it was cheaper to lift a whole box onto a ship than to load thousands of sacks and crates by hand. Loading loose cargo cost about $5.86 a ton; McLean's boxes cost about 16 cents a ton. Containers made shipping so cheap that factories in one country could use parts from ten others. In 2023 the port of Shanghai, the busiest in the world, handled about 49 million twenty-foot containers. This unit explains why countries trade, who gains and loses, why governments still put up barriers, and how exchange rates and the balance of payments link national economies.

In this unit you will:

- describe the characteristics and causes of globalisation and weigh its costs and benefits;
- use opportunity cost to explain comparative advantage and the gains from trade;
- calculate the terms of trade and analyse trading blocs and the WTO;
- use a diagram to analyse the effects of a tariff;
- explain the balance of payments, exchange-rate systems, depreciation and the J-curve;
- measure international competitiveness and evaluate policies to raise it.

Globalisation

Globalisation 全球化 is the growing integration of the world's economies. It has three characteristics:

- **trade grows as a share of GDP**: world exports and imports were about a quarter of world GDP in 1970 and about 60% by 2008;
- **transnational companies** 跨国公司 (TNCs) and **foreign direct investment** 外国直接投资 (FDI) become more important: a TNC owns production in more than one country;
- **migration** 移民 of workers between countries increases.

Its causes over the last 50 years:

- **trade liberalisation** 贸易自由化: average tariffs fell through rounds of talks, and China joined the World Trade Organization on 11 December 2001;
- more and larger trading blocs, such as the European single market and ASEAN;
- political change: the end of the Soviet system and China's opening up from 1978 brought more than a billion workers into world trade;

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- lower transport and communication costs: containers, cheaper air freight, the internet;
- the growth of TNCs, which spread their production across many countries.

TNCs invest abroad to reach new markets, to secure raw materials, to use cheaper labour and to pay lower taxes. Tesla's Shanghai Gigafactory, opened at the end of 2019, was the first wholly foreign-owned car factory in China: it sells to Chinese buyers and exports to Europe and Asia. For the **host country** 东道国 FDI can bring jobs, capital, new technology, management skills and tax revenue. It can also crowd out local firms, send most profits home to the parent company, and give a large firm influence over government policy.

Benefits and costs of globalisation

Possible benefits	Possible costs
faster economic growth and higher tax revenue	workers in industries that move abroad lose their jobs
economies of scale 规模经济 in world markets	poor working conditions: the Rana Plaza factory collapse in Bangladesh (2013) killed more than 1,100 garment workers
lower prices, more choice, higher **consumer surplus** 消费者剩余	environmental damage from more production and shipping
higher living standards; hundreds of millions lifted out of poverty in East Asia	tax lost through **transfer pricing** 转移定价: in 2024 the EU's top court ruled that Apple owed Ireland €13 billion in unpaid taxes
spread of technology and ideas	inequality within countries may widen; TNCs may influence policy

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The container terminal at Bremerhaven, Germany: containers cut shipping costs so far that a product can cross many borders before it is finished.

Specialisation and comparative advantage

When countries **specialise** 专业化, each produces the goods it makes best and trades for the rest. World output rises. But a country that specialises in a few products depends on their prices: when world copper prices fell by more than half in late 2008, Zambia's export earnings fell sharply.

A country has an **absolute advantage** 绝对优势 when it can produce more of a good from the same resources. It has a **comparative advantage** 比较优势 when it can produce a good at a lower **opportunity cost** 机会成本 than another country. David Ricardo set out this idea in 1817 with England's cloth and Portugal's wine. Trade depends on comparative, not absolute, advantage.

Worked example: who should make what? One hour of labour produces:

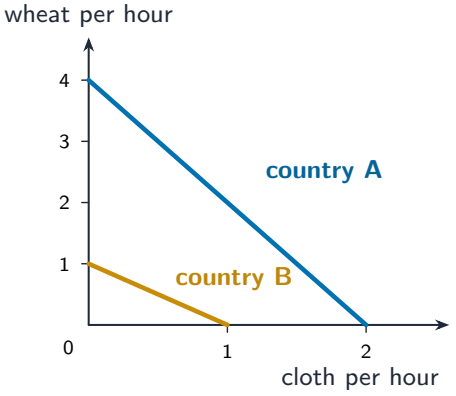
	Wheat (tonnes)	Cloth (rolls)	Opportunity cost of 1 cloth	Opportunity cost of 1 wheat
Country A	4	2	$4 \div 2 = 2$ wheat	$2 \div 4 = 0.5$ cloth
Country B	1	1	$1 \div 1 = 1$ wheat	$1 \div 1 = 1$ cloth

1. A has an absolute advantage in both goods: it makes more of each per hour.
2. Cloth costs A 2 wheat but costs B only 1 wheat, so B has the comparative advantage in cloth.

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3. Wheat costs A 0.5 cloth but costs B 1 cloth, so A has the comparative advantage in wheat.
4. A specialises in wheat and B in cloth. They agree a **trade ratio** 交换比率 between the two opportunity costs, say 1 cloth for 1.5 wheat.
5. A now gets a roll of cloth for 1.5 wheat instead of giving up 2. B gets 1.5 wheat for a roll of cloth instead of 1. Both gain.

Any ratio between 1 and 2 wheat per cloth gives both countries a gain. Outside that range, one country would be better off making the good itself.



A: 4 wheat or 2 cloth
1 cloth costs 2 wheat
comparative advantage: **wheat**

B: 1 wheat or 1 cloth
1 cloth costs 1 wheat
comparative advantage: **cloth**

A is faster at both (absolute advantage); trading at 1.5 wheat per cloth sits between the two costs

Country A's frontier lies outside B's, so A has an absolute advantage in both goods; the different slopes show the different opportunity costs.

The theory rests on **assumptions**: constant costs as output grows, no transport costs or trade barriers, full employment, and workers who can move easily between industries. **Limitations**: costs often rise as a country specialises; transport costs and tariffs reduce the gains; workers in shrinking industries cannot easily retrain; and the gains may be shared unequally within each country.

Terms of trade, trading blocs and protectionism

Patterns of trade change with comparative advantage. China's share of world goods exports rose from under 2% in 1990 to about 14% in 2023 as its manufacturing grew. Patterns also shift with exchange rates, the growth of emerging economies, trading blocs and bilateral trade agreements, and protectionism.

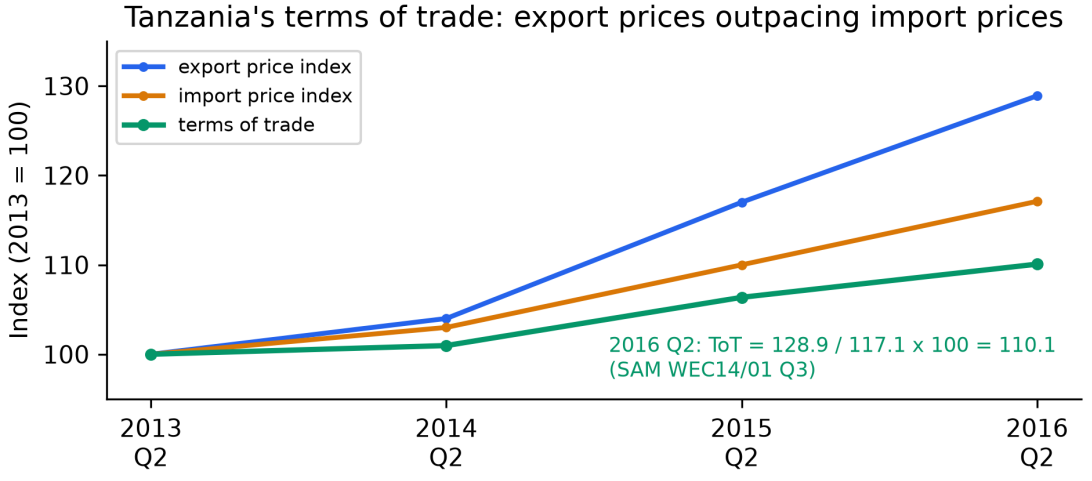
The **terms of trade** 贸易条件 compare a country's export prices with its import prices:

$$\text{terms of trade} = \frac{\text{index of average export prices}}{\text{index of average import prices}} \times 100$$

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Worked example (WEC14 sample assessment). Tanzania's export price index rose from 100 to 128.9; its import price index rose from 100 to 117.1.

- Terms of trade $= \frac{128.9}{117.1} \times 100 = 110.1$.
- The terms of trade improved by 10.1%: each unit of exports now buys 10.1% more imports.



Tanzania's export prices rose faster than its import prices, so its terms of trade rose to 110.1.

The terms of trade change with relative inflation rates, relative productivity and labour costs, the exchange rate, and world prices of commodities. An improvement means a country's exports buy more imports, which can raise living standards. But it is not always good news: if export prices rise because of high domestic inflation, foreign buyers may switch away, and the **balance of trade** 贸易差额 can worsen if demand for the exports is price elastic.

The WTO and trading blocs. The **World Trade Organization** 世界贸易组织 (WTO), with 166 members, runs negotiation rounds to cut trade barriers, sets trade rules and settles disputes between members. A **trading bloc** 贸易集团 is a group of countries that cut barriers between themselves. Blocs come in stages of integration:

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Type	What members share	Example
free trade area 自由贸易区	no tariffs between members; each sets its own tariffs on others	ASEAN Free Trade Area; USMCA
customs union 关税同盟	free trade plus a **common external tariff** 共同对外关税	Mercosur
common market 共同市场	a customs union plus free movement of labour and capital	the EU single market
monetary union 货币联盟	a common market plus one currency and one central bank	the euro area (since 1999)

The Regional Comprehensive Economic Partnership (RCEP), in force since 1 January 2022, joins China, Japan, South Korea, Australia, New Zealand and the ten ASEAN members: about 30% of world GDP.

Blocs bring **trade creation** 贸易创造: cheaper production in a partner replaces dearer production at home. They also risk **trade diversion** 贸易转移: dearer production in a partner replaces cheaper production outside, because the outsider now pays the common external tariff. When the UK joined the European Economic Community in 1973, British buyers switched from New Zealand lamb and butter to dearer European supplies. Other effects of blocs are lower transaction costs, larger markets with economies of scale, and easier movement of workers and capital. Blocs can conflict with the WTO's **most-favoured-nation** 最惠国 principle, which says that a lower tariff given to one member should be given to all.

Protectionism 贸易保护主义 means restricting imports to help domestic producers. Governments give these reasons:

- to protect an **infant industry** 幼稚产业 until it grows large enough to compete, or an old (sunset) industry while it shrinks;
- to save domestic jobs;
- national security: food, energy, defence and computer chips;
- to stop **dumping** 倾销: selling exports below their cost of production;
- to reduce a current-account deficit;
- to raise tax revenue.

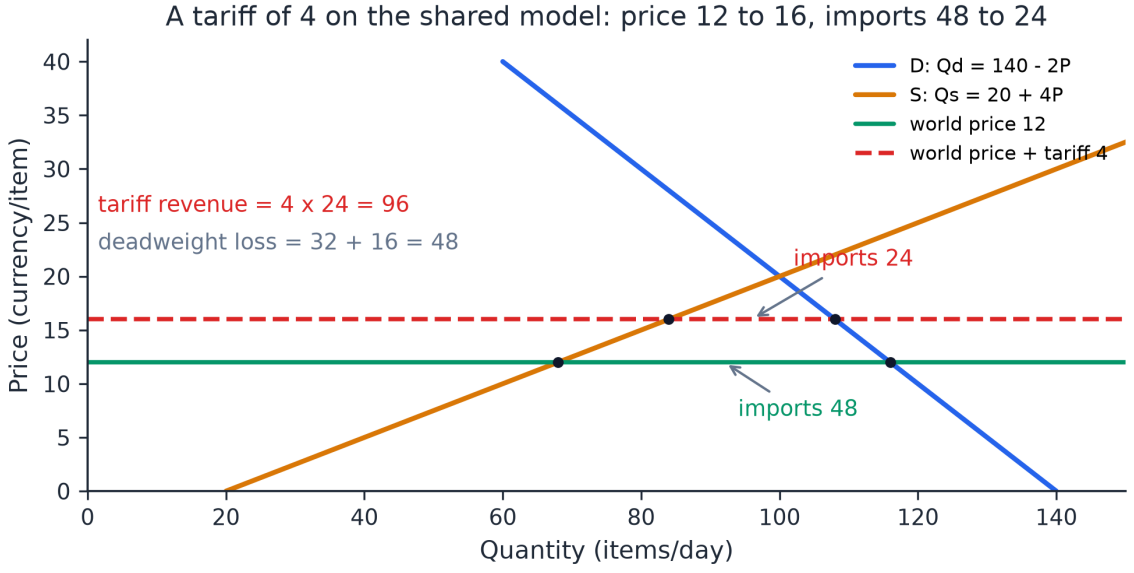
The tools are **tariffs** 关税 (taxes on imports), **quotas** 配额 (limits on the quantity of imports), **subsidies** 补贴 to domestic firms, and **non-tariff barriers** 非关税壁垒 such as strict product standards and slow customs checks. In 2024 the EU added duties of up to 35.3% on electric cars made in China, saying that Chinese subsidies let firms sell below fair prices; China called the duties protectionism.

> **Worked example: a tariff on the shared model.** Domestic demand is $Q_d = 140 - 2P$ and domestic supply is $Q_s = 20 + 4P$. The world price is 12.

1. Free trade: $Q_d = 140 - 24 = 116$, $Q_s = 20 + 48 = 68$, so imports are $116 - 68 = 48$.

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2. A tariff of 4 raises the domestic price to 16: $Q_d = 140-32 = 108$, $Q_s = 20+64 = 84$, imports are $108 - 84 = 24$.
3. Government revenue $= 4 \times 24 = 96$.
4. Consumer surplus falls by $\frac{116+108}{2} \times 4 = 448$.
5. Producer surplus rises by $\frac{68+84}{2} \times 4 = 304$.
6. **Deadweight loss** 无谓损失 $= 448 - 304 - 96 = 48$: a production triangle $\frac{1}{2} \times 16 \times 4 = 32$ (dearer domestic firms replace cheaper imports) plus a consumption triangle $\frac{1}{2} \times 8 \times 4 = 16$ (buyers priced out).



The tariff raises the price from 12 to 16, halves imports from 48 to 24, raises 96 for the government and leaves a deadweight loss of 32 + 16 = 48.

Who gains and loses? Domestic producers and their workers gain; the government gains revenue; consumers lose, and lose most where the good is a large part of a poor family's spending, so equality can fall. Foreign producers lose sales and their governments may retaliate. When the US put tariffs of up to 50% on imported washing machines in 2018, prices of washing machines (and of dryers, usually bought with them) rose by about 12%; economists estimated the cost to US buyers at about $815,000 for each factory job created.

Balance of payments and exchange rates

The **balance of payments** 国际收支 records all money flows between a country and the rest of the world. It has three parts:

- the **current account** 经常账户: trade in goods, trade in services, primary income (wages, profits and interest earned abroad) and secondary income (transfers such as remittances and aid);

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- the **capital account** 资本账户: small flows such as debt forgiveness and the transfer of patents;
- the **financial account** 金融账户: FDI, purchases of shares and bonds (portfolio investment), bank lending and changes in reserves.

A current-account deficit is caused by low competitiveness (high costs or a strong currency), fast growth of domestic demand that pulls in imports, or a fall in the world price of the country's main exports. A surplus has the opposite causes. China's current-account surplus peaked at about 10% of GDP in 2007, while the US ran a deficit of about 6% of GDP in 2006.

Governments can reduce a deficit with:

- **expenditure-reducing policies** 减少支出政策: higher taxes or interest rates cut spending, including on imports, but also cut growth and jobs;
- **expenditure-switching policies** 转换支出政策: a lower exchange rate or tariffs make imports dearer and domestic goods relatively cheaper;
- supply-side policies that raise productivity and competitiveness over time.

Global imbalances 全球失衡 matter because a surplus country lends its savings to a deficit country. Large, long imbalances can end suddenly: deficit countries can face a fall in the currency and a debt crisis, as several did in 2008.



An exchange rate is the price of one currency in terms of another.

Exchange-rate systems

System	Who sets the rate	Example
fixed exchange rate 固定汇率	the central bank pegs it and defends it with reserves and interest rates	Hong Kong dollar, 7.75–7.85 per US dollar since 2005 (pegged since 1983)
managed exchange rate 管理汇率	the market, but the central bank keeps it inside a band or near a target	the yuan since July 2005
floating exchange rate 浮动汇率	demand and supply in the currency market	pound sterling, Japanese yen

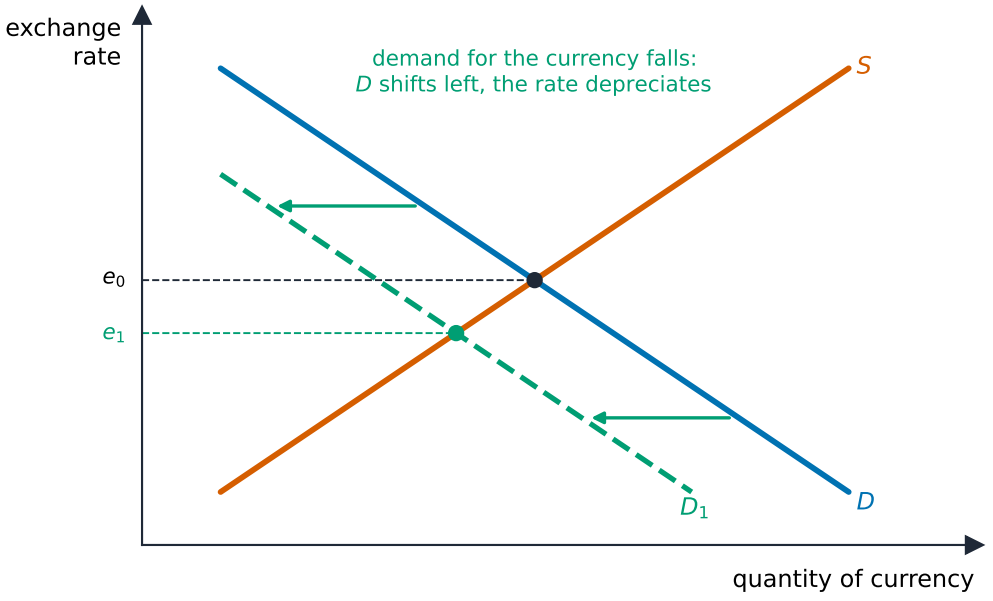
The yuan was fixed at 8.28 per US dollar from 1994. On 21 July 2005 China moved it to 8.11 and began a managed float against a basket of currencies. Governments influence the rate by buying or selling foreign currency, by changing interest rates, and through **quantitative easing** 量化宽松, which can push a currency down.

> **Worked example: how much did the yuan rise?** At 8.28 yuan per dollar one yuan is worth $\frac{1}{8.28} = \$0.1208$. At 8.11 it is worth $\frac{1}{8.11} = \$0.1233$. Rise $= \frac{0.1233-0.1208}{0.1208} \times 100 \approx 2.1\%$.

In a floating system the rate is set where demand for the currency meets its supply. Foreigners demand pounds to buy British exports, to invest in Britain and to save in British banks; British people supply pounds to buy imports and invest abroad. The rate changes with:

- **relative interest rates**: in 2022–2024 US interest rates rose above 5% while Japan's stayed near zero, and the yen fell to about 160 per dollar in April 2024;
- **relative inflation**: by **purchasing power parity** 购买力平价 theory, the currency of a high-inflation country falls until a basket of goods costs the same in both countries;
- the current-account balance and the economy's strength;
- **speculation** 投机 and expectations, and **capital flight** 资本外逃 in a crisis;
- global shocks, such as a fall in world commodity prices for a commodity exporter.

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If demand for the currency falls from D to D1, the exchange rate falls: a depreciation.

A rise in the value of a currency is an **appreciation** 升值 in a floating system and a **revaluation** 法定升值 in a fixed one. A fall is a **depreciation** 贬值 (floating) or a **devaluation** 法定贬值 (fixed). On 11 August 2015 China cut the yuan's daily reference rate by 1.9%, its largest one-day fall in two decades.

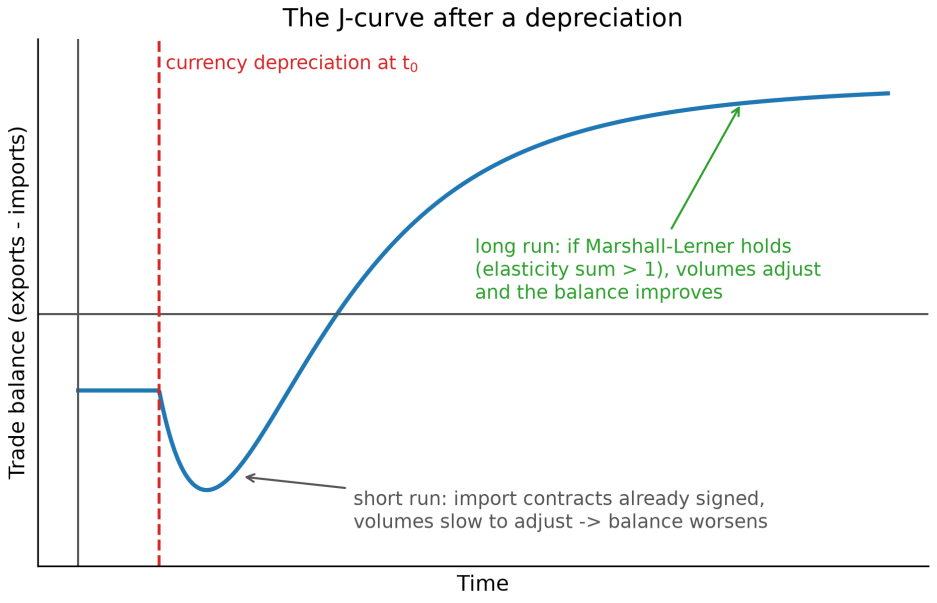
> **Worked example: what a depreciation does to prices.** On 23 June 2016, the day of the UK's referendum on leaving the EU, £1 bought about 1.50. *Adaylateritboughtabout*1.32.

- A £20 British jacket cost an American buyer $20 \times 1.50 = 30$ dollars before and $20 \times 1.32 = 26.40$ dollars after: 12% cheaper.
- A 600-dollar phone cost a British buyer $600 \div 1.50 =$ £400 before and $600 \div 1.32 \approx$ £455 after: about 14% dearer.

Whether a depreciation improves the current account depends on how much buyers respond. The **Marshall–Lerner condition** 马歇尔-勒纳条件 says that, starting from balanced trade, the balance improves only if the price elasticities of demand for exports and imports add up to more than 1 (ignoring the minus signs). With $PED_X = -0.6$ and $PED_M = -0.7$: $0.6 + 0.7 = 1.3 > 1$, so the balance improves. With -0.2 and -0.3: $0.5 < 1$, so it worsens.

In the short run demand is inelastic: contracts are already signed and buyers take time to find new suppliers. So the trade balance usually gets worse first, then improves as volumes adjust. This path is the **J-curve** J 曲线. After the UK devalued sterling by 14.3% in November 1967 (from 2.80*to*2.40), its trade balance took about two years to improve.

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The J-curve: after a depreciation the trade balance first worsens, then improves as export and import volumes respond.

A depreciation also affects:

- **economic growth and jobs**: more exports and fewer imports raise aggregate demand;
- **inflation**: dearer imported food, fuel and parts raise costs;
- **FDI**: domestic assets become cheaper for foreign investors, but an unstable currency deters investment.

When countries push down their currencies in turn (**competitive depreciation** 竞争性贬值), each gains little and trade partners may answer with tariffs: a **currency war** 货币战.

International competitiveness

A country is **internationally competitive** 具有国际竞争力 when its firms can sell abroad at good prices and quality. It is measured by:

- relative **unit labour costs** 单位劳动成本: labour cost per unit of output;
- relative productivity: output per worker or per hour;
- relative export prices.

> **Worked example: high wages can still be competitive.** In country X a worker earns 20 dollars an hour and makes 40 units, so the unit labour cost is $20 \div 40 = 0.50$ dollars. In country Y a worker earns 5 dollars an hour and makes 8 units, so the unit labour cost is $5 \div 8 = 0.625$ dollars. Country X pays four times the wage but has the lower cost per unit, because its workers are five times as productive.

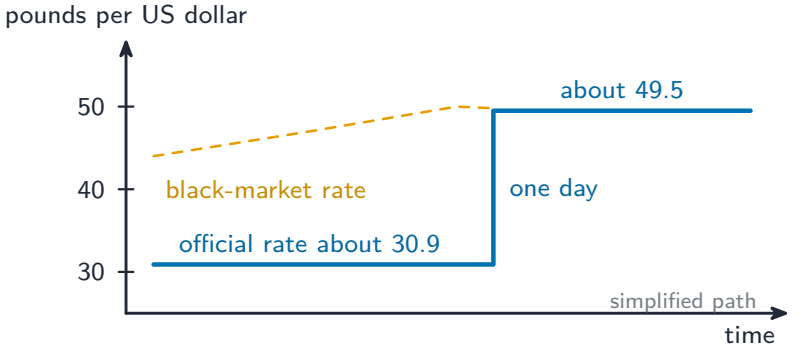
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Competitiveness depends on productivity, the skills and health of workers, the exchange rate, wage and non-wage costs (taxes on employment, pensions), regulation, the quality of infrastructure, and non-price factors such as design, reliability and after-sales service. As Chinese wages rose in the 2010s, firms moved labour-intensive work to Vietnam, where Samsung now makes about half of its phones; Chinese firms moved up to high-productivity goods such as electric cars, batteries and solar panels.

Policies to raise competitiveness include education and training, incentives for investment and research, privatisation and deregulation, a lower exchange rate, and lower trade barriers on imported parts. A competitive economy gains export-led growth, jobs and inward FDI. An uncompetitive one suffers current-account deficits, **deindustrialisation** 去工业化, and may need painful cuts in wages and spending to regain its markets.

Data-response practice (Section B style)

Extract. In March 2024 Egypt's central bank let the Egyptian pound float. In one day the official rate moved from about 30.9 pounds per US dollar to about 49.5, close to the rate on the black market, where dollars had been scarce for months. Inflation had reached a record of about 38% in September 2023, and many importers had been unable to buy dollars to pay for goods. At the same time the central bank raised interest rates by 6 percentage points, the IMF increased its loan programme to about US$8 billion, and the United Arab Emirates agreed to invest US$35 billion in a coastal development project. Egypt imports much of its wheat and fuel, while its main sources of foreign currency include tourism, Suez Canal fees and money sent home by Egyptians working abroad.



The official rate jumps to meet the black market

Questions

- (a) Calculate the percentage fall in the value of the Egyptian pound against the US dollar. [2]
- (b) Explain **two** reasons why Egypt allowed its currency to fall. [4]

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- (c) With the help of a J-curve diagram, explain how Egypt's trade balance might change after the depreciation. [6]
- (d) Examine the likely effect of the depreciation on inflation in Egypt. [8]
- (e) Evaluate whether the depreciation is likely to improve Egypt's current account. [12]

Model answers

(a) One pound was worth $\frac{1}{30.9} \approx \$0.0324$ before and $\frac{1}{49.5} \approx \$0.0202$ after. Fall $= \frac{0.0202-0.0324}{0.0324} \times 100 \approx -38\%$. (Note: the number of pounds per dollar rose by about 60%, but the pound's value fell by about 38%.)

(b) **To end the shortage of dollars and the black market:** the official rate was far above the pound's market value, so few people would sell dollars at it; trade and investment were held back. Floating the pound brings the official rate to the market rate, so dollars flow through official channels again. **To meet the conditions of IMF support and attract investment:** a flexible exchange rate was part of the IMF programme, and foreign investors are more willing to bring money in when they can convert it at a fair rate.

(c) The J-curve shows the trade balance against time. Immediately after the depreciation, import contracts are priced in dollars and volumes are slow to change, so Egypt pays more pounds for the same imports and the trade balance gets worse. Over time, Egyptian exports and tourism become cheaper for foreigners and imports dearer for Egyptians, so export volumes rise and import volumes fall. If the Marshall–Lerner condition holds ($|PED_X| + |PED_M| > 1$), the balance then improves: the curve rises above its starting level.

(d) A depreciation raises the pound price of imports. Because wheat and fuel are necessities with price-inelastic demand, Egyptians keep buying them at higher prices, so food and energy prices rise: cost-push inflation, which spreads through transport and production costs. Cheaper exports and more tourism raise AD (demand-pull). *But:* the black-market rate was already near 49.5, so many prices had already adjusted to it, which limits the extra inflation. The 6-point interest-rate rise reduces demand and makes holding pounds more attractive, and new dollar inflows allow importers to buy goods again, easing shortages. Over time inflation may fall rather than rise.

(e) *Reasons it may improve:* tourism, a large export of services, becomes cheaper and is likely to be price elastic. Remittances from Egyptians abroad are more likely to come through official channels at a fair rate, raising measured current-account inflows. Expensive imports of non-essential goods fall.

Reasons it may not: demand for imported wheat and fuel is inelastic, so the import bill may rise in pounds without falling much in volume, and the Marshall–Lerner condition may not hold in the short run. Suez Canal fees are priced in dollars and depend on world shipping, not on the exchange rate; they fell when shipping avoided the Red Sea in 2024. If inflation rises fast, the competitive gain from the cheaper pound is lost.

Other influences: the large capital inflows (UAE investment, IMF loans) appear in

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the financial account, not the current account; they support the currency but must be repaid or earn profits later, which are current-account outflows.

Judgement: the depreciation is likely to improve the current account slowly, mainly through tourism and remittances, but less through goods trade, because Egypt's key imports are necessities. The improvement depends on keeping inflation under control (so the real exchange rate stays competitive) and on factors outside Egypt's control, such as Red Sea shipping.

What examiners reward: a percentage change in the currency's value (not in the number of units per dollar), reasons linked to the extract, a J-curve with the Marshall–Lerner condition, inflation effects that weigh cost-push against the offsetting policies, and a conditional judgement.

Sources for this lesson

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- People's Bank of China announcements of 21 July 2005 and 11 August 2015; Court of Justice of the European Union, *Commission v Ireland and Apple* (10 September 2024).
- Pearson Edexcel International A Level Economics specification (WEC14), Issue 2, sections 4.3.1–4.3.3, and the WEC14/01 Sample Assessment Materials.

Common errors

- Saying a country should make the good it is "best at". Compare opportunity costs, not output.
- Calling any rise in the terms of trade "good". Ask why export prices rose and what happened to export volumes.
- Confusing trade creation (cheaper partner replaces dearer home production) with trade diversion (dearer partner replaces cheaper outside producer).
- On a tariff diagram, counting the revenue box as a loss to society. Only the two triangles are deadweight loss.
- Working out a currency's fall from the change in units per dollar. 30.9 to 49.5 pounds per dollar is a 38% fall in the pound, not 60%.
- Saying a depreciation always improves the current account. It depends on the Marshall–Lerner condition, the time period and inflation.

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- Using "devaluation" for a floating currency. Floating currencies depreciate; fixed ones are devalued.

Key terms

- **Globalisation**: the growing integration of national economies through trade, investment, migration and technology.
- **Comparative advantage**: producing a good at a lower opportunity cost than another country.
- **Terms of trade**: export price index ÷ import price index × 100.
- **Trade creation / trade diversion**: a bloc moves production to a cheaper partner / from a cheaper outsider to a dearer partner.
- **Tariff / quota**: a tax on imports / a limit on the quantity imported.
- **Current account**: trade in goods and services plus primary and secondary income.
- **Depreciation / devaluation**: a fall in a floating / fixed exchange rate.
- **Marshall–Lerner condition**: a depreciation improves the trade balance if the export and import price elasticities sum to more than 1.
- **J-curve**: the trade balance worsens after a depreciation before it improves.
- **Unit labour cost**: labour cost per unit of output.

Check yourself

1. One hour of labour makes 6 phones or 3 bikes in country P and 2 phones or 2 bikes in country Q. Which country has the comparative advantage in bikes?
2. A country's export price index falls to 95 and its import price index rises to 105. Calculate its terms of trade.
3. On the shared model, the world price is 12 and the tariff is raised from 4 to 6. Find the new level of imports and the government's revenue.
4. Explain why joining a customs union can cause trade diversion.
5. The yen moves from 110 to 160 per US dollar. By what percentage has the yen's value fallen?
6. A country's export and import price elasticities are -0.3 and -0.4. Will a depreciation improve its trade balance? Explain.

Answers: 1. Q: a bike costs Q 1 phone but costs P 2 phones. 2. $\frac{95}{105} \times 100 = 90.5$, a 9.5% deterioration. 3. The price is 18: $Q_d = 104$, $Q_s = 92$, imports 12, revenue $6 \times 12 = 72$. 4. The common external tariff makes imports from cheaper outside producers dearer than goods from a partner, so buyers switch to the dearer partner. 5. Value falls from $\frac{1}{110}$ to $\frac{1}{160}$ dollars: $\frac{110}{160} - 1 = -31.25\%$, a fall of about 31%. 6. No, not on the Marshall–Lerner condition: $0.3 + 0.4 = 0.7 < 1$, so spending on imports rises by more than export earnings and the balance worsens, at least until demand becomes more elastic.

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Poverty, the state and development

Pearson Edexcel · International A-Level · Economics

Why it matters. In 1981 about 88% of China's people lived below the World Bank's extreme-poverty line of the time. On 25 February 2021 China's government announced that extreme poverty in the countryside had been eliminated: by its own national line of 2,300 yuan a year (at 2010 prices), almost 99 million rural people had left poverty since 2012 alone. No country has reduced poverty so fast or for so many people. Yet over the same years income inequality in China rose to one of the highest levels in Asia. Fast growth lifted the poorest out of poverty without making incomes more equal. This unit explains how economists measure poverty and inequality, how governments tax, spend and borrow, and why some countries develop while others stay poor.

In this unit you will:

- distinguish absolute from relative poverty and explain what changes them;
- measure inequality with a Lorenz curve and calculate a Gini coefficient;
- classify public spending and taxes, and use the Laffer curve;
- distinguish a fiscal deficit from the national debt, and structural from cyclical deficits;
- evaluate macroeconomic policies and the problems policymakers face;
- measure development with the HDI, explain the constraints on growth and evaluate development strategies.

Poverty

Absolute poverty 绝对贫困 means a person cannot afford basic needs: food, clean water, shelter and clothing. The World Bank's international extreme-poverty line was updated in June 2025 to 3.00 dollars per person per day, measured at 2021 **purchasing power parity** 购买力平价 (PPP), so that it buys the same basket in every country. When you compare poverty figures, state the line, the PPP year and the date.

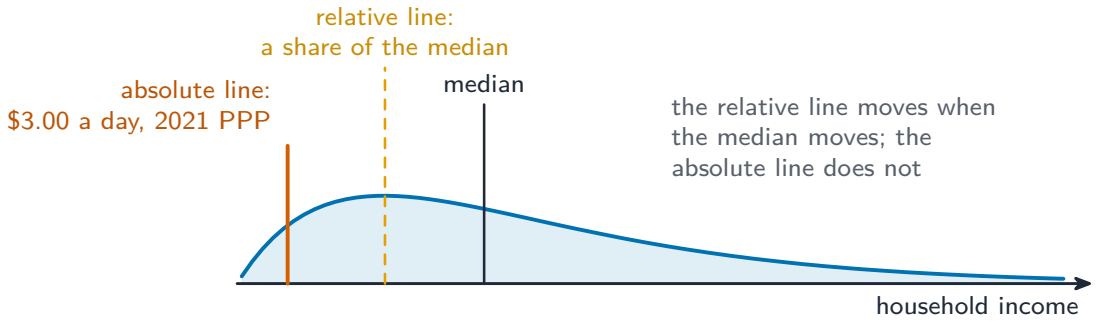
Relative poverty 相对贫困 means being poor compared with others in the same society. The UK and the EU count a household as poor if its income is below 60% of the **median** 中位数 household income. Relative poverty can rise when everyone is getting richer, if the poorest gain more slowly than the middle.

> **Worked example: absolute and relative lines.** In a country the median household income is 30,000 a year.

- The relative poverty line at 60% of the median is $0.6 \times 30{,}000 = 18{,}000$.
- Ten years later the median has risen to 40,000. The relative line rises to $0.6 \times 40{,}000 = 24{,}000$.

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- A household whose income rose from 17,000 to 22,000 has escaped absolute poverty if the absolute line is fixed below 17,000, but it is still in relative poverty: 22,000 is below 24,000.



The absolute line is a fixed amount near the bottom of the distribution; the relative line is a share of the median, so it moves when the median moves.

What changes poverty?

- **Economic growth** raises incomes and usually cuts absolute poverty, but relative poverty falls only if the poor share in the gains.
- **Education and training** raise the earnings of the poor.
- **Welfare benefits** 福利 and cash transfers: Brazil's Bolsa Família, begun in 2003, paid poor families a monthly sum if their children attended school and had vaccinations; by 2013 it reached about 14 million families.
- **Changes in the tax system**, for example a higher tax-free allowance.
- **Structural change** 结构性变化: when coal mines and steel works close, whole regions fall behind, as in northern England in the 1980s and north-east China in the 1990s.
- **Aid**, and **civil wars and conflict**, which destroy farms, schools and jobs: Syria and Yemen saw poverty rise sharply in the 2010s.

Inequality

Wealth inequality 财富不平等 is unequal ownership of assets: houses, land, shares and savings. Wealth is a stock. **Income inequality** 收入不平等 is unequal flows of wages, profits, rent and interest. Wealth is usually far more unequal than income, because wealth earns income and can be passed on through **inheritance** 继承.

The **Lorenz curve** 洛伦兹曲线 plots the cumulative share of income against the cumulative share of households, from the poorest upwards. If income were shared equally, the curve would be the 45° **line of equality** 绝对平等线. The further the curve sags below that line, the more unequal the incomes. The **Gini coefficient** 基尼系数 measures the sag:

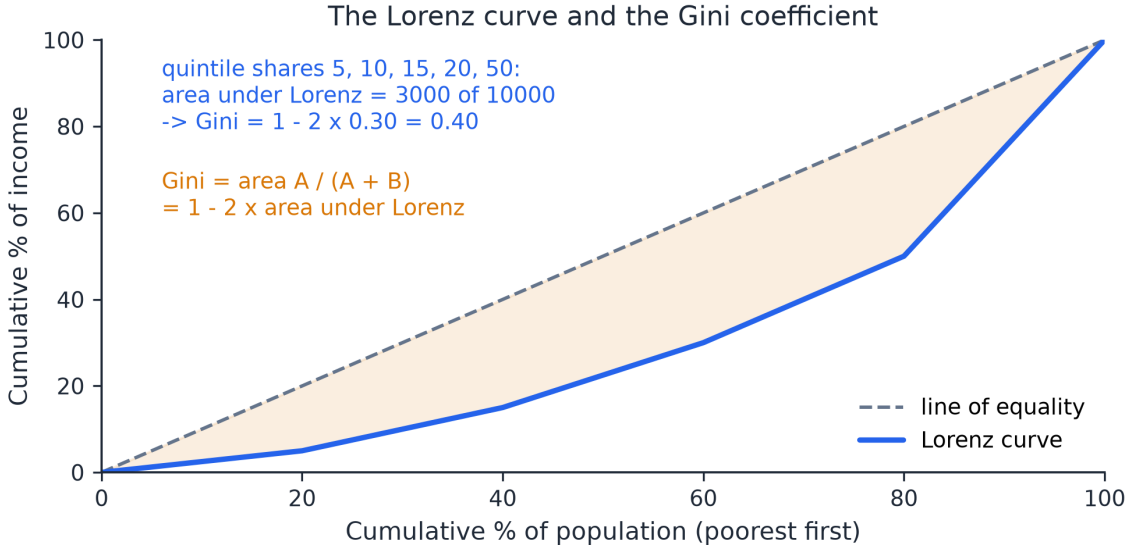
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$$\text{Gini} = \frac{\text{area between the line of equality and the Lorenz curve}}{\text{whole area below the line of equality}}$$

It runs from 0 (everyone has the same income) to 1 (one household has everything). South Africa's Gini is about 0.63, among the highest in the world; Slovakia's is about 0.24, among the lowest. China's official Gini peaked at 0.49 in 2008 and was still about 0.47 in 2022.

Worked example: a Gini from quintile shares. The poorest 20% of households receive 5% of income, the next 20% receive 10%, then 15%, 20%, and the richest 20% receive 50%.

1. Cumulative points: (0, 0), (20, 5), (40, 15), (60, 30), (80, 50), (100, 100).
2. The area under the Lorenz curve is five trapezoids, each 20 wide: $\frac{0+5}{2} \times 20 + \frac{5+15}{2} \times 20 + \frac{15+30}{2} \times 20 + \frac{30+50}{2} \times 20 + \frac{50+100}{2} \times 20$.
3. That is $50 + 200 + 450 + 800 + 1500 = 3000$.
4. The area under the line of equality is $\frac{1}{2} \times 100 \times 100 = 5000$.
5. Gini $= \frac{5000-3000}{5000} = 0.40$: a fairly unequal distribution.



Quintile shares of 5, 10, 15, 20 and 50 per cent give a Lorenz curve with a Gini coefficient of 0.40.

Causes of inequality within a country: differences in skills and education, so wages differ; differences in wealth and inheritance; weak trade unions or low minimum wages; tax and benefit systems that redistribute little; and globalisation and technology, which raise the pay of skilled workers more than that of unskilled ones. **Causes between countries:** different histories of growth, institutions, geography, and access to world markets and capital.

Impacts of inequality:

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- some inequality gives incentives to work, train and start firms;
- very high inequality can waste talent, because poor children cannot afford good schooling;
- the rich save more of their income, so high inequality can hold back consumption;
- it pushes people to migrate in search of better pay;
- it is linked with gaps in health and **life expectancy** 预期寿命, and with crime and lower trust.

The economist Simon Kuznets suggested in 1955 that inequality first rises as a country industrialises, because a few people move into well-paid factory and city jobs, and then falls as most workers make the move: the **Kuznets curve** 库兹涅茨曲线. Free-market economies reward scarce skills and the owners of capital, so they create inequality as a side effect of the incentives that make them grow.



A favela beside wealthier districts of Rio de Janeiro: income and wealth inequality in one view.

Public expenditure, taxation and borrowing

Government spending comes in three kinds:

- **capital expenditure** 资本支出: spending on assets that last, such as railways, hospitals and schools;
- **current expenditure** 经常性支出: day-to-day running costs, such as teachers' and nurses' pay and medicines;
- **transfer payments** 转移支付: pensions and benefits, which move income from taxpayers to others without buying any output.

The size of the state differs widely: general government spending was about 57% of GDP in France in 2023 and under 20% in Singapore. Spending tends to rise as

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countries get richer (people want more health care and education) and as populations age: more than 29% of Japan's people were 65 or over in 2023, and pensions and health care take a growing share of its budget. Its effects depend on what it buys. Spending on infrastructure and education can raise **productivity** 生产率 and growth; high spending financed by borrowing can cause **crowding out** 挤出效应, where government borrowing pushes up interest rates and reduces private investment; and high spending needs high taxes, which may weaken incentives.

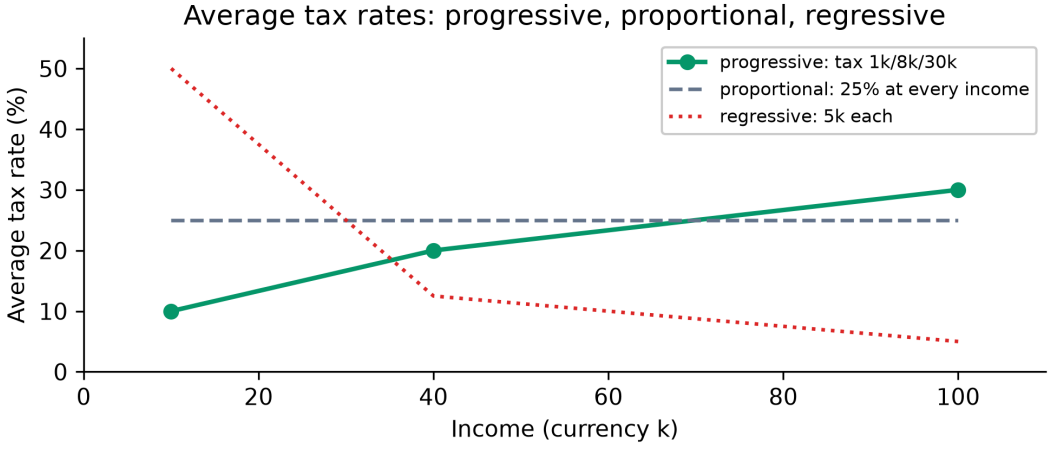
Direct taxes 直接税 fall on income and wealth: income tax, corporation tax, inheritance tax. **Indirect taxes** 间接税 fall on spending: VAT (13% standard rate in China), excise duties on fuel, alcohol and tobacco. A tax system can be:

- **progressive** 累进税: the average tax rate rises as income rises. China's income tax rises in bands from 3% to 45%;
- **proportional** 比例税: everyone pays the same share of income;
- **regressive** 累退税: the average rate falls as income rises. Taxes on tobacco take a bigger share of a poor smoker's income than of a rich smoker's.

Worked example: classifying taxes.

Income	Tax paid (scheme X)	Average rate	Tax paid (scheme Y)	Average rate
10,000	1,000	10%	5,000	50%
40,000	8,000	20%	5,000	12.5%
100,000	30,000	30%	5,000	5%

Scheme X is progressive: the average rate rises. Scheme Y, a fixed charge of 5,000 on everyone, is strongly regressive, even though everyone pays the same amount. A flat 25% on every income would be proportional.



Average tax rates by income: rising under a progressive scheme, flat under a proportional one, falling under a regressive one.

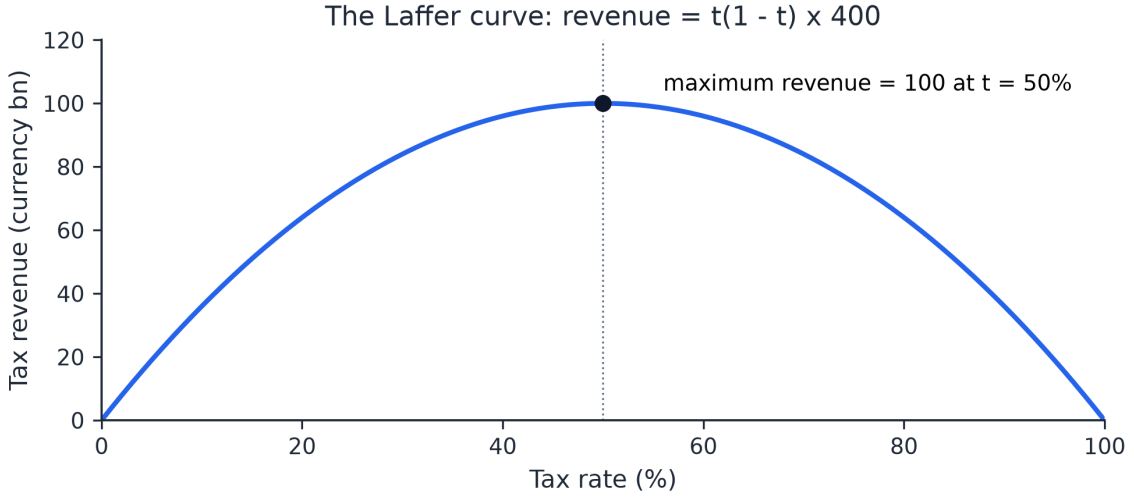
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A change in tax rates affects incentives to work, government revenue, the distribution of income, real output and employment, the price level (indirect taxes raise prices), the trade balance (lower taxes raise spending on imports) and inflows of FDI (low corporation tax attracts TNCs). The **Laffer curve** 拉弗曲线, named after the US economist Arthur Laffer, shows that above some rate a higher tax rate raises less revenue, because people work less, avoid tax or move away.

Worked example: the Laffer model. Suppose revenue $= t(1-t) \times 400$, where t is the tax rate.

- At $t = 0.3$: revenue $= 0.3 \times 0.7 \times 400 = 84$.
- At $t = 0.5$: revenue $= 0.5 \times 0.5 \times 400 = 100$, the maximum.
- At $t = 0.7$: revenue $= 0.7 \times 0.3 \times 400 = 84$.

Raising the rate from 50% to 70% loses 16 of revenue. In practice nobody knows where the peak is. The UK cut its top income-tax rate from 50% to 45% in 2013 partly on evidence that high earners had moved income to avoid the 50% rate.



In the model, revenue $t(1-t) \times 400$ peaks at 100 when the rate is 50%; 30% and 70% raise the same 84.

Borrowing. A **fiscal deficit** 财政赤字 is the gap in one year between government spending and tax revenue. The **national debt** 国债 is the total amount the government owes, built up from past deficits. The deficit is a flow; the debt is a stock. Japan's government debt is about 250% of GDP, the highest among rich countries.

Worked example: debt as a share of GDP. Debt is 900 and GDP is 1,000, so debt is 90% of GDP. Next year the deficit is 50 and nominal GDP grows by 5%. Debt becomes $900 + 50 = 950$ and GDP 1,050: $\frac{950}{1050} \times 100 \approx 90.5\%$. A deficit raises the debt, but faster GDP growth can keep the ratio nearly flat.

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- **Automatic stabilisers** 自动稳定器 change the budget without any decision: in a recession tax revenue falls and benefit spending rises, which supports demand.
- **Discretionary fiscal policy** 相机抉择的财政政策 is a deliberate change in tax rates or spending.
- A **cyclical deficit** 周期性赤字 exists only because the economy is in a downturn and disappears in recovery. A **structural deficit** 结构性赤字 remains even at full employment. If the actual deficit is 5% of GDP and 2 percentage points of it are cyclical, the structural deficit is 3% of GDP.

Deficits and debt grow in recessions, with banking rescues (Ireland's deficit reached 32% of GDP in 2010 after it saved its banks) and as populations age. They matter because of interest rates (heavy borrowing can raise them and crowd out investment), **debt interest** 债务利息 that takes money from schools and hospitals, the country's **credit rating** 信用评级, and **intergenerational equity** 代际公平: borrowing today must be repaid by tomorrow's taxpayers. In 2010 Greece, with debt above 140% of GDP and markets refusing to lend, had to accept rescue loans with deep spending cuts.

Macroeconomic policies and the state

Governments use **fiscal policy**, **monetary policy**, **exchange-rate policy**, **supply-side policies** and **direct controls** 直接管制 (price or wage controls, limits on bank lending) to reduce deficits and debt, control inflation, respond to external shocks and cut poverty and inequality.

The 2008 global financial crisis. Banks failed, credit froze and world output fell in 2009. Governments responded with demand-side policies: the US, UK and others rescued banks; central banks cut interest rates close to zero and began **quantitative easing** 量化宽松; China launched its ¥4 trillion stimulus. During the COVID-19 lockdowns of 2020 the UK went further: its furlough scheme paid 80% of the wages of workers who could not work, up to £2,500 a month.

Controlling TNCs. TNCs can cut their tax bills by **transfer pricing** 转移定价: a subsidiary in a high-tax country buys inputs or brand rights at inflated prices from a subsidiary in a low-tax country, so profits appear where taxes are low. Governments respond with rules that prices between subsidiaries must match market prices, and in 2021 about 136 countries agreed a **global minimum corporate tax** 全球最低企业税 of 15%. The limits: TNCs can move production, and countries compete to attract them.

A policy decided in one place affects others: a US interest-rate rise strengthens the dollar and raises the cost of dollar debts in poor countries. Policymakers also face **inaccurate information** (GDP figures are revised for years), **time lags**, risks and uncertainty, and **external shocks** they cannot control, such as the jump in energy prices after Russia invaded Ukraine in 2022.

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Growth and development

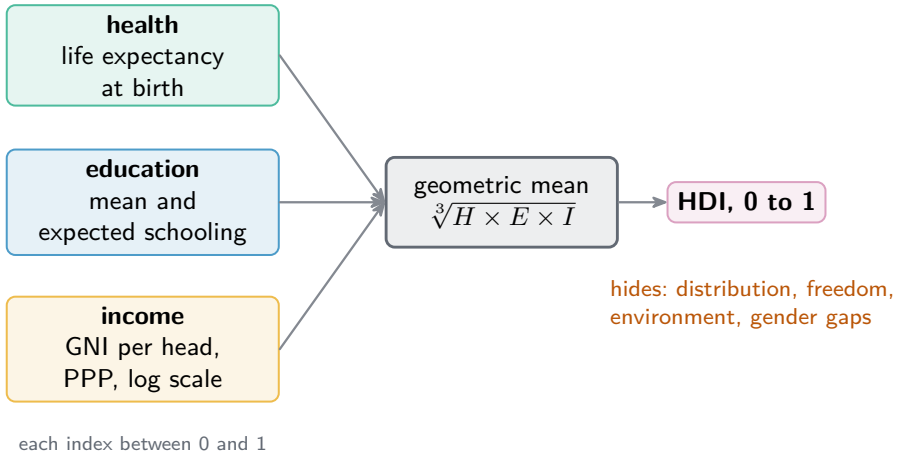
Economic growth is a rise in real GDP. **Economic development** 经济发展 is a wider improvement in people's lives: health, education, freedom and the chance to live a long and decent life. The **Human Development Index** 人类发展指数 (HDI), published by the UN Development Programme since 1990, combines three indices, each between 0 and 1:

- **health**: life expectancy at birth;
- **education**: mean years of schooling of adults and expected years of schooling of children;
- **income**: **GNI per head** 人均国民总收入 at PPP, on a log scale, so each extra dollar counts for less in a rich country.

The HDI is the **geometric mean** 几何平均数 of the three: $\text{HDI} = \sqrt[3]{\text{health} \times \text{education} \times \text{inco}}$ In the 2023/24 report Switzerland ranked first at 0.967; China scored 0.788 and India 0.644.

> **Worked example: why a geometric mean?** A country's health index is 0.90, education 0.70 and income 0.80.

- $\text{HDI} = \sqrt[3]{0.90 \times 0.70 \times 0.80} = \sqrt[3]{0.504} \approx 0.796$.
- The ordinary average would be $\frac{0.90+0.70+0.80}{3} = 0.80$.
- The geometric mean is lower because one weak dimension pulls it down: a country cannot make up for poor schooling with high income.



Health, education and income indices, each between 0 and 1, combine by a geometric mean into the HDI.

The HDI is broader than GDP per head, easy to compare and simple to understand. But it is an average, so it hides inequality; it leaves out political freedom, the environment and gender gaps; and the data for poor countries can be weak. Other measures of development include the share of adult men working in agriculture, the share of

people with clean water, energy use per head, and mobile phones, internet users and doctors per thousand people.



A tomato market in Lagos, Nigeria: growth raises output, development asks whether lives improve.

Economic constraints on growth and development:

- **primary product dependency** 初级产品依赖: copper earns about 70% of Zambia's export revenue, so a price fall cuts its income. By the **Prebisch–Singer hypothesis** 普雷维什-辛格假说, prices of primary products tend to fall over time compared with prices of manufactures, so the terms of trade of commodity exporters worsen;
- **volatile commodity prices**, which make incomes and tax revenue unpredictable;
- the **savings gap** 储蓄缺口: by the **Harrod–Domar model** 哈罗德-多马模型, growth = savings ratio ÷ capital–output ratio, and poor households save little;
- the **foreign currency gap** 外汇缺口: too few exports to pay for imported machines and fuel;
- **capital flight** 资本外逃: the rich move their savings abroad;
- fast population growth, high debt, little access to credit, poor infrastructure, and low levels of education and skills.

Worked example: the savings gap. A country saves 12% of GDP and needs 4 units of capital for each extra unit of output.

- Growth $= \frac{12\%}{4} = 3\%$ a year.
- If the population also grows by 3% a year, GDP per head does not grow at all.
- To grow GDP per head by 2%, GDP must grow by 5%, which needs savings of $5\% \times 4 = 20\%$ of GDP. The gap of 8 percentage points must come from abroad (FDI, aid or loans) or from more saving at home.

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Non-economic constraints: corruption 腐败, poor governance, civil war (South Sudan has been at war for most years since independence in 2011), migration of skilled workers abroad, and terrorism.

Development strategies

Type	Strategies	Real example
market-orientated 市场导向	trade liberalisation, attracting FDI, removing subsidies, privatisation, floating exchange rates, **microfinance** 小额信贷	Shenzhen special economic zone from 1980; Grameen Bank's small loans to poor women in Bangladesh (Nobel Peace Prize 2006)
interventionist 干预主义	spending on education and health, protection of infant industries, managed exchange rates, infrastructure, **joint ventures** 合资企业 with TNCs, **buffer stocks** 缓冲库存	South Korea's state-backed steel, ships and cars in the 1960s–80s; the International Tin Agreement's buffer stock, which collapsed in 1985
other	industrialisation, tourism, developing primary industries, **debt relief** 债务减免, aid	Botswana's diamond-funded growth; the Heavily Indebted Poor Countries debt relief from 1996

The **Lewis dual-sector model** 刘易斯二元经济模型 explains industrialisation. A poor economy has a large farm sector with surplus labour, where extra workers add almost nothing to output, and a small modern sector. Factories can hire workers from the farms at wages a little above farm incomes. Their profits are reinvested, the modern sector grows and draws in more workers, and output per head rises. China's roughly 300 million rural migrant workers are the largest example. The model assumes that surplus labour exists and that profits are reinvested at home rather than sent abroad.

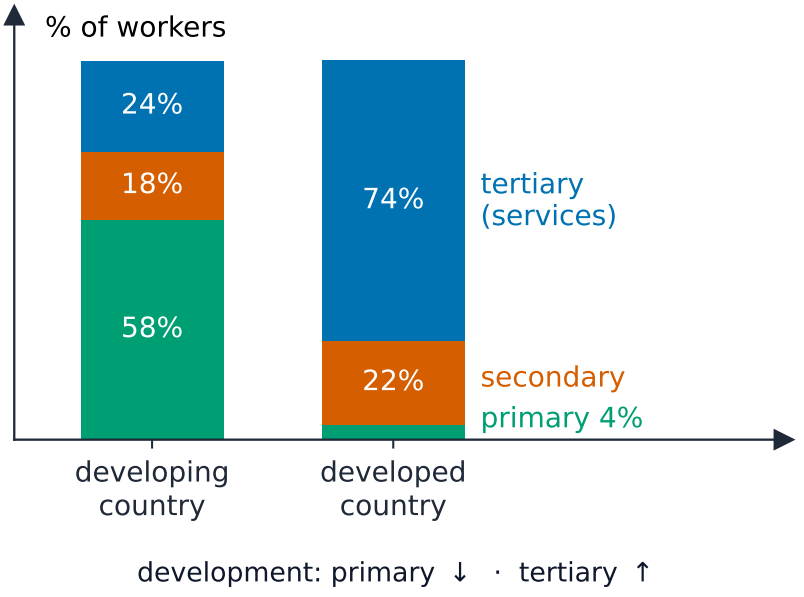
International institutions also act:

- the **World Bank** 世界银行 lends for long-term projects such as roads, power and schools, often at low interest rates;
- the **International Monetary Fund** 国际货币基金组织 (IMF) lends to countries in a balance-of-payments crisis, with **conditionality** 附加条件: the loans come with required policies, such as cutting deficits or floating the currency, as in Egypt's 2024 programme;
- **non-governmental organisations** 非政府组织 (NGOs), such as BRAC in Bangladesh, run local schools, health clinics and small-loan schemes.

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Data-response practice (Section B style)

Extract. Bangladesh has been one of the world's fastest-growing economies since 2000, with real GDP growth often above 6% a year. Ready-made garments earn more than 80% of its export revenue, and the industry employs about four million workers, most of them women who moved from farms to factories in the cities. Extreme poverty has fallen sharply, and life expectancy is now above 70 years. But wages in the garment industry are among the lowest in the world, and in 2013 the collapse of the Rana Plaza factory building killed more than 1,100 workers. In 2026 Bangladesh is due to leave the United Nations' list of Least Developed Countries, which means losing some tariff-free access to markets such as the EU over the following years.



As a country develops, workers shift out of the primary sector and into the secondary and then the tertiary (services) sector.

Questions

- (a) Bangladesh's GDP is about US$450 billion and its population about 173 million. Calculate GDP per head. [2]
- (b) Explain **two** limitations of GDP per head as a measure of development, using the extract. [4]
- (c) Explain, with reference to the Lewis dual-sector model, how the growth of the garment industry has helped to reduce poverty. [6]
- (d) Examine **two** risks of Bangladesh's dependence on garment exports. [8]
- (e) Evaluate the policies Bangladesh could use to keep developing after it loses its Least Developed Country status. [12]

Model answers

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(a) $\frac{450 \text{ billion}}{173 \text{ million}} \approx \$2{,}600$ per head.

(b) **It hides distribution:** an average says nothing about whether garment workers, many on very low wages, share in the growth. **It ignores quality of life and working conditions:** GDP counts the output of unsafe factories in the same way as safe ones; the Rana Plaza deaths and long hours do not lower GDP. (Also: it omits health and education, which the HDI includes, and it is not adjusted for purchasing power unless PPP is used.)

(c) The Lewis model has a large traditional (farming) sector with surplus labour, whose marginal product is close to zero, and a modern (industrial) sector. Factories can hire workers from the farms at a wage only a little above farm incomes. As garment firms grow, workers move to the cities, total output rises, and the profits are reinvested in more factories, so the modern sector keeps expanding. Workers, especially women, earn more than on farms, which reduces poverty and gives them more independence. *Evaluation:* the model assumes profits are reinvested at home and that there is surplus labour; once surplus labour runs out, wages must rise.

(d) **Demand and price risk:** if world demand for clothes falls (a recession in the EU or US) or buyers move orders to cheaper countries, export revenue and jobs fall sharply, because there is little else to export. **Loss of preferential access:** leaving the Least Developed Country list means facing tariffs in some markets, which raises prices for buyers and could cut orders. Also: automation could replace low-wage sewing jobs. *Evaluation:* the risks are smaller if firms move into higher-value products and if Bangladesh signs new trade agreements.

(e) *Diversification:* developing new export industries (electronics, pharmaceuticals, food processing) reduces dependence on garments. This needs infrastructure (ports, power, roads) and skills, which take time and money.

Human capital: more spending on education and health raises productivity and lets workers move into higher-paid jobs, and it improves the HDI directly. The returns come over many years.

Trade agreements and FDI: negotiating free-trade agreements can replace lost tariff-free access; attracting foreign direct investment brings capital and technology. But foreign firms may repatriate profits and look for the cheapest place to produce.

Better working conditions and higher wages: safer factories and minimum wages protect workers and meet buyers' demands for responsible supply chains, but too fast a rise in costs may move orders to other countries.

Judgement: the most important policies are diversification and human capital, because they reduce the main risk (one export) and raise long-run productivity. In the short run, trade agreements to keep market access are urgent. The best mix depends on how fast tariffs change after 2026 and on whether Bangladesh can fund infrastructure without excessive debt.

What examiners reward: a GDP-per-head calculation with units, limitations linked to the extract, a correct explanation of the Lewis model with its assumptions, examined

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risks, and a judgement that ranks policies by time scale.

Sources for this lesson

- World Bank, *June 2025 Update to the Poverty and Inequality Platform* (the 3.00-dollar line at 2021 PPP), and Poverty and Inequality Platform data.
- State Council Information Office, *Poverty Alleviation: China's Experience and Contribution* (April 2021); National Bureau of Statistics of China, Gini coefficients and migrant-worker monitoring report.
- UNDP, *Human Development Report 2023/2024*.
- S. Kuznets, "Economic Growth and Income Inequality", *American Economic Review* 45 (1955); W. A. Lewis, "Economic Development with Unlimited Supplies of Labour" (1954).
- OECD, statement on the two-pillar solution to the tax challenges of the digitalisation of the economy (October 2021).
- IMF, World Economic Outlook and Fiscal Monitor databases (government spending and debt).
- Pearson Edexcel International A Level Economics specification (WEC14), Issue 2, sections 4.3.4–4.3.6.

Common errors

- Saying poverty has fallen when only absolute poverty has. Relative poverty can rise while everyone gets richer.
- Mixing up wealth (a stock of assets) and income (a flow).
- Reading a higher Gini as more equal. A higher Gini means more inequality.
- Calling a tax progressive because the rich pay more money. Look at the average rate, not the amount.
- Confusing the deficit (one year's gap) with the debt (the total owed).
- Treating the HDI as a full measure of development. It leaves out distribution, freedom and the environment.
- Describing the Lewis model without its assumptions: surplus farm labour and profits reinvested at home.

Key terms

- **Absolute / relative poverty**: unable to meet basic needs / poor compared with the society's median.
- **Lorenz curve**: cumulative share of income against cumulative share of households.
- **Gini coefficient**: area between the line of equality and the Lorenz curve ÷ area below the line of equality.

- **Progressive / proportional / regressive tax**: average rate rises / stays the same / falls as income rises.
- **Laffer curve**: tax revenue first rises and then falls as the tax rate rises.
- **Fiscal deficit / national debt**: one year's excess of spending over revenue / total government debt.
- **Structural / cyclical deficit**: a deficit that remains at full employment / one caused by a downturn.
- **HDI**: geometric mean of health, education and income indices.
- **Primary product dependency**: relying on a few raw materials for export earnings.
- **Conditionality**: policies a country must adopt to receive an IMF or World Bank loan.

Check yourself

1. Median income rises from 25,000 to 35,000. By how much does a relative poverty line at 60% of the median rise?
2. The poorest 50% of households receive 20% of income and the richest 50% receive 80%. Using two strips, calculate the Gini coefficient.
3. Taxes of 2,000, 6,000 and 10,000 are paid on incomes of 10,000, 40,000 and 100,000. Is the tax progressive, proportional or regressive?
4. On the Laffer model revenue $= t(1-t) \times 400$, what revenue does a 20% rate raise?
5. The actual deficit is 6% of GDP; the structural deficit is 4%. What is the cyclical deficit, and what happens to it in a recovery?
6. A country's health, education and income indices are each 0.64. Calculate its HDI, and explain why a country with indices 0.95, 0.40 and 0.64 scores lower.

Answers: 1. From 15,000 to 21,000: a rise of 6,000. 2. Area under the curve $= \frac{0+20}{2} \times 50 + \frac{20+100}{2} \times 50 = 500 + 3000 = 3500$; Gini $= \frac{5000-3500}{5000} = 0.30$. 3. Regressive: the average rates are 20%, 15% and 10%. 4. $0.2 \times 0.8 \times 400 = 64$. 5. 2% of GDP; it shrinks and disappears as tax revenue rises and benefit spending falls. 6. $\sqrt[3]{0.64^3} = 0.64$; $\sqrt[3]{0.95 \times 0.40 \times 0.64} = \sqrt[3]{0.2432} \approx 0.62$, lower because the geometric mean punishes the weak education index more than the high health index makes up.

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